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

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# Improving Transnational Transport Corridors In the OIC Member Countries: Concepts and Cases




**COMCEC COORDINATION OFFICE**
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## List of Abbreviations

AADT: Annual Average Daily Traffic
ACSC: Azerbaijan Caspian Shipping Company
ADB: Asian Development Bank
AfDB: African Development Bank
BCP: Border Crossing Point
CAREC: Central Asia Regional Economic Cooperation
CBTA : Cross-Border Transport Agreement
CIS: Commonwealth of Independent States
CPI: Corruption Perceptions Index
DPC: Document Processing Centre
EAC : East African Community
EBRD: European Bank for Reconstruction and Development
ECOTA: Economic Cooperation Organization Trade Agreement
EEU: Eurasian Economic Union
EODB: Ease of doing business
EU: European Union
FFFAI: Federation of Freight Forwarders Association in India
FTA: Free Trade Agreements
HCR: Headcount Ratio
HDI: Human Development Index
IFIs: International Financial Institutions
IMF: International Monetary Fund
IRU: International Road Transport Union
IsDB: Islamic Development Bank
ITS: Intelligent Transport System
JICA: Japanese International Cooperation Agency
KPI: Key Performance Index
LLC: Land Locked Country
LPG: Liquid Petroleum Gas
LPI: Logistics Performance Index
MCA: Multi Criteria Analysis
MENA: Middle East and North African
MoU: Memorandum of Understanding
NCTA: Northern Corridor Transit Agreement
NCTTCA: Northern Corridor Transit and Transport Coordination Authority
Nm: Nautical miles
NSW: National Single Window
NTB: Non Tariff Barrier

NTTC: Northern Transit Transport Corridor
OBOR: One-Belt One-Road initiative
OI: Openness Index
OSC: One Stop Centre
OSBP: One-stop Border Post
OSC: One Stop Centre
PMO: Ports & Maritime Organization
RIDMP: Regional Infrastructure Development Master Plan
SCT: Single Customs Territory
SDG: Sustainable Development Goal
SEZ: Special Economic Zone
SGMS: Agreement on International Goods Transport by Rail
SSATP: Sub Saharan African Transport Program
TAH: Trans-African Highway
TAPs: Technical Assistance Projects
TCITR: Trans-Caspian International Transport Route
TENT-T: Trans-European Networks for Transport
TEU: Twenty Foot Equivalent Unit
TRACECA (Transport Corridor Europe-Caucasus-Asia)
TIR: *Transports Internationaux Routiers* (or International Road Transports)
UNDP: United Nations Development Program

## Executive Summary

This study investigates the latest trends related to transnational transport corridors in the OIC geography, identifies the common challenges these corridors are facing and proposes recommendations for enhancing effective and efficient transnational transport corridors. The ultimate aim of the study is to raise awareness of transnational transport corridors among the OIC Member States as well as to trigger a serious debate around the issues identified and how to address them.

Within the OIC geography, there are more than 100 transport routes dispersed over Arab, Asia, and Africa regions. It should be noted that not all of these transport routes are transport corridors. Transport corridors should meet the criteria of a multi modal transport corridor that facilitates trade. Transport corridors are denoted as such because, among others, (1) they are subject to an international treaty between countries that call it such, (2) there are common technical and operations standards, (3) the traffic is mostly international, and (4) the operating standards are usually higher than "ordinary" transport routes.

The literature review and analyses conducted for this study were based on a framework of seven subject areas, in order to better understand the lessons learned from the best practices, and at the same time to identify the main challenges faced by the transport corridors outside the OIC geography. The seven areas of the framework, which were used as a basis for the entire report, are: (1) political and institutional factors, (2) economic factors, (3) trade facilitation, (4) social factors, (5) safety, security and legal liability, (6) technical and operational factors, and (7) environmental and energy factors. An in-depth investigation of the different aspects of each area was given for transport corridors outside and within the OIC geography.

In addition three corridors were visited (TRACECA, INSTC, and TAH1), for which a detailed analysis of the findings is provided. Additional in-depth analyses were conducted for CAREC corridor 3, Northern Corridor, and Mashreq North-South Corridor. The performance of these six corridors were assessed using a Multi Criteria Analysis in which 11 corridor experts assigned weights to the seven framework areas. TRACECA performs the best among the case study corridors, followed by CAREC. Their mature and well established secretariats clearly play an important role. This finding also supports one of the study findings that Asian region performs best among the three OIC regions. Should a prioritization be made, for example to disperse funding, the order should be: 1) Middle East; 2) Africa; and 3) Asia.

It is clear that political and institutional factors are the most important factors when it comes to OIC transport corridors. In terms of political factors, political tensions and crises take place in many OIC member states. As a result, trade restrictions and discriminations are often applied to one or more corridor countries. These reduce transport efficiencies, increase transportation costs and consequently decrease the competitiveness of the goods. In terms of institutional factors, the OIC transport corridors either lack of good governance or do not have governance.

In terms of trade facilitation area, the OIC transport corridors are characterized by many non-physical barriers such as unofficial payments (corruption) and cumbersome border crossing. Low intra trade is also characterizing the OIC transport corridors. The average is less than 10% of the total trade, while this figure is 50-60% in the EU where many successful transport corridors are situated.

In terms of internal security and especially legal liability, especially with respect to liability for damage, theft, and other causes of loss, is not yet well developed in the OIC transport corridors. As such, commercial risks and insurance premiums are high, and consequently so are trading costs. This situation partly explains why the OIC corridor countries trade mainly with Europe and the rest of the world (where legal liabilities are more advanced) than with the neighboring countries.

A common characteristic of OIC transport corridors in terms of technical and operational factors, is a significant shortage and underutilized of rail infrastructure. Low interoperability and lack of interconnections are the main challenges, although these are not only the domains of the OIC corridors. Several TEN-T corridors are still facing road and rail interoperability issues.

Environmental and energy efficiency issues are almost absent in the OIC transport corridor development, most likely due to wide availability of oil. Whilst oil remains affordable, alternative fuels are viewed as expensive and unnecessary.

Following the findings of the study, the key recommendations for improving the transport corridors in the OIC geography are summarized as follows:

| Framework area | Key actions |
|---|---|
| Political and institutional factors | • Transforming transport routes to transport corridors with a corridor secretariat<br>• Develop a Corridor Treaty template for members to use or benchmark with.<br>• Corridor secretariat to disseminate the positive impacts of successful corridors in order to promote political integration |
| Economic factors | • Promoting simplification of business processes among member states |
| Trade Facilitation | • Reviewing the existing trade agreements to determine the incorporation of relevant elements to remove non-physical barriers to trade<br>• Stimulate intra-trade along corridors<br>• Increasing the efficiency of customs inspection by improving risk management techniques, green channeling, encouraging an advance manifest, etc.<br>• Developing an efficient trade statistic collection system<br>• Promoting electronic single window facilities |
| Social factors | • Facilitating common passport |
| Safety, security and legal liability | • Developing a data collection system related to fatalities along the corridors |
| Technical and operational factors | • Improving road conditions<br>• Improving rail interoperability |
| Environmental and energy factors | • Promoting intermodal transport<br>• Improving logistics organization, coordination, and corridor route planning |

# 1. Introduction

## 1.1. Scope and Description of the Study

There has been a growing interest on developing transnational transport corridors globally. A transport corridor plays an important role in facilitating trade and movement to promote economic growth across a region and enhance political and regional integration. However, not all transport corridor initiatives are successful in addressing these objectives. The success of a transport corridor depends on many factors, mainly the existence and performance of corridor management and trade and transport facilitation initiatives. The corridor management refers to an organization established by diverse actors including the government and the private sector. Trade and transport facilitation refers mainly to trade development between the member states in the corridor, non-physical barriers to trade, customs harmonization, and border operations.

With more than 1.7 billion population, OIC Member States account for more than 23% of world population. OIC countries have a relatively high and growing market potential. Much of the increase in the market potential of OIC countries is also due to the increase in intra-OIC market potential[1].

COMCEC has clearly recognized the fundamental role of effective and efficient transport corridors in the OIC regions to facilitate movements of passengers and freight among the Member States. Therefore, the CCO conducted a research on "Improving Transnational Transport Corridors in OIC Member States: Concept and Cases" with the following objectives:

- To identify the basic concepts of (transnational) transport corridors, its role in enhancing trade and factors affecting its success.
- To investigate the major and successful transport corridors outside the OIC geography in order to provide benchmarks for the OIC regions.
- To describe the general situation related to corridor studies in the OIC Member Countries and to analyze the selected six transport corridors in the OIC Member Countries as a case study in detail.
- To propose recommendations for enhancing effective and efficient transnational transport corridors among OIC member states.

The ultimate aim of the study is to raise awareness of transnational transport corridors among the OIC Member Countries as well as to trigger a serious debate around the issues identified and how to address them.

[1] OIC-SESRIC (2016), SESRIC staff calculations based on World Governance Indicators of the World Bank.

## 1.2. Background to Work Undertaken

A literature review, including desk research of transnational transport corridors in both OIC and non-OIC regions has been undertaken based on available documents. The review examined not only problems and challenges but also success factors with regard to transnational transport corridors. The literature review is structured in the following framework areas: 1) general factors, 2) political and institutional factors, 3) economic factors, 4) trade facilitation, 5) social factors, 6) safety, security and the legal liability, 7) technical and operational factors, 8) environmental and energy factors, and 9) corridor performance evaluation criteria.

These framework areas are also used as criteria to assess the performance of the six case study corridors (two case studies for each OIC regions: Arab, Asia, and Africa). A Multi Criteria Analysis is conducted; involving 10 corridor experts that have assigned weights to these criteria.

# 2. Conceptual Framework for Transnational Transport Corridors

## 2.1. Introduction

Undertaking a literature review is a fundamental step in the research process that enables the status quo of the issue/s to be understood and the main dependent and independent variable or parameters to be identified. There is an underlying hypothesis to the study that *international trade and travel if organized in a systematic way along specific routes and networks will be more successful than a more random approach.*

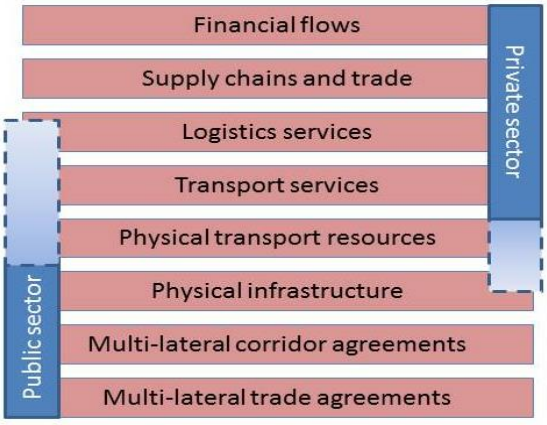
The following two sections take a holistic perspective on multinational transport corridors. The following sections focus on political, economic, social, safety and security, technical and operational as well as environmental aspects respectively. The final section puts the chapter together discussing how corridor performance is monitored and evaluated.

## 2.2. Main Concepts and Definitions

Corridors are lines of concentration of socio economic activity that connect two or more sovereign countries. Multi-national transport corridors are viewed in a context of agreements between states facilitating trade through infrastructure investments and development of commercial services for moving freight.

The public sector generally takes a large interest in the transport system as part of developing the society and because transport activities build on economies of scale requiring shared resources, and that traffic affects also non-users resulting in potentially conflicting goals. Besides the obvious role of supplying infrastructure, there is often a large share of public ownership in firms supplying transport services. It is most pertinent in passenger transport over short distances, but also railways, airlines, forwarders and postal services have a long tradition of state ownership. Figure 1 below shows how multi-lateral corridor agreements fit into different layers of economic activity.

**Figure 1: Multi-lateral corridor agreements in a public and private sector context**

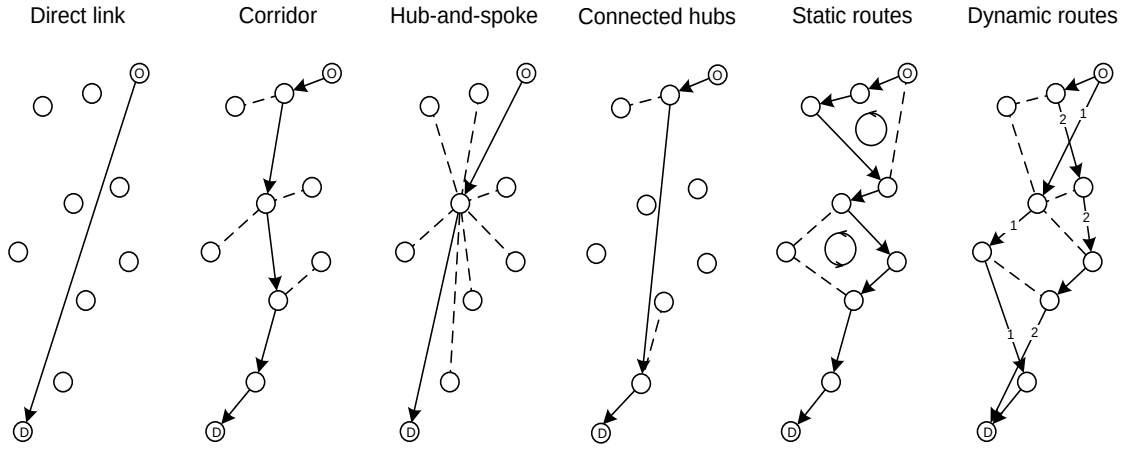



*Source: Fimotions (2017).*

As infrastructure is generally paid for by national states, there are economic and political incentives to connect the capital with other cities in the country implying that the network is dense in the heart of the country, but less dense closer to the borders to other countries. This is strengthened by the fact that infrastructure is often built for passenger transport rather than freight motivated by travel time savings and that passengers vote, while freight does not. Multi-national corridor agreements are thus needed for international trade to work and joint investments focus the bottle-necks between states rather than the main domestic routes.

In transport network theory, a corridor is only one way of connecting an origin (O) to a destination (D). Figure 2 shows different ways of using links to connect an O with a D using different nodes.

**Figure 2: Six options for transport from an origin (O) to a destination (D) in a network**




*Source: Woxenius (2007).*

The transport corridor is a design based on using a high-density flow along an artery and short capillary services to nodes of the corridor. The nodes are thus hierarchically ordered. In this example, O is a satellite node, and D is a corridor node. Corridors often origin in concentrations of population and industry in linear belts with natural resources or fertile soil, or in the supply of natural infrastructures like rivers. Nevertheless, also man-made canals, older roads and rail trunk lines have over time fostered conurbations along the line (Priemus and Zonneveld, 2003) sometimes going back to antiquity, as described by Schönharting et al. (2003). The traffic modes are often poorly integrated along corridors (Priemus and Zonneveld, 2003) but Rodrigue (2004) identifies that the fragmentation stemming from intramodal competition is being reduced and is now replaced by terms like co-modality and synchromodality (Woxenius et al., 2017) emphasizing modal complementary along corridors aiming at efficient transfer of goods.

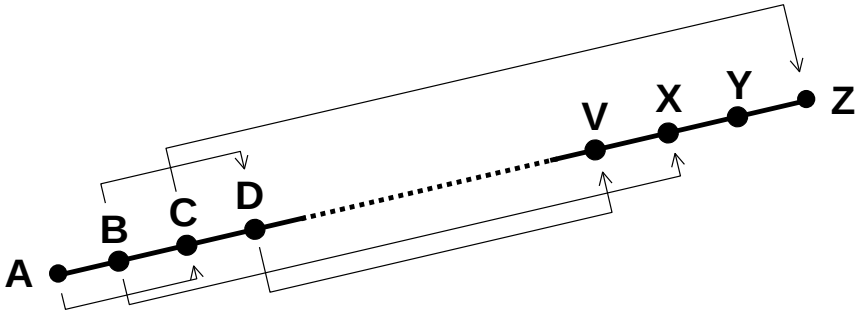
Some geographically long and narrow countries such as Japan and Italy have developed domestic infrastructure corridors (Woxenius, 1998) and large countries like China and the USA have domestic corridor-based transport networks at par with multi-national transport corridors in regions with smaller countries. An example in the USA is the Dwight D.

Eisenhower National System of Interstate and Defense Highways, also referred to as the Interstate Highway System. Examples of particular mega-corridors are found along the Japanese east coast (Perl and Goetz, 2015), the BostWash corridor in the USA (Rodrigue, 2004), the Rhein-Ruhr-Randstadt/Flemish diamond corridor in Western Europe (Schönharting et al., 2003) and the West Midlands to London corridor in the UK, which Chapman et al. (2003) denotes a complex area of 'braided' infrastructure. Economic development along the corridor often resulted in substantial urbanization and congestion, which has led to some reluctance to actively develop corridors (de Vries and Priemus, 2003) and sometimes even unwillingness by spatial planners (Priemus and Zonneveld, 2003).

A typical application of the corridor design in a national setting is the intercity passenger trains with stops along the line. For geographical reasons, freight traffic with barges on inland waterways, as investigated by Al Enezy et al. (2017), utilizes the corridor design, while the US structure with Class I railroads, cooperating with feeder short lines, represents a rail freight application.

Multinational corridors are sometimes intended to move freight from end-points, but there is often enough demand for direct links and often also for using alternative routes or modes. One example is that land transport corridors connecting East Asia with Europe, where shipping and partly air will dominate for many years. More importantly, the corridors can develop the intermediate areas by improved connectivity, access to large markets via the corridor or by deep sea shipping access for land-locked countries. Hence, a corridor differs from a culvert or tunnel by the presence of "doors" that leads to new opportunities. Figure 3 shows how freight can follow the corridor for different distances.

**Figure 3: Example of a corridor with intermediate terminals and some alternative transport arrangements**




*Source: Woxenius (1998)*

The corridor concept is also used for development of transport systems with less focus on a linear geography. One example is the EU project Swiftly Green with a Corridor Development Plan (CLOSER, 2015) that brings up different initiatives along a corridor between Sweden and Italy including very local initiatives in terminals along the corridor, but also in a rather wide region around the corridor.

## 2.3. General factors

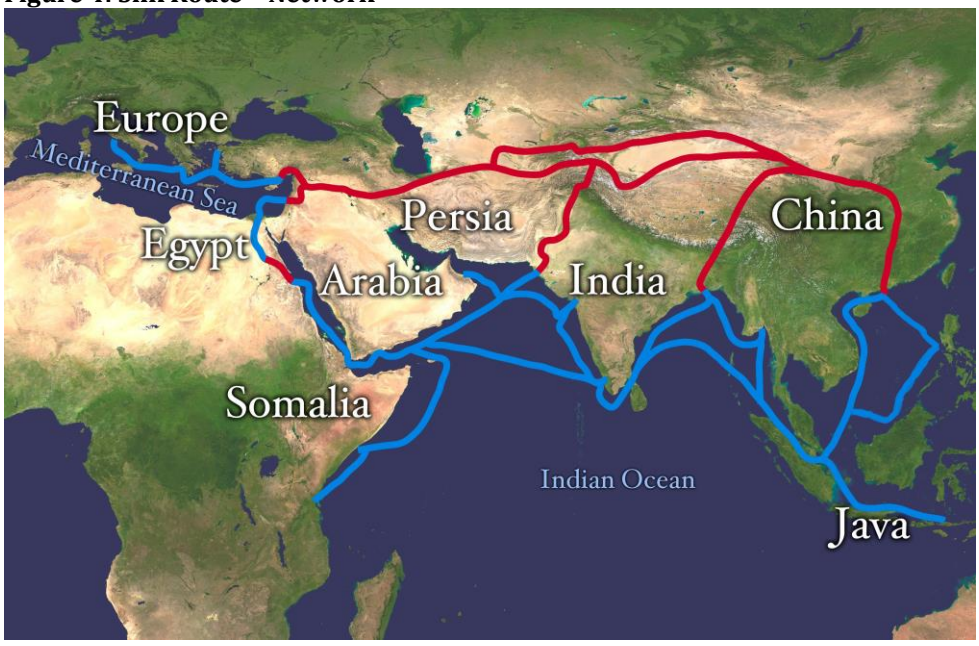
To establish a conceptual foundation of the transnational transport corridors in OIC member states in line with the overall objective of the study, necessitates a general appreciation of the issues that drive the formation of transport corridors and a discussion on whether the issues mostly economic, political or cultural.

One of the oldest examples of transport corridors is the Silk Road or Silk Route, which was an ancient network of trade routes that were for centuries central to cultural interaction through regions of the Asian continent connecting the East and West and stretching from the Korean peninsula and Japan to the Mediterranean Sea.

It is important that the historic role of the Silk Road is seen in economic and cultural terms. The main traders during antiquity included the Chinese, Arabs, Turkmens, Indians, Persian, Somalis, Greeks, Syrians, Romans, Georgians, and Koreans (Khyade, 2012). Trade on the Silk Road played a significant role in the development of the civilizations of China, the Goguryeo kingdom (now called Korea), Japan, the Indian Subcontinent, Persia, Europe, the Horn of Africa and Arabia, opening long-distance political and economic relations between the civilizations. The ancient route, which operated for 1700 years, gave rise to new cities along its path, many of which have become famous contemporary centers of religions and culture.

Though silk was certainly the major trade item exported from China, many other goods were traded, and religions, syncretic philosophies, various technologies and diseases, most notably the plague, also spread along the Silk Road. In addition to economic trade, the Silk Road was a route for cultural trade among the civilizations along its network (Christian, 2000). The Silk Road encapsulates almost everything that is diagnostic of a contemporary transport corridor, many countries, moving trade and spreading culture. Yet looking at the map of the silk route Figure 4, one can see that it is more of an international network than a narrow route that simply contains two or more modes of transport as is commonly defined today.

**Figure 4: Silk Route – Network**




***Source: Wikipedia (2017).***

An imperative is to define what a transport corridor actually is and surprisingly the definitions are rather few and somewhat limited. One is that a transport corridor is "*generally linear area that is defined by one or more modes of transportation like highways or public transit which share a common course. Development often occurs around transportation corridors because they carry so many people, creating linear agglomerations like the New York Strip or the linear form of many neighborhood retail areas*"[2]. Such a definition is clearly very narrow when compared to the immensity and diversity of the silk route, the contemporary version of which is TRACECA.

Many observers believed that the TRACECA was much more of a mode of political influence, than one of trade or transport. TRACECA was the medium thought which the European Union intended to extend its dialogue with the New Independent States (NIS) of the former USSR (Nuriyev, 2008, Dekanozishvili, 2004, Burkhanov, 2007). Consequently, the definition of a transport corridor depends on its objectives. If mostly political, then expect the corridor to become an almost nebulous network of routes that merely has a common geographical orientation. But if the corridor has economic objectives then expect it to be of a much narrower format offering traders and travellers the shortest and least costly alternative.

One of the modern complexities of contemporary corridor development is the influence of international funding agencies, commonly known as IFIs, like the World Bank, the Asian Development Bank and the European Union, If these erstwhile bodies find it administratively expedient to disperse funding to regions or corridors in preference to individual countries

[2] https://www.revolvy.com/main/index.php?s=Transportation%20corridor&item_type=topic

(Schiff and Winters, 2002), then it is clear that IFIs have a considerable influence on the regionalization agenda, of which corridor development is very often a component. This would have the effect that countries seeking funding largesse will comply and set up a corridor, complete with a secretariat and an investment plan. The IFIs generally make it clear to its client / partners that investment will be prioritized to those projects that are located within the corridor rather than other national projects. Emerson and Vinokurov (2009) commented on massive budgets that have been allocated to the Europe West China Project for example. The response is for nations to add various variations and deviations to the main route to comply with funding eligibility. Funding agencies are usually accommodating because of the pressure that their operations are to disperse the funding that has been allocated. This leads to the creation of complex international networks, rather than a straightforward single road / rail corridor. This can be observed by looking at one of the oldest set of transport corridors, those of the Trans European Networks for Transport (TEN-T).

The TEN-T are a planned set of roads, railways, airports and canals in the European Union. It aims at removing bottlenecks, upgrade infrastructure and streamline cross border transport operations for passengers and businesses throughout the EU. It will improve connections between different modes of transport and contribute to the EU's climate change objectives.

Core network corridors (CNC) were introduced to facilitate the coordinated implementation of the core transport network and European Corridor Coordinators were appointed to secure an effective and efficient development. Each Coordinator has to draw up a work plan, which guides the development of the corridors in the short and longer term and by that establishes the basis for actions until 2030.

Thus, another perhaps less obvious objective to the formation of corridors, is to attract more funding from IFIs.

Of the 196 countries in the world 48 are land locked. The need for land locked countries to be connected to the sea for trade is an imperative that transport corridors satisfy. As stated by Faye et al. (2004), landlocked countries often lag behind their maritime neighbors in overall development and external trade. While the relatively poor performance of many landlocked countries can be attributed to distance from coast, the researcher argues that several aspects of dependence on transit neighbors are also important. Usefully for this assignment, Faye et al. (2004) discuss four such types of dependence: 1) dependence on neighbors' infrastructure; 2) dependence on sound cross-border political relations; 3) dependence on neighbors' peace and stability; and 4) dependence on neighbors' administrative practices.

Transport corridors are mostly certainly advantageous to land locked countries, Arvis (2011) notes that the logistics performance indices (World Bank, 2016) for land locked countries is usually lower than maritime countries and the existence of transport corridors makes a significant difference to price and time. The World Bank explains that the main sources of costs are not only physical constraints but widespread rent activities and severe flaws in the implementation of the transit systems, which prevent the emergence of reliable logistics

services[3]. It can be added that rent seeking is obtaining economic gain from others without reciprocating any benefits to society through wealth creation. In the case of transit corridors, developers exploit the ease of access raise property prices without returning any net value added. Furthermore, unplanned and ad-hoc development along transport corridors actually undermines their integrity as a through route, converting them, in some cases, into no more than urban roads.

Transport corridor development in many cases is either a part of a process of regionalization or a precursor to it. Transport corridors in Southern Africa (Teravaninthorn and Raballand, 2009), South Asia (Su, 2012) or Europe (Notteboom, 2010), are very much a part of promoting cohesion between its protagonists. The key to the success of transport corridor development and regionalization is harmonization of regulations and or deepening socio economic integration (Kessides, 2012, Monios, 2016). The main components of a transport corridor are typically a gateway port, hinterland road and rail networks, inland ports or dry ports and border controls. In addition to land corridors there are also sea corridors, especially short sea "bridge substitutes" (Woxenius, 2012) and aviation corridors as well. Invariably all transport modes follow a similar orientation and serve the principle conurbations within its tract.

As shown, various modes of transport serve a single corridor. Because of this, it is vital that freight is unitized and transferable between modes to take advantage of the most efficient type of transport. This is normally road for distances of up to 500-700 km and rail beyond that. The container has over the last 30 years become the main vehicle in this process and the term defining the use of several modes by the same loading unit is known as intermodal transport (Woxenius, 1998). Two important intermodal transport corridors linking North-East and Central Asia namely: Korea–China–Central Asia; and Korea–China–Mongolia–Russian Federation uses maritime, road and rail modes for the transportation of goods and were studied by (Regmi and Hanaoka, 2012), who made recommendations to improve physical infrastructure and minimize non-physical barriers to enhance operational efficiency of the intermodal transport corridors are offered which can be useful for other countries and parts of Asia.

## 2.4. Political and Institutional Factors

There is an undoubted link between transport and development and more essentially between regional transport and regional development that includes also integration. Yet, assuming that the development of transport networks *per se* will drive development is simplistic and this is increasingly understood. Building a transport corridor and expecting that development will automatically follow is probably not going to be the way it works. Much more likely is that the transport corridor linking places may possibly become the nexus of a set of advantages in terms of accessibility that will lead to further positive feedback. This process, also known as

[3] https://openknowledge.worldbank.org/handle/10986/7420?show=full

circular and cumulative causation[4] gives rise to the idea that growth is focused on corridors linking places that are a highly interactive[5]. That there needs to be a common set of goals around which there could be political adhesion is prerequisite. In some cases, it may be driven by land locked countries demanding secure trade routes, in others it may be economic and social cohesion as in the European Union, but a driver for political integration is prerequisite. That transport and also energy and environment are seen as transnational issues that have the potential to unite different territories, has emerged in the last 40 years. As regards transport, the corridor approach has been particularly useful in drawing together contiguous countries. The modus operandi nearly always follows a pattern of memorandum of understanding which sets out a range of commonly share objectives, which have no legal force; to an international treaty that commits governments to a range of economic, financial and legal obligations that require domestic ratification. Always an essential component of this process is the creation of a transport corridor coordinating entity.

Thus, it is clear that a prime motive for corridor development may be political rather than economic. This can be seen in some former communist countries, and along the TRACECA, which Russia has more than hinted, has become a means for EU expansionism (Demirag, 2004, Burkhanov, 2007). Corridors have also been developed for military and strategic purposes rather than economic. An example of this is the Moscow-Berlin axis. This heavy haul railway and four-lane highway provided the Red Army with a transport chain. The extra spacing between the broad gauge rail tracks accommodated the movement of tanks and artillery. Indeed, historians may argue it was to counter Napoleonic and Hitleresque escapades into Mother Russia. Now renamed and, some may say, rebranded, the TEN T Corridor II or the East Wind Container Corridor, may now have more economic than strategic objectives (Emerson and Vinokurov, 2009). It can be noted that China's foray into the world of rail corridor building, may also be partly driven political motives (Wang et al., 2009) and may been seen as vectors of Chinese intensions (Garver, 2006).

The ownership of transport corridor assets also warrants some consideration here. Invariably, within a corridor group, there will be varying levels of economic development, so it is expected that foreign direct investment (FDI) flows along the corridor in tandem with trade and transport. It should be possible, as it is in the EU, for third countries to own transport assets, without difficulty. The overriding criteria for the successful transport corridor is that of providing unimpeded access to good and services, including transport, whether it be state owned infrastructure such as major highways or ports which may be owned by a municipality. With this in place, corridor development may be realized by both public and private sector.

[4] Circular cumulative causation is a theory developed by Swedish economist Gunnar Myrdal in the year 1956. It is a multi-causal approach where the core variables and their linkages are delineated. The idea behind it is that a change in one form of an institution will lead to successive changes in other institutions.

[5] https://www.researchgate.net/post/Are_transportation_corridors_the_best_solution_to_regional_economic_development_especially_in_the_developing_countries [accessed Jun 9, 2017].

## 2.5. Economic Factors

### 2.5.1. Corridors, trade and economics

Between transport corridors and trade there is a mutual relation, fostering each other. They are connected in the same way as the connection between economics and infrastructure.

According to (Rietveld and Bruinsma, 1998) in the introduction of their book, economic development is the result of transport infrastructure. It leads to increased productivity, lower transport costs, affects trade relationships and the location of production factors. According to Banister and Berechman (2001) if investment political and institutional conditions are met, beneficial economic development will take place. (COMCEC, 2016) equally points at the interaction between economics and transportation. “As most of the transportation textbooks underline, transportation is a derived demand. People use transportation services to go work, to visit their relatives and friends, to go shopping, etc. That is why, the change in the transportation activities can be used as a proxy for changes in overall economic activities. The rise in the container traffic, for example, is a perfect indicator of the growth in the trade and manufacturing industry. On the other hand, the change in the air passenger traffic can reveal how some high-tech and service based industries, which rely more on air travel, are performing.”

Economic theory of international trade started with David Ricardo's theory of comparative advantage. It says that trade between two entities is based on comparative advantages. About one century later Eli Heckscher and Bertil Ohlin (Gandolfo, 2014) analyzed that trade between two entities is based on comparative advantages and factor endowments of the production factors, being labor, land and capital. A country will export products that use its abundant and cheap factor of production. This country will equally tend to import products that use the countries' scarce and dear factor(s).

Illustrative is the so-called flying geese effect (Carruthers, 2003), that occurred between 1960 and 1990 in East Asia. This is the effect of a rapid expansion of the industrial complex combined with a strong focus on international trade (Akamatsu, 1962), leading to a steep increase in economic growth, slowing down at a very high (>10% p.a.) economic growth rate . In East Asia, the first wave of growth was in Japan, followed by a second wave of the "Four Tigers" - Hong Kong, the Republic of Korea, Singapore, and Taiwan. The third wave occurred in Indonesia, Malaysia, and Thailand. Followed by the transition economies of China and Vietnam. The first wave triggered the next one because Japan needed additional production capacity to meet the high demand for its products, leading to outsourcing. This led to economic growth in the economies around Japan, and the effect repeated and spread further on. Trade and economic development went hand in hand (Mascelluti, 2015), and were followed by institutional, political and technological changes. (Joshua, 2017) highlights the importance of international trade to the Chinese economy. Carruthers (2003) distinguishes:

- Outward oriented highly accessible countries, having higher incomes, high technology and services based economies, high transport volumes and competitive logistics costs;

- Outward oriented accessible countries, who are in early stage of designing national policies and institutional structures that encourage multi-modal transport services, causing long transport times and high transportation costs;
- Less open and accessible countries, low income countries depending on a small number of commodities, poor roads lead to transportation systems with low efficiency;
- Land locked and Island countries, low-income countries depending on a small number of commodities, poor roads lead to transportation systems with low efficiency.

### 2.5.2. Corridor and regional integration

Schürmann et al. (2002) refer to the role of transport infrastructure for regional development as "one of the fundamental principles of regional economics". With a recursive simulation model of regional socio-economic development (Schürmann et al., 2002) try to validates the not undisputed hypothesis that "regions with better access to locations of input materials and markets will, *ceteris paribus*, be more productive, more competitive and hence more successful than more remote and isolated regions".

In the definitions of a corridor (section 2.2) integration is a key element. A successful transportation corridor is often being followed by an integration that goes deeper than the physical infrastructure. Srivastava (2011) and Hope and Cox (2015)), as discussed in Section 2.3, identify several stages until it reaches the stage of economic integration.

According to Vickerman (2002), economic corridors are widely viewed as major determinants of economic integration. They increase intraregional trade and investment; play a pivotal role in integrating economies across a region. They result in reducing the costs of transportation, both within and across regions, improving international market access, increasing income, and reducing poverty. According to De and Iyengar (2014) regional integration slows down if countries are not interlinked through modern transportation and communication networks. The three distinct features reported are:

> (i) Economic corridors have always played a key role in integrating economies across a region (Vickerman, 2002).
> (ii) Economic corridors' relation to welfare can be seen in both direct and indirect terms (Venables, 2008)
> (iii) Economic corridors have become important building blocks of regional economic integration in an era of globalization (Kuroda et al., 2008).

De and Iyengar (2014) empirically analyze the linkages between economic corridors and regional integration. They identify for South Asia the determinants of economic corridors. They conclude that countries (and regions) with high incomes, strong institutions, good governance, and more open economies are likely to have higher levels of regional infrastructure. Indirectly, the estimated results of the baseline models suggest that efforts to promote regional infrastructure have to address policy reform in a number of areas, and not be limited to traditional measures to attract investment in infrastructure. According to De and

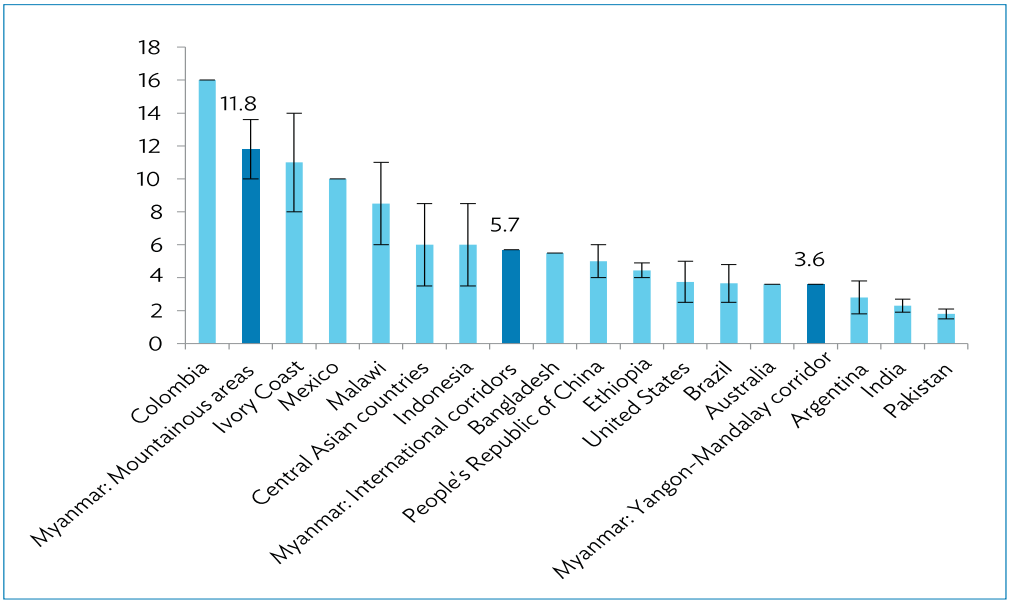
Iyengar (2014) there is thus an important complementary role to be played by the governance of institutions in enhancing South Asia's regional infrastructure. In the European Union, De and Iyengar (2014) see the proof that good governance in institutions that facilitate the development of regional infrastructure does matter. Poor governance isolates countries from good global markets.

Byiers and Vanheukelom (2014) put the question forward what are the drives of regional economic integration? Analyzing the Maputo Development Corridor and the North-South Corridor (Luanda-Durban), he finds that "While regional integration is taking place across the continent, it is not happening at the pace and the scope that the institutional architects in the Regional Economic Communities and their member states had agreed upon. Southern Africa is no exception. In looking for answers as to what obstructs or what drives regional integration, this study focuses on one particular type of integration process: cross- border transport corridors." Byiers and Vanheukelom (2014) distinguish hard and soft infrastructure, and points at the relevance of analysis of the political economy of transport corridors.

### 2.5.3. Cost of transport

The case of Myanmar (Asian Development Bank, 2016) shows how corridors can help to reduce transportation costs. Demand for transport in Myanmar is characterized by a high mobility of the population and a relatively low mobility of goods. Since 2007 this demand for transportation has undergone a deep transformation as consequence of economic policy measures: lifting of constraints and high taxes on private owned vehicles, and reducing subsidization of public transportation at the same time. "As a result, the market share of public transport operators has collapsed and in 2014 remained on a declining trend."

**Figure 5: Truck Freight Rates in US$ cent/ton-kilometer**




*Source: Asian Development Bank (2016).*

Corridor related investments in road infrastructure are expected to "bring large cost savings and support faster economic growth. Altogether, the program highlighted above would reduce by 29% Myanmar's transport costs—20% for passengers and 36% for freight. For a cost of $5 billion–$6 billion, it would bring $84 billion in cost savings over 15 years. These savings could in turn raise Myanmar's economic activity by 13% by 2030, an increase in GDP of $40 billion." The effects would not be limited to the road sector, but "would also strongly improve the competitiveness of rail and river transport. By 2025, rail's share could reach 34% in passenger transport and 7%–12% in freight transport. River transport's share would keep on shrinking for passenger transport to 0.3%, but could rise for freight transport to 18%."

According to Woxenius (2006) the cost-cutting race in the manufacturing industry has resulted in global sourcing of components. This spatial extension of production networks is a clear challenge to managers that are accustomed to reduce lead times by geographically contracting supply chains rather than expanding them. Woxenius (2006) further focuses on time as a reflection of distance and analyses the effects of extending production networks from within a mature economic region to adjacent, nearby, and distant low-cost regions. The character of component sourcing from distant regions is significantly affected by a supply gap between sea and air on the opposite ends of the time, cost, and capacity scales for traffic modes. To operations, the supply gap implies that much of the freight is transported too expensively or too slowly, leading to serious impediments for component trade between continents.

Rail connections are well fit to close the gap between air and sea, as can be seen from the emerging rail connections linking East and West on a long distance (China) Rail will connect continents (Maitra, 2014, Yoosefzadeh, 2012), stretching corridor lengths. Corridors tend to becoming detached from countries where they are running through. One of the solutions is

building nodes and logistics hubs to connect corridor to landlocked countries and gain local value from corridor.

In view of establishing the "Mongolia– China–Russia Economic Corridor" (Otgonsuren, 2015) researches the current situation and challenges ahead. He concludes that in order to establish an economic corridor, the countries involved need to develop connecting infrastructure, especially railroad transportation. He concludes that in view of facilitating the cooperation in a cost-effective way, creation of a joint working mechanism is necessary for the effective operation of the proposed economic corridor that crosses Russia, China and Mongolia.

Corridors can be essential to sustain economic and demographic developments. Urbanization and concentration of economic clusters make transport corridors indispensable in order to guarantee availability of products and labor, and efficient pricing on large concentrated markets. (Frost & Sullivan, 2013) explain Middle East as vulnerable region with a 58% dependency on food imports; City as a customer, and a development of the emergence of mega cities, mega regions and mega corridors; By 2025 90-99% of the population of Kuwait, Qatar, Bahrain and Lebanon is estimated to be living in urban areas. For Saudi Arabia, Libya and Jordan this will be 80-90%; The contribution from oil exports to the GDP for most oil exporters from MENA is expected to decline. The necessary transition will be of influence of production and trade patterns. Transportation corridors will play a role.

According to De and Iyengar (2014) in most developing economies, the lack of economic corridors is a major constraint on growth. Inadequate infrastructure causes congestion, resulting in diminishing returns to capital in industry, acting as a disincentive to investment. This leads to a low rate of labour absorption, and perpetuates a vicious circle of poverty.

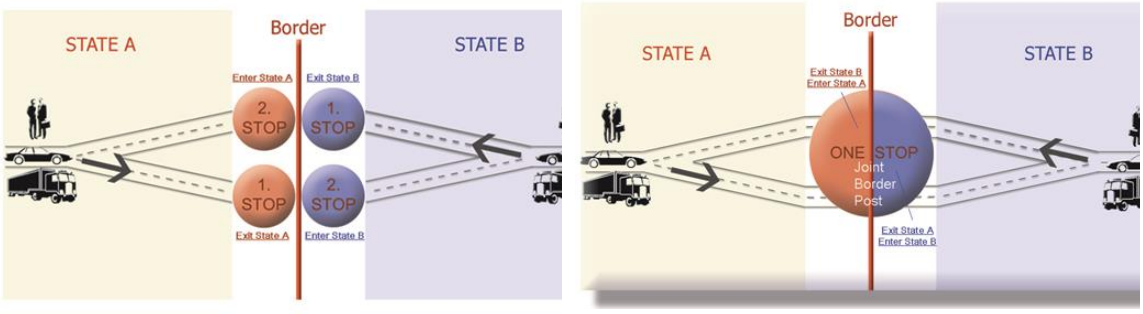
## 2.6. Trade Facilitation

Trade facilitation and economic development are closely related (Wilson et al., 2005). Reform in trade facilitation requires both hard and soft measures (Portugal-Perez and Wilson, 2012). The hard measures include improved border infrastructure and communications and the soft measures include, for example, improvement and harmonization of a range of customs procedures such as the adoption of ASYCUDA[6], Risk Analysis, through the deployment of the Customs Risk Management Framework[7] and Electronic Data Interchange or EDI[8]. Generally waiting and processing times at borders represent up to 50% of total transit times along international trade routes (Yang, 2017). Such delays due to pre clearance and border processing delays add considerably to the transit time and, because of this, the reliability of logistics chain also reduces (Hausman et al., 2005). Of importance is that Djankov et al. (2010) noted that each additional day that a product is delayed prior to being shipped reduces trade

[6] http://www.asycuda.org/
[7] http://ec.europa.eu/taxation_customs/general-information-customs/customs-risk-management/measures-customs-risk-management-framework-crmf_en
[8] https://en.wikipedia.org/wiki/Electronic_data_interchange

by more than 1%. More sophisticated processing using one stop border crossings, sharing risk analysis data and electronic data interchange can transform an inefficient and costly transit route to an efficient and more productive one. An example of how a one stop border works is shown in Figure 6.

**Figure 6: Conventional two stop crossing and one stop border crossings**




*Source: SADC OSBP Source Report First Edition.*

What is revealed from literature is that facilitation of trade is as important, some may say more important, than infrastructure, when planning transport corridors. Certainly, the investment needed in transport infrastructure to reduce transit time by one hour is infinitely more than that needed to reduce border crossing processing time by 1 hour. This is exemplified by Stone and Strutt (2010) in the ASEAN region, by Teravaninthorn and Raballand (2009) in Africa and by Banomyong and Beresford (2000) in South East Asia.

In particular the collection and dissemination of information in participating countries has been noted by Moïsé (2013) as being very important. Such exchange of information needs to be based on trust and facilitated by good communications infrastructure and an agreement on electronic data interchange. Effective consultation processes between participating countries and collectively at the World Trade Organization is vital (Narlikar, 2002) and this speaks to the level of institutional democracy, accountability, legitimacy of participating countries, especially regarding measures to uphold rules of non-discrimination (Bolhofer, 2007). Participating countries along transport corridors are also members of a preferential trade area. The Mekong Preferential Trade Area (PTA) is an example of this (Stone and Strutt, 2010). As rules of conducting PTAs and transport corridors evolve fees, charges, penalties, instituting acceptable processes in corridor countries are pre-requisite. Such procedures include clarity of release and clearance of goods procedures in corridor countries, border agency cooperation in countries along the corridor. Incoterms[9] were first developed in 1936 and are updated from time to time to conform to current trade practices, accordingly, it will be necessary for corridor

[9] Incoterms are trade terms published by the International Chamber of Commerce (ICC) that are commonly used in both international and domestic trade contracts. Incoterms, which is short for "international commercial terms," are used to make international trade easier by helping traders who are in different countries to understand one another. For more information, please refer to http://www.investopedia.com/terms/i/incoterms.asp#ixzz4qSmdJYh1

participants to consistently apply these rules. For example, because of these updates, contracts should specify which version of Incoterms they are using should apply. Rules cover the movement of uncleared imports within territory (needed for Inland Clearance Depots (ICD), the simplification of formalities (one stop windows) in participating countries and the freedom to transit (removal of movement impediments) in participating countries (Rippel, 2011, Banomyong and Beresford, 2000).

## 2.7. Social Factors

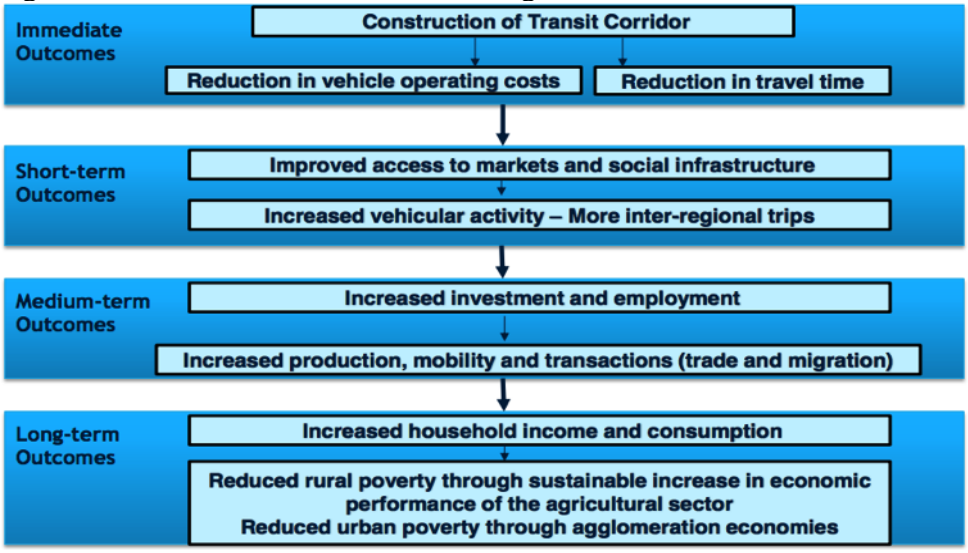
### 2.7.1. Introduction

The importance of equity and poverty alleviation in transport corridor development is discussed in this section. Transport corridors may well leave the territory through which is passes unaffected, indeed it may even generate external costs. The need to ensure the corridors development is equitable and inclusive is briefly covered. Moving on from this, the impact in poverty reduction is elaborated in more detail.

### 2.7.2. Inclusive growth

El-Hifnawi (2015) points at corridors contributing to inclusive growth, and to the importance of understanding the causal change linking corridor development with poverty reduction.

**Figure 7: Corridors contribute to inclusive growth**




*Source: (El-Hifnawi, 2015).*

He illustrates this with the case of the Kazakhstan's West China West Europe Corridor, that is expected to have a short-term impact of 35,000 direct jobs, and more employment and enhanced access to social infrastructures in the medium and the long term.

Through economic growth and regional integration corridors have their effect on movement of labor, social standards, education and wage rates.

### 2.7.3. Poverty

Setboonsarng (2005) identifies the problem of poverty in relation to corridors. He provides a range of policy, regulatory, and institutional measures that could help strengthen the impact of transport infrastructure on poverty reduction. In developing countries investment in transport infrastructure is a priority area of attention.

Empirical studies confirm that transport infrastructure does contribute to economic growth. However, studies reveal that while improved transport infrastructure may be a necessary condition for poverty reduction, it is by no means a sufficient one. Many transport investments have failed to provide benefits for the poor, despite aggregate gains in productivity and income, or even worse, have exacerbated existing inequities as well as given rise to a number of negative externalities. Setboonsarng concludes that there is considerable room for making transport infrastructure more pro-poor.

In the case of cross-border transport activities the domestic provision of public goods, in order to secure social benefits, like poverty reduction measures, may become less effective, due to international effects. According to (Fujimura, 2004) increasing globalization, liberalization, and changing patterns in trade, providing regional public goods such as cross-border infrastructure, has become more critical in bringing benefits that may not materialize through domestic provision alone.

For small land locked countries that are making a transition to a market economy investing in cross-border transport infrastructure is most compelling. Their distance from markets is for these countries a strong motivation to cooperate.

The success of cross-border transport projects depends on the extent to which they are able to meet three overriding challenges, as identified by (Wescott, 2005):

- countries have to agree on a common framework;
- collecting information on benefits to different countries under various stages of development;
- coordinating allocation of responsibility regarding financing regional projects among the countries as well as participating donor agencies, as too often cross-border transport projects are underfunded.

In view of the described challenges, (Markovich and Lucas, 2011) summarizes what is known about social impacts and equity of transport, transport disadvantage as it pertains to different social groups, and the wider interactions between transport poverty and social exclusion; and come with a research agenda on the distributional impact of transport.

### 2.7.4. Congestion

Congestion along corridors is a challenge. It leads to economic and social costs. According to Minnesota Department of Transportation (2012) Integrated Corridor Management (ICM) is believed to be an effective way to reduce social costs, like congestion, and to enhance safety. In

ICM the traffic can appropriately be diverted to parallel routes containing unused capacity. There are two groups of ICM models: one focusing on the information provision and travellers' response and the other more on evolution and interaction of the traffic.

Gerald (2014) points at social costs that can occur as a consequence of the success of a corridor. He takes the example of the North American Free Trade Agreement (NAFTA), that has increased trade between Canada, the United States (US) and Mexico by reducing tariffs on imports and exports. This has an influence on foreign direct investment, economic growth and reduces trade barriers in these regions. This has strongly stimulated commercial traffic through these countries continental transportation corridors. In this case the transportation and distribution services are operating independently and lack interconnectivity among each others' logistical channels. As a result, the transportation channel participants are not able to prevent congestions and delays along their routes. Gerald (2014) concludes that US and Mexico government and private agencies need to establish policies and regulations that address environmental and infrastructure issues that affecting their transportation network systems.

Litman (2017) and also Hesse and Rodrigue (2004) point at research indicating that generated traffic often fills a significant portion of capacity added to congested urban road infrastructures. Generated traffic reduces the congestion reduction benefits of road capacity expansion, it increases many external costs and it provides relatively small user benefits because it consists of vehicle travel that consumers are most willing to forego when their costs increase. These aspects should be included in analysis.

## 2.8. Safety, Security and the Legal liability factors

The aspects of trade route safety and security are very important indeed and tend to pre-occupy the thoughts of politicians and decision makers. And yet, there is precious little research and study into these vital issues. Transport corridors tend to be looked at from an economic point of view, but freedom of movement and trade seem to have become linked issues with terrorism, and other negative forces that serve only to undermine the peaceful coexistence of friendly relations. In this section, the issues of invasive plant species, communicable diseases and phytosanitary aspects will be covered.

In a paper entitled trade transport and trouble, Hulme (2009) explains that invasive species of plants and animals tend to migrate along the paths of the great trade routes. That species of plants, animals and microorganisms are introduced by humans to the different countries that they have moved to has been apparent for centuries and examples abound to prove the case. A measure of the relative importance of different transport vectors is the number of invasive species that can be attributed to it (Bax et al., 2003). Regarding the spread of disease along trade routes, the silk route is historically notorious for the spread of the bubonic plague that led to the death of millions and the depopulation of a continent in the 12$^{th}$ century and beyond. More contemporary diseases such as HIV/AIDS has been observed to spread along international transport routes (Morse, 2001). It can be concluded that transport corridors

which intensify movement and trade along certain routes also heightens the risk of spreading disease as well as foreign species of plant and animals.

Despite the profound impact of communicable diseases transmitted through international transport on entire populations, the much smaller impact of crime, including terrorism, gets far more prominence. Criminal activity occurs on transport systems (Easteal and Wilson, 1991) which requires special consideration such as mobile law enforcement and international cooperation (Woodburn et al., 2008). Globalization has boosted international organized crime such as drug and human trafficking that utilize main transport routes (Williams, 1994, Gastrow, 2001). Customs and immigration authorities are vigilant to cross border crimes, in terms of trade facilitation, unified customs processes (Widdowson, 2007), risk management and control for revenue protection (Geourjon and Laporte, 2005) and exchange of information along the supply chain (Mikuriya, 2007) are essential features of improving trade facilitation along a transport corridor.

Ensuring safety and welfare of citizens is the raison d'être for government, this shared objective compels the harmonization of operational safety between protagonists. This includes driving hours, vehicle conditions, axel loading and competence (Harrison, 2000) which together comprise the critical success factors in providing interconnectivity and interoperability (Stone, 2008).

Corridor development and performance may be affected by wars, regional conflicts and tensions. The probability of a major conflict occurring between or within countries that work, trade and communicate continuously with each other are minimal compared to those that are separated and isolated. Trade security lies at the heart of corridor development. Having said this, should conflicts arise that disturb the flow of trade, then traders are, of course, seriously affected. In such cases, normally insured risks cease to be valid in times of war. Where blockages do interrupt the normal flow of goods, invariably there are more circuitous routes and alternative means that can be used. Southern Africa was a case in hand where war threatened with South Africa due to its apartheid regime in the 1980s. In this case traders got together to set up alternative routes and means and, where necessary, travelled in convoy and employed security forces provide protection. Where a corridor passes through a war zone, such in South East Europe in the 1990's for the one linking Turkey with Europe, then alternative routes and modes were expedited. In Algeria, its borders with Morocco have been closed for many years due to dispute and alternatives have been developed. Traders are very inventive, 'necessity is the mother invention' so it is said, and this applies very much to the world of trade.

## 2.9. Technical and Operational Factors

**Logistic services on corridors**

According to (Banomyong and Faust, 2010), the development of logistics services and communication technologies has revolutionized production and distribution processes and created a 'global' market. Shippers and consignees require efficient logistics services that can

move their goods to the right place, at the right time, in the right condition, and at the right price. For some countries in the sub region, inadequate transport infrastructure and high logistics service costs have constrained economic corridor development and integration. Physical connectivity between neighboring countries will be significantly improved on completion of these investments in infrastructure. Improved infrastructure, coupled with expanded cross-border cooperation among countries, can accelerate the process of integrating the sub region's economic corridors into the rest of the world and the global market.

According to the ADB[10], a highly efficient logistics system means goods and people move around the sub region without excessive cost or delay. This improvement promotes further economic growth and regional development, thus contributing to poverty reduction. An Economic Corridor has the following characteristics:

1. Covers smaller, defined geographic space, usually, straddling a central transport artery such as a road, rail line, or canal;
2. Emphasizes bilateral rather than multilateral initiatives, focusing on strategic nodes particularly at border crossings between two countries;
3. Highlights physical planning of the corridor and its surrounding area, to concentrate infrastructure development and achieve the most positive benefits

**Cross Border Transport Agreements**

According to the ADB[11], Cross-Border Transport Agreement (CBTA) is a compact and comprehensive multilateral instrument that covers all the relevant aspects of cross-border transport facilitation in one document. These include:

1. Single-stop/single-window customs inspection
2. Cross-border movement of persons (that is, visas for persons engaged in transport operations)
3. Transit traffic regimes, including exemptions from physical customs inspection, bond deposit, escort, and agriculture and veterinary inspection
4. Requirements that road vehicles will have to meet to be eligible for cross-border traffic
5. Exchange of commercial traffic rights; and
6. Infrastructure including road and bridge design standards, road signs, and signals. The CBTA applies to selected and mutually agreed upon routes and points of entry and exit in the signatory countries.

**Vehicle Design**

To increase the efficiency of the vehicles operating within the corridors, then it will be important to consider, for example, optimized vehicle specifications that better tailor truck and trailer components, weight and length of vehicle combinations, increased level of modularity and innovation in the trailer market (e.g. the uptake of light weight high volume low bed

[10] ADB, www.adb.org/GMS/EconomicCorridors/approach.asp
[11] ADB, www.adb.org/GMS/EconomicCorridors/approach.asp

trailers) and also more efficient operation of the truck by the driver. For the vehicle to be effective for the corridor use the efficiency level can be judge by the following criteria:

1. Vehicle technically specified for running in corridors
2. Vehicle dimensions for optimized load capacity within corridors

**Infrastructure**

(ERTRAC, 2011) indicated that in order to enable the green, safe and efficient corridors, the supporting road network needs to be highly adaptable, automated and climate resilient in order to accommodate for changing demands and conditions, to enhance the implementation of ITS and intelligent road operations, and to ensure adequate service levels under extreme weather conditions. As the latter research and innovation challenge is covered in a separate roadmap, this green corridors roadmap will focus on the research and innovation that enhance the adaptability and automation of road operations.

**User-friendly Design & Construction**

For the road user/truck driver the traffic situation becomes more complex. Conditions become more critical to error or failure. Therefore research is needed into improving user friendliness of the road infrastructure to better fit the requirements, expectations and behavior of the user (ERTRAC, 2011).

**Durable and integrated Pavements, Bridges, Tunnels & Structures**

The durability of the road structures (pavements, bridges, tunnels) should be designed to service high volumes of freight traffic. Freight traffic imposes a heavy burden on the road structures and without the proper innovations in durability of the materials and components this will lead to increasing levels of maintenance interventions (e.g. resurfacing), reducing the network availability

**Advanced Utility, Sensory and Communication Systems**

According to (ERTRAC, 2011), advanced road based utility, sensory and communication systems are indispensable for the desired high service levels on the green freight corridors. Such road based systems serve three distinct objectives:

1. Automation of the road availability and maintenance e.g. to safe guard against strongly nonlinear road surface deterioration phenomena under the intensive freight transport loads
2. Enhancing full grade ITS in road transport, integrating the user, vehicle, service provider and operator. For full co-modality this should be connected to the traffic control of the other modes
3. Enhancing the penetration of new propulsion concepts in the road transport system, including the supporting alternative energy and fuel supply system

**Intelligent Traffic Management strategies**

One objective of intelligent infra management is to optimize the utilization of the available road network within the service levels set by policy and governing principles (reliability, availability, maintainability, safety). Although on a transport system level, this is set in the context of commonality, here the focus is on road operations. Another important area would be an operation and traffic control-management by e.g. ITS and that provides all actors within the freight transport with a variety of advanced options for efficient and flexible seamless freight shipments.

**Freight Corridor Governance**

The management of green fright corridor must be fitted with an adequate toolbox of data, models & methods to allow adequate risk based evaluations and decisions on the desired performance/service levels by the different road administrations involved in the selected corridors(ERTRAC, 2011). (Panagakos, 2010) defines the following KPIs that reflect the success factors of transport corridors and supply chain against the SDGs of the European Union.

Efficiency Indicators

1. Absolute unit costs (€/ton), used for comparisons of transport solutions on the same route. Also used to express costs incurred on nodes. •
2. Relative unit costs (€/tkm), used for comparisons of transport solutions either on different routes within the same corridor, or on different corridors.
3. An additional indicator concerning the open, fair and non-discriminatory access to corridors and transhipment facilities can be considered for inclusion, in accordance with the relevant requirement for co-modality explicitly stated in the Freight Transport Logistics Action Plan

Service quality Indicators

1. Transport time, expressed in either absolute terms (hours, days) or in relative terms (average speed)
2. Reliability, expressed as the percentage of on-time deliveries
3. Frequency of service, expressed as number of shipments available per week
4. ICT applications, expressed as the assessed result of -
    - Availability of tracking services on nodes/links
    - Integration & functionality of tracking services
    - Availability of other ICT services on nodes/links
    - Integration & functionality of other ICT services
5. Cargo security, expressed as percentage of security incidents over total number of shipments
6. Cargo safety, expressed as percentage of safety incidents over total number of shipments

Infrastructural sufficiency

1. Congestion, expressed in either absolute terms (average delay in hours) or in relative terms (ratio of average delay over total transport time). Alternatively congestion can be expressed in money terms, if the average delay is multiplied by a proper 'value of time'. •
2. Bottlenecks, expressed as the assessed result of an inventory of different types of bottlenecks per transport solution combined with information on ongoing and planned projects addressing removal or diminishing of the bottlenecks.
3. An additional indicator concerning the energy balance of the infrastructure can be considered for inclusion. It compares the energy produced (mainly through renewable energy sources) against the energy consumed during operation on an annual basis.

Social issues of corridor consideration

1. Land use – urban areas, expressed as the percentage of urban areas in a buffer zone formed by a 20 km radius from the median line of each corridor (use of CORINE Land Cover spatial dataset).
2. Land use – sensitive areas, expressed as the percentage of environmentally sensitive areas in a buffer zone formed by a 20 km radius from the median line of each corridor (use of Natura 2000 spatial dataset).
3. Traffic safety, expressed as the incident rate of accidents and/or fatalities over the total number of shipments or total transport work (ton-km).
4. Noise level, expressed as percentage of total distance exposed to noise levels above 50 dB (55 dB for rail transport).

## 2.10. Environmental and Energy Factors

Environmental and energy factors in transport corridors cover signatories of international agreements on environment and sustainability, emissions regulations, environmental impact assessment, energy and CO2 emissions.

One of the main concerns is that transport corridors generate externalities, that is to say costs that the user will not bear, but which transit countries and local communities have to bear. Such costs will be mostly environmental – such as community severance, air pollutions and noise along the route. The issue is a socio economic one. One graphic but different example this is in on the Main TAH4 highway and Northern Corridor through Botswana. The road passes through some 200 km of pristine nature reserve populated by the continent's largest population of African Elephants. The trucks in transit are not originating in Botswana but South Africa. No toll is paid, and only a modest permit charge is levied at the border. But the environmental impact is serious as shown in Figure 8.

**Figure 8: Wildlife issues on TAH4 (North – South Corridor) in Botswana**

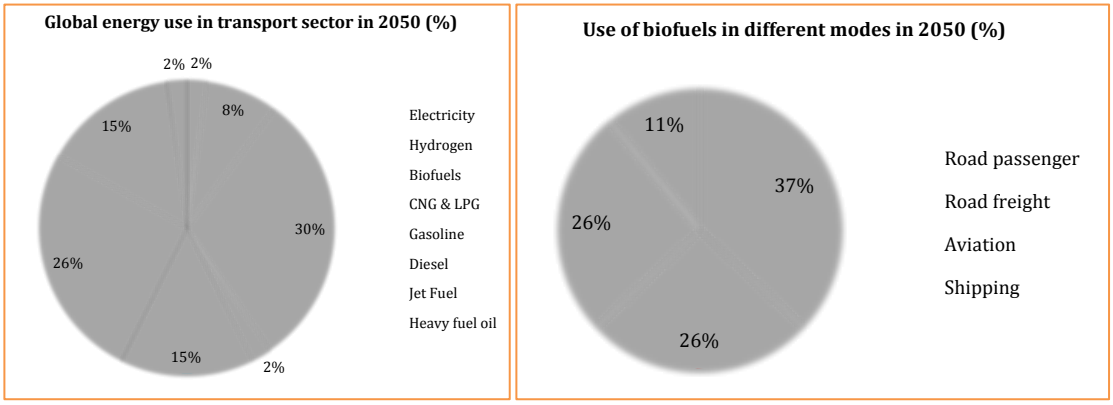
*Source: Douglas Rasbash (2016).*

It is difficult to spin out specific environmental and energy issues to transport corridors only. Hence literatures about these issues are very limited. The keyword "environment" in different literatures of transport corridors refers mostly to *trade environment* instead of natural environment. It is very likely due to the fact that energy and environmental standards are most obviously transferrable along transport corridors, for example green-fueled lorries and trucks.

Global concerns about climate change, energy use, environmental impacts, and limits to financial resources for transportation infrastructure indicate the need for new approaches to planning, designing, constructing, operating, and maintaining transportation systems. These will include making climate adaptation adjustments to engineering specifications, alignments, and master planning, incorporating associated environmental measures, promoting green freight and logistics, and adjusting maintenance and contract scheduling (Asian Development Bank, 2014).

The share of freight emissions of greenhouse gases has been estimated at 42 percent of transport emissions and 7 percent of total emissions. In the long term, the share of freight logistics is expected to grow to 60 percent of transport emissions in 2050 (World Bank, 2016). These results are consistent with the growing voluntary targets set by a number of major international organizations. The International Energy Agency, for example released the ETP 2010 BLUE Map Scenario in 2010 (IEA, 2010), setting a target for 50% reduction in energy-related emissions by 2050. To meet this target, the model proposed the fuel mix presented in Figure 9.

**Figure 9: Global energy use in transportation (left) and use of biofuels in different modes (right) according to the BLUE map energy Scenario**




*Source: IEA (2010).*

Among the alternative fuel technologies examined in this study, the BLUE Map Scenario awards the greatest share to biofuels, forecast to account for 27% of the total estimated energy consumption for transportation by 2050, predominantly for road transportation, but also for aviation and shipping.

Typically, these objectives can be achieved by shifting to less emission-heavy modes of transportation and also by better load factors in freight transportation (Kopp et al., 2012). The greenhouse gas emissions per ton-kilometer (km) for a freight train can be less than 30% of those of trucks and passenger train emissions per passenger-kilometer are less than 40% of those for passenger cars. Increased use of rail transport can therefore help reduce harmful emissions (Asian Development Bank, 2017).

In 2008 the European Commission released its first handbook on estimation of external costs (accidents, air pollution, climate change, noise, nature and landscape, biodiversity losses, soil and water pollution, and urban effects) in the transport sector. This handbook provided quantifications and monetary values by the European Union member country and by mode of transport. For freight transport, the average external costs in 2008 for EU-27 (excluding congestion) are presented in Table 1. Rail and waterborne freight transport modes have 14 – 22% lower external costs than road transport.

**Table 1: Average external costs for freight transport in 2008 for EU-27**

| | **High scenario (€/1,000 ton-kilometer)** | **Low scenario (€/1,000 ton-kilometer)** |
|---|---|---|
| **Road** | 50.5 | 36.1 |
| **Rail** | 7.9 | 5.3 |
| **Waterborne** | 11.2 | 7.7 |

*Source: (Asian Development Bank, 2017)*

The building and operation of infrastructure accounts for only about 1% of the total energy consumption of transport as a whole. However, this part indirectly affects emissions from

transport in the large system. What infrastructure is available creates the conditions for what modes of transport can be used. Before certain modes of transport or energy carriers can be implemented, a reliable infrastructure is needed.

## 2.11. Corridor Performance Evaluation

There is some literature on corridor performance measurement, often referred to as monitoring, observatory or diagnostics, for instance in general by (World Bank, 2010) and more specifically on Rwanda (World Bank, 2005), the Northern Corridor (Mombasa and inland) by Fitzmaurice and Hartmann (2013) and Hartmann (2013) and also best practices in trade corridors by Arnold (2006) and Hartmann (2013) and also best practices in trade corridors by Arnold (2006).

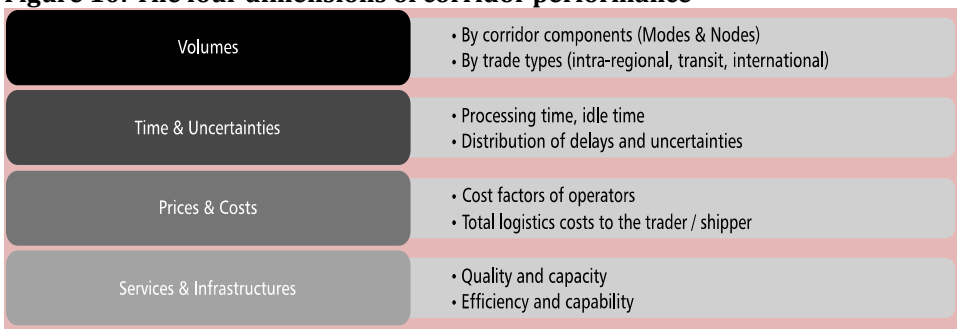
### 2.11.1. Performance Monitoring

A corridor is a complex structure of hard and soft infrastructure. Successful corridors require performance monitoring and management. Hope and Cox (2015) argue that a corridor can be considered as a single initiative, but it cannot be developed by a single project that managed as a one-off exercise. They state that corridor management includes for instance planning, financing, legislation, regulation, operation, monitoring and promotion. These activities need to be coordinated as well as the provision of physical infrastructure and development of national-level and regional-level institutions. During the lifespan of a corridor, managing activities aimed at achieving the development stage objectives must be combined with the coordination with indirectly responsible stakeholders needed for getting the full potential of the corridor. Examples of such stakeholders are government departments and agencies, investors, and local communities and businesses.

The question why to monitor corridor performance, Hope and Cox (2015) answer “that one cannot manage that which cannot be measured”. Corridor performance measurement facilitates the corridor management or secretariats to assess how corridor goals are fulfilled and to identify under-performing areas to improve. Srivastava (2011) points out that monitoring corridor performance entirely by the time, distance and cost methodology or time surveys implicitly incorporate a narrow view of the corridor. This does not capture the broader context of a development corridor, at least not in the higher levels of corridor ambitions. Prioritizing certain measures at the expense of others, risks to result in an incomplete and unbalanced appreciation of a corridor’s performance. To compare corridors requires a benchmarking methodology taking the different types of corridor, as well as their differing stages of development into account.

Hartmann (2013) suggests Corridor Transport Observatory (CTO) as a Corridor Performance tool, with a set of indicators. Efforts to address specific challenges faced by landlocked developing countries resulted in Transport Observatories and corresponding practically useful guidelines and tools. Corridor management institutions and other corridor stakeholders can use the Transport Observatory to diagnose bottlenecks along the transport and transit supply chains, and to assess the performance of the corridor at different hierarchical levels.

**Figure 10: The four dimensions of corridor performance**



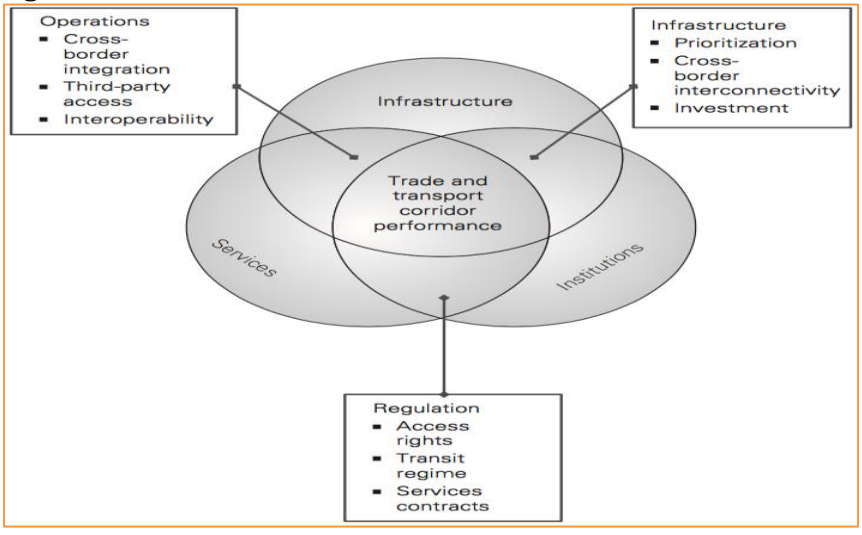

*Source: Hartmann (2013).*

Hartmann illustrates CTO Analysis with nine African cases:

- Shifting routing patterns of the Burkina Faso trade;
- Entry border traffic counts in Tanzania;
- Regional traffic volumes on the Abidjan Lagos corridor;
- Impact of pre-arrival declaration on port dwell time;
- Transport time on Abidjan-Ouagadougou corridor;
- Border crossing times at the Kenya Uganda border of Malaba;
- Trucking operating costs in West Africa;
- Concentration of the trucking industry in East Africa;
- Age and operating conditions of truck fleet in Cameroun.

The World Bank has developed a Trade-and-Transport Management Toolkit (Kunaka and Carruthers, 2014). A corridor has three main categories of intertwined dimensions: infrastructure, services, and institutions for coordinating corridor activities (see Figure 11).

**Figure 11: The infrastructure-services-Institutions Nexus of Corridors**




*Source: Kunaka and Carruthers (2014) p. 17.*

According to Kunaka and Carruthers (2014) there are three main uses of corridor performance measures:

- assessing how well a corridor is performing and where the main deficiencies are;
- tracking changes in corridor performance over time and determining whether changes made to improve performance have had measurable impact;
- determining performance relative to other corridors serving the same or different origins and destinations of traded goods.

In order to make the monitoring process relatively simple to be replicable and affordable, one should limit to a few indicators to be included in the monitoring process. These indicators should satisfy several criteria: be measurable, should add only marginally to the cost of collecting data, be relevant, be specific and consistent (Kunaka and Carruthers, 2014). "It is important to be precise on several aspects to which the indicator applies, including type of products and their packaging, the size of the consignment and the frequency of shipments, whether it is for import and export traffic, the component of the corridor to monitor, as well as the specific origins and destinations of the traffic monitored."

"The design of an effective system for monitoring the performance of a corridor requires decisions about four key dimensions:

- the parameters to be monitored
- the locations for which they should be measured
- the types of product and forms of shipment for which they should be measured
- the frequency with which the monitoring should be made.

Five main indicators measure the performance of a corridor:

- the volume of trade passing through a seaport gateway, a border post, or some other important checkpoint and handled by different modes (volumes reflect trade growth and can be used to assess how choices of time, cost, and reliability affect flows along a corridor);
- the time taken to transit the whole corridor and each part of it;
- the cost to importers or shippers to move cargo over the length of a corridor or a part of it;
- the variation in time and cost for the whole corridor and each part of its components (reliability);
- the security of goods transported in the corridor and the safety of the people involved in that transport."

### 2.11.2. Evaluation

According to (Laird et al., 2005) transport infrastructure projects have network effects ('total economic impact') which are not taken into account in the appraisal of these projects. "Good quality appraisals should be capable of picking up relevant network effects in the transport

market, but the state of the art remains limited on the linkages between transport and the wider economy."

OECD (2002) argues in the same line, and recognizes the need to be able to measure the impact of infrastructure investments on regional development. "The basic conclusion … is that there is a lack of information derived from ex-post studies which could provide a firm, quantitative basis for claims about the impact of infrastructure investment on regional economies and regeneration. …. This relates in particular to the assessment of local employment impacts and to the contributions which transport can make to improving economic efficiency. … The impacts of the project should always, in both their ex-ante and ex-post evaluations, be evaluated against these broader objectives. … Finally, it is recommended that a major research effort should be initiated with a view to improving our understanding of the issues. A number of ongoing "before and after studies" (e.g. the JLE Impact Study in London) are a useful step in this direction. There is also a commitment from the UK Government, in response to the SACTRA Report on "Transport and the Economy", to introduce an Economic Impact Report as a fundamental part of its appraisal methods."

Wanitwattanakosol and Pongpatcharatorntep (2015) provide us with a performance analysis of cities within the East-West Economic Corridor (EWEC). The East-West Economic Corridor (EWEC) is an important corridor for economic cooperation program under the Great Mekong Sub-region. Wanitwattanakosol and Pongpatcharatorntep (2015) benchmark the current status and visible short-run prospect of major regional cities. They discern five strategies, each with their key performance indicators: 1) business logistics improvement, 2) transport and logistics network optimization, 3) logistics service internalization, 4) trade facilitation enhancement and 5) capacity building. Scoring per strategy is each time higher, when developing from Transport via Multimodal and then Logistics and finally Economic Corridor. The research found that each city was still at an early stage of the corridor development stages.

### 2.11.3. Data control

Data sets on transport and corridors are used for operational and for evaluative means, both in academic and in commercial/ operational spheres. Statistical and numerical data are being collected on a large scale. Some of these data are being collected by commercial organizations and not made publicly available (like mobile phone operators). Others are being collected at non-commercial public organizations.

Data on transport and corridors are used, among others, for traffic analysis, feasibility and cost benefit analysis, performance analysis, evaluations, management and control purposes, business cases, revenue collection, life cycle management, and maintenance operations.

The following is a non exhaustive list of locations where data are being collected an made available to the public:

- Eurostat collects and publishes data on Trans-European networks (TEN-T): http://ec.europa.eu/eurostat/statistics-explained/index.php/Trans-European_networks_in_transport_(TEN-T)
- Knoema collects and publishes a transportation index: https://knoema.com/kvhigbf/transportation-price-index
- OECD collects and publishes data on transport performance, safety, economic and social data, transport measurement, transport infrastructure: http://www.oecd.org
- "The Geography of Transport Systems" (Hofstra University) collects and publishes data on transportation
- World Bank collects and publishes data on transport: http://www.worldbank.org/en/topic/transport
- VOX (CEPR) collects and publishes data on Trans-European networks

Furthermore a non-exhaustive list is also prepared regarding the organizations that develop and distribute parameters and methods for socio economic evaluation in transport:

- European Union
- Multilateral Banks, like Asian Development Bank, Islamic Development Bank, European Development Bank
- Australia's Victoria Transport Policy Institute
- Rijkswaterstaat, the Netherlands Road Authority: SEE guidelines
- UK Department for Transport: Transport Analysis Guidance (TAG)

# 3. Successful Transport Corridors Outside the OIC Geography

## 3.1. Introduction

When can one say a corridor is successful? This depends on the policy objectives of establishing a corridor: such as encouraging trade, reducing transport costs, improving access to markets, promoting economic integration, or enhancing modal choice? Based on such objectives, another challenge is to measure the results of a corridor so that success can be ascertained. Corridors induce complex interrelationships: they are both a consequence of many phenomena and equally they are the cause for other changes, together with a complex of other causes – this effect is known as circular causation[12]. The corridor might also be just one of the many interventions in a situation that was already (un)successful.

The most successful of all transport corridors must be those of the European Union. TEN-T corridors are the pinnacle of transport corridors in every sense. TEN-T is a network of corridors. It is not easy to pinpoint the impact of the TEN-T corridors on the EU region, as the corridors were just one aspect of a multi-sided diamond of development policies.

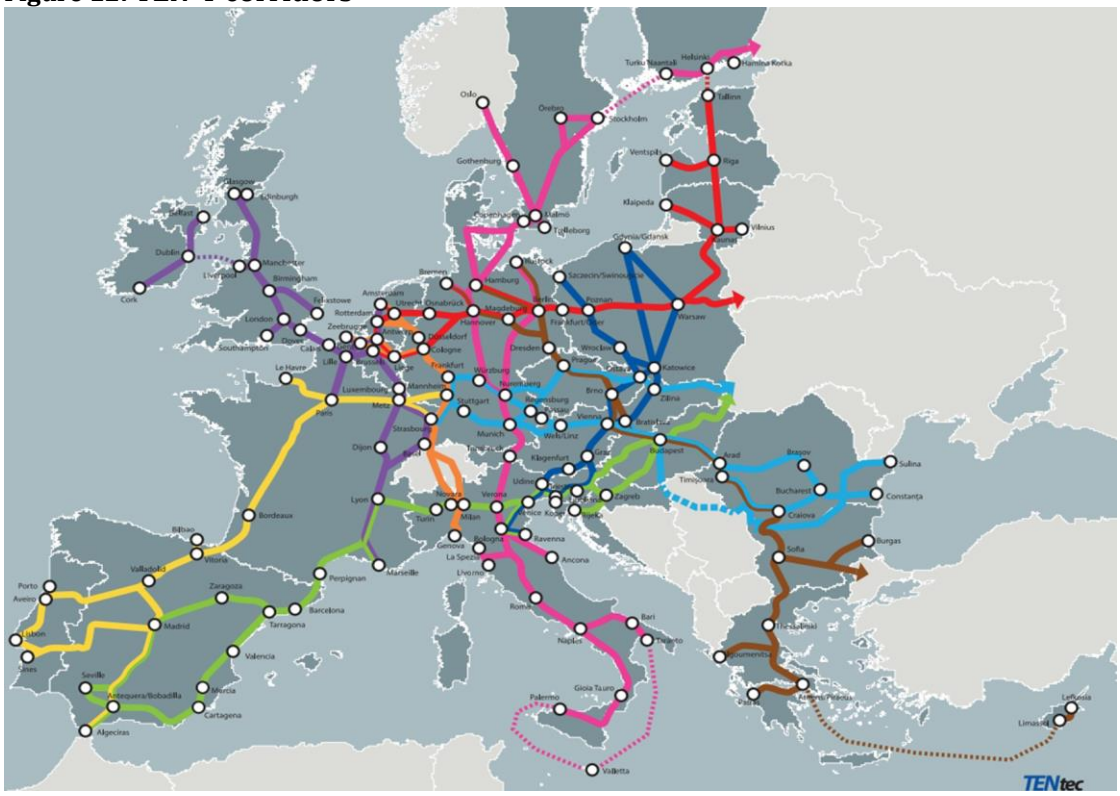
The network of TEN-T transport corridors started to be developed in 1980's with studies to determine the criteria for their selection, route identification and performance monitoring. A series of conferences set up the initial 10 TEN T corridors that have evolved into the latest network agreed in 2013[13].

The aim of the TEN T is to ensure that progressively, and by 2050, the great majority of Europe's citizens and businesses will be no more than 30 minutes' travel time from the comprehensive network, and that between 2010 and 2015 passenger transport grows with 42% and freight transport with 60%. Figure 13 illustrates key facts and figures of the European transport and mobility. The TEN-T initiative has three pillars: 1 Fair & Competitive, 2 Connected and 3 Clean.

The TEN-T Map is given below and the URL to the interactive link[14].

[12] developed by Swedish economist Gunnar Myrdal in the year 1956
[13] https://ec.europa.eu/inea/en/news-events/newsroom/agreement-reached-new-ten-t-network
[14] http://ec.europa.eu/transport/infrastructure/tentec/tentec-portal/map/maps.html and the basic TEN T

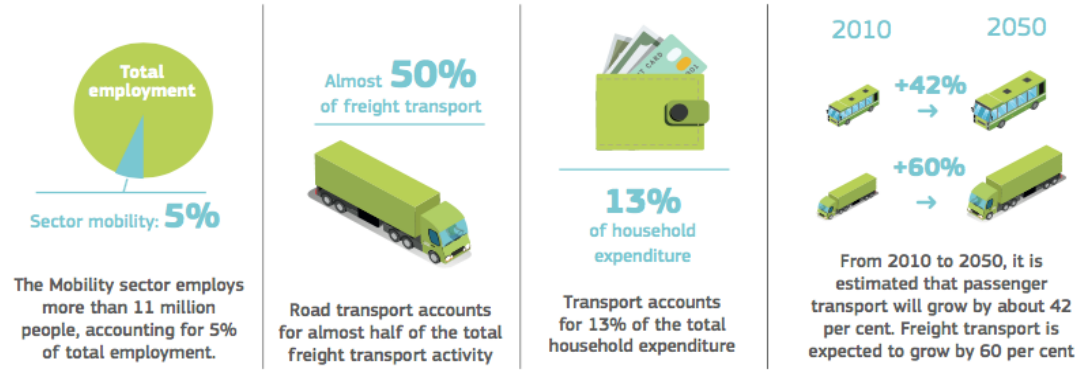
**Figure 12: TEN-T corridors**




*Source: EU TEN-T Maps*

Thus, one lesson learnt here is that the idea of a corridor as being one route from a to b to c is not correct. While there may be one or two main routes, they cannot function without a good feeder network. The evolution of the TEN-T from corridors to a network proves the point.

**Figure 13: Mobility in Europe, key facts and figures**



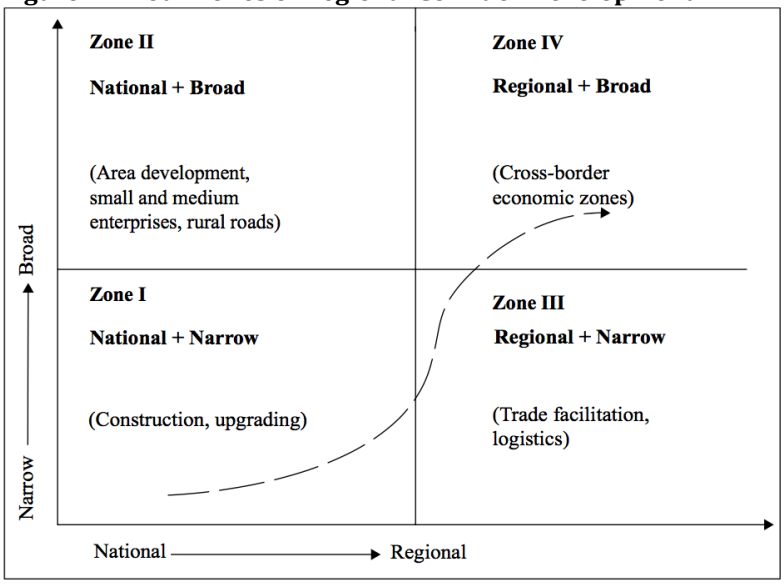

*Source: European Commission 2017 Europe on the Move General factors*[15]

[15] https://ec.europa.eu/transport/modes/road/news/2017-05-31-europe-on-the-move_en

The scientific and grey literature shows transport corridors to be politically, economically, socially and technically driven, providing the most reliable and cost effective trade routes for land locked countries, whilst being important drivers of regionalization and integration. In terms of format, corridors should be considered as multidimensional, both in the physical and metaphysical sense, for they are multimodal and multi-route, stimulating choice and competition, benefiting traders and travelers and by doing so, maximizing economic and social opportunities Srivastava (2011). Hope and Cox (2015) further discern that the development of a corridor evolves from a basis transport route through to an economic corridor. The subsequent stages are (1) Transport Corridor, (2) Transport and Trade Facilitation Corridor, (3) Logistics Corridor, (4) Urban Development Corridor and finally (5) Economic Corridor. Srivastava (2011) identifies a linear process with corridors starting as natural transport routes and investments in hard infrastructure for one or more modes of transport to become a transport corridor. The next evolution step requires development of the "soft infrastructure" of transport services and transport logistics. Evolution into a fully-fledged economic corridor requires a broader approach and investments in the regions served by the corridor. Srivastava (2011) further finds that corridors must stimulate economic growth to be viable but corridors do not create economic strength in itself, but they channel, focus, and amplify the potential for economic growth. Thus, a corridor "from nowhere to nowhere through nowhere" would not be so meaningful. On the other hand, early developments of rail corridors in the USA did connect something with nowhere with an aim of developing the economy in the "Wild West". Similarly, a corridor linking two nodes but with no potential for growth in between is also of limited interest. As mentioned, the stops along a corridor are more interesting than connecting the end points.

The area of influence of the corridor (narrow or broad) in combination with national demarcation results in a four zone scheme (See Figure 14), where the development of a national corridor to a regional one, is the movement from Zone 2 to 3, and may involve the linking of national corridors.

**Figure 14: Four Zones of Regional Corridor Development**




*Source: Srivastava (2011).*

Corridors are meant to fill regional infrastructure gaps and at the same time promote pro-poor socio-economic development (see 3.5).

## 3.2. Political and Institutional Factors

Many agreements are needed to be made for a transport corridor to be successful. These range from the movement of goods, people and intellectual property to the technical specifications of goods, working practices and educational accreditation. Without sound institutional structures, good governance and reliable jurisprudence, corridor development and operational integrity are less likely. For there to be common political goals, there must be common values and history. In Europe those drivers fell easily from the long history of conflict that spans 1000 years or more. From the Polish German Wars of 1001 the Kosovo crisis of 1999, there have been over 500 European conflicts. Clearly the vision of Jean Monnet and others that only through sound international relations, shared social and economic goals and interdependence of the highest order, can long term peace and prosperity be assured. Jean Monnet would not have been surprised by Brexit and other set-backs. In his preliminary declaration for European integration in 9 May 1950, he slipped in the warning: "Europe will not be made all at once, or according to a single plan: rather it will be formed by taking concrete measures which bring about real solidarity." These institutions were the ones conceived and set into place by Jean Monnet: The Parliament, the Council (today the European Council) and the Commission are the "common democratic institutions that hold the necessary sovereignty."[16]

[16] http://www.theeuropean-magazine.com/jose-maria-gil-robles--2/6146-monnets-vision-of-europe

Article 136 of the Treaty on the functioning of the European Union contains the above authority. The procedures necessary to govern the euro-zone economically still need to be put into place—by means of a reinforced cooperation. These procedures must anticipate the potential need for speedy and urgent decision-making, and even the possibility of delegating authority to the Commission—with a control by the Parliament and the Council in hindsight.

For a transport corridor, the minimum institutional structure necessary is the corridor authority or secretariat. So much the better, for that is what has happened in the EU and elsewhere, that funding is and was tied to international commitments to facilitate trade.

For national governments it is not easy, having to balance on the one hand the call to protect vulnerable indigenous industries from global competition and on the other hand, wanting to participate in the world of commerce and trade. They know very well that tariffs put on imports from another country will be reciprocated. This is why globally trade tariffs are gradually falling and governments are seeing the wisdom of deriving revenue from sources other than customs duties. However, it is to non-tariff-barriers that Governments must pay attention. These are listed in Appendix 1. The way forward with such long list is to categorize them in MUST, SHOULD, and COULD be done. In Europe, most of those NTBs have gone. Hard work in countless thousands of meetings and, as Jean Monnet said, doing things step by step.

(Hope and Cox, 2015) point at the importance of financing, as corridor development is not a single project. Hope and Cox (2015) describe it as "a complex combination of hard and soft infrastructure projects with different durations, often overlapping and interacting, throughout the stages of a corridor's evolution." Because of this complexity there is no 'one size fits all' financing solution. Financing solutions must be tailored for each set of circumstances during the corridor's evolution, taking into consideration the capacity of the host government(s) to enter into financing agreements with donor agencies, private investors, and specific combinations of debt and equity.

In the case of TEN-T corridors the aspect of finance has full attention. Financing is one of the spearheads of TEN-T. The **Connecting Europe Facility (CEF)** aims to blend public and private finance. Blending, in the context of the CEF Call, is the combination of CEF grants with finance from the EIB, notably the EFSI, or with finance from National Promotional Banks or private investors. The public funding is needed to achieve "flagship transport infrastructure on the TEN-T network, with special focus on cross border projects. Combining public funds with private finance helps projects having high economic and societal impact and help closing the financing package. A targeted component of CEF grant enables the financial case to be established.

The CEF calls are successful, as every year they are oversubscribed. Projects that are selected for funding have a positive cost benefit ratio, are likely to generate revenues and make up for the shortfall of revenue.

The corridor not only leverages finance, but also generates supply, especially when the corridor evolves and increasingly supports economic activity. This causes the perceived risks to be reduced, enabling the corridor managers to attract additional investment.

El-Hifnawi (2015) adds the so-called financing gap. Private funding can fill this gap and speed up project implementation, but it also requires more work to secure, compared to public funds. In the case of TEN-T, CEF calls aim at closing this funding gap. The funding gap is the part of the (discounted) investment costs that are not covered by the (discounted) net revenues generated by the project. In the context of this call the "modulated EU co-funding amount" is the lowest of the following values: "funding gap amount" or "maximum co funding amount". Therefore, the success of the TEN T Corridors has been in both attracting investment for infrastructure and also in investment in related services.

## 3.3. Economic Factors

As explained in the previous paragraph, there are no indicators that uniquely reflect the effects of the successful TEN-T corridors. EU membership, trade and TEN-T are closely connected. As a proxy the change in openness and the change in per capita income of EU Member States during their accession phase have been chosen to reflect economic results of countries joining the TEN-T network.

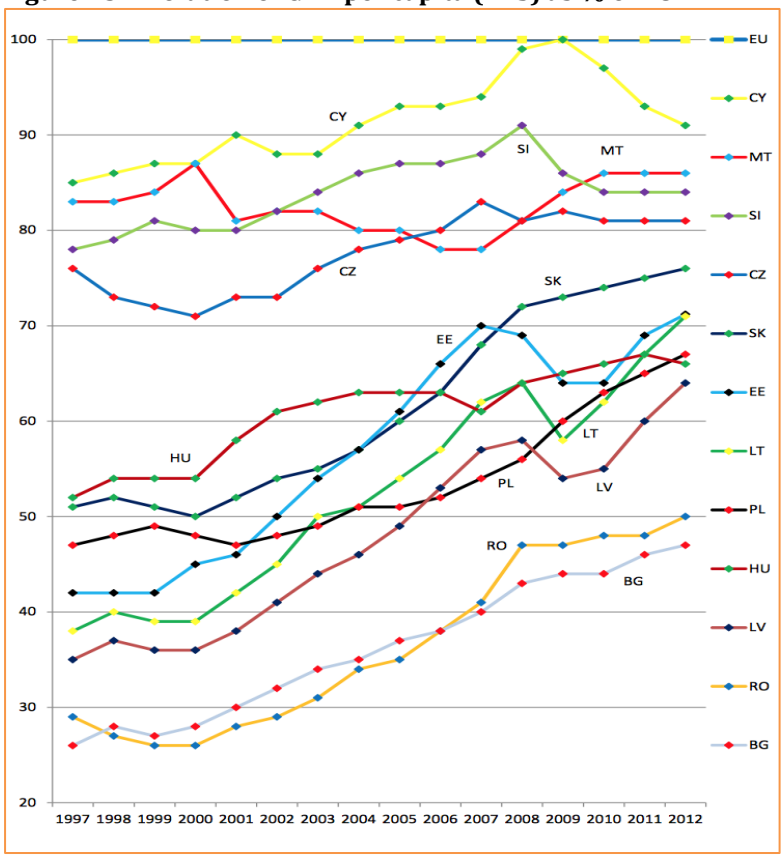
According to Lejour *et al.* (2006), EU membership is crucial for the ten new member states to catch up with the average income level in the old member states[17]. Lejour *et al.* (2006) illustrate this with some figures:

- EU membership increases trade between two of its member states with about 34%;
- EU membership induces countries to improve the quality of their institutions and hence trade;
- Trade increases by 22% if institutions improve, yielding a total trade increase of 56%;
- Improved openness increases income by 37.5%;
- Adding the effect of improved institutions on income, income increases by 39%.

(EuropeAid, 2015) shows that the performance of the new Member States compares favorably with the EU-27 (see Figure 15). “While the countries have each made economic progress during their pre-accession and post- accession period, each does still remain below the EU-27 average for GDP per capita. In this regard the availability of public financing to process the reforms remains a constraint for some.”

[17] Lejour refers to Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia.

**Figure 15: Evolution of GDP per capita (PPS) as % of EU-27**




*Source: EuropeAid, 2015.*

The PHARE (EU-pre-accession) support to Poland had a strong focus on the improvement/development of road and rail infrastructure. Between 1990 and 2006 a total of 502.55 million EUR co-financing has been granted for investment projects, including 7 road investment projects and 7 rail investment projects (EuropeAid, 2015). The investment projects have had a strong impact on decreasing population marginalization, increasing the quality of life on the border areas and reduction of barriers in socio-cultural integration of societies on different sides of the border (an increase in knowledge on societies and areas abroad, increase of common trust, combating prejudice, knowledge of the language). As a consequence Poland as shown an increase of international transport services as a share of total transport and an increase in transport services with foreign countries (cabotage as a share of international transport). Poland's cargo transport volumes grew much faster than GDP in the post-accession period while in the EU the same indicator rose at a similar rate.

One of the consequences the success of the TEN-T network is the establishment of a level playing field. This is visible within the TEN-T area for example in the area of labor, labor conditions, wage levels and skill levels.

In TEN-T region wages do influence each other. Wages differ within Europe. In Eastern Europe average wages are lower compared to the average wage in Western Europe. Truck drivers from the Eastern parts of Europe have a strong influence on the transport market in Western Europe. The average price of road transportation has dropped considerably. This tariff reduction pushes high waged truck drivers out of the market, and it has a price effect on other modes for cargo types that compete with road transport. This wage equalization is the consequence of intensive trade. (Darvas, 2016) shows that income inequality in the 28 countries which are now members of the European Union has been on a unique course in recent decades. Inequality is much lower among EU citizens than in other parts of the world, and actually fell in 1994-2008.

Whether this is advantageous or disadvantageous depends on the scale and the scope of the observation. For the region internal competition and equalization will lead to higher performance on aggregate level. For the individual countries the result can differ: the strengthening of the Polish transportation sector is a gain for Poland. For the transportation sector in Western European countries is resulted in competition, price drops and contraction. Profit margins on successful and busy corridors tend to drop due to the high volume and the high level of competition. This has the effect that companies seeking higher profit will divert to other less operated routes.

This phenomenon is clearly reflected by the cabotage market. In this market there is increasing competition. Table 2 shows the amount of cabotage for the EU-27 and the amount that takes place in each country for a selection of years. Germany, Luxembourg and the Netherlands have a market share of about half of this market. Parallel the newer Member States all show significant growth figures, especially Poland, Slovenia, Slovakia and Estonia.

**Table 2: Cabotage transport – in million ton-kilometers and as % in EU total**

| | Cabotage performed by each country | | | | Cabotage performed in each country | | | |
|---|---|---|---|---|---|---|---|---|
| | 2004 | 2006 | 2008 | % share in EU total -2008 | 2004 | 2006 | 2008 | % share in EU total -2008 |
| **BE** | 1,816 | 1,552 | 1,546 | 8,8% | 574 | 705 | 890 | 5,5% |
| **BG** | - | 204 | 137 | 0,8% | 11 | 15 | 3 | 0,0% |
| **CZ** | 5 | 86 | 293 | 1,7% | 27 | 68 | 72 | 0,4% |
| **DK** | 254 | 239 | 254 | 1,4% | 184 | 203 | 375 | 2,3% |
| **DE** | 1,944 | 2,273 | 2,781 | 15,8% | 3,794 | 3,479 | 3,639 | 22,4% |
| **EE** | 57 | 102 | 216 | 1,2% | - | 2 | 2 | 0,0% |
| **IE** | 505 | 434 | 573 | 3,3% | 122 | 177 | - | 0,0% |
| **EL** | 17 | 89 | 18 | 0,1% | 60 | 145 | 159 | 1,0% |
| **ES** | 1,031 | 854 | 1,085 | 6,2% | 929 | 1,403 | 975 | 6,0% |
| **FR** | 624 | 523 | 429 | 2,4% | 4,586 | 4,521 | 5,417 | 33,4% |
| **IT** | 847 | 1,022 | 939 | 5,3% | 1,001 | 1,037 | 1,062 | 6,5% |
| **CY** | - | - | - | - | - | - | - | - |
| **LV** | 10 | 30 | 50 | 0,3% | 20 | 2 | 9 | 0,1% |
| **LT** | 28 | 66 | 75 | 0,4% | 5 | 4 | 5 | 0,0% |
| **LU** | 2,262 | 2,133 | 2,695 | 15,3% | 11 | 18 | 7 | 0,0% |
| **HU** | 92 | 80 | 168 | 1,0% | 29 | 37 | 20 | 0,1% |
| **MT** | : | : | : | : | : | : | - | : |
| **NL** | 2,871 | 2,172 | 2,563 | 14,6% | 257 | 388 | 432 | 2,7% |
| **AT** | 390 | 717 | 642 | 3,7% | 245 | 284 | 415 | 2,6% |
| **PL** | 506 | 1,273 | 954 | 5,4% | 42 | 22 | 43 | 0,3% |
| **PT** | 708 | 714 | 886 | 5,0% | 69 | 23 | 5 | 0,0% |
| **RO** | : | 14 | 97 | 0,6% | 22 | 44 | 8 | 0,0% |
| **SI** | 132 | 264 | 389 | 2,2% | 2 | - | 3 | 0,0% |
| **SK** | 89 | 125 | 264 | 1,5% | 7 | 22 | 33 | 0,2% |
| **FI** | 70 | 88 | 33 | 0,2% | 14 | 26 | 34 | 0,2% |
| **SE** | 170 | 164 | 222 | 1,3% | 356 | 547 | 932 | 5,7% |
| **UK** | 203 | 242 | 272 | 1,5% | 1,855 | 1,760 | 1,689 | 10,4% |
| **EU-27** | 14,631 | 15,460 | 17,571 | 100% | 14,221 | 14,931 | 16,229 | 100% |
| **HR** | : | : | 2 | - | 1 | 2 | 3 | - |
| **MK** | : | : | | - | : | 16 | 21 | - |
| **TR** | : | : | | - | 6 | 25 | 12 | - |
| **LI** | 22 | 18 | 10 | - | - | : | - | - |
| **NO** | 12 | 19 | 47 | - | 197 | 152 | 193 | - |
| **CH** | : | : | 275 | - | 51 | 107 | 67 | - |

*Source: EuroStat (2010)[18].*

The data show that the general tendency for cabotage is to increase, with substantial rises since 2004 for Finland, the Czech Republic, Greece, Sweden and Denmark. Even the newer Member States saw rises in cabotage performed in their country. This can be interpreted as healthy sign of growing competition in the TEN-T region.

[18] http://ec.europa.eu/eurostat/statistics-explained/index.php/Archive:Competitiveness_in_EU_road_freight_transport

Fraunhofer Institut (2015) has studied what "price" Europe would have to pay when Member States and other stakeholders failed to implement the core network as the central element of the new TEN-T policy. Their conclusion is that the economy would give away an 1,8 % growth potential and 10 million man-years of jobs would not materialize. Fraunhofer Institut (2015) further concludes that investing in transport infrastructure promises more to the European economy and its citizens than what it costs.

Preconditions enhancing the success of corridors are the existence and effectiveness of **technical and economic and financial agreements**. According to Gerald (2014) “a poor distribution channel will influence the price strategy that affects the freight service and promotion of the product in the marketplace. As a result, the channel functions are critical aspect of the transportation network system that connects international corridors.”

## 3.4. Trade Facilitation

The most important steps in the evolution of TEN-T included establishing funding for the construction of new infrastructure and missing links, setting up Transport Infrastructure Needs Assessment Unit (TINA) in Vienna, agreements to facilitate trade and harmonize customs procedures, common passport and immigration controls. The final step was the Schengen Agreement that paved the way to removing borders all together on mainland Europe. It was signed on 14 June 1985, near the town of Schengen and in 1990, the Agreement was supplemented by the Schengen Convention, which proposed the complete abolition of systematic internal border controls and a common visa policy. Thus, this led the way to totally borderless trading between EU member states and provided the ultimate level in trade facilitation between sovereign states that exists in the World today and, as a result of this, intra-regional trade increased as enumerated in the previous section.

To illustrate this intra-regional trade data from EuroStat has been extracted and the analysis contained in the Table 3 has been produced. The analysis shows that intra-regional trade has been between 50% and 60% of total EU trade over the last 13 years or so. It shows that for all its members that intraregional trade has grown over this period by an overall average of 3% per annum. The top 6 out of 28 trading countries accounted for 36% of all intraregional trade (see Figure 16). The levels of interregional trade in the case studies are very small by comparison, but where there is a strong political commitment to regional integration as with the EU, that level will increase for sure.

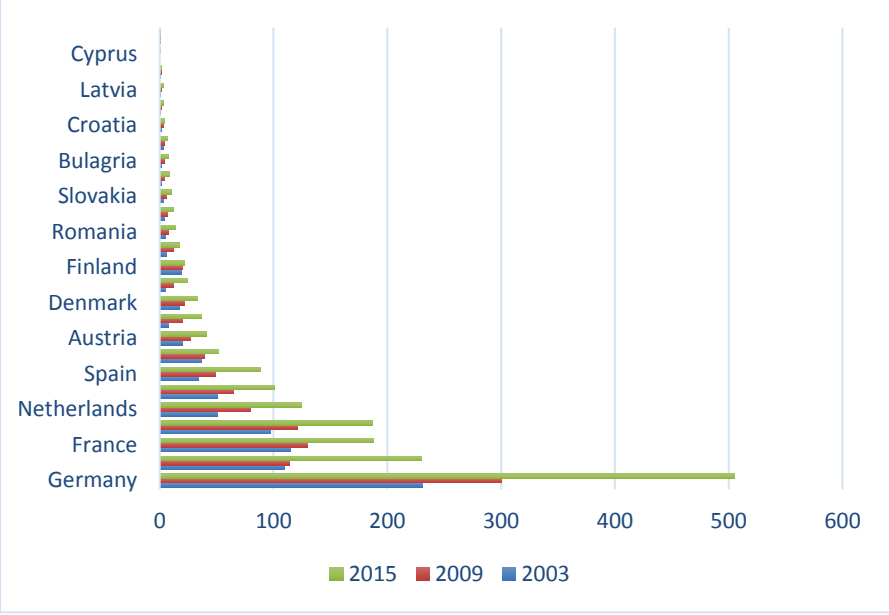
**Table 3: EU Countries Exports to EU**

| | EU Countries Exports to EU *(in Euro Billions)* | | | AAGR*% |
|---|---|---|---|---|
| | 2003 | 2009 | 2015 | |
| Intra-Regional | 2,829 | 3,063 | 3,740 | 3% |
| External Trade | 1,756 | 3,096 | 3,453 | |
| Total Trade | 4,585 | 6,159 | 7,193 | |
| Percentage | 62% | 50% | 52% | |

*Average Annual Growth Rate

*Source: Fimotions, 2017 (compilation based on Eurostat data).*

**Figure 16: EU intra-regional trade**




*Source: Eurostat: Trade in Goods – Recent Trends*[19].

In terms of the logistics performance index, the mean LPI for all 28 EU countries is 3.61[20] with Germany being the highest and 4.23 and Romania the lowest at 2.99. Important to note that the recently joined members of the EU from Central Europe, including Poland, Hungary, Romania, Estonia, Croatia, LPIs all increased some by up to 35% from the time of joining due to the TEN T and removal of the NTBs. It would be fair to say that for new EU members and some older ones like Portugal and Greece, the promise of funding road and rail improvements by the EU helped to secure the removal of the NTBs, and hasten the political support. The carrot offered of project funding generally helps to move the intransigence of the political donkey.

[19] http://ec.europa.eu/eurostat/statistics-explained/index.php/Intra-EU_trade_in_goods_-_recent_trends
[20] http://data.worldbank.org/indicator/LP.LPI.OVRL.XQ?name_desc=false European Union

Ultimately, the most successful corridors promote freedom of movement and a completely seamless supply chain. While investment in better roads and railways certainly help trade, it is mostly facilitated by the removal of non-physical barriers. Common NTBs include government aids, subsidies, tax benefits, state trading, government monopolies in corridor countries, non-harmonized rules of origin of imports in corridor countries and consistent customs formalities in corridor countries. Other NTBs include import licensing in corridor countries, pre-shipment inspection formalities and non-harmonized technical regulations. Such regulations include sanitary and phytosanitary controls and specified product treatment in corridor countries (Das, 2005). Please refer to Appendix 1 for a comprehensive list of NTBs that OIC member states should be mindful of when aiming to facilitate trade.

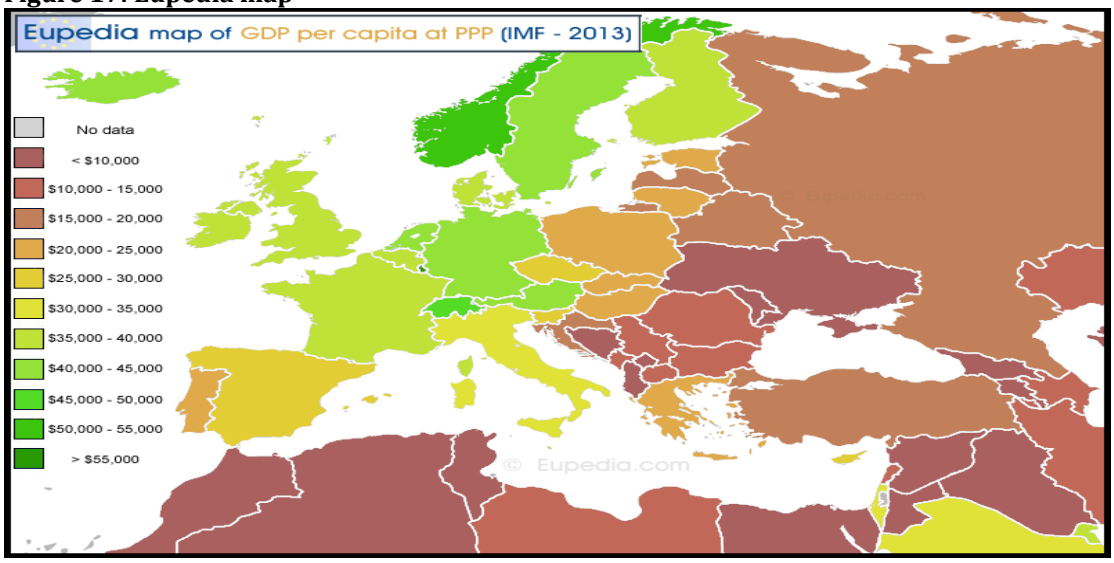
While the removal of NTB is conventional wisdom, Haveman et al. (2003) showed that they were not always particularly effective in meeting their objectives. This is because in parallel with efficiency improving initiatives, many countries impose various specific limitations such as quantitative restrictions, export taxes etc. which will need to be harmonized in corridor countries as will import and export declaration fees (Das, 2005). Several corridor experts who took part in the Fimotions' online survey indicated that removing NTB is still a challenge even for TEN-T, especially when it comes to sharing responsibilities among Member States.

With regard to tariffs, the WTO notes that the trend for Governments to use trade tariffs as a means to raise government revenue has mostly reversed and also as an instrument to protect domestic economic activity. Much of world's trade takes place between countries that are part of a free trade agreements (FTA). The meaning of free trade agreement is that its multiple protagonists all agree to trade on the same terms and, where possible, reduce or eliminate import and export tariffs … so that trade can flow freely between them. Ultimately, the WTO aim for a tariff free trading world, because tariffs on trade are acknowledged to depress economic development and growth. The implications for OIC members desiring to improve trade efficiency through corridors, is for them to focus on the removal of NTBs, because tariff barriers to trade are slowly being reduced, if not eliminated altogether. A fine example of this is the EU where tariffs on merchandisable trade average only 2.6%.

## 3.5. Social Factors

The TEN T has not only mobilized trade, but also materially affected the quality of people's lives. Figure 17 clearly charts how distance from the economic heart of Europe and per capita incomes closely correlate. In other words, accessibility to markets for both good and labor are critical determinants of individual wealth, such as Portugal and Greece and the Baltic States.

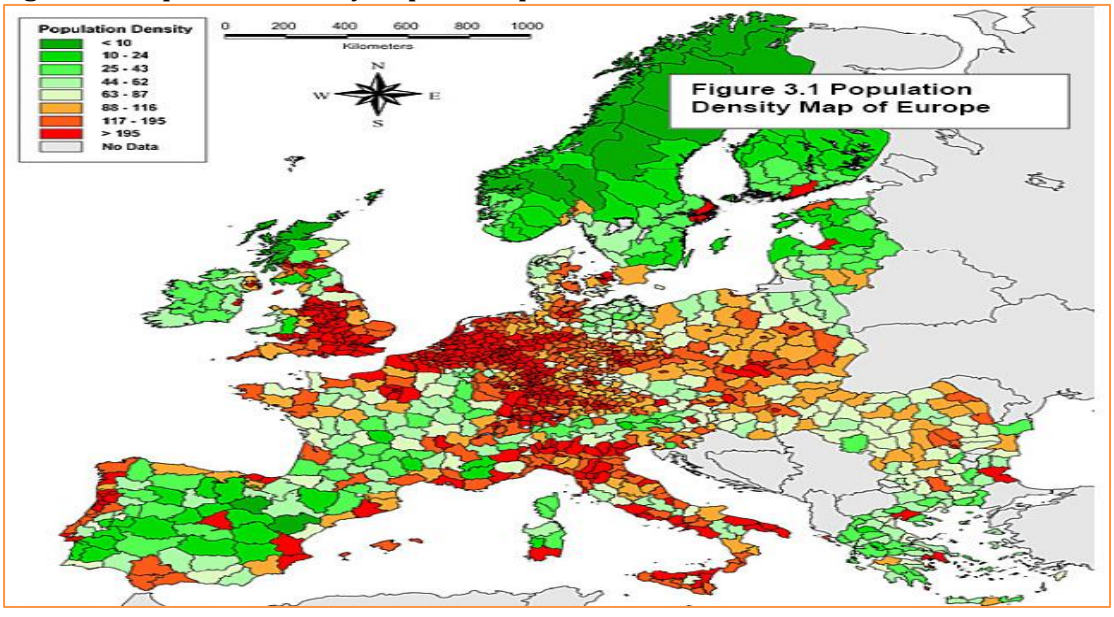
**Figure 17: Eupedia map**




*Source: IMF - Socio Economic Mapping of Europe*[21]

Demographic mapping also reveals how populations migrated along the TEN T to places where there is employment. Germany has especially benefited from immigration over the last 10 - 15 years and has been able to maintain high levels of per-capita income despite the influx of migrants as its economy grows.

**Figure 18: Population Density Map of Europe**




*Source: [http://www.eupedia.com/europe/maps_of_europe.shtml.](http://www.eupedia.com/europe/maps_of_europe.shtml)*

[21] http://www.eupedia.com/europe/maps_of_europe.shtml

The EU strongly maintains its philosophy of strength in diversity, despite right wing pressures in recent times. The map in Figure 18 shows the second largest nationalities living in European nations by their flags. Although this cannot be put down to TEN-T corridors it is important to state that the movement of people and trade in goods and services cannot be separated.

In the EU there is a very strongly held position regarding human rights, especially after the human tragedy of WW2. All people, irrespective of nationality, religion or creed have equal rights. The European Convention on human rights was ratified and entered into force on 3 September 1953. It is overseen and enforced by the European Court of Human Rights in Strasbourg, and the Council of Europe. Thus, the important point is the people move along the TEN-T corridors in the certain knowledge of that their rights as users are equally protected.

**Unemployment**

Many argue these days that globalization and regionalization has left people behind. Whether this is just a politically popular statement or there is real evidence linking globalization to unemployment it is beyond the scope of this assignment. But it is incumbent on the consultants to show where the areas of long term unemployment persist in Europe. The reasons for this are that investment in employment generation remains in the logistic core of Europe and that in the Balkans and Iberia, insufficient jobs are being generated.

The TEN T has had an impact on demography, which seems to be concentrating rather dispersing wealth. This is something that needs very careful attention in the future.

## 3.6. Safety, security and the legal liability

The EU TEN-T also offers the best examples of how to protect a common trade area or customs zone from external threats without undermining economic and social development. This is not to say that it is perfect, there have been problems of security, smuggling, trafficking, drugs, but arguably at a no more intensive rate than, for example North America, and some may argue, that security is much better in the EU than the USA.

The solution in the EU is to make sure that there is a well-defined external border. When the EU enlarged in the 90's to include another 11 countries, it built new border infrastructure from the Arctic Circle in Norway to Moldova and the Black Sea. This line of new borders was interlinked and referenced to a common security and customs database. The procedures used at all the borders are common, irrespective of territory personnel trained to common standards.

So, it is possible for corridors to develop and regional integration to take place in such a way as to not compromise security. It is a "one for all and all for one" approach that requires trust between its partners built up over time. Needless-to-say, there being no impediments to EU logistics chains along its principle transport corridors, the EU enjoys the highest proportion of intra-regional trade than anywhere in the world.

In terms of internal security and especially liability, international logistics chains need to be supported by international law. Goods moved between a multiple of countries need a common set of laws with respect to liability for damage, theft and other causes of loss. If not, commercial risks are greater, insurance premiums much higher and consequently so are trading costs.

As regards safety along the EU transport corridors, with 9 accidents per 100,000 registered vehicles they provide some of the safest roads in the World.

**Table 4: Road fatalities EU-28 in 2014**

| | | |
|---|---|---|
| Total passenger cars (million) | | **249.8** |
| Total commercial freight vehicles (million) | | **35.86** |
| Road fatalities | Number | **25974** |
| | Per 100.000 registered vehicles | **9** |

*Source: Fimotions (2017), data source: EU Transport in Figures 2016.*

Self-regulation of the trucking industry is the best way to ensure that operational standards are kept especially using tracking devices to detect speeding, driver hours and overloading. Driver coaching is a part of package of training measures that can be introduced. National Road Freight Associations enforce regulations, and only accredited members will be able to get work and pass through corridors without interference from Police and other agencies. Self-regulation also has the added benefit of helping to restructure road trucking industries from being one-man operations to large modern fleets of low polluting, high performance vehicles.

## 3.7. Technical and Operational Factors

### 3.7.1. Southern Africa Development Community

While TEN-T does provide the ideal in terms of the most successful corridors, it is an almost impossible example to follow. In SADC, the transport corridors were first set up in the 1980's with the explicit objective of developing alternative routes to those that pass through South Africa. They were supported by the international community due to their rejection of apartheid. There was, therefore, a strong political motivation for countries to work together. The corridors identified and then developed all started (or ended) at a gateway port. Another reason for promoting corridors in Southern Africa is due the preponderance of Land Locked Countries (LLCs). The present day network of SADC Corridors is shown in Figure 19, which also shows the proximity of South Africa and also the preponderance of LLCs.

**Figure 19: Network of SADC Corridors**


*Source: GIZ.*

Some of the features of the SADC corridors that made them successful were:

1. Common Political objectives
2. A history of cooperation (colonial mostly)
3. SADC and corridor secretariats established
4. Funding from the international community for roads, railways and ports
5. Common Languages (English and Portuguese)
6. English Common Laws
7. Same road and rail design and operational standards

Some infrastructure bottlenecks do exist, like the lack of river bridges as shown in Figure 20 and for this reason the SADC Transport Master Plan was prepared which has been reviewed for this study.

**Figure 20: Zambesi river crossing at Kazungula Botswana being replaced by a bridge**

*Source: Douglas Rasbash (2015).*

### Regional Development Integration Master Plan

The OIC might be interested to promote/ fund the preparation of corridor master plans in member countries, where none exist of course. This section may help in this regard. The SADC Regional Transport Master Plan was prepared as one of six components of the RDIMP, the others being Energy, Water, Telecommunications, Tourism and Meteorology. The RDIMP is also part of a wider movement to regionalize as explained in the text below. The regional context for transport corridor development is again proving to be important.

Introduction to the RDIMP from the SADC Executive Secretary July 16th 2012

The SADC Master Plan is aligned to the Program for Infrastructure Development in Africa, as well as the COMESA-EAC-SADC Inter-Regional Infrastructure Master plan, and no doubt lays a foundation for the development of the African Economic Community, as espoused by the Lagos Plan of Action and the Abuja Treaty. Implementation of the Master Plan will enable us to consolidate the SADC Free Trade Area, the COMESA-EAC-SADC Tripartite Grand Free Trade Area, as we march towards the total integration of Africa, guided by the ideals of our Founding Fathers, whose legacy remains unparalleled.

The Regional Infrastructure Development Master Plan (RIDMP) approved in 2012 guides the development in key infrastructure such as road, rail, air and ports, and it also acts as a framework for planning and cooperation with development partners and the sector. Infrastructure was also a key component of the Regional Indicative Strategic Development Plan. The RIDMP contains ambitious targets and is expected to be implemented by 2027.

The SADC transport sector entails road transport, rail transport, ports, maritime and inland waterways, as well as air transport. As noted previously pipelines are excluded. The first conclusion was that **the need to strengthen the capacity of the SADC Secretariat to**

**undertake the critical role of coordinating and facilitating strategic policy formulation and implementation in the Transport Sector cannot be overemphasized.**

The transport component of the Master Plan indicated a widening gap in the provision of infrastructure in the surface transport subsector across the Region. While roads have improved in most countries, rail lines have seen very minimal improvement and in fact have mostly deteriorated. The RDIMP provided a response to these challenges in recognition of **a need to intensify regional transport programs that enhance multimodal transport linkages and improves interconnectivity.** The Plan is founded on a Spatial Corridor Development Strategy initiative of 2008, which identified the main spinal North-South Corridor Project through Zimbabwe.

The SADC Corridor approach to regional development is based both on well-maintained and operated infrastructure and the provision of seamless transport services. RDIMP recognizes that realization of this vision is a major challenge given the huge deficiencies in capacity, human, financial and institutional.

**Growth in Transport Demand**

Traffic across SADC Corridor Borders is typically around 300 trucks and 500 vehicles per day, which is not very high[22]. The SADC transport corridor development is premised on the assumption that regional transport demand will grow rapidly. The Program for Infrastructure Development for Africa (PIDA), which is a continental strategic framework for infrastructure development, forecasted that transit traffic for landlocked SADC[23] will increase from 13 million tons in 2009 to 50 million tons by 2030 and 148 million by 2040, at an average annual growth rate of 8.2% pa. This is high, but intraregional trade starts from a very low base accounting for just 4% of trade in SADC.

In addition to intra-regional trade foreign trade will also increase as per capita incomes increase. The SADC Master Plan assumes that port traffic in Southern Africa will jump from 92 million tons in 2009 to 500 million tons by 2027. It is suggested that a 550% increase in Port Traffic over just 18 years would be globally unprecedented and to caution OIC on overly optimistic demand projections.

**SADC Transport Problems**

While largely successful in sustaining the intra-regional trade for a generation, problems persist. A summary of the problems initially identified in the RDIMP for the Transport Sector, are listed below:

- Lack of maintenance;
- Missing links between key origins and destinations;

[22] National Transport Plan of Botswana 2014-2017 CPCS for MTC Botswana
[23] PIDA, *Phase II Transport Sector Brief.* Countries are Botswana, Malawi, Southern DRC, Zambia and Zimbabwe.

- Delays at cities where by-passes have not yet been built;
- Capacity and safety constraints;
- Delays at border posts – though they are much improved;
- Trade and transport facilitation delays due to slowness of tackling NTBs
- High accident rate due very poor enforcement. Mostly fatigue and drunken driving
- Poor reliability due to lack of quality in the freight transport industry;
- Lack of continuity and inter-regional connectivity;
- Poor modal integration;
- Need for modernization; and
- Skills and capacity constraints.

**Roads**

Productivity in every economic sector is affected by the quality and performance of the road system. While there is considerable capacity on most of the network currently, the projections for 2027 suggest the need for increasing capacity, construction of bypasses for major cities, passing lanes in hilly regions and more efficient border posts. The RDIMP also proposes that missing links have to be paved in the remaining sections where the network is still gravel or earth. However, what is absent from the Transport Master Plan is attention to maintenance.

It is very important that SADC recognized in the RDIMP that a major issue across the Region is maintenance funding and many of the proposed projects that were identified are rehabilitation of trunk roads to catch up with the backlog of works due to inadequate regular maintenance.

It is emphasized that: **Ensuring that priority is given to road maintenance must be a priority for SADC - generally, road maintenance budgets are about 30% of what it should be.**

Some roads have also suffered from damage due to overloading which remains a persistent problem in some countries. **Enforcement of existing regulations as well as harmonized axle load limits and related regulatory standards, should be a precondition of all road projects.**

**Railways**

The SADC regional railways, which are extensive and contiguous, operated on the common Cape Gauge are fully interoperable but are managed as collection of separated national systems. SADC through the RDIMP recognized that they should be operated as seamless, relatively fast cross-border services that are totally integrated. **A priority for SADC must be to advance the process of regional railway integration.**

**Railways Tapering Tariffs**

One of the constraints to international railways is the tapering tariff structure. Railway tariffs are nearly always tapered, the further the movement the lower the unit rate. This is applied with the management jurisdiction of the railway - which is national. Each time a consignment crosses into a new jurisdiction the taper starts over again. Thus, the consignor is denied the benefit of ultra-low tariff rates for very long movements involving 2 or more countries. If railways worked together and offered a through rate, then prices will fall and the rail market share will surely increase.

Almost all railways operate at much lower traffic levels than they were designed for. Domestic freight demand has all but disappeared. They are in a critical state. **It is noted that the use of railways in Transport corridors is much less than it should be. To regain a market share SADC has proposed that common technical, operating and safety standards need to be established and enforced so that railways can operate across borders under the oversight of a Regional Regulator.**

Formulation of a multilateral regional business agreement between railways needs to be negotiated to facilitate migration from the existing constraints of bilateral agreements. **The rail corridors have much to gain from a SADC open access railway network.**

Even though SADC railways generally operate well below their original design capacity, they cannot increase their volumes because of poor track condition, lack of locomotive and wagon availability and low operating capital.

The SADC Railway Sub Sector Plan proposes many projects to revitalize the existing railways, construction of missing links (especially those serving the mining sector) But the main challenge for railways is reform, to restructure and permit open access to private operators. SADC does not go far enough, but instead proposes that national railways should invest in new locomotives and rolling stock which is not a good idea given the high commercial risks.

### Ports

According to the SADC diagnostics, most regional ports are currently operating near or over capacity. Some of the factors causing delays are cited as being due high costs, poor port/road and port/rail interfaces, poor handling capabilities and equipment, congested access routes, inefficient layouts, insufficient use of operating software, insufficient berths and drafts and slow clearances by regulatory agencies and transport operators.

SADC notes that despite the current expansion programs at most of the Region's ports, there is apparently an urgent need to increase port capacity and landside access beyond the projects already in the pipeline, particularly for existing deep-water ports, such as Nacala and Walvis Bay. It is noted that there was nothing mentioned about landlocked countries buying an interest in Ports, which is possible.

**Air Transport**

SADC record that air transport is a global enterprise based on commercial considerations. (As if other transport enterprises are not commercial!) Operations are governed by international conventions that stipulate SARPs under the auspices of ICAO. SADC concluded that there is need to expedite the establishment of an oversight body at the SADC level to augment the safety oversight capacity of national civil aviation authorities and to facilitate harmonization of regulatory and operating systems and procedures. One question is if this is really needed, what is SADC benchmarking with? **But there should be a regional air traffic control hub modeled on Euro-control in Brussels[24].**

Issues of market access in compliance with the Continental market liberalization initiatives within the framework of the Yamoussoukro Decision need to be addressed. The same will almost certainly apply to all regions except North America and Europe. SADC has identified priorities for cooperation including integration of the Regional upper air space, implementation of the Yamoussoukro Decision, incorporation of ICAO SARPs into national legislation and establishing joint regional training institutions.

**Intermodal Development**

A number of dry port projects are under construction or in the planning stages in the SADC Plan (Dry ports are needed to move cargo quickly away from congested sea ports for processing before onward transportation). It is noted that there is a need to ensure that there is adequate network of road rail transfer points. This is possibly as important as evolving the concept of dry ports or ICDs.

Intermodality is particularly applied to movement of containers from one mode of transport to another**,** but it also applies to where vehicles of one mode can use another, such as a ferry, roll on roll off, piggy back railways etc, as shown in Figure 21.

[24] http://en.wikipedia.org/wiki/Eurocontrol

**Figure 21: Intermodal transport - railway piggy back**


*Source: Canadian National Railways.*

### Investment Phasing and Costs

The master plan will be implemented over three five-year intervals - short term (2012-2017), medium term (2017-2022) and long term (2022-2027). This is in line with the SADC Vision 2027, a 15-year implementation horizon for forecasting infrastructure requirements in the region. It is also in line with the African Union's **Program for Infrastructure Development in Africa (PIDA)** and will constitute a key input into the Inter-Regional Infrastructure Master Plan and proposed tripartite Free Trade Area of SADC, the COMESA, and the EAC.

The total investment requirements are $ 860 Billion for the RDIMP as shown in Table 5.

**Table 5: SADC RDIMP Investment Needs**

| Sector | Program Description | Initial Investment Cost (USD) Billion |
|---|---|---|
| Energy | Energy generation and grid connections | 236 |
| Transport | Construction and Maintenance | 100 |
| ICT | Complete broadband connectivity | 383 |
| Meteorology | Improved equipment, manpower, expertise | 125 |
| Water | Investment Projects and Studies | 15 |
| Tourism (TFCAs) | TFCA Facilities Investment Plans | 1 |
| **Total** | | **860** |

*Source: SADC Transport Master Plan (2012).*

The total investment requirement for the transport sector was estimated to be $860 Billion. SADC expects that over 70% of the funding to come from the private sector. When the

implementation of the plan is reviewed, very little had been accomplished. It is suggested that a major constraint to the ability to raise private funding is the lack of progress towards regionalization as most projects by definition are cross border, depend on market liberalization, structural reform, political stability and elimination of economic crime.

**Partnership with Private Sector in Infrastructure Development**

From recent studies and as determined by the RIDMP, public financing of infrastructure continues to face challenges owing to fiscal limitations, as well as competing needs from other urgent socio economic sectors. In order to address this challenge, the RIDMP advocated for the adoption of joint public and private partnership participation in Regional Infrastructure development.

A further problem is the perceived political risk to investors of cross border investment and the lack of harmonization of regulations. In practice, some SADC States have invited the private sector to partner with governments on investment in infrastructure, either as sole investors or in the form of PPP. However, the practice has not been wide spread and has met with only limited success. Since future investment in infrastructure and transport services is largely contingent on the private sector, innovative ways of presenting or packaging investment need to be explored.

The RIDMP also recommended that States also need to explore elimination of monopolies and institutionalize open access options, where the services are more amenable to the private sector. Despite the global trend in PPP, there are few examples outside South Africa. It is a pity that given the enormity of the investment proposed, USD 850 Billion, the issue of project financing was not given greater prominence. Again, It is noted that the whole issue of cross border investment is not discussed either where an investor is interested in funding infrastructure that passes through two of more countries. However, the very existence of an investment plan enables investors to appreciate the bigger picture.

**Maintaining Asset Value**

One of the key challenges to sustainability and rehabilitation of infrastructure, as observed by the Diagnostic Analysis of the RIDMP, is the lack of application of cost reflective tariffs for the usage of infrastructure. This has resulted in limited resources for maintenance, dilapidation of infrastructure and crucially significant loss in asset value. Clearly the loss of value of strategic regional assets is not acceptable. Despite the importance of this issue, SADC has not really addressed it in the Master Plan. SADC needs to draft a protocol that member states maintain strategically important infrastructure as a matter of priority.

**User Pays Principle**

The User Pays is a principle that is developed slightly in the SADC Master Plan with regarding to power supply, but it is not extended to transport. It is crucial that this principle is widely accepted and that sustainable development is openly discussed between corridor development partners. Projects advanced through the SADC Master Plan must be both economically and

financially viable, which is rarely the case. Under-pinning this would be an agreement regarding the application of user charges for roads, railways, aviation, maritime and river transport. Inclusion of user pays principles in Transport Policy is a good start. The application of satellite tolling of all SADC roads would do much to advance this principle. This is being done on some roads in Germany, Austria, Slovakia and France.

### 3.7.2. European Union

**EU Support to Corridor Development and Regionalization**

Unsurprisingly, The EU is a long-standing supporter of regional integration and cooperation in ACP countries, and is set to remain so, as the EU has again clearly stressed this priority in its Agenda for Change – the blueprint for a higher-impact, more results-oriented EU development policy going forward. The strategic policy framework governing EU support for ACP regional integration is defined by the ACP-EU Cotonou Partnership Agreement and was formalized in the Commission Communication of 6 October 2008 on "*Regional integration for development in ACP countries*".

The main objectives of the EU regional cooperation are very important to note: (Those in bold are interesting for trade and transport)

1. *Support the expansion/improvement of infrastructure in line with regional and continental strategies, with an emphasis on completing the key "**missing links" and providing interconnectivity between national transport, energy and telecommunication networks, and notably.***
2. *Improve availability of and access to energy (including renewable), make further progress towards regional energy markets in particular by improving interconnectivity with neighboring countries and reinforcing regional strategies.*
3. *Contribute to the improvement of regional transport corridors (roads, railways, waterways, ports, airports, intermodal facilities) in line with regional priorities in order to reinforce the flow of transportation and to **promote closer regional integration by reinforced trade exchange.***
4. ***Improve regional telecommunication networks.***
5. ***Support regional core infrastructure projects** for safeguarding sustainable water supply.*
6. ***Improving the strategic and regulatory framework of regional infrastructure networks.***
7. ***Support the regional strategic and regulatory framework to progress towards smoothly functioning regional infrastructure systems** (transport, energy, aviation, telecommunications, etc.): enforcement of the axle load control strategy.*
8. *Support regional power trade, i.e. the development of a regulatory framework for transmission (wheeling tariff structure), establish transmission access regime, adopt electricity grid code, etc; and **facilitation of transit at border points, reduction of obstacles and delays (NTBs), harmonization of legislation and administrative procedures in telecommunications, transport** and energy, etc.*
9. ***Promote transposition of regional infrastructure related policies at national level.***

**EU - SADC Programming**

COMCEC should note that particular progress is expected to be made in the following areas:

1. Cross Border Third Party Motor Vehicle Insurance: recognizing the COMESA Yellow Card Scheme as the Tripartite scheme;
2. RTMS standard which will be used as a benchmark to audit and assess transporters and their clients with regard to the issues covered by the standard which now cover transport operations, border processes and adherence to other regulatory requirements during a transit transport movement across a number of countries;
3. Road Transport Market Liberalization (RTML);
4. Vehicle Over-Load Controls;
5. Harmonization of Vehicle Regulations and Standards.

## 3.8. Environmental and Energy Factors

The most successful transport corridors in terms of environmental and energy factors are the TEN-T. Corridor-wide climate and environmental appraisals are being done continuously in these networks. The important aspects are climate change mitigation, adaptation to climate change, reduction of negative environmental impacts, and tackling (rail) noise.

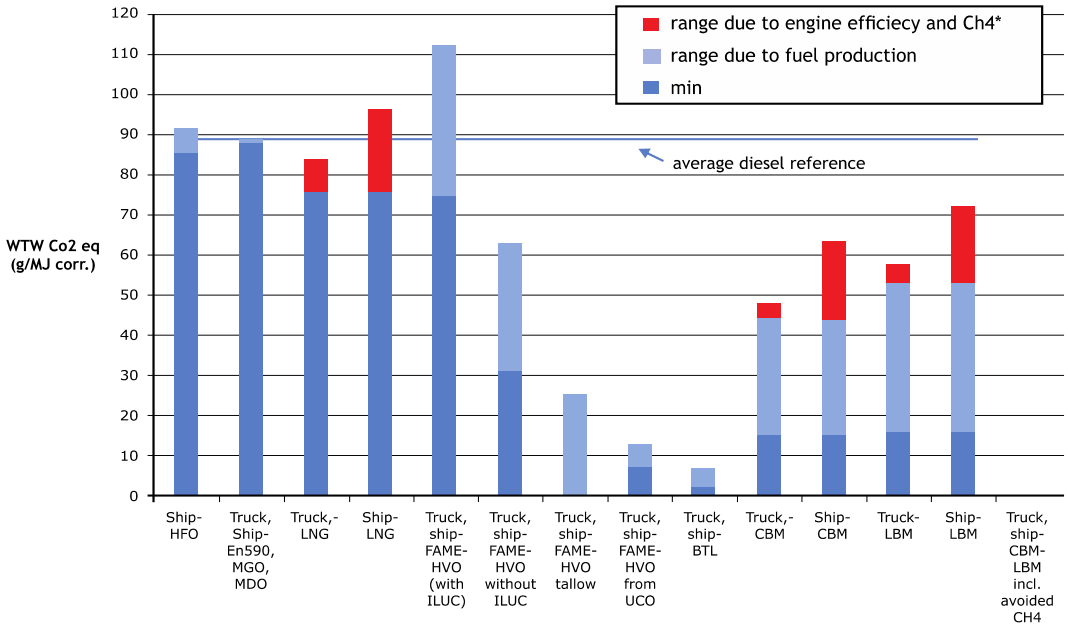
Besides other improvement activities, TEN-T work plans shall contain sustainable aspects through "*measures to be taken in order to mitigate GHG emissions, noise and, as appropriate, other negative environmental impacts*" (European Union, 2013).

**The Directive on the deployment of alternative fuels infrastructure (EU Directive 2014/94)** provides an example on the latest development. It requires Member States to develop national policy frameworks for the market development of alternative fuels and their infrastructure. At the same time it foresees the use of common technical specifications for recharging and refueling stations and by that paves the way for setting up appropriate consumer information on alternative fuels, including a clear and sound price comparison methodology. These are translated in the following objectives: 1) an appropriate number of compressed natural gas (CNG) refueling points along the TEN-T core network by end 2025; and 2) an appropriate number of LNG refueling points for heavy-duty vehicles along the TEN-T core network by end 2025.

For trucks, the application of LNG will lead to a GHG reduction of 10-15%, provided that the energy consumption increase of gas engines can be limited to some 5-10%. The following graph shows Well to Wheel (WTW)[25] GHG emissions for different fuels and transport modalities: truck, inland ship and sea ship.

[25] WTW emissions are the total of Well To Tank/WTT emissions (that are produced during the production of the fuel) and Tank To Wheel/TTW emissions (that are produced when the vehicles are being operated, as such the emissions are directly dependent on the required amount of fuel).

**Figure 22: Well to Wheel (WTW)[26] GHG emissions for different fuels and transport modalities: truck, inland ship and sea ship**




*Source: LNG for trucks and ships: fact analysis Review of pollutant and GHG emissions – Final, TNO, 2015.*

Introducing LNG/CNG for heavy-duty vehicles in TEN-T network faces several bottlenecks:

a. **Economic barriers**. In developing LNG/CNG infrastructure, there is a hurdle of needing to reach a minimum penetration threshold. The commercial viability depends highly on customers demand (number of LNG/CNG trucks per filling station), gas oil spread and the location of the filling station.
b. **Psychological barriers**. Logistic companies have been very conservative in their approach towards the use of alternative fuel for transport to tackle environmental issues. They would first like to see the technical viability and performance of the technology compared to the diesel solution.
c. **Regulatory barriers**. Large-scale roll out needs fixed and formalized standards, which can be applied for all filling stations.

Alternative fuels are key to improving the security of energy supply, reducing the impact of transport on the environment and boosting EU competitiveness. The lack of harmonized development of alternative fuels infrastructure across the Union prevents the development of economies of scale on the supply side and Union-wide mobility on the demand side. New

[26] WTW emissions are the total of Well To Tank/WTT emissions (that are produced during the production of the fuel) and Tank To Wheel/TTW emissions (that are produced when the vehicles are being operated, as such the emissions are directly dependent on the required amount of fuel).

infrastructure networks need to be built up, such as for electricity, LNG and CNG, and where appropriate, hydrogen and methanol.

Thus, new EU rules have been adopted to ensure the build-up of alternative refueling points across Europe with common standards for their design and use, including a common plug for recharging electric vehicles. Cross-border continuity needs to be ensured if an international continuity in infrastructure is to be obtained. Cross-border links should be taken into account with a view of enabling alternative fuels powered motor vehicles to circulate Union-wide.

As indicated in the Directive, Member States should therefore cooperate, where necessary, with other neighboring Member States at regional or macro-regional level, by means of consultation or joint policy frameworks, in particular where continuity of alternative fuels infrastructure coverage across national borders or the construction of new infrastructure in the proximity of national borders is required, including different non-discriminatory access options for recharging and refueling points. The coordination of those national policy frameworks and their coherence at Union level should be supported by cooperation between Member States and assessment and reporting by the Commission.

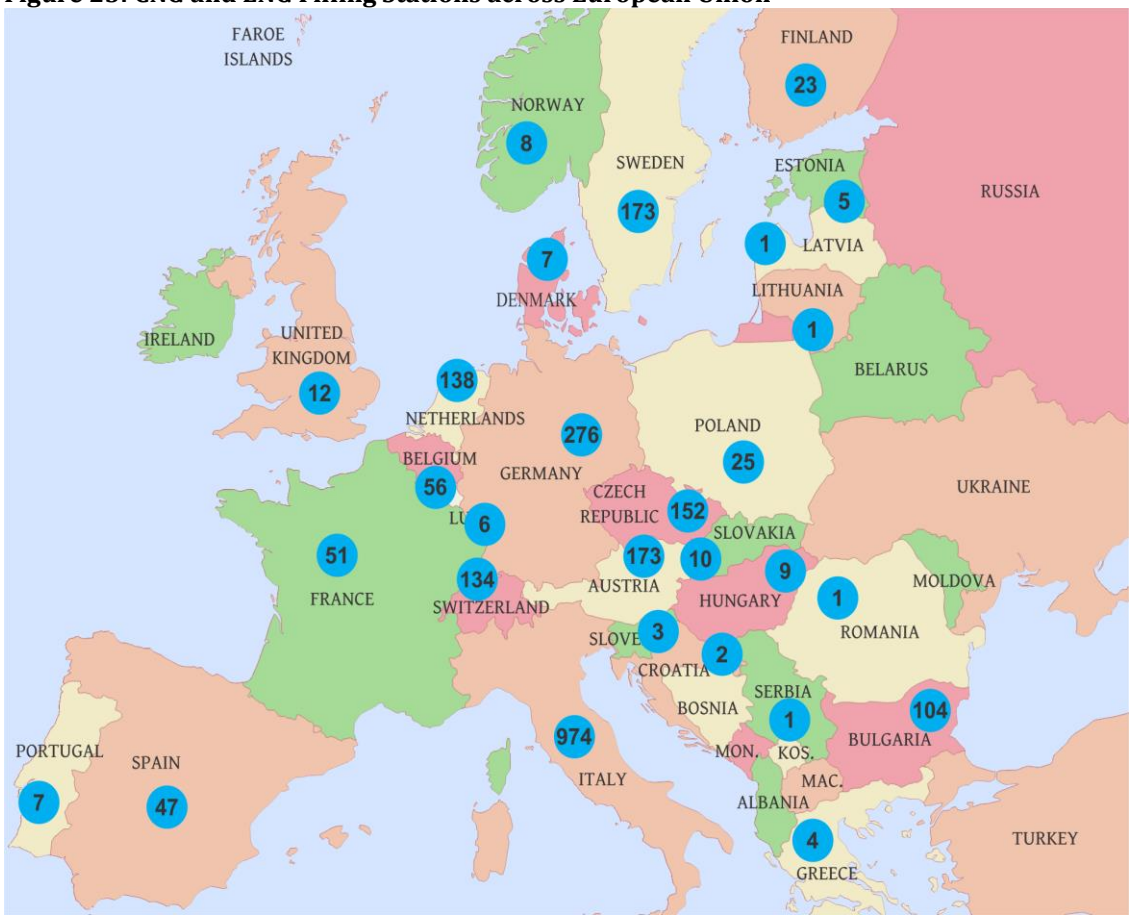
Currently, several initiatives and measures have been already taken into account and implemented to guarantee solutions ensuring interoperability across some neighboring Member States.

**Point of view of industry sector**

The European industry sector supports the effort of the European Commission to make the transport sector more sustainable. Not only because they are obliged to meet the European standards and requirements, but also because they are starting to realize the importance of being independent from fossil fuels. Based on the online survey conducted by Fimotions for industry representatives, sustainability is among the top three of decision-making criteria when it comes to freight transport. The other two are total costs (door-to-door) and quality of suppliers (ports, rail, barges, roads).

Furthermore, freight companies look for alternatives and multimodal channels next to each other in order to tackle environmental issues. Respondents with academic background also confirm this trend. They believe that multimodality through integration of ICT offers more value and opportunities.

**Figure 23: CNG and LNG Filling Stations across European Union**




*Source: Fimotions (2017); data source: NGVA Europe - www.ngva.eu, retrieved on June 7th 2017; map source: www.freeworldmaps.net*

## 3.9. Experts' Views on Successful Transport Corridors

In the period of April – July 2017, an online survey was organized in which transport corridor experts and industry representatives have participated. Each of these experts has been studying or is familiar with successful transport corridors outside the OIC region, such as Green Corridor in the North Sea Region, Scandinavian - Mediterranean, North Sea - Baltic, Rhine - Alpine, North Sea – Mediterranean, Atlantic, and South China – Europe. The opinion of these experts is summarized as follows:

1. Most experts agree that many transport corridors are developed following trade flows, and not the other way around. This is especially the case in Europe. After a while, the relation works both ways in which trade will occur more on a corridor that is efficient, cost effective, and reliable.
2. Rail, inland waterway, and maritime transport play an important role in a successful transport corridor. They offer not only low cost transport, but also high and steady

volumes. All successful corridors are multimodal corridors and most have both rail and road.

3. The trend regarding transnational transport corridors is the opportunity to reap multimodality value through the integration of modal systems using ICT. While the main challenges are:
    - Interoperability and harmonization issues
    - IT interconnectivity for travel planning, information and management
    - Sharing responsibilities among corridor countries for infrastructure planning and financing, and for removing bottlenecks.
    - Mismatch between national laws and operational issues
    - Addressing environmental challenges and providing seamless and reliable transport solutions.

## 3.10. Conclusion

The main lessons learnt from the successful transport corridors outside the OIC geography are as follows:

- Regional Integration drives the best examples of successful corridors. Regional master plans that are approved by all protagonists can set up corridor networks are likely to obtain funding.
- Reduction of NTBs along the supply chain will be as important as improving infrastructure.
- Intra-regional trade will increase with transport corridors.
- Coordination through a professional secretariat is vital.
- Maintenance must not be forgotten and ways and means of generating revenue needs serious consideration.
- Self-regulation is more effective than heavy police attention, in improving quality.

# 4. Transport Corridors in the OIC Member Countries

## 4.1. Introduction

This chapter reviews the transport corridors within the OIC geography. The review is divided in two sections. The first section (4.2) outlines the general situation of the transport corridors in the OIC geography.

The second section (4.3) presents six specific transport corridors that are selected as case studies. Each major OIC region (Middle Asia, Africa, and Middle East) is represented by two case studies; one case study is developed based on a study visit and the other one is based on a desk research.

**Table 6: Selected transport corridors as case studies**

| OIC region | Transport corridor | Research methodology |
|---|---|---|
| Middle Asia | TRACECA | Study visit |
| | CAREC | Desk research |
| Africa | Trans-African Highway 1 | Study visit |
| | Northern Transit Transport Corridor | Desk research |
| Middle East | International North-South Transport Corridor | Study visit |
| | Mashreq North-South Corridor | Desk research |

The information and analysis derived from studying the six case studies of transport corridors from around the world will facilitate the discussion in OIC and COMCEC in the following ways:

- Demonstrating experience of successful and less successful transport corridors
- Proving focus on the issues of importance when considering establishing transport corridors in OIC countries.
- Better appreciating the indirect as well as direct benefits of transport corridor development.
- Providing material for the construction of contemporary, comprehensive and forward looking corridor agreements.

Multinational transport corridors are of a complex nature, and highly contextual. The different character of the investigated corridors and the combination of methods and approaches adds to the understanding of the phenomenon of multinational transport corridors. By highlighting different facets of the corridors, COMCEC can learn lessons valuable when developing new and improving existing corridors.

## 4.2. General Situation

Within the OIC geography, there are more than 100 transport routes dispersed over Arab, Asia, and Africa regions. It should be noted that not all of these transport routes are transport corridors. A transport corridor should meet the criteria of a multi modal transport corridor that facilitates trade, such as the existence of a treaty and a coordinating secretariat. While

transport routes are merely constructed roads or rails that passes through different countries. Appendix 2 presents transport routes and transport corridors in the OIC regions. It is worth mentioning that transport corridors do not exist in the Arab region.

### 4.2.1. Political and Institutional Factors

For a transport corridor, the minimum institutional structure necessary is the corridor authority or secretariat. For some corridors, higher order organizations already exist such as SADC of COMESA in Africa. For Islamic countries, there are also such higher-level entities such as the OIC, Arab League and GCC. The consultants suggest that it will help tremendously if such multilateral entities brokered an agreement that stated.

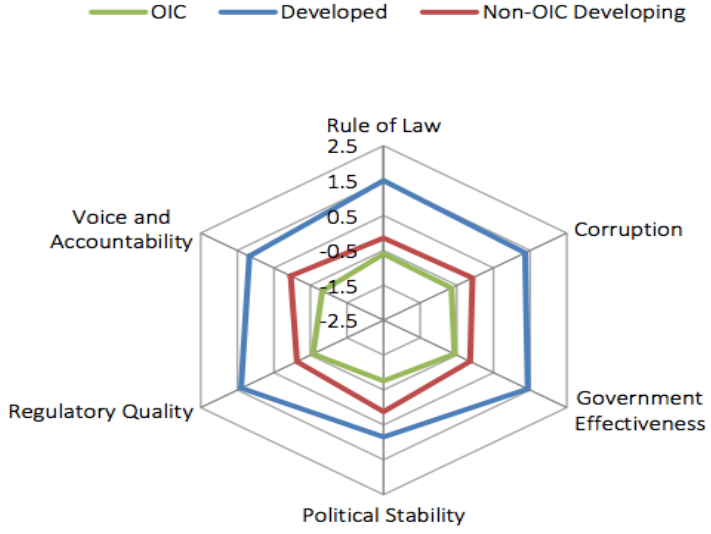
*where possible its members must cooperate through trade to foster economic and social development and, where it is in the national and regional interest, promulgate relations through the establishment of trade and transport corridors …*

If it went on to say…

*International and cross boarder investment will be positively influenced by the establishment of institutional structures judged to be conducive to fostering the development of international transport and related services*

Moreover, the institutional and governance quality of the national governments also plays an important role for the success of a transport corridor. For OIC countries, this aspect is relatively weak, as shown by Figure 24.

**Figure 24: Institutional and Governance Quality**




*Source: OIC-SESRIC (2016), SESRIC staff calculations based on World Governance Indicators of the World Bank.*

### 4.2.2. Economic factors

OIC has a diverse economic structure. According to Islamic Development Bank (2011) the OIC member countries "exhibit high levels of heterogeneity and diversity in their economic structure, performance, and income. The OIC countries are well-endowed with potential economic resources, especially in the fields of agriculture, land, energy and mining, and human resources, and they form a large strategic trade region that can be subdivided into three regional groups: Sub- Saharan African countries, Asian countries and MENA countries. Africa should broaden its economic base and not remain so dependent on commodity exports for its growth; financial crisis had spread to Africa through the impact on its commodity exports. A lesson to the continent from the global crisis had been that job creation had suffered from volatility in the commodities sector"

The promotion of economic growth through the improvement of trade competitiveness is the chief objective of the development of transport corridors. Therefore Islamic Development Bank (2011) views "analysis of existing trade patterns (exports, imports, and transit) among the OIC member states and between the OIC member states and the rest of the world as a prerequisite to identify and prioritize transport corridor initiatives."

Financing, key in establishing transport corridors, has been discussed in sections 2.5.1 and in 2.7.1, and is fully related to ownership. In the Transport and Communications Outlook 2016 (COMCEC, 2016) concludes, "Unfortunately, the OIC countries generally fail to achieve most of the preconditions" for a successful PPP implementation. "A successful implementation of a PPP project requires; (1) political and economic stability, (2) sound legal framework, (3) institutional capacity, (4) political commitment and support, (5) transparent and competitive tender procedures free from corruption, (6) an organized and developed domestic private entrepreneurship (including financial institutions and construction companies), and (7) public acceptance and support."

For the OIC countries, the total times taken and costs of exports are higher compared to the rest of the World except Sub-Saharan Africa, as shown in Table 7. Reducing customs and border crossing fees is difficult as at the country level, states rely heavily on tax and revenue collected by customs.

**Table 7: EoDB in the World's Regions in 2016**

| Region | Border Compliance | | Documentary Compliance | |
|---|---|---|---|---|
| | **Time to export** (hours) | **Cost to export** (USD) | **Time to export** (hours) | **Cost to export** (USD) |
| Sub-Saharan Africa | 103 | 583.4 | 92.6 | 229.6 |
| Latin America & Caribbean | 63.5 | 526.6 | 55.7 | 110.5 |
| East Asia & Pacific | 57 | 401.7 | 73.3 | 131.8 |
| South Asia | 59.4 | 376.1 | 78 | 182.6 |
| Europe & Central Asia | 28 | 195 | 26.9 | 110.7 |
| Middle East & North Africa | 64.4 | 459.6 | 77.4 | 261.3 |
| OECD high income | 12.4 | 149.9 | 2.6 | 35.7 |
| **OIC Average** | **73.4** | **492.3** | **80.4** | **209.5** |

*Source: World Bank*

### 4.2.3. Trade Facilitation

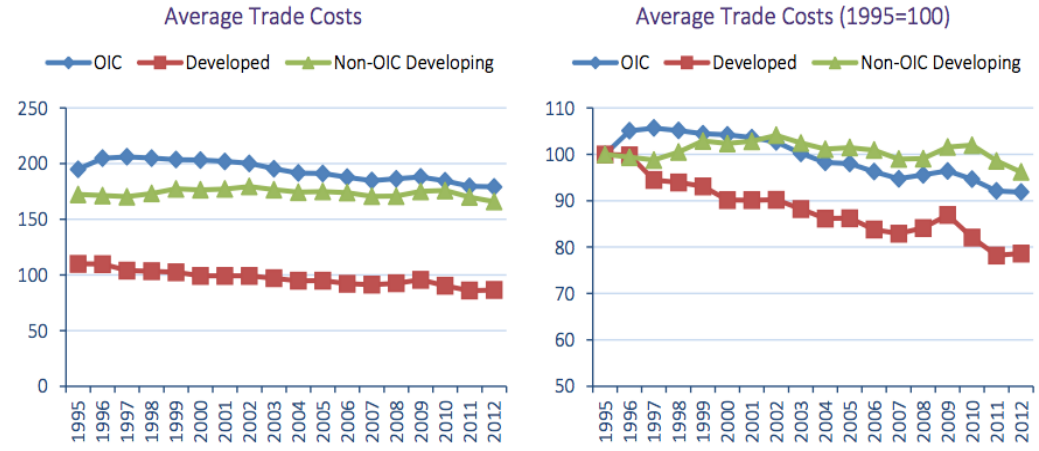
Different OIC regions have different objectives when it comes to the transport corridors development. For Asia, transport corridor secretariats like CAREC, TRACECA, and ECO have an objective to open-up the trade potential of the many landlocked Central Asian countries, promote intra-trade along the corridors, and to accommodate trade between Asia and Europe. As for Africa, unlocking the landlocked countries is also one of the main objectives together with poverty reduction. Since maritime access is not an issue for the MENA region, transport corridors are mainly considered as catalysts to enhance regional integration and trade cooperation, although this is not yet achieved. Regarding the Middle East (Islamic Development Bank 2011) identifies that a major problem for this region seems to be the low level of economic integration by way of international trade. This is most likely the result of the absence of proper transport corridors. This is also shown by the level of intra-trade in the OIC regions, which accounts for less than 10% of total trade.

Non-physical barriers to trade are major bottlenecks in OIC countries. Unofficial payments (corruption), multiple checkpoints, cumbersome border crossing, high insurance and tax, are some of the non-physical barriers that hampering the level of trade facilitation in OIC transport corridors.

(Islamic Development Bank 2011) also argues that with regard to the adopted objective of promoting intra-OIC trade, it can be seen that significant progress has been achieved in the last decade in the OIC region. The majority of the OIC member states have also now taken measures to liberalize their foreign trade: the number of countries with average tariffs higher than 20 percent and very high non-tariff barriers has dropped sharply by about 30 percent, decreasing from 64 percent in 1995 to 38 percent in 2005. On the other hand it seems that non-tariff barriers are yet to be tackled properly, with cumbersome customs and administrative procedures in place, technical barriers to trade, quantitative restrictions on imports, sanitary and phytosanitary measures, etc. This situation is especially very problematic in the SSA region.

The cost of transport is a factor influencing competitiveness of a country, and having a strong link with infrastructure. OIC – SESRIC (2016) analyses “the average trade costs for different country groups over the period 1995-2012. As it is evident, although tariffs in many countries are now at historical lows, overall trade costs remain high. Average trade costs tend to exhibit higher trade costs particularly in developing countries. OIC countries, on average, display even higher trade costs. In 2012, trade costs in OIC countries (179% ad valorem) were on average two times higher than those in developed countries (86% ad valorem).”

**Figure 25: Average trade costs**




*Source: OIC – SESRIC (2016), SESRIC staff calculation based on WB-UNESCAP.*

### 4.2.4. Social factors

Parallel to the development of infrastructure, in a micro-economic level, trade facilitation has a direct impact on total logistical costs, the sum of time and money involved in moving traded goods. Lower transport costs can lead to higher wages, thereby having a direct impact on poverty reduction. The associated increase and broadening of the exports of a country can reduce the vulnerability of the respective economy to exogenous shocks, increase the potential for knowledge spillovers in specific sectors, and have a positive impact on foreign direct investment (FDI) (Islamic Development Bank, 2011).

Within OIC policy, social objectives are highly prioritized. In November 2016 the OIC General Secretariat adopted the OIC-2025, a Program of Action comprising of 17 priority areas. The priority areas are peace and security, Palestine and Al-Quds, poverty alleviation, science, technology and innovation, education, health, environment, climate change and sustainability as well as culture and interfaith harmony and humanitarian action among others. The economic component includes poverty alleviation, trade, investment and finance; agriculture and food security; employment, infrastructure and industrialization; transport; energy; tourism as well as entrepreneurship and SMEs development. Each priority area has specific goals and actions.

OIC – SESRIC (2016) analyses the social capital within OIC. Different social protection and trust mechanisms have been instrumental in supporting community development throughout history. However, recent developments show that there are serious issues that undermine the trust and social cohesion in OIC countries. Another important dimension of inclusive development is wealth distribution, where the share of people with low welfare levels is significantly higher than other country groups.

According to OIC – SESRIC (2016), the current level of social capital seems to be rather weak. One of the traditionally most important strengths of OIC countries needs some attentions from

policy makers and community leaders to restore its role in social and economic development. Until then, social capital will not be considered among the major strengths of OIC countries in promoting growth and development.

Regarding the Sub Sahara African region Islamic Development Bank (2011) concludes that most countries still fail to maintain road networks adequate for economic and social needs of the populations. In spite of the challenging opportunities that exist in the context of social aspects of transportation corridors, the benefits of developing transport corridors along the African routes have been tremendous. Wider impacts have been the reduction of poverty, better access to healthcare services and markets, and better access to education. In sum, the expected benefits of transport corridor development in the African continent go beyond the improvement of trade competitiveness and include many social benefits such as poverty reduction or access to health and education.

#### 4.2.5. Safety, security and the legal liability

One of the enduring concerns for seamless trade and closer union between sovereign states is the aspect of security. Somehow the feeling pervades that "foreigners" will have lower standards and values. Security is a global issue; it is not local at all for it may be said that " trouble in one corner of the world impacts on us all'. Never the less, in some regions, armed conflict is more pervasive than in others. This being the case, concerns over security are understandable. Clearly a pre-requisite for integration and transport corridor development is normalization. Without peace, there can be basis for moving ahead with transport corridor development. Having said this, international transport development can also be seen as peace builder once overt hostilities have ceased. The study herein makes this point.

Safety, due to civil or non-military actions, such as road accidents, is a concern of course, and setting high and harmonized technical standards as well as regulation, of issues such as truck driving hours. This is well covered in the report. But public health is also an issue, when contemplating transport corridor development, as they provide ready conduits for the spread of communicable disease. Similarly concerns over animal health, such as foot and mouth disease, and plant diseases and food hygiene, are pertinent.

Crime spreads along transport corridors, such as weapons, drugs and people trafficking which may only be contained through the exchange of intelligence. Moreover, trade in illegal and counterfeit goods, money laundering and other economic crimes need also controlling. Thus, it can be demonstrated that political cooperation is over-arching, sharing common values, compatible, if not harmonized laws and the willingness to apply them are all essential qualities of successful transport corridors.

#### 4.2.6. Technical and Operational Factors

Literatures suggests that the OIC regions suffer from physical barriers to trade – as well as non-physical barriers, that is to poor inter-operability. Rail infrastructure is in significant shortage and underutilized, and it has different technical standards in participating countries In North Africa, missing rail links are an obvious challenge with a very high lack of

interconnections. Many countries in the SSR and the Middle East do not even have railway networks. The existing railways lack of investment and maintenance, and in some countries the infrastructure is damaged due to conflict.

Road infrastructure is being the first choice of transport companies. However, missing road links exist (especially at border areas) and affect trade negatively. In the major parts of the Arab region, roads conditions are very good. In some countries, infrastructures have been damaged or destroyed by war or other conflicts.

Harmonizing border management systems including customs controls has been a goal of UNCTAD for 25 years or more. The Un organization came up with a customs control and tracking system (ASYCUDA) that it set out to implement globally. Many countries have locked into this. Sharing customs risk information as well as trade related documentation using digital means is essential. Thus, agreements between countries of data exchange is as important as efficient transport – the process known as Electronic Data Interchange needs full implementation between corridor partners. This then leads to the installation of GNNS along the corridor so that transiting trade and their modes of transportation may be tracked. The report aims to cover all these aspects in various case studies.

Transport Corridors cannot be looked at in isolation, indeed without connecting networks they would not function at all. (COMCEC, 2016) refers to developing transport infrastructure as a powerful instrument for a wide variety of policy goals such as reducing logistics costs, poverty (through enhancing rural road infrastructure) and congestion, and enabling the mobility of the workforce. While for developed nations the challenge is to sustain the aging infrastructure in the most cost-effective way, for least developed nations, it is to establish a transportation infrastructure by meeting at least the basic needs. Roads are an important public asset as improving of it can bring about immediate and large benefits by providing better access to hospitals, schools, and markets; improved comfort, speed, and safety; and lower vehicle operating costs. This document also concludes that the road network in most OIC countries is not in a very good condition. The analyses point to a need for further development of the road networks in the OIC Member Countries. When comparing the composition of the road network in the OIC countries as a group to the road networks in the United States, and the European Union as a whole, it shows that a large percentage of the total road networks in OIC countries are motorways and highways. Such recognition of the weaknesses of current transport infrastructure provides a good platform upon which improvements can be made.

#### 4.2.7. Environmental and Energy Factors

Environmental and energy efficiency issues are almost absent in the transport corridor development in Islamic countries, most likely due to wide availability of oil and its low prices. As such, alternative fuels are viewed as unnecessary. Although there have been implementations of policies that encourage the use of CNG in the Arab region, notably in Egypt. Through the development of CNG infrastructure and by providing incentives to promote switching to natural gas such as lowering natural gas prices and tax reduction on CNG components, the Egyptian government has succeeded in increasing CNG vehicles in the

country. As shown in Table 8, the number of CNG vehicles in Egypt greatly exceeds those in other Arab nations, with Egypt also ranking 11th worldwide in terms of CNG vehicle usage[27].

**Table 8: Total Natural Gas Vehicles and Stations in Arab Region in 2013**

| Country | Total CNG Vehicles | CNG stations |
|---|---|---|
| **Algeria** | 125 | 3 |
| **Egypt** | 193,555 | 166 |
| **Tunisia** | 34 | 1 |
| **UAE** | 2,801 | 17 |

*Source: Alamo (2013)[28].*

Our online survey for the OIC Member States also showed similar issue. The respondents acknowledged that policy interventions to raise the demand for environmentally friendly international logistics and to target the supply side have been developed in some of the Member States. What is missing is a target of air emission reduction and a cooperation among countries in the region to achieve a common sustainability goal.

## 4.3. TRACECA Routes

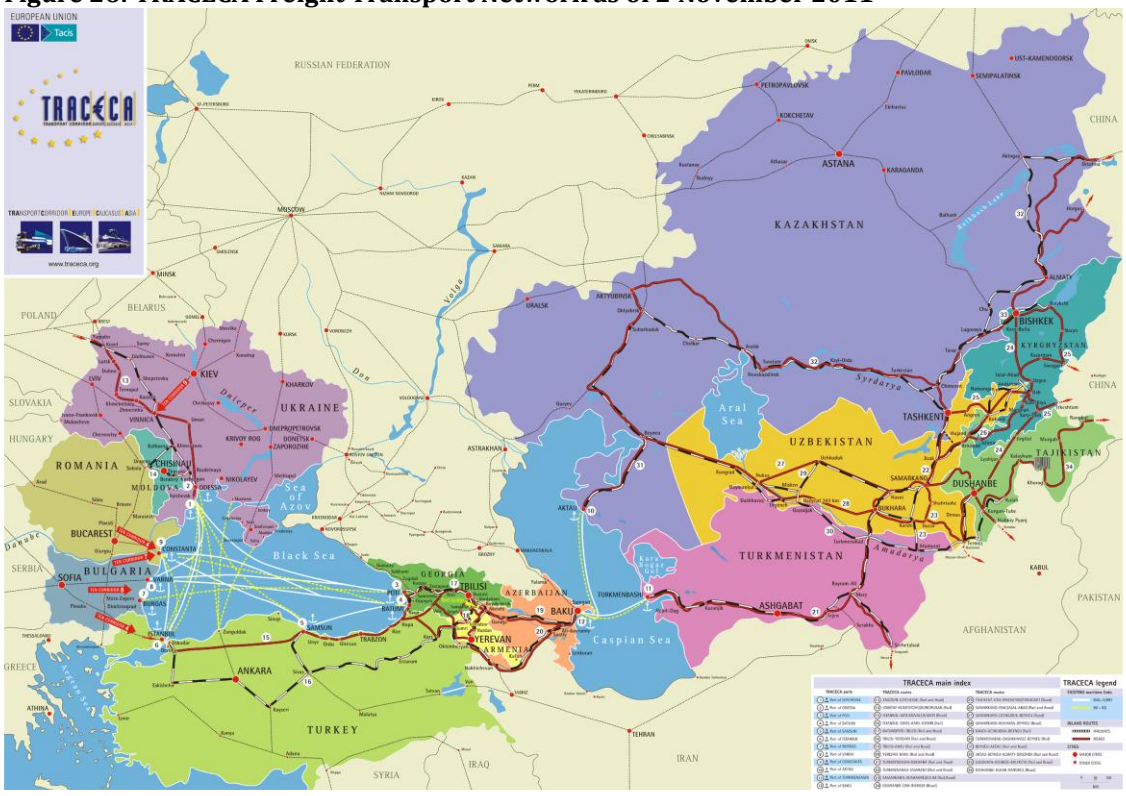
This case study builds on a literature review including scientific journal articles and grey literature, mostly technical assistance reports made available through TRACECA's website, interviews with key persons and primary data collected during a field visit to the TRACECA Secretariat in Baku 24-26 April 2017. A separate travel report with meeting notes and pictures is submitted separately. Findings from the field visit are emphasized rather than information from the open literature. The part on Political and Institutional Factors is deliberately extensive since there seems to be much to learn for COMCEC. Furthermore, the quantitative data presented is more detailed for the transit countries Georgia and Azerbaijan.

### 4.3.1. General factors

The Intergovernmental Commission (IGC) TRACECA (TRAnsport Corridor Europe-Caucasus-Asia) is a set of routes connecting Europe with Asia through countries located in a band south of Russia. It was initiated by the European Union in 1993 to stimulate economic development and political stability in the involved Commonwealth of Independent States (CIS) countries after the collapse of the Soviet Union. TRACECA comprises the transport system of the 13 member-states: **Azerbaijan**, Armenia, Bulgaria, Georgia, **Iran, Kazakhstan**, Kyrgyzstan, Moldova, Romania, **Tajikistan, Turkey**, Ukraine and **Uzbekistan**.

[27] ESCWA. (2013). Green Economy Initiatives Success Stories and Lessons Learned in the Arab World. New York: Economic and Social Commission for Western Asia.
[28] Álamo, J. d. (2013). NGVs and Refueling Stations Worldwide.

**Figure 26: TRACECA Freight Transport Network as of 2 November 2011**




*Source: TRACECA (2017).*

TRACECA facilitates trade and secures transport capacity and deep-water port access to land-locked countries (TRACECA, 2003b), but it also reflects EU's geopolitical ambitions by creating an alternative to transiting Russia for east-west transport on the Eurasian continent and tying the included countries politically firmer to the EU. Two TRACECA member states, Bulgaria and Romania, are now also members of the EU. The sphere of influence of TRACECA relates strongly to the Black Sea and Caspian Sea with EU aspirations to connect the Trans-European Networks for Transport (TEN-T) eastward as an element of the revival of the ancient Silk Route (Dekanozishvili, 2004, Acar and Gürol, 2016) and the Byzantine maritime links (Lyratzopouoou and Zarotiadis, 2014).

In particular, the routes T19-T22 and T24 in TRACECA's central parts are studied in detail. T19 is a 1700 km rail link connecting Istanbul with Gumri in Armenia, although the land border between Turkey and Armenia is closed, but it can also serve Georgia with a new link through Kars in eastern Turkey. T20 connects Tbilisi with the Black Sea ports Batumi and Poti by rail and road over 370 km. Tbilisi is also connected by rail and road to Yerevan in Armenia (T21, 290 km) and Baku in Azerbaijan (T22, 580 km). T24, finally, is a 1350 km rail and road link between the Caspian Sea port Turkmenbashi in Turkmenistan and the ancient Silk Route city of Bukhara in Uzbekistan. Note that Turkmenistan is not member of TRACECA, but might become that soon (Ciopraga, 2017). Rail and RoRo ferries connect Baku and Aktau (300 nautical miles), but the maritime links are not numbered by TRACECA. The land borders

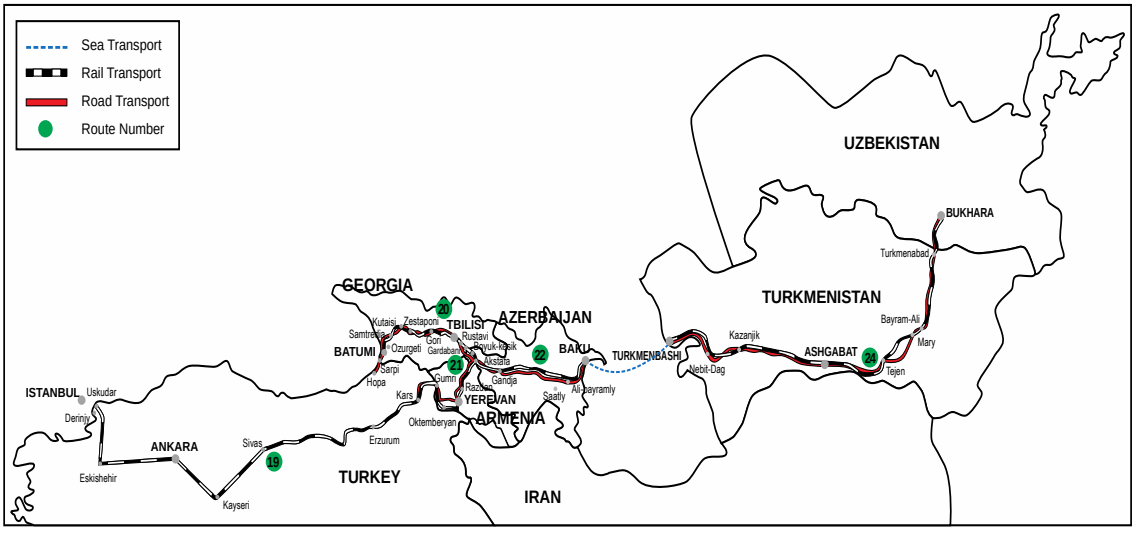
between Armenia and Turkey and Azerbaijan are closed due to the on-going conflict over Nagorno-Karabakh, but trade can find its way via a detour through Georgia or by air transport. The involved OIC member states are presented in the table below and illustrated in the map in Figure 27.

**Table 9: Corridor profile TRACECA routes T19-T22 and T24**

| Location | Countries covered | Length (km) | Secretariat |
|---|---|---|---|
| Eastern Europe to Central Asia | **Turkey, Georgia, Azerbaijan**, Armenia, **Turkmenistan, Uzbekistan** | 4,300 | Baku, Azerbaijan |

Note: Countries in bold are OIC Member Countries

**Figure 27: TRACECA routes T19-T22 and T24**




*Source: Fimotions, 2017*

In this case study, the wider issues concern the whole of TRACECA while the empirical details are, as far as possible, focused on the studied routes and particularly Georgia and Azerbaijan at the heart of the selected routes.

### 4.3.2. Political and Institutional Factors

TRACECA differs from most corridor initiatives since it is signed by heads of state and not, as usual in corridor agreements, by ministers of infrastructure/transport or the like. The political developments between Armenia and Azerbaijan troubled the signing, but EU conditioned the funding upon Armenia's inclusion but Armenia was represented by the prime minister rather than the president at the first conference in Baku in 1998. The multilateral agreement (TRACECA, 1998) is very important and acts as TRACECA's constitution. A special feature that, in the view of Mustafayev (2017), both helps and creates problems is that the decisions at minister level must be taken in consensus. Important parts are the tariff agreements and the technical annexes.

The TRACECA Secretariat depends much on national coordinators and seems to have developed few links directly with transport operators in each country. The appointment of national coordinators mirrors political changes in the member states and while Azerbaijan has had one national coordinator, Georgia has been represented by about ten different persons and Romania by six. Armenia and Tajikistan changes less often and most country's national coordinators over the years are about five.

According to Abbasova (2016) TRACECA has received 187 M€ in EU funding over the years. The EU funding has mostly been spent on some 70 Technical Assistance Projects (TAPs), typically performed by large European consultancy firms, but since two years there are no more funding and thus no on-going TAPs (Ciopraga, 2017). EU has also issued an investment manual (Ehrlich *et al.*, 2012), hosted two investment forums for TRACECA member states and International Financial Institutions (IFIs). So far 31 investment projects have been approved based on the TRACECA feasibility studies.

The halt in EU funding is of course a big problem. TRACECA's Secretary General has approached the European Commission's DG Neighborhood and received polite responses but no commitments, implying that the EU now wants to see TRACECA member state actions based on the funding of TAPs.

The TAPs resulted in "books" and TRACECA now needs to act on the content in those reports (Ciopraga, 2017). This emphasizes the need for long-term continued funding to realize the best results from the extensive and expensive corridor studies. The secretariat has a staff of approximately ten persons, experts in land transport, maritime and legal issues. The national coordinators have two annual meetings and an annual workshop/meeting is held at minister level. At present the TRACECA member states fund the work of the secretariat (office rent, staff, national coordinators and the three annual events) (TRACECA, 2005) and the fee is 60 000 € per year and country (Ciopraga, 2017). In addition, the member countries assist with studies.

At the moment, the main contribution from the TRACECA Secretariat to member states are continued work along the plans drawn up in the TAPs, its feasibility studies and priorities helping the member states in their discussions with IFIs (Ehrlich *et al.*, 2012, TRACECA, 2014). For instance, the roadmaps and action plans from the LOGMOS project (Egis International and Dornier Consulting, 2014) are now implemented, however at a slow pace.

Regarding governance, the success of TRACECA is limited by the lack of institutional power. The secretariat can only ask the member states "politely" to conform and TRACECA has no priority over other multinational corridors in the member states' infrastructure planning. The secretariat has requested an arbitrage role to solve disputes, but member states have refused. The country coordinators have enough competence to solve their tasks and they are helpful and Ismayil (2017) finds that dissemination among TRACECA member states works well.

Central Asia is increasingly influenced by overlapping institutions with a strong Asian identity, that coexist with the region's Western institutional references as is thoroughly investigated by Contessi (2016). Another option for long-term funding is that China steps in as part of the ambitions with One-Belt One-Road initiative[29] (OBOR). TRACECA seeks a Memorandum of Understanding (MoU) with Chinese Silk Road Chamber of International Commerce and hope to sign in the autumn of 2017 and TRACECA has sent its list of potential investment projects. According to Ismayil (2017), China works intensely to build markets and if EU won't continue with TRACECA support, eventually the Chinese will. So far, however, it seems that China is more interested further to the east, in the western parts of the China-Europe land bridge and particularly on the TRACECA routes studied in detail in this case study, the transport system already works rather well. Lack of infrastructure and insufficient transport quality are not the critical problems in the west.

TRACECA also seeks a MoU with CAREC, but diplomatic negotiations are slow (Ciopraga, 2017). In addition it is expected to sign a MoU with Crans Montana Forum[30] during 2017. It will add a discussion forum for TRACECA focusing on inter-regional affairs.

TRACECA coordinates with some other adjacent corridors like CAREC, but so far it lacks active cooperation with the North-South Transport Corridor that crosses TRACECA in Azerbaijan. Trans-Caspian International Transport Route (TCITR) is an initiative between transport operators along TRACECA. It involves state owned railways, ports and ferry lines but does not include road transport. There are no private participants so far, but Romanian actors including the private sector have shown an interest. TCITR cooperates well with TRACECA but through the national contacts rather than between the two corridor layers, infrastructure and operations.

Both Ciopraga (2017) and Ismayil (2017) emphasize that TRACECA is open for new members and likes to expand. Turkmenistan, Pakistan and Afghanistan are close to become members and Greece is close to join as observer. Ismayil (2017) would also like to see deeper involvement from some existing member countries. Iran, for instance, has some special legislation that is problematic in a corridor perspective and has ratified some international agreements in its own way.

**Transport Strategies and Planning**

Corridors are mentioned and analyzed in different extent in the transport plans of the core countries of the TRACECA study. Whereas TRACECA is mentioned 120 times (!) in Azerbaijan's Transport Development Strategy (Asian Development Bank, 2006), 14 times in Georgia's Transport Sector Assessment, Strategy, and Road Map (Asian Development Bank, 2014b), it is not mentioned at all in Armenia's corresponding document (Asian Development Bank, 2011). Corridors are mentioned as a factor for developing the transport system, but it only refers to

[29] http://english.gov.cn/beltAndRoad/
[30] http://www.cmf.ch/

the North-South corridor between Russia and Iran. Nevertheless, the report on Azerbaijan is 235 pages long and more detailed than the other reports containing 48 and 36 pages respectively.

No information can be found with regard to the transport strategies of other corridor countries.

**Table 10: Corridor Features in National Transport Plans of Corridor Countries**

| Country | Document reviewed | Transport and corridor development features |
|---|---|---|
| **Azerbaijan** | Executive Summary of Overview of the Azerbaijan Transport System & Transport Sector Development Strategy | - TRACECA National Secretary is involved in the development of this document.<br>- It acknowledges the need to improve the TRACECA corridors to ensure future growth of traffic, and to harmonize transport and customs legislation. |
| **Georgia** | Georgia Transport Sector Assessment, Strategy, and Road Map (2014) | - It recognizes that making the transport system an integral part of the TRACECA and CAREC corridors is vital for sustaining investments in other trust areas.<br>- It acknowledges that TRACECA would only be competitive when connected and operated efficiently to reduce travel time and costs. |
| **Armenia** | Armenia's Transport Outlook – Transport Sector Master Plan | None |

*Source: Fimotions (2017).*

### 4.3.3. Economic factors

Despite some protectionist trends in parts of the world, globalization is here to stay and transport systems are obviously the backbone of international trade. Guluzade (2017) claims that developing infrastructure and transport services is more important for Azerbaijan's development than extracting raw materials. It is a remarkable, but not surprising, statement from a country much dependent on crude oil. International trade is obviously the baseline also for TRACECA although passenger transport is a factor for some corridor segments. The trade matrix in Table 12 shows that rather modest shares of each country's foreign trade is related to other TRACECA member states, except for Tajikistan (58% of imports and 18% of exports), Georgia (44%/36%) and Moldavia (36%/41%).

**Table 11: Trade matrix TRACECA**

| | COUNTRY | Imports (Million USD) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | AZER | ARME | BULG | GEOR | IRAN | KAZA | KYRG | MOLD | ROMA | TAJ | TURKEY | UKRA | UZBE | Total | World | % |
| Exports (Million USD) | AZER | | N/A | N/A | 449 | 139 | 10 | 1 | 0 | 0 | 2 | 458 | 69 | 62 | 1,191 | 12,642 | 9.4% |
| | ARME | 2 | | 152 | 142 | 75 | 6 | 1 | 0 | 27 | 1 | 0 | 8 | 2 | 417 | 1,776 | 23.5% |
| | BULG | 12 | 20 | | 184 | 76 | 17 | 2 | 21 | 2,290 | 2 | 2,090 | 82 | 14 | 4,809 | 26,088 | 18.4% |
| | GEOR | 153 | 151 | 167 | | 47 | 40 | 7 | 2 | 37 | 6 | 174 | 73 | 71 | 928 | 2,114 | 43.9% |
| | IRAN | N/A | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | - | 46,068 | 0.0% |
| | KAZA | 106 | 0 | 47 | 19 | 551 | | 376 | 18 | 724 | 372 | 851 | 911 | 923 | 4,900 | 36,775 | 13.3% |
| | KYRG | 1 | 0 | 5 | 3 | 8 | 151 | | 0 | 2 | 22 | 90 | 3 | 125 | 410 | 1,423 | 28.8% |
| | MOLD | 5 | 1 | 76 | 17 | 1 | 13 | 2 | | 513 | 1 | 62 | 50 | 6 | 745 | 2,045 | 36.4% |
| | ROMA | 44 | 3 | 2,047 | 194 | 369 | 64 | 4 | 832 | | 0 | 2,017 | 444 | 19 | 6,038 | 63,581 | 9.5% |
| | TAJ | 0 | 0 | 0 | 0 | N/A | 218 | 6 | 0 | 0 | | 162 | 3 | N/A | 390 | 673 | 58.0% |
| | TURKEY | 1,286 | 0 | 2,384 | 1,177 | 4,969 | 625 | 309 | 262 | 2,672 | 152 | | 1,254 | 533 | 15,623 | 142,606 | 11.0% |
| | UKRA | 319 | 102 | 419 | 403 | 534 | 713 | 76 | 524 | 570 | 30 | 2,772 | | 174 | 6,635 | 36,736 | 18.1% |
| | UZBE | 6 | 2 | 2 | 9 | N/A | 588 | 70 | 3 | 1 | N/A | 709 | 62 | | 1,446 | 6,983 | 20.7% |
| | Total | 1935 | 277 | 5300 | 2598 | 6767 | 2445 | 854 | 1664 | 6836 | 587 | 9385 | 2959 | 1929 | 43,529 | | |
| | World | 7097 | 3230 | 28875 | 7236 | 46237 | 25175 | 3844 | 4020 | 74605 | 3223 | 198602 | 38199 | 9163 | | 379,510 | |
| | % | 27.3% | 8.6% | 18.4% | 35.9% | 14.6% | 9.7% | 22.2% | 41.4% | 9.2% | 18.2% | 4.7% | 7.7% | 21.1% | | | 11.5% |

*Source: Fimotions (2017), analysis on data on www.trademap.org.*

However, with many landlocked countries, parts of TRACECA is likely to be used much also for trade with third parties. The intra trade of the selected routes is shown in Figure 28.

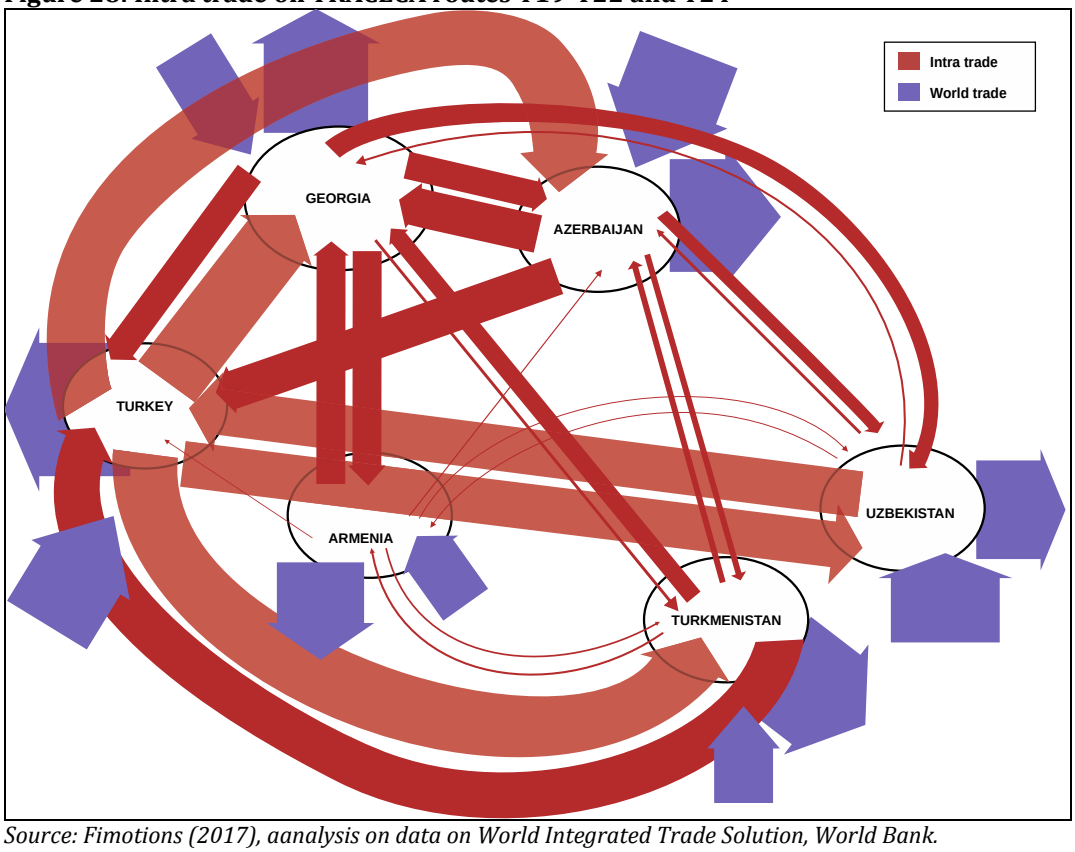
**Table 12: Trade matrix TRACECA routes T19-T22 and T24 countries**

| | Country | Imports (Million USD) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | AZER | ARME | GEOR | TURKEY | TURKM | UZB | Total | World | % |
| Exports (Million USD) | AZER | | N/A | 449.13 | 457.50 | 13.10 | 61.67 | **981** | **12,637** | **7.8%** |
| | ARME | 2.26 | | 142.46 | 0.48 | 5.24 | 1.84 | **152** | **1,776** | **8.6%** |
| | GEOR | 153.46 | 150.65 | | 173.57 | 10.35 | 71.30 | **559** | **2,114** | **26.5%** |
| | TURKEY | 1,285.84 | 0.00 | 1,177.09 | | 1,245.51 | 533.32 | **4,242** | **142,606** | **3.0%** |
| | TURKM | 19.62 | 6.23 | 75.48 | 422.49 | | N/A | **524** | **7,415** | **7.1%** |
| | UZB | 6.23 | 1.56 | 9.26 | 709.29 | N/A | | **726** | **6,984** | **10.4%** |
| | **Total** | **1,467** | **158** | **1,853** | **1,763** | **1,274** | **668** | **7,185** | | |
| | **World** | **7,157** | **3,230** | **7,236** | **198,602** | **4,664** | **9,141** | | **173,531** | |
| | **%** | **20.5%** | **4.9%** | **25.6%** | **0.9%** | **27.3%** | **7.3%** | | | **4.1%** |

***Source: Fimotions (2017), analysis on data on www.trademap.org.***

However, with many landlocked countries, parts of TRACECA is likely to be used much also for trade with third parties. The intra trade of the selected routes is shown in Figure 28.

**Figure 28: Intra trade on TRACECA routes T19-T22 and T24**




*Source: Fimotions (2017), aanalysis on data on World Integrated Trade Solution, World Bank. Retrieved on June 13th 2017.*
Note: the thickness of the line represents the trade volume

At the heart of the studied routes, Azerbaijan is an interesting case and the trade data is presented in Table 13 emphasizing the significant importance of the fossil fuel export. The majority is exported in its raw forms of crude oil and natural gas, accounting to 85% of the volume and 82% of the value of Azerbaijan's export, but there is also a rather extensive export of refined oil products and plastics. Altogether, the petroleum based products account for 95% of the volume and 87% of the value of the export. The import is more fragmented, but foodstuffs dominate in volume by 62% but only account for 9% of the value. On the other hand, metals, electrical and other products, plastics and vehicles account for 59% of the value but only 29% of the volume.

**Table 13: International trade of Azerbaijan in weight and value (2016)**

| Commodities | Export | | Commodities | Import | |
|---|---|---|---|---|---|
| | Quantity, kton | Value, MUSD | | Quantity, kton | Value, MUSD |
| Crude oil | 20,901 | 6,504 | Products | | 1,322 |
| Oil products | 1,541 | 409 | Meat | 33 | 38 |
| Natural gas | 6,754 | 970 | Milk | 5 | 8 |
| Electric products | 646 | 28 | Butter | 14 | 48 |
| Fruits & vegetables | 378 | 372 | Fruits | 317 | 135 |
| Tea | 1 | 6 | Tea | 13 | 44 |
| Vegetable oil | 16 | 17 | Wheat | 1,600 | 295 |
| Sugar | 108 | 62 | Vegetable oil | 154 | 144 |
| Alcohol | | 18 | Sugar | 365 | 152 |
| Chemical products | 276 | 55 | Tobacco | | 153 |
| Plastics | 1,445 | 98 | Cement | 376 | 18 |
| Cotton | 9 | 18 | Pharmaceutics | 10 | 196 |
| Metals | 223 | 96 | Plastic | 152 | 281 |
| Aluminum | 66 | 98 | Textiles | | 189 |
| Others | | 386 | Metals | 853 | 1,118 |
| | | | Electric products | | 2,013 |
| | | | Vehicles | 152 | 813 |
| | | | Furniture | | 111 |
| | | | Others | | 2,314 |
| **Total** | **32,364** | **9,137** | **Total** | **4,044** | **9,392** |

*Source: TRACECA.*

The TRACECA member states can be divided in three groups: 1) west and north of the Black Sea, 2) south of and between the Black Sea and Caspian Sea, and 3) east of the Caspian Sea.

**Openness Index** is an economic metric calculated as the ratio of country's total trade (the sum of exports plus imports) to the country's GDP. The higher the index the larger the influence of trade on domestic activities. It is a measure of the extent the which the economy trades with the outside world and that is important for an assessment of the relevance of an international transport corridor. The trade openness of the member states, defined as being the value of trade compared to GDP, differs between the three groups with a tendency of successively decreasing openness towards the east. Outliers are Azerbaijan in group 2 with comparatively low openness, Tajikistan with a rather high and the Kyrgyz Republic with a very high openness compared to the rest of group 3 as visible from Table 14. In this table, Turkmenistan is included for better comparison even though it is not member of TRACECA.

**Table 14: Openness of TRACECA countries**

| Country | USD Millions | | | Openness |
|---|---|---|---|---|
| | GDP | Imports | Exports | |
| **AZER** | 53,047 | 9,211 | 11,327 | 38.7% |
| **ARME** | 10,561 | 3,230 | 1,776 | 47.4% |
| **BULG** | 48,953 | 28,875 | 26,088 | 112.3% |
| **GEOR** | 13,965 | 7,236 | 2,114 | 66.9% |
| **IRAN** | 425,326 | 68,319 | 130,544 | 46.8% |
| **KAZA** | 184,361 | 25,175 | 36,775 | 33.6% |
| **KYRG** | 6,572 | 3,844 | 1,423 | 80.2% |
| **MOLD** | 6,551 | 4,020 | 2,045 | 92.6% |
| **ROMA** | 177,954 | 74,605 | 63,581 | 77.7% |
| **TAJ** | 7,853 | 3,223 | 673 | 49.6% |
| **TURKEY** | 718,221 | 198,602 | 142,606 | 47.5% |
| **TURKMEN** | 37,334 | 4,664 | 7,415 | 32.4% |
| **UKRA** | 90,615 | 37,516 | 38,127 | 83.5% |
| **UZBE** | 66,733 | 9,163 | 6,983 | 24.2% |

*Source: Fimotions (2017), analysis on data on www.trademap.org.*

### 4.3.4. Trade Facilitation

For the longer flows between Europe and the Far East, TRACECA routes mainly compete with inter-continental shipping and rail through Russia. A major concern for the competitiveness is the number of border crossings, so this section focuses how TRACECA addresses the administrative interface between member countries, whereas more technical harmonisation is dealt with under Technical and Operational factors.

TRACECA works towards implementation of one stop border crossings rather than one exit and one entry border post. According to Ismayil (2017), it is difficult and a bit slow to implement, but Turkey-Georgia works as well as the border between Ukraine and Moldova. Sometimes borders are closed due to political arguments, e.g. between Uzbekistan and Tajikistan. In addition, the land borders between Armenia and Azerbaijan and Turkey respectively are closed as mentioned above, but air transport works. *Transports Internationaux Routiers* (or International Road Transports, TIR)[31] for road transit is implemented in most countries, but Iran has tougher rules than other countries. Iran has ratified the Geneva convention for free passage but has implemented own version and imposes a very high fuel surcharge.

The main problem for rail is the administrative process at border crossings. TIR does not apply to rail, Agreement on International Goods Transport by Rail (SGMS) is the equivalent, but it is not implemented along TRACECA. Paperless rail transport is wanted, but legal amendments have to be done in member states. The border between Ukraine and Moldova works well, though.

[31] https://www.iru.org/tir

TRACECA asks the member countries about border crossing times, but it seems that the replies are not fully useful to make up a coherent picture (Ismayil, 2017). For road transport, TRACECA also works with the International Road Transport Union (IRU), which asked road hauliers about the border transit times in the NELTI project[32] but monitoring seems to have stopped after 2009. TRACECA has a hotline system; the road hauliers/chauffeurs have a phone number to the national coordinators and can report border crossing and other issues relating to corridor performance. They are recorded and at the meetings, the accumulated lists are discussed with an aim to remove bottlenecks. Rail border crossing is difficult and the paper process can take 5-6 hours. Good examples are the new rail link Iran-Armenia with single border control as well as the border Ukraine-Moldova.

The main border crossings, but not all, offer 24 hour service. (Ismayil, 2017) does not consider interoperability a significant problem today, but it might become problematic when flows increase.

A good indicator for capturing much of the desired information and for measuring the overall effectiveness of corridor performance is the LPI. It indicates the easiness and efficiency of trade in a country. This compilation includes customs and border procedures quality and competence, infrastructure, tracking and tracing of goods in transit, paperwork needed for international shipments and punctuality/timeliness. The World Bank issues the LPI (Arvis *et al.*, 2016) and the TRACECA member states are on the list as shown in Figure 29.

**Figure 29: Logistics Performance Index in TRACECA Member states**


*Source: Fimotions (2017), data source: The World Bank.*

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[32] See http://www.iru-nelti.org/index/en_nelti_index and http://www.unescap.org/resources/timecost-distance-methodology on IRU's initiative.

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Figure 29 shows that a number of years of steadily higher values of LPI was followed by a stagnation in 2014 and changed for the worse in the 2016 assessment. Most TRACECA member states showed significantly lower performance. Among the countries of the selected routes, Turkey has a good score of 3,42 giving a rank as 34th of 160 countries, but Uzbekistan (2,40/118th), Azerbaijan (2,47/118th for 2010-2016, not ranked 2016), Georgia (2,35/130th),

Turkmenistan (2,21/140st) and Armenia (2,21/141st) all have low rankings. Among other TRACECA countries, Kazakhstan (2,75/77th) does reasonably well.

The ease of doing business (EODB) is a compilation of factors, which includes the quality of financial markets that reflects the philosophy of the World Bank. It would be logical to assume that as trade improves due to the effect of a transport corridor, the constraints on doing business would improve as well. A nation's ranking on the index is based on the average of 10 sub-indices that are set out below:

- Starting a business – Procedures, time, cost and minimum capital to open a new business
- Dealing with construction permits – Procedures, time and cost to build a warehouse
- Getting electricity – procedures, time and cost required for a business to obtain a permanent electricity connection for a newly constructed warehouse
- Registering property – Procedures, time and cost to register commercial real estate
- Getting credit – Strength of legal rights index, depth of credit information index
- Protecting investors – Indices on the extent of disclosure, extent of director liability and ease of shareholder suits
- Paying taxes – Number of taxes paid, hours per year spent preparing tax returns and total tax payable as share of gross profit
- Trading across borders – Number of documents, cost and time necessary to export and import
- Enforcing contracts – Procedures, time and cost to enforce a debt contract
- Resolving insolvency – The time, cost and recovery rate (%) under bankruptcy proceeding

It is being compiled annually to provide an insight into the progress that individual countries are making to simply and streamline business processes. The performance of the TRACECA member states are shown in Table 15.

**Table 15: EoDB of TRACECA member states**

| Country | Ranking | | Border Compliance | | Documentary Compliance | |
|---|---|---|---|---|---|---|
| | Overall | Trading across borders | Time to export (hours) | Cost to export (USD) | Time to export (hours) | Cost to export (USD) |
| **ARME** | 38 | 48 | 39 | 100 | 2 | 150 |
| **AZER** | 65 | 152 | 29 | 214 | 33 | 300 |
| **BULG** | 39 | 21 | 4 | 55 | 2 | 52 |
| **GEOR** | 16 | 54 | 14 | 383 | 2 | 35 |
| **IRAN** | 120 | 170 | 101 | 565 | 152 | 143 |
| **KAZA** | 35 | 119 | 133 | 574 | 128 | 320 |
| **KYRG** | 75 | 79 | 20 | 445 | 21 | 145 |
| **MOLD** | 44 | 34 | 3 | 76 | 48 | 44 |
| **ROMA** | 36 | 1 | 0 | 0 | 1 | 0 |
| **TAJ** | 128 | 144 | 75 | 313 | 66 | 330 |
| **TURKEY** | 69 | 70 | 16 | 376 | 5 | 87 |
| **UKR** | 80 | 115 | 26 | 75 | 96 | 292 |
| **UZB** | 87 | 165 | 112 | 278 | 174 | 292 |

*Source: World Bank (2017b).*

The figures are issued for whole countries and are not necessarily the same for the transport along TRACECA, but the member states show a wide variety in their performance. Iran and Tajikistan takes fairly low positions (in all almost 200 countries are ranked), whereas he World Bank finds it easy to trade with Georgia, Kazakhstan and Armenia and rather easy with Azerbaijan and Turkey. Compared to the LPI, Georgia takes a surprisingly high position and Turkey a low one.

### 4.3.5. Social factors

Transport is a phenomenon that depends on and affects a truly wide variety of society sectors. Many social effects are derived from the economic development described above, but in human history, trade and transport has been an instrument to not only move people and goods but also to spread knowledge, scientific approaches, ideas, culture and religion. This section is focused on the capacity building needed for the transport corridor to function, but also for wider development of human resources along the corridor.

Based on the figures in Table 16, the TRACECA member states have a joint population of 313 million with an average unemployment rate of 9,5% and they host some 22,5 million people (7,2%) living in poverty. Hence, there is a certain need for economic growth and a significant potential for it if more people could be set to work. Also for the social factors, the figures are given to include Turkmenistan.

**Table 16: Social factors in TRACECA member states**

| Country | Population (Million) | Unemployment (%) | Poverty Index (%) |
|---|---|---|---|
| AZER | 9.7 | 5.1 | 6 |
| ARME | 3 | 16.8 | 30 |
| BULG | 7.2 | 8 | 22 |
| GEOR | 3.7 | 11.6 | 14.8 |
| IRAN | 79.1 | 11.3 | |
| KAZA | 17.5 | 5.2 | 2.7 |
| KYRG | 6 | 7.7 | 32.1 |
| MOLD | 3.6 | 5 | 11.4 |
| ROMA | 19.8 | 6.4 | 25.4 |
| TAJ | 8.5 | 10.8 | 31.3 |
| TURKEY | 78.7 | 10.3 | 1.6 |
| TURKM | N/A | 8.6 | N/A |
| UKRA | 45.2 | 8.9 | 6.4 |
| UZBE | 31.3 | 8.9 | 14.1 |

*Source: World Bank*

There is a lot of attention to the revival of the Silk Route from both European and Chinese scholars[33] and there are also scientific work published by institutions in between (see, e.g., Özdemir (2010), Özceylan *et al.* (2016), Nuriyev (2008), Dekanozishvili (2004a), Contessi (2016) and Acar and Gürol (2016)). More research capacity is likely to be needed for the long-term supply of human capital.

Throughout history, transport and infrastructure projects have contributed with technology transfer and developing human resources. Since the majority of the TRACECA TAPs were performed by European consultancies, however, it can be expected that the result in regional capacity building was not fully satisfactory. The phenomenon of highly specialised engineers and workers flown in for infrastructure projects and leaving little competence behind upon project completion is increasingly highlighted (see, for instance, World Bank (2017a)). Rafizadeh (2017), TRACECA Public Relation Expert, has worked for TRACECA for seven years and sees a big difference in the TRACECA activities now since the EU funding has dried out. Before there was more focus on helping consultants to do TAPs, and learning a lot in the process, while there is now more focus on realising the plans drawn up by the TAPs. The view is shared by Ismayil (2017), who states that the secretariat staff worked very closely with the visiting consultants. They explained the realities to the consultants and they seemingly reached good results. For the current phase of TRACECA resting on the member countries' own resources, however, relies on a strong higher education sector in the region.

Rafizadeh (2017) holds Kazakhstan first and then Turkey when it comes to higher education in freight transport and logistics. The maritime and rail sectors have their academies, as is customary due to the importance of certificates to operate ships and locomotives, but in the road and logistics sector it is more customary to work your way up and learn in the profession.

[33] https://www.law.ox.ac.uk/one-belt-one-road and http://en.xjtu.edu.cn/info/1044/1572.htm

It is often the same as in western countries, but supply chain management and logistics are increasingly popular university subjects at bachelor and masters levels and the forwarders and shipping lines hire the students rather than experienced practitioners.

This is also the case in Azerbaijan, where the ADA University has much influence in the region. It started as a diplomat academy, but has developed into a general university with a business school, a faculty of Information technology and engineering and a faculty of Education added to the faculty of Public and international affairs. An example is that an alumni was appointed to become director of the new port of Alat south of Baku (Ismailzade, 2017). The interest in developing further education in supply chain management, logistics and freight transport indicates a great interest in TRACECA and there are tight personal connections between the secretariat and the university (Ciopraga (2017) and Ismailzade (2017)) and even with the diplomatic sector (Danestad, 2017). To further develop, much focus is laid on international collaboration (Danestad (2017) and Ismailzade (2017)) and ADA University has exchange agreements with many European universities, like Maastricht University. ADA University seeks to develop more cooperation particularly in the field of transport, logistics and supply chain management.

Anyway, excessive academic education is of less added value when operating the vessels and vehicles, but certainly needed for developing the networks and more complicated services. It seems that a similar development of logistics education is needed in the TRACECA countries and the ADA program in Supply Chain Management is a good start.

Another social factor is the labor mobility. In a transport corridor setting, the ability of drivers to operate along the corridor is a first step. CIS is a visa free area, but work permits are required for drivers. Acceptance of international driver's licenses is not a major problem along TRACECA. Ismayil (2017) states, however, that an Afghan driver and vehicle might be more likely to be checked at borders than an EU colleague but <1% of vehicles are checked at the borders. Driver's license and permits are shown but not always scrutinized.

#### 4.3.6. Safety, security and the legal liability

According to Ismayil (2017), TRACECA can offer better transport safety and reliability than the routes through Russia. To maintain this as a selling point, TRACECA must work hard and continuously to keep the advantage.

The work on road traffic safety from EU-funded TAPs, like the Land Transport Safety and Security project (TRACECA Secretariat, 2011) and the TRACECA – Road Safety II project (SAFEGE, 2016) continues. The project aimed at improving transport safety and security in line with European standards in the field of land transport. Although security is mentioned and the scope is land transport, there is a very strong focus on the subset of road safety. Very little is written on security. It was also limited to the TRACECA countries east of Turkey. TRACECA aims for the Swedish level of traffic safety, the "zero vision" is a benchmark, but it is 10-15 years into the future since the infrastructure and vehicles are not there yet (Ismayil, 2017).

The same applies to intelligent transport systems (ITS). To capture traffic safety data, forms are sent to the member states every six months and they reply on progresses made.

**Table 17. Road deaths and injuries in 2014 in a selection of TRACECA countries**

| No. | Country | Police reported injuries | Police reported deaths | WHO corrected 30 day deaths | Deaths/ 100.000 population after data correction | Comments and WHO correction factors |
|---|---|---|---|---|---|---|
| **1** | Armenia | 4,479 | 297 | 513 | 17.23 | 1.7278 |
| **2** | Azerbaijan [a] | 2,676 | 1,124 | 1,461 [d] | 15.52 | 1.3 [d] |
| **3** | Georgia | 8,536 | 511 | 511 | 11.77 | 1 |
| **4** | Kazakhstan | 25,942 | 2,585 | 3,184 | 19.36 | 1.2319 |
| **5** | Kyrgyzstan [b] | N/A | 1,184 | 1,220 | 21.99 | 2013 data 1.0304 |
| **6** | Moldavo | 3,080 | 324 | 469 | 13.44 | 1.447 |
| **7** | Tajikistan | 1,746 | 446 | 1,354 | 16.49 | 3.0374 |
| **8** | Turkmenistan | N/A | 883 | 914 | 17.44 | 2013 data 1.1242 |
| **9** | Ukraine | 32,352 | 4,464 | 4,464 | 10.08 | 1.0008 |
| **10** | Uzbekistan [c] | N/A | 2,298 | 3,240 | 11.19 | 2013 data 1.4099 |

*Source: SAFEGE (2016). Note: Figures are adjusted for definitions and under reporting for international comparison 30 day deaths unless indicated otherwise a = 7 days, b = 1 year, c = unlimited time d= the calculation in who global status report 2015 for converting Azerbaijan 7 day deaths to 30 day deaths is an error and corrected figure should be 1461 as shown .*

As visible from Table 17, the selection of TRACECA countries studied SAFEGE's project report thousands of people killed on the roads. The countries' death tolls per 100 000 population range from Ukraine's 10.08 to Kyrgyzstan's 21.99. As a comparison, Sweden's corresponding figure is 3. Ismayil (2017) mentions that Kazakhstan has made reasonable progress lately, however from a bad starting point (19.36 dead per 100 000 citizens). Statistics for road security has not been found.

Safety and security is also a crucial issue for maritime transport. In the TRACECA strategy, there is an appendix on maritime safety, security and environmental protection but also in this case, little is written about mitigating intentional and unlawful actions like smuggling and terrorism.

A large share of the commodities moved along TRACECA is petroleum products and other types of hazardous goods. Liquid Petroleum Gas (LPG) is particularly dangerous and the project Regulation on the Transport of Dangerous Goods along the TRACECA Corridor (TRACECA, 2007) introduced an alternative, cost efficient, modern and safe transport scheme for LPG transport along TRACECA. It also addressed dangerous good more generally and is a good knowledge base for improving transport safety including the legal and institutional framework.

Many of the TRACECA member states are on the bottom part of Transparency International's Corruption Perceptions Index (CPI)[34]. This is obviously troublesome for an organization like TRACECA building on infrastructure investments that are prone to corruption. This implies that all spending might not come to use jeopardizing the success of TRACECA and making IFIs cautious. According to Ismayil (2017) the problems are worse in the eastern part, an observation that coincides with the countries' CPI rankings. In Romania and Bulgaria, for instance, officials do not dare to take bribes since there are signs where to call if you have been encouraged to bribe and there are strict actions due to EU rules. In the east there seem to be more of a liberal attitude towards corruption and officials are not so afraid of getting caught.

### 4.3.7. Technical and Operational Factors

Trade in value is reported above, but another measure of the economic value of a transport corridor is the amount of freight forwarded. According to Ismayil (2017), TRACECA had an annual flow along the corridor of some 200 ktons at the start, it is now in the range of 70 mtons, some years ago even 80 mtons. Now are mostly dry bulk and oil products transported, but also some general cargo.

In the case of Georgia at the heart of the selected routes, the 11,8 mtons transported along TRACECA in 2016 were divided between 2,8 mtons domestically, 1,1 mtons export, 2,6 mtons import and 6,2 mtons transit (Ismayil, 2017). Crude oil and oil products dominate with 5,5 mtons, while the other reported commodities sugar, grain, iron and manganese ores, non-ferrous ores and chemicals and fertilizers are surprisingly equal each accounting for 430-500 ktons. The high amount of transit traffic reflects the importance of TRACECA for landlocked countries' access to deep sea ports in the Black Sea.

The other country in the middle of the studied routes, Azerbaijan, has very strong focus on the oil trade. This is obvious from the figures in Table 18 showing the dominance of pipeline export of crude oil.

**Table 18: Border crossing trade of Azerbaijan in 2016 (ktons)**

| | Import | Export | Total |
|---|---|---|---|
| Maritime | 704 | 395 | 1,099 |
| Rail | 4,936 | 2,456 | 7,392 |
| Road | 1,775 | 644 | 2,419 |
| Aviation | 18 | 52 | 70 |
| Post | | | 0 |
| With motor | 53 | 5 | 58 |
| Non-motor (pipeline) | 163 | 25719 | 25,882 |
| | 7,649 | 2,9271 | 36,920 |

*Source: TRACECA*

[34] https://www.transparency.org/news/feature/corruption_perceptions_index_2016

As all border posts as well as pipeline transport are not part of the TRACECA, it is interesting also to see the subset traveling along the corridor, which is shown in Table 19.

**Table 19: Transport statistics - TRACECA routes in Azerbaijan in 2016 (ktons)**

| | Total | Road | Aviation | Rail | Maritime |
|---|---|---|---|---|---|
| Import | 11,417 | 906 | 158 | 6,025 | 4,328 |
| Export | 9,724 | 507 | 91 | 5,124 | 4,002 |
| Transit | 10,125 | 437 | 67 | 4,727 | 4,894 |
| Total border-crossing | 31,266 | | | | |
| Domestic | 18,884 | | | | |
| Grand total | 50,150 | | | | |

*Source: TRACECA*

Ismayil (2017) states that 17-18 mtons of rail cargo travels along TRACECA every year. Comparing to other rail freight markets, there are currently few containers along TRACECA since these are generally moved by road. Feeder ships move about 300 000 twenty foot equivalent units (TEUs)/year to the Georgian ports Batumi and Poti, and about 2/3 are moved by truck and 1/3 go by rail (Ismayil, 2017), of which 35 kTEU were moved along the TRACECA routes T20-T22 in Georgia in 2016, down from 44 kTEU in 2015.

Oil shipping has a long history on the Caspian Sea and in fact, the Nobel brothers launched the world's first oil tanker, Zoroaster, between Baku and Astrakhan in 1878 (Azerbaijan Caspian Shipping Company, 2017). Nowadays vessels carry oil from Kazakhstan and Turkmenistan over the Caspian Sea to Azerbaijan for transit by pipeline or rail. There are no dry ports (Roso *et al.*, 2009) for containers by the combination of sea and rail and little containerized goods overall along the Caspian Sea part of TRACECA but mostly bulk and oil (Mamedov, 2017). Nevertheless, the new port in Alat, 75 km south of Baku, is prepared for containers. Much of Baku's maritime traffic has now moved to Alat to avoid congestion in Baku and release the city from air pollution. The new port is positioned to grant more direct access to Georgia along TRACECA route T22.

Competing for rail cargo between China and Europe with more northern routes through Russia, TRACECA can offer superior transport safety and reliability. It is critical, though, that the time spent at border crossings can be reduced as too many border crossings significantly hamper competitiveness compared with a northern route through Russia. In the best case, border control (inspection and paper work) is done in two hours, but due to many border crossings it is still slowing down trains travelling over many countries.

To be competitive, however, not only time consumption but also costs need to be kept low. For rail transport, shipping and port handling, pricing follows nationally decided tariffs depending on commodities, type of wagon and container rather than attempting to apply market pricing. Ministries set maximum tariffs, but not minimum. Road, on the other hand, is highly competitive but restricted by road permits. Ismayil (2017) finds rail operators to be rather inflexible compared to road hauliers, so if more road permits were issued, rail would lose traffic.

When time and costs for using each link are competitive, transport services can be developed along the corridor. Danestad (2017) and Vlassiouk (2017) witnessed a strong interest from Swedish companies to use the TRACECA routes for moving products into the region. Akhundov (2017) states that TRACECA works well and so do the transport services offered by ADY Express and its partners in the TCITR. Now, TCITR puts much effort in informing the customers about the new services along TRACECA under the umbrella of TCITR, that extends to China in the east (Trend, 2017) and Poland in the west. The consortium is still focused on the middle and eastern parts of TRACECA where the railways of Kazakhstan, Azerbaijan and Georgia offer a transport service jointly with the Azerbaijan Caspian Shipping Company under a single tariff. Poland has entered TCITR and Ukraine is about to enter as is Turkey when the rail link to Kars (TRACECA route T19) is opened. Tariffs are agreed, technology reasonable harmonized and efforts made to shorten border controls/customs clearance. TCITR now focuses on sales, emphasizing transport efficiency and less climate-related problems than for the more northern routes through Russia (Akhundov, 2017).

The focus ahead is to improve the operations. TCITR has run test trains from China to Turkey in 18 days (should have been 14 days, but there was a storm on the Caspian Sea at the time). The commercially offered services are now extended into Turkey. It is based on containers, which are unloaded from Russian-gauge rail wagons and transported by truck in Turkey (Akhundov, 2017). TCITR also intends to develop value-added logistics improving usefulness for the states beyond transit traffic.

On road there are no severe harmonization problems reported, but there is a divide between CIS countries, Turkey/EU and Iran with some other standards. Axle load differs a bit but common road signage is generally developed and in place. TRACECA wants to harmonize further with the EU but as long as trucks passes within CIS countries there are no major obstacles. Regarding road quality, there are still some problems but lots of investments are going on in the member countries. Azerbaijan, for instance, has borrowed 2 billion USD to improve TRACECA routes. Ismayil (2017) finds that average speeds are satisfactory along TRACECA and the absence of major road congestion allows traffic speeds according to the road regulations. There are intermittent problems with force majeure (avalanches, accidents etc.) but maritime transport is more sensitive to inclement weather, mainly from November to March. TRACECA does not inform particularly regarding road regulation in individual countries along the corridor, IRU does it better, but they cooperate. According to Vlassiouk (2017) (confirmed from TRACECA Secretariat interviews) is that Turkish trucking firms dominate the carriage of the trade in the region.

Instead of technical issues, operational factors like quotas and permits are of major concern for the road hauliers. The big problem is the Autoroad agreement, a quota system. TRACECA wants a “TRACECA Permit System” (TRACECA, 2003a) that authorizes the international road hauliers to perform multilateral haulages along the corridor. It is implemented in Armenia, Georgia, Moldova, Romania, Turkey and Ukraine from 1 January 2016. TRACECA issues these multilateral road transport permits along demand, but only in the member states where the system is ratified.

The rest have a permit/quota system. As the member states distribute these permits, it is subject to corruption and the road quotas/permits are held in shortage to stimulate rail transport. Road hauliers often complain to TRACECA that they do not get enough permits and if no permits where required, road transport is likely to three-fold according to Ismayil (2017). Transparency is OK, but the quota system does not help integration and fairness along TRACECA. Ismayil (2017) finds the multilateral TRACECA Permit System much better than the quota system.

Common rules obviously apply within the EU part of TRACECA, and most TRACECA member states adhere to international rules like the Vienna Convention on Road Traffic. Iran, however, has an own set of rules.

For rail transport, the CIS member states have monopolies as a continuation from the Soviet times, although new equipment is purchased. TRACECA wants deregulation and competition on the tracks and at least division between infrastructure and operations following European experiences (Flodén and Woxenius, 2017). The Caucasian countries are now assisted by DB Schenker/DB International to investigate how rail competition can be implemented. Commercially, rail works like the UIC in the EU. Each country claims how much they need to cover their costs and a reasonable profit and together the railways give a quote for an international haulage (Ismayil, 2017).

The big difference from Soviet times, and that to the worse, is that the operations are now restricted to each CIS country's territory. Locomotives can be borrowed between countries, but they generally stay on national territory and locomotives are changed at borders. Nevertheless, it does not add transit time since locomotive changes are carried out during administrative processing at the borders that, as mentioned above, can take 5-6 hours and at a minimum 2 hours.

The rail gauge is different on either side of the Georgian-Turkish border. Azerbaijan has some passenger wagons with flexible boogies and there is a boogie exchange terminal at the border. Wagons with flexible boogies are expensive, though, so often consignments are transloaded between rail wagons with different gauges. Containers could ease the border problem of different rail gauges by transshipping containers between wagons. The new railway Baku-Kars at the Georgia-Turkey border (TRACECA route T19) via Tblisi is soon ready. It will mostly transport passengers, bulk and oil but hopefully also more containers in the future.

Also maritime transport in the Caspian Sea is dominated by the states although there are no national monopolies. In the Azerbaijan Caspian Shipping Company (ACSC), the state has >51% and the director is appointed by the state. ACSC has vessels from the Soviet time, but competes with other nations on the Caspian Sea. Kazakhstan has ordered new ferries from Croatia (AzerNews, 2016), that will be shipped through Azov Sea and canals/rivers into the Caspian Sea (Mamedov, 2017). This route is not used much for shipping due to limited draught; allowing to use only half of the load capacity of ships. Instead, crude oil is sent in pipelines

through Turkey to the Mediterranean coast, while refined oil products are more frequently moved by train from Baku.

In Kazakhstan, the new port in Kurin (50 km from Aktau) invests in new piers to take two ferries at once. There is a problem with draught, however, limiting ships to 5,3 m. Nominally it is 6,5 m but the fairway is silted and not dredged often enough. The Black Sea has no draught problems except for a channel in Ukraine, but it is no major problem according to Mamedov (2017).

#### 4.3.8. Environmental and Energy Factors

Environmental issues seem not to be very focused in TRACECA so far, but the replacement of the port downtown Baku to Alat is partly motivated by reducing air pollution in Baku. For road transport, EURO 3 engines are allowed along TRACECA including Turkey as long as international standards are followed, but the trucks might not be allowed into Romania and Bulgaria in the EU. Azerbaijan has EURO 4 requirements, but these are not strictly enforced.

The core of TRACECA is in a region, in which the energy sector has had strong influence for well over 100 years. Much crude oil and oil products are also transported in trains along TRACECA. Nevertheless, the EU chose to foster the development, expansion and modernization of the energy corridor between Europe and the Caucasus as well as between participant states in the separate INOGATE[35] initiative launched in Corridor Performance Monitoring in 1993 (Dekanozishvili, 2004).

#### 4.3.9. Corridor Performance Monitoring

EU funded the French company Visiom to develop a database system for TRACECA for capturing detailed transport data, but it required some 1M€ per year to maintain and run it and it has not been operational for 10-15 years. Trade between different TRACECA countries are nowadays reported by the member states, sometimes in tons sometimes in money terms, and the TRACECA Secretariat compiles the statistics. It is particularly difficult to capture data on how long distances the freight follows the corridor, which implies that there are no current and longitudinal data on tonkms. The secretariat's view is that very little follows TRACECA all the way, but some trains might do so.

A more recent TAP, Transport Dialogue and Networks Interoperability II (IDEA II, see Maffii and Martino (2016) and TRT Trasporti e Territorio (2015)) includes data capture. Also the individual reports from the LOGMOS project (Egis International and Dornier Consulting, 2014) are most relevant sources of contemporary information and it is available through the TRACECA website.

This means that TRACECA has continuous monitoring of data delivered by the member states, but it is often based on national statistics and not particular for TRACECA routes. A

[35] http://www.inogate.org/

shortcoming is that the data is collected and delivered following different methods, and the picture is not fully coherent. A much more detailed picture is given by the TAPs, but at the risk of being anecdotal in narrowly scoped projects and also the wider scoped projects give a snapshot view rather than longitudinal data and key performance indices (KPIs) to monitor and act upon.

#### 4.3.10. Conclusion

TRACECA clearly benefits from having a secretariat accumulating experience, giving identity and "a voice". The main problem identified is the member states' unwillingness to authorize the TRACECA Secretariat to implement the common plans more forcefully. This is, however, common for transport corridors as the main responsibility for funding infrastructure rests with national states and supranational bodies are often restricted to impose harmonizing regulation and fund infrastructure bottlenecks in close to borders.

EU's lack of interest in continued funding of TRACECA is another major challenge. The reason is not necessarily a mistrust or disappointment regarding TRACECA's effectiveness and success, but more likely related to financial limitations among EU member states and uncertainty of the EU institutional framework but also attributed to the fact that politicians tend to prioritize taking new initiatives over maintaining old ones. After all, TRACECA has received funding over almost 20 years and, although much is to be done, the main goals of revitalizing the Caucasus region and avoiding full-scale war can be regarded as achieved. There are plenty of recommendations in the TAPs that TRACECA can implement, but the issue remaining for TRACECA is what to implement in the future if no TAPs/new knowledge is funded today. The success of TRACECA now depends on external geopolitical developments like China's plans for OBOR and the relationship between EU member states and Russia.

There is a lack of continuous performance data although several TAPs have given detailed snapshot descriptions of the situation on a wide array of challenges. Surprisingly for a corridor in a traditionally politically unstable region, very little information on security is found in the TRACECA TAPs.

#### 4.3.11. Recommendation

From TRACECA, COMCEC can learn that creating a corridor with "an identity", is a long and toilsome process subject to the commitment of the member countries. Taking decisions in consensus has advantages for a successful implementation, but many ideas that are good for the corridor as a whole is likely to be stopped when the member states assess the own benefit of every initiative. The corridor development is then subject to many disparate decisions and diplomatic negotiations, of which the corridor development is a small piece. Particularly difficult is it obviously with diplomatic differences between individual member states like in the case of Armenia and Azerbaijan. Shifting governments in member countries might also complicate decision making and implementation due to the long time required from the first feasibility study to the opening of new infrastructure links. Developing successful transport corridors certainly requires a firm and constant support from the involved countries.

In this case the corridor was initiated by the EU that at the time was external to the member states (some have become EU members afterwards) which risks resulting in an attitude of "not invented here" and that the member states become used to external donors. When they have to pay for the further development themselves, the commitment is tested. An external donor can put pressure on multilateral cooperation, like EU did when requiring that Armenia was involved to even start the funding, but there is a certain risk that national interests are prioritized over corridor interests. TRACECA was successful to survive the phase when EU stopped funding TAPs, but the ambition level seems to have been reduced.

## 4.4. CAREC Corridor 3

### 4.4.1. General factors

The Central Asia Regional Economic Cooperation (CAREC) Program is a program established in 1997 by the Asian Development Bank (ADB) to encourage economic cooperation among countries in the Central Asian region. It is a committed partnership of 11 countries: **Afghanistan**, **Azerbaijan**, People's Republic of China, Georgia, **Kazakhstan**, **Kyrgyz Republic**, Mongolia, **Pakistan**, **Tajikistan**, **Turkmenistan**, and **Uzbekistan**[36]. The CAREC region is at the heart of the rapidly growing and integrating Eurasian continent. ADB serves as the CAREC Secretariat.

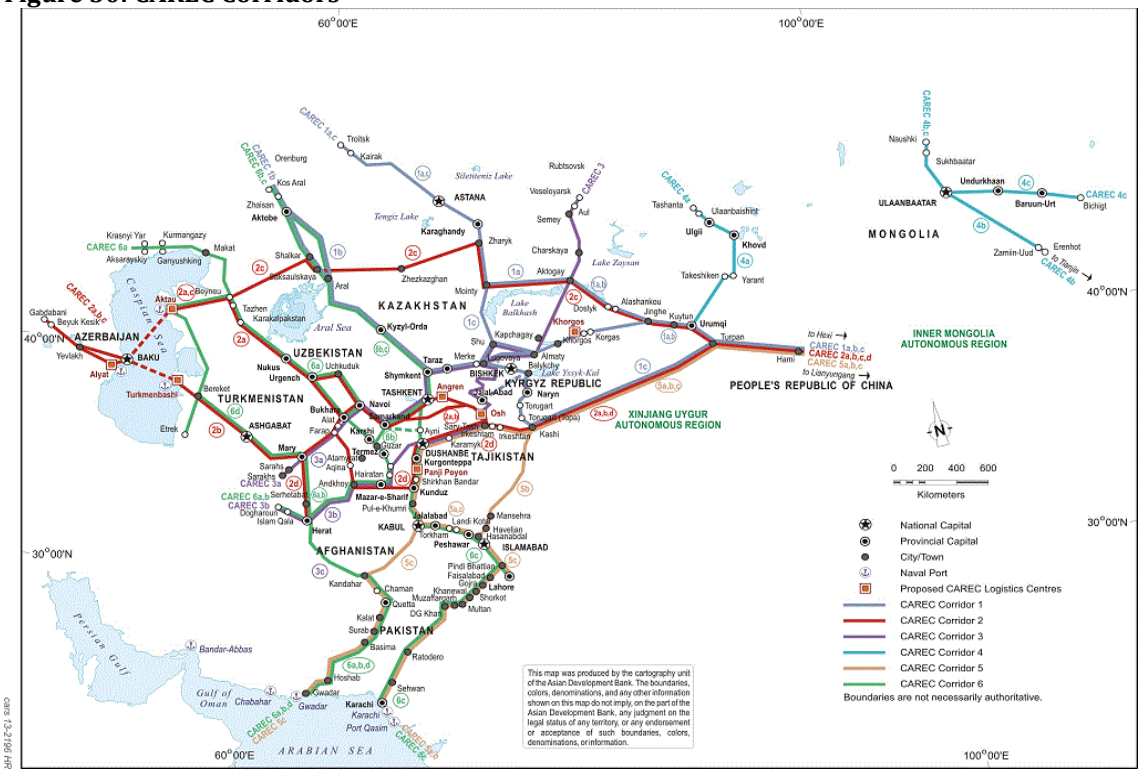
The CAREC program covers four sectors: transport, trade facilitation, energy, and trade policy. Transport and trade facilitation sectors share a development vision that identifies three transport goals:

1. establish competitive transport corridors across the CAREC region;
2. facilitate efficient movement of people and goods across borders; and
3. develop safe, people-friendly transport systems.

CAREC focuses on the development of six competitive transport corridors that link north, south, east, and west through the pivot of Central Asia. According to the CAREC Secretariat, the corridors were defined to establish competitive corridors. They reflect trade flow patterns, facilitate movement of people and goods across the region, and provide sustainable, safe and user-friendly transport networks. Critically, they also connect the mainly landlocked CAREC countries to wider regional and global networks.

[36] The countries in bold are OIC Member States

**Figure 30: CAREC Corridors**




*Source: CAREC Secretariat (2017).*

This study will review CAREC corridor 3 that links the Russian Federation with the Middle East and South Asia. CAREC Corridor 3 has 6,900 km of roads and 4,800 km of railways, running from west and south of Siberian region of the Russian Federation through Afghanistan, Kazakhstan, the Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan to the Middle East and South Asia.

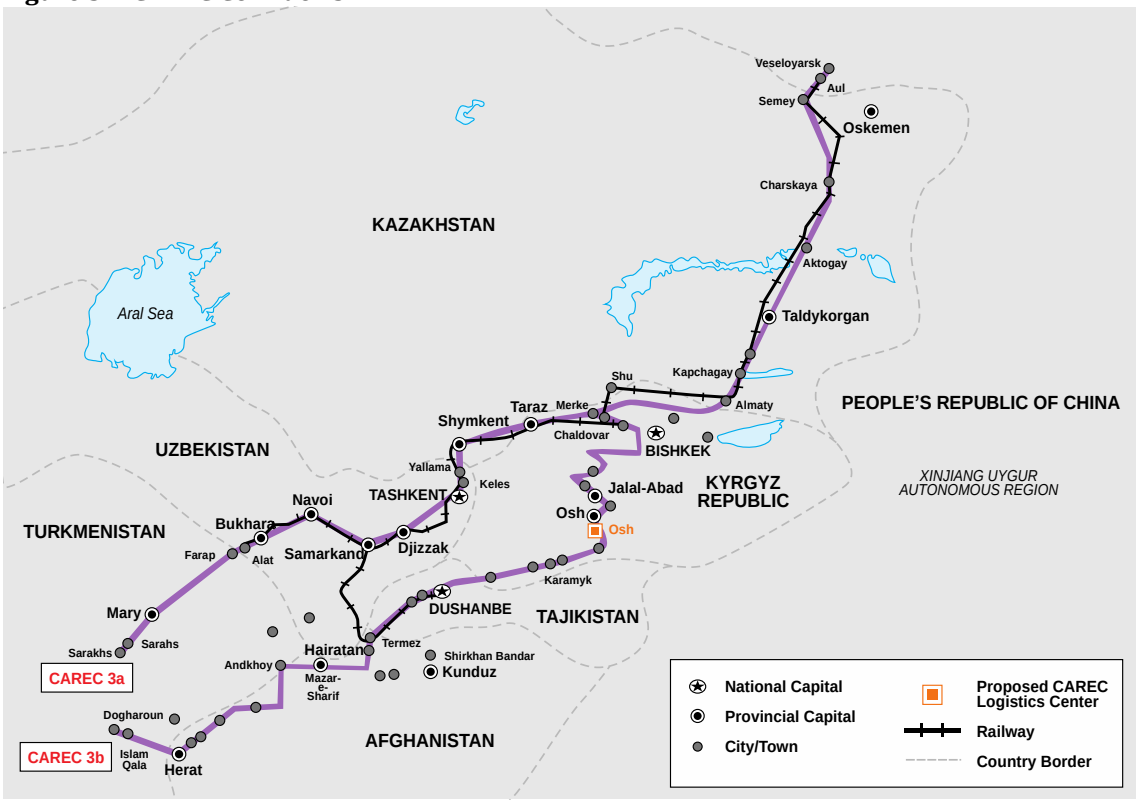
**Table 20: Corridor profile CAREC 3**

| Location | Countries covered | Length (km) | Secretariat |
|---|---|---|---|
| Russian Federation to East Asia | **Afghanistan, Kazakhstan, Kyrgyz Republic, Tajikistan, Uzbekistan** | 6,900 | ABD, Manila, Philippines |

*Source: CAREC (2017).*
Note: Countries in bold are OIC Member Countries

The region in Kazakhstan from Aul to Merke forms the trunk section of Corridor 3, which splits into two at Merke-Chaldovar (KAZ-KGZ). Corridor 3a passes through Uzbekistan and Turkmenistan, ending at Sarahs-Sarakhs (TKM-IRN). Corridor 3b crosses Kyrgyz Republic, Tajikistan, and Afghanistan and terminates at Islam Qala-Dogharoun (AFG-IRN).

**Figure 31: CAREC Corridor 3**




*Source: CAREC Secretariat (2017), reproduced and adjusted by Fimotions.*

According to CAREC Secretariat, corridor 3 is actively utilized by road transport operators to move agricultural products. Uzbek drivers move exports and imports in containers along 3a from Bandar Abbas seaport, crossing Alat-Farap (UZB-TKM) and Sarahs-Sarakhs (TKM-IRN). In the west-east direction, Uzbekistan ships agricultural produce to Kazakhstan, mainly destined to Almaty for further consolidation and break-bulk before distribution to other cities. Corridor 3b is active but it has several challenges. The Kyrgyz Republic's mountainous geography and harsh winter climate create challenging circumstances. By ADB estimates, 33% of the roads in the country '*are in poor condition and need rehabilitation and reconstruction*' (CAREC, 2015). Despite the relatively recent rehabilitated roads, climate-induced impacts require constant maintenance of the road surface. Other challenges are the political issues between the countries in the region that results in trade restrictions and closed BCPs (see 3.3.2).

### 4.4.2. Political and Institutional Factors

**Transport Strategies and Planning**

In reviewing the national transport strategies and plans of each country, the most important aspect to determine is the extent to which international transport and corridor development features in them. The transport master plans of Afghanistan and Tajikistan clearly indicate policy actions to remove physical and non-physical barriers to trade.

**Table 21: Corridor Features in National Transport Plans of Corridor Countries**

| Country | Document reviewed | Transport and corridor development features |
|---|---|---|
| **Afghanistan** | Afghanistan Transport Sector Master Plan Update (2017-2036) | - The needs to improve the performance of transport and trade logistics and recommends an assessment of BCP infrastructure in addition to BCP operations.<br>- Policy actions required to develop a seamless intermodal network, to introduce a single access point for administrative procedures, and to encourage foreign vehicle transit through adequate transit fees |
| **Tajikistan** | Developing Tajikistan's Transport Sector – Transport Sector Master Plan (ADB) | - Rehabilitation of CAREC corridor 3b as one of the road investment plans<br>- Harmonization of border-crossing procedures<br>- Implementation of single-window scheme |

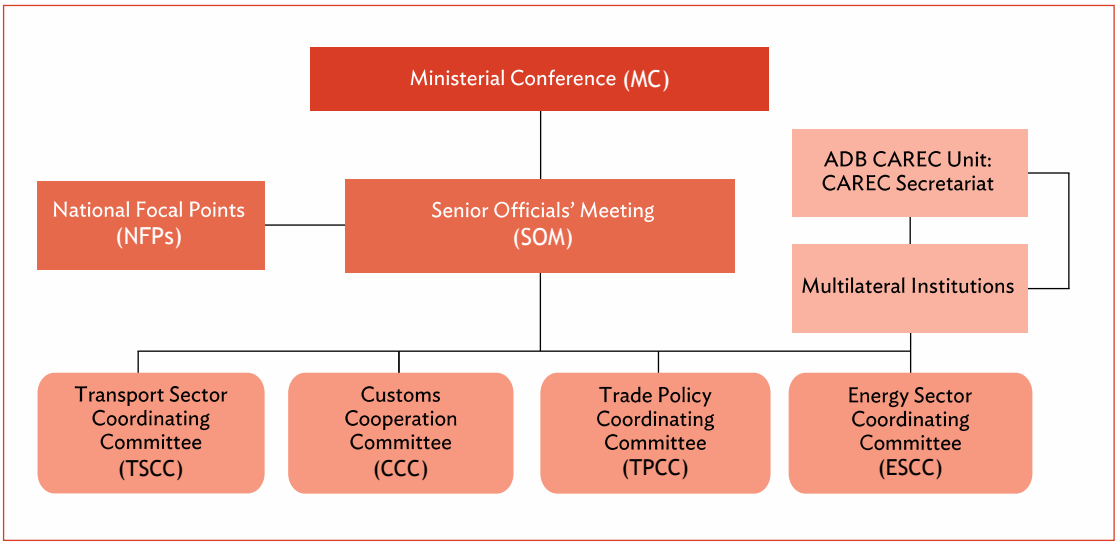
*Source: Fimotions (2017).*

No information can be found with regard to Kazakhstan, the Kyrgyz Republic, and Uzbekistan. However, considering the maturity of the CAREC secretariat and its institutional frameworks (see here below), it is very likely that these countries include international transport corridor features in their national transport strategies and plans.

**Institutional Frameworks**

CAREC has an Overall Institutional Framework (OIF) provides the mechanism for guiding, coordinating, and overseeing the CAREC program, supported by the coordination function of the CAREC Secretariat and the technical and financial support from the multilateral institutions (Asian Development Bank, 2012). These multilateral institutions are the ADB, EBRD, IMF, IsDB, UNDP, and the World Bank.

**Figure 32: CAREC Overall Institutional Framework**




*Source: CAREC 2020 (2012).*

The MC provides mainly an overall strategic guidance to the process of economic cooperation. The SOM ensures the effective implementation of the policy decisions made by the MC. The NFPs are responsible for effective coordination among government agencies and other parties and for overseeing implementation of priority projects and initiatives. As such strong institutional capacities are mandatory.

The institutional arrangements of CAREC are established based on the flexibility and pragmatism responded to the countries' unique needs and circumstances. On the other hand, this principle has caused countries to be less forthcoming in manifesting their commitment to the Program. Country plans for infrastructure development are not always consistently aligned with those of CAREC[37]. Despite this, CAREC has a strong institutional framework that plays a very important role in the success of the CAREC corridors. According to the experts at the CAREC secretariat, the main success factors can be formulated as follows:

1. **Cooperative Approach**
   For projects funding, CAREC uses the "2+X" principle, which means that a project can be classified as a CAREC regional project, be it investment or technical assistance, if it involves at least two CAREC countries[38]. CAREC countries must follow the said overarching goals in implementing projects.

[37] An institutional Framework for Facilitating Economic Cooperation in the Central Asia Region, CAREC.
[38] CAREC Secretariat (2017).

2. **Bottom-up Mechanism**
   Projects and technical assistance related to corridor completion and/or improvement (e.g. road asset management, road safety, transport facilitation, railway strategy) are country-driven. CAREC countries and development partners strive to align regional initiatives with national transport needs and plans.

3. **Interactive Approach**
   CAREC regularly holds meetings and workshops to discuss challenges and opportunities for regional cooperation through CAREC. CAREC also facilitates consistent communication and coordination to implement regional corridor projects/initiatives. In 2016 for example, two strategies were developed in response to CAREC countries' concern for road safety and the need for a more integrated railway planning in the region. The CAREC Road Safety Strategy embodies CAREC countries' commitment to prioritizing road safety as they continue to implement road projects, while the CAREC Railway Strategy provides a long-term guide for coordinated railway planning in the CAREC region.

#### 4.4.3. Economic factors

The countries along CAREC 3 are characterized as economies in transition. These countries are also transit countries for international cargo. Shipments have to cross multiple borders, which results in high transport costs and low competitiveness of the goods in international markets. Based on EoDB, the Kyrgyz Republic performs best among the corridor countries. As shown in Table 22, the times taken to complete border and documentary processes are very low (20-21 hours). This is also confirmed by its OI as indicated in Table 23 shows that Kyrgyz Republic is the most open trading country followed by Tajikistan and Afghanistan. The OI of Kazakhstan is the lowest after Uzbekistan, most likely due to weak business environment and large distances to global markets. The government has struggled to build a diversified manufacturing sector and the economy remains highly dependent on commodity exports (The Economist Intelligence Unit, 2016).

In average, the total times taken and costs of exports in the corridor countries are very high. The average times and costs for Europe and Central Asia are at least 50% less.

**Table 22: EoDB of countries on corridor 3**

| Country | Ranking | | Border Compliance | | Documentary Compliance | |
|---|---|---|---|---|---|---|
| | Overall | Trading across borders | Time to export (hours) | Cost to export (USD) | Time to export (hours) | Cost to export (USD) |
| **AFG** | 183 | 175 | 48 | 453 | 228 | 344 |
| **KAZ** | 35 | 119 | 133 | 574 | 128 | 320 |
| **KYRG** | 75 | 79 | 20 | 445 | 21 | 145 |
| **TAJ** | 128 | 144 | 75 | 313 | 66 | 330 |
| **UZB** | 87 | 165 | 112 | 278 | 174 | 292 |
| **Average CAREC3** | | | **77.6** | **412.6** | **123.4** | **286.2** |
| **Europe & Central Asia** | | | **28** | **195** | **26.9** | **110.7** |

*Source: World Bank (2017).*

Table 23 shows that Kyrgyz Republic is the most open trading country followed by Tajikistan and Afghanistan. The OI of Kazakhstan is the lowest after Uzbekistan, most likely due to weak business environment and large distances to global markets. The government has struggled to build a diversified manufacturing sector and the economy remains highly dependent on commodity exports (The Economist Intelligence Unit, 2016).

**Table 23: Openness of countries on corridor 3**

| Country | USD Millions | | | Openness |
|---|---|---|---|---|
| | GDP | Imports | Exports | |
| **AFG** | 19,199 | 7,723 | 571 | 43.2% |
| **KAZ** | 184,361 | 25,175 | 36,775 | 33.6% |
| **KYRG** | 6,572 | 3,844 | 1,423 | 80.2% |
| **TAJ** | 7,853 | 3,223 | 673 | 49.6% |
| **UZB** | 66,733 | 9,163 | 6,983 | 24.2% |

*Source: Fimotions (2017), analysis on data on www.trademap.org.*

### 4.4.4. Trade Facilitation

Trade is essential for CAREC countries, thanks to their geographic location that connects EU, Asia, and the Middle East. Trade facilitation is one of four core areas of cooperation within CAREC[39]. Customs cooperation has been a major part of CAREC trade facilitation efforts. Integrated trade facilitation also promotes efficient regional trade logistics development and supports the development of priority trade corridors, single-window facilities, enhanced interagency cooperation and private sector participation, improvement of sanitary and phytosanitary measures, and capacity building.

The trade facilitation program is implemented through two coordinating bodies: (i) the Customs Cooperation Committee (CCC), which comprises heads of customs administrations of all CAREC countries and provides a regional forum for discussing issues of common interest;

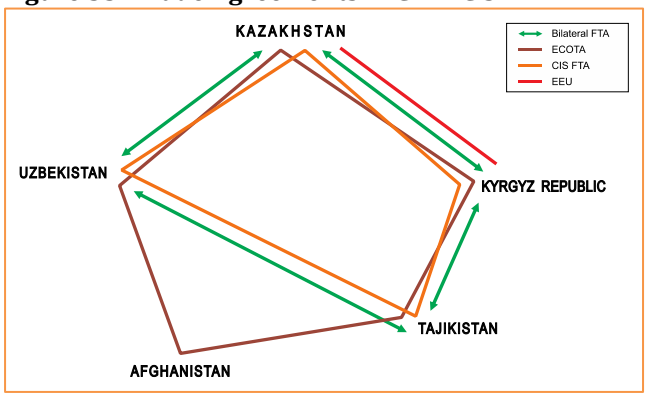
[39] The CAREC four core areas of cooperation are transport, trade facilitation, trade policy, and energy.

and (ii) the CAREC Federation of Carrier and Forwarder Associations (CFCFA), which is a private nonprofit organization.

### Trade Agreements

Each country in corridor 3 is being a party to at least one FTA. Except Afghanistan, all countries have also bilateral FTAs. The following figure shows bilateral and regional FTAs in corridor 3. A complete overview of eight agreements in force in these corridor countries is given in Appendix 3.

**Figure 33: Trade Agreements in CAREC 3**




*Source: Fimotions (2017).*

Kazakhstan and Kyrgyz Republic are the most open countries. They are involved in all regional FTAs, which are ECOTA, CIS, and EEU. Again, this explains their high trade performance (see Figure 34). At the time of this report, sources show that all of these agreements are still in effect. However, the compliance with and the implementation of the agreements are not completely assured since the following barriers still persist in the region:

- Uzbekistan has the most restrictive transit regime in CAREC. It has a differentiated scheme of fees for each of the neighbor countries, and particularly discriminates against Tajikistan due to their tense bilateral relations.
- In terms of railways, Uzbekistan is an important transit country for Afghanistan. Goods carried in trains pass through Termez and stop at Mazar-e-Sharif terminal in Afghanistan. Counter intuitively, Uzbekistan bans Afghanistan exports from entering Uzbekistan by train. Rather, freight trains are stopped at Hairatan, cargo is off-loaded onto trucks, and ferried across the Amu-Darya. The trains then cross the river, returning empty to Termez.
- The Kyrgyz Republic still maintains its bilateral status with Tajikistan, thus restricting third country vehicles and goods from crossing at Karamyk. Thus, international transit traffic is diverted to Batken province and crosses at Kyzyl Bel-Guliston (KGZ-TAJ), adding 250-300 km to the route.

These result in the increase of the cost of transport and in barriers to regional trade, which effectively drive traffic away from CAREC corridors, and demonstrate the challenges of

harmonization of regulations. Ideally, trade agreements should be maintained considering the fact that the countries covered by this corridor are landlocked countries that have common interests.

### Trade Volumes

Among the countries on CAREC corridor 3, Kazakhstan has the highest trade flow in terms of exports and imports. It is clearly due to its geographical position, which is pivotal for both Europe-Asian transit and to the Central Asian countries.

Table 24 and Figure 34 show exports and imports data between countries on CAREC corridor 3. The highest trade flow can be seen between Kazakhstan - Uzbekistan, followed by Kazakhstan - Kyrgyz Republic. This partly explains why corridor 3a is more active than corridor 3b.

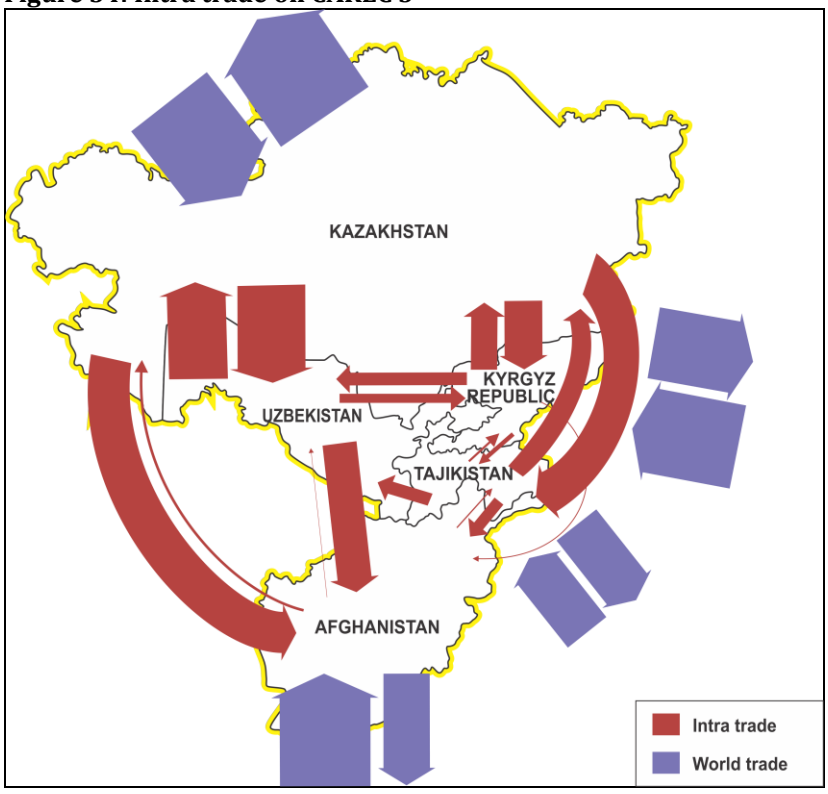
The analysis shows that intra trade on corridor 3 is only 8.2% of the trade with rest of the world. Of the whole CAREC region, this number is only 3.7%. Ideally, there is substantial trade between a landlocked country and its neighbors due to the absence of ports. Restrictive transit between the corridor countries (see 3.3.2) might explain these figures. Tajikistan appears to be trading more with the corridor countries than rest of the world.

**Table 24: Trade Matrix CAREC 3 in 2015**

| COUNTRY | | Imports (Million USD) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | AFG | KAZ | KGZ | TAJ | UZB | Total | World | % |
| Exports (Million USD) | AFG | | 10.85 | N/A | 4.70 | 0.26 | **16** | **421** | **3.8%** |
| | KAZ | 486.89 | | 376.13 | 371.89 | 922.53 | **2,157** | **36,775** | **5.9%** |
| | KGZ | 8.19 | 151.15 | | 21.84 | 125.07 | **306** | **1,423** | **21.5%** |
| | TAJ | 91.53 | 218.42 | 6.43 | | N/A | **316** | **673** | **47.0%** |
| | UZB | 336.01 | 587.80 | 69.77 | N/A | | **994** | **6,983** | **14.2%** |
| | **Total** | **923** | **968** | **452** | **398** | **1,048** | **3,789** | | |
| | **World** | **3,320** | **25,175** | **3,844** | **3,223** | **9,163** | | **46,276** | |
| | **%** | **27.8%** | **3.8%** | **11.8%** | **12.4%** | **11.4%** | | | **8.2%** |

*Source: Fimotions (2017), analysis on data on www.trademap.org.*
*Note: data between Tajikistan and Uzbekistan is dated in 2000.*

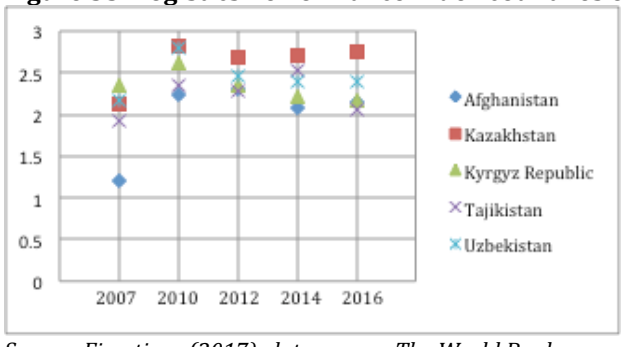
**Figure 34: Intra trade on CAREC 3**




*Source: Fimotions (2017), analysis on data on www.trademap.org.*
Note: the thickness of the line represents the trade volume

The high trade performance of Kazakhstan is also shown by its LPI that increases in the last decade.

**Figure 35: Logistics Performance Index countries on CAREC 3**




*Source: Fimotions (2017), data source: The World Bank.*

### Trade Facilitation Indicators

CAREC 3 is an active corridor. Interestingly, it has been observed that significant impediments to smooth flow of cargoes may be due not only to lack of improvements in infrastructure but mostly due to policies and regulations imposed at the borders. For instance, the non-opening

of Karamyk to international transit traffic cause the round-about diversion of trucks from People's Republic of China going to Tajikistan that have to travel an additional 300 km. Afghan exports cannot be transported by trains across Hairatan, but need to be loaded onto barges and ferried across the Amu Darya River, resulting in delays and higher costs. The formation of Eurasian Economic Union has re-shaped borders between Kazakhstan and Kyrgyz Republic. Performance of corridors 3a and 3b are also compared. CPMM data shows that while average border crossing time and cost are higher in 3a, 3b suffered from the high vehicle operating cost. There is no clear winner to determine which route is superior, but the removal of those non-physical barriers described earlier could result in significant improvements in transit trade for the region.

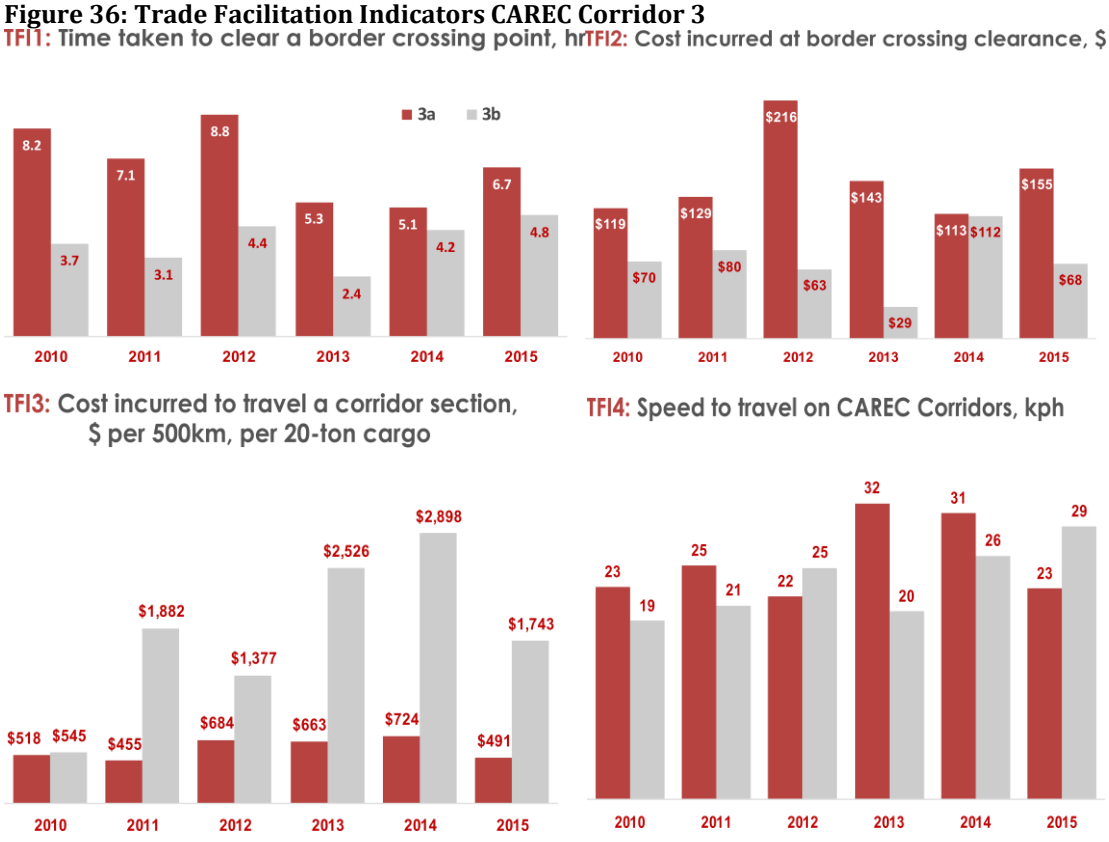
**Table 25: Duration and cost of activities spent on BCPs on CAREC Corridor 3 in 2015**

| Activities | TFI1 (average in hours) | | TFI2 (average in $) | |
|---|---|---|---|---|
| | Corridor 3 | Overall (CAREC) | Corridor 3 | Overall (CAREC) |
| **A. Border Security / Control** | 0.5 | 0.4 | 19 | 20 |
| **B. Customs Clearance** | 1.4 | 6.4 | 28 | 106 |
| **C. Health / Quarantine** | 0.2 | 0.4 | 9 | 22 |
| **D. Phytosanitary** | 0.4 | 0.3 | 11 | 10 |
| **E. Veterinary Inspection** | 0.3 | 0.3 | 10 | 9 |
| **F. Visa/ Immigration** | 0.2 | 0.2 | 13 | 22 |
| **G. GAI/ Traffic Inspection** | 0.2 | 0.2 | 9 | 7 |
| **H. Police Checkpoint/ Stop** | 0.3 | 0.2 | 5 | 6 |
| **İ. Transport Inspection** | 0.4 | 0.4 | 17 | 16 |
| **J. Weight/ Standard Inspection** | 0.5 | 0.4 | 15 | 19 |
| **K. Vehicle Registration** | 0.5 | 0.4 | 6 | 6 |
| **L. Emergency Repair** | - | 1.3 | - | - |
| **M. Escort/ Convoy** | - | 1.0 | - | 51 |
| **N. Loading/ Unloading** | 3.7 | 2.2 | - | 106 |
| **O. Road Toll** | 0.7 | 0.4 | 167 | 50 |
| **P. Waiting/ Queue** | 5.1 | 5.0 | - | 5 |

*Source: (CAREC, 2015).*

At BCPs, a truck driver has to go through each activity sequentially. Waiting in queue is the most time-consuming activity, followed by loading/unloading and customs clearance. The remaining activities are completed in less than an hour. Despite these, corridor 3 performs quite well if when its figures compared with the overall figures for CAREC. The only outlier is the road toll cost. In Turkmenistan for example, truck operators are required to pay a $160 toll for using Turkmen roads. The following graphs show all TFIs for corridor 3.

**Figure 36: Trade Facilitation Indicators CAREC Corridor 3**




*Source: (CAREC, 2015).*

The average border crossing time in 3b increased to 4.8 hours. This was largely driven by delays encountered by Kyrgyz operators crossing Aul-Veseloyarsk (KAZ-RUS) in their return journey to Bishkek. Since Kyrgyz Republic formally acceded to the Eurasian Economic Union in August 2015, it is expected that transit shipments of Kyrgyz operators along 3b should enjoy shortened average border-crossing time.

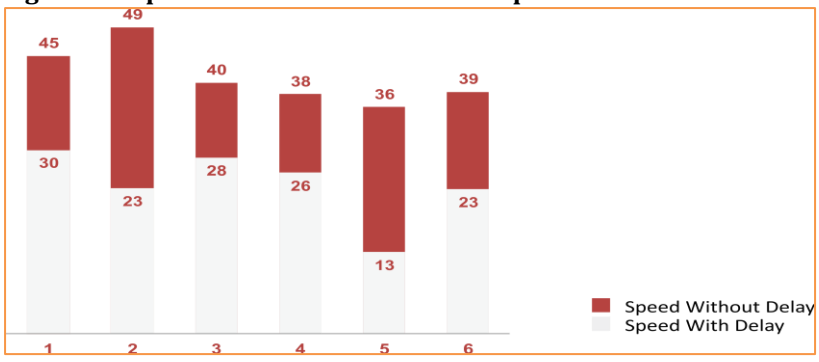
The cost incurred at border crossing clearance on corridor 3b is decreased between 2014 and 2015, while it is increased on corridor 3a. From all countries covered by corridor 3, only Kazakhstan is contracting party to Revised Kyoto Convention (RKC) or the International Convention on the Simplification and Harmonization of Customs Procedures. This means that only Kazakhstan complies with the key principles of the General Annex of the RKC[40].

[40] The key principles are, among others, transparency and predictability of Customs actions, standardization and simplification of the goods declaration and supporting documents, maximum use of information technology, use of risk management and audit-based controls, and coordinated interventions with other border agencies (http://tfig.unece.org/contents/revised-kyoto-convention.htm).

TFI3 between 2014 and 2015 decreased 33% due to price competition between transport operators in Afghanistan, Kyrgyz Republic, and Tajikistan, that drove down shipment cost. These transport operators were severely affected by the ISAF (International Security Assistance Force) withdrawal; the corresponding drop in demand means that the overcapacity of trucks continues to depress prices. Before this withdrawal, transport operators enjoyed a brisk volume of business moving goods between these countries.

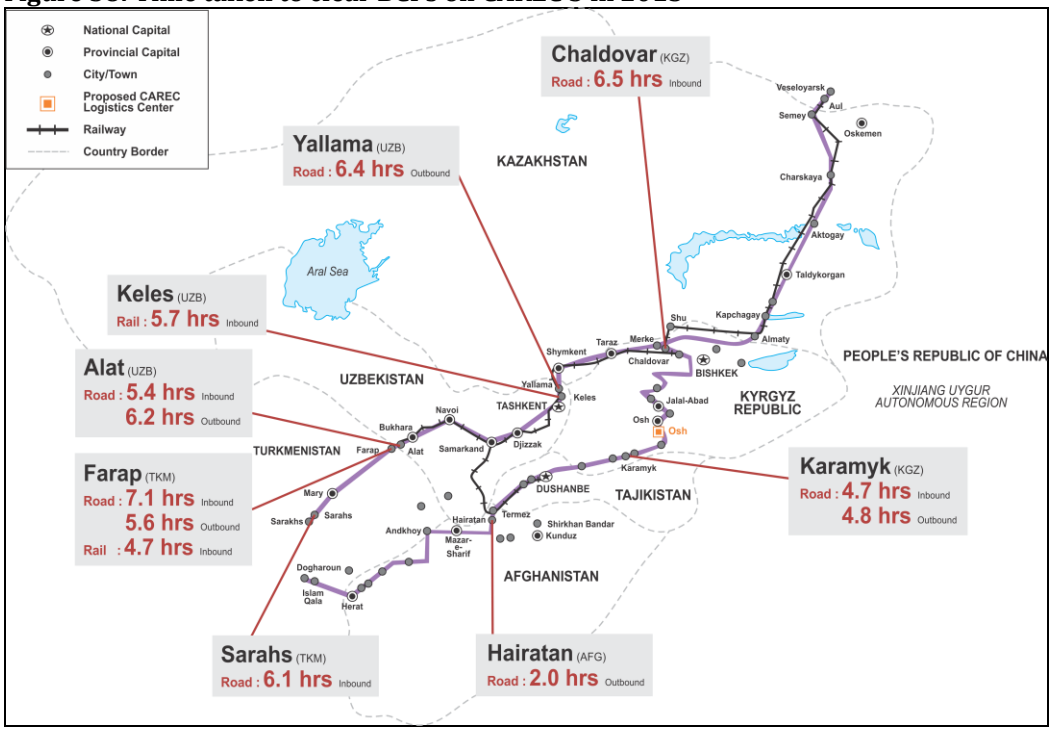
Trucks moving on corridor 3a experienced substantial reduction in speed due to border crossing delays (TFI1 in 3a increased between 2014 and 2015). Despite this, corridor 3 is among the three fastest CAREC corridors (see Figure 37) due to relatively good infrastructure.

**Figure 37: Speed indicators for road transport on CAREC corridors**




*Source: (CAREC, 2015).*

**Figure 38: Time taken to clear BCPs on CAREC 3 in 2015**




*Source: (CAREC, 2015), reproduced and adjusted by Fimotions.*

The average clearing time for road vehicles at BCPs on corridor 3a is 6.2 hours, while at corridor 3b is 3.8 hours. This large difference is caused by the difference in traffic volume between both corridors. As indicated in 3.3.1, corridor 3b is less active than 3a due to the poor road condition. However, it is worth mentioning that the lower clearing time in Karamyk is very likely the impact of the ADB projects on improvement of border services that modernizes the NSW in the Kyrgyz Republic. While the lowest clearing time in Hairatan is very likely due to the fact that Afghanistan is the only CAREC country that utilizes ASYCUDA World.

**CAREC Federation of Carrier and Forwarder Associations (CFCFA)**

CFCFA is a non-government and non-profit organization established in 2009 at the initiative of national carrier, freight forwarder and logistics associations and with the CAREC support. It is an instrument of public private partnership expansion for developing transport and logistics in the region and a cooperation mechanism for CAREC region's national associations to solve topical issues[41]. CFCFA contributes to CAREC transport and trade facilitation policies and infrastructure from its private sector perspective. It also enhances professionalism within road carrier and freight forwarder industries.

This institution functions very well. They have a representative website on which transport companies, insurance companies, customs brokers, and logistic centers and warehouse can register. The website also allows corridor users to write reviews and opinions on BCPs in CAREC countries.

**Automated Customs Procedures**

Implementing a single window environment for trade enhances the exchange of information between private sector trade participants and the government, and extends benefits from investment in technology to trade facilitation (USAID, 2014). Potential efficiencies could be gained with an electronic system for submitting and processing consignment information. The current status of electronic single window implementation in the corridor countries is indicated in the following table.

[41] www.cfcfa.net

**Table 26: Automated Customs Procedures in Corridor Countries**

| Country | Current state of customs procedures |
|---|---|
| **Afghanistan** | - ASYCUDA++ system in operation for automation of customs processes<br>- Transit procedures in line with international standards, enable transit declarations to be submitted in an electronic format<br>- Result: revenue enhancement as revenue leakages have been minimized, and clearance times significantly reduced. |
| **Kazakhstan** | - Electronic single window for Customs Registration and Control is in place, although it is not fully implemented yet.<br>- Strong use of ICT, automated customs information system has been upgraded |
| **Kyrgyz Republic** | - Implementation of integrated single window system is ongoing, although it is not fully implemented yet.<br>- Unified automated information system is in place |
| **Tajikistan** | Still at an early stage (pilot phase test). |
| **Uzbekistan** | - Single window is not yet in place, however an interagency working group has been created<br>- Unified automated information system for the state customs committee is in place |

*Source: Fimotions (2017), from various sources.*

### 4.4.5. Social factors

Improving physical transport infrastructure is a driver for increased trade and foreign investments, which ultimately results in poverty reduction. This is mainly of importance for the landlocked CAREC countries. Poverty reduction is often mentioned as one of the expected outcomes of CAREC infrastructure projects. Several projects have higher social goals like the Qaisar-Bala Murghab Road project (see Appendix 4). This project is located in Afghanistan and completed in 2016. The expected outcome is to promote not only the economic but also social development and reduce poverty by rehabilitating the primary road network damaged during two decades of conflict and neglect. Table 27 shows the Human Development Index (HDI) of countries on corridor 3.

**Table 27: HDI countries on corridor 3 in 2015**

| Country | HDI | Rank |
|---|---|---|
| **Afghanistan** | 0.479 | 169 |
| **Kazakhstan** | 0.794 | 56 |
| **Kyrgyz Republic** | 0.664 | 120 |
| **Tajikistan** | 0.627 | 129 |
| **Uzbekistan** | 0.701 | 105 |

*Source: Human Development Reports, UNDP.*

As indicated by Table 27, Kazakhstan has the highest standard of living among all countries on corridor 3. Not surprising, Kazakhstan (together with Russian Federation, Ukraine, and other countries) has become a receiving country hosting migrants from (in order from the highest to the lowest number of migrants) Uzbekistan, Tajikistan, and Kyrgyz Republic. It is also due to Kazakhstan's open-door migration policy (local ID suffices to cross the border). Many people

cross the border just to work, returning to their homes abroad in the evenings. The available data indicates that this migration plays a significant role in reducing poverty in the less wealthy countries. This is most apparent in the Kyrgyz Republic, where remittances reduce the national poverty rate by some 6-7 percentage points (UNDP, 2015). The following table shows the social profile of the corridor countries.

**Table 28: Social factors of countries on CAREC corridor 3**

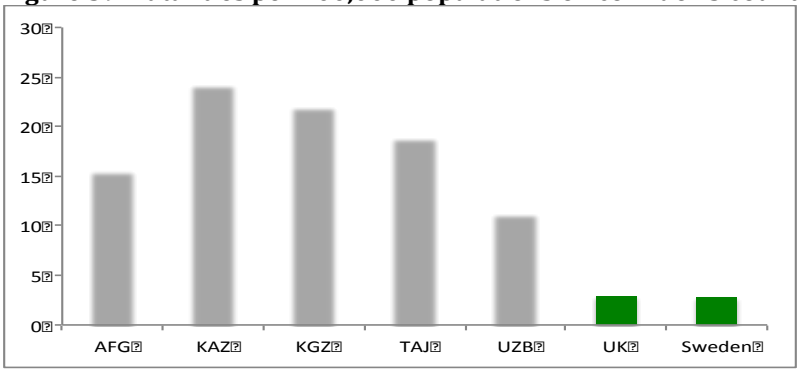
| Country | Population (Million) | Unemployment (%) | Poverty Index (%) |
|---|---|---|---|
| **AFG** | 32.5 | 8.5 | N/A |
| **KAZ** | 17.5 | 5.2 | 2.7 |
| **KYRG** | 6 | 7.7 | 32.1 |
| **TAJ** | 8.5 | 10.8 | 31.3 |
| **UZB** | 31.3 | 8.9 | 14.1 |

*Source: World Bank.*

### 4.4.6. Safety, security and the legal liability

Road infrastructure accounts for the most investment in CAREC transport corridors. However, this means that little attention has been paid to addressing **road safety**. Similarly, road safety records remain poor, and crash rates are more than four times those in countries that have adopted good road safety practices[42]. This is also shown in the figure here below.

**Figure 39: Fatalities per 100,000 populations on corridor 3 countries in 2015**




*Source: Global Status Report on Road Safety 2015, WHO.*

On corridor 3, a high incidence of road traffic accidents is mostly caused by poor road condition. On the trunk road connecting Bishkek to Osh there were 4,248 road crashes in 2009 and 4,813 in 2013, resulting in 1,022 deaths (CAREC, 2015). A road rehabilitation project on this section is ongoing (see Appendix 4, project code IP9). Improved capacity and safety level is one of the expected outcomes.

[42] World Health Organization. 2013. *Global Road Safety Report 2013*. Geneva.

Recognizing the huge opportunity for CAREC countries to work together to tackle the road safety challenge, the 14th Ministerial Conference (September 2015, Ulaanbaatar, Mongolia), endorsed a joint commitment to road safety. This commitment calls for adoption of the "safe systems" approach, combining safer road infrastructure, safer vehicles and safer road users. It aims to reduce the number of fatalities on the CAREC road corridors by 50% by 2030 (compared to 2010). This translates to 23,000 lives saved and 250,000 serious injuries prevented per year by 2030. The estimated economic savings amounts to approximately $16 billion a year.

The **Sanitary and Phytosanitary** (SPS) Agreement by WTO is the internationally recognized set for ensuring the safety of food and agricultural products. This agreement is binding on all WTO Members. From all countries on corridor 3, only Uzbekistan is not a WTO member. As such, Uzbekistan is still using the State Standards (GOST) inherited from the former Soviet Union, which are not WTO compliant, hence they are not recognized by most trading countries. This leads to duplication of certification when the shipment passes through different countries.

### 4.4.7. Technical and Operational Factors

Even though CAREC corridors can be considered as mature transport corridors, they do not possess corridor traffic data such as statistics of heavy goods vehicles and origin-destination data. The secretariat also does not maintain a trade database. Instead they prepare analyses as needed using IMF Direction of Trade Statistics (DOTS) and ADB in-house sources. [43]

Furthermore, procedure harmonization and interoperability remain a challenge[44]. For road transport, unharmonized transit trade procedures can be observed on BCPs. As shown in Table 25, loading/unloading activity counts for 26% of the total time spent on BCPs. This activity relates to trans-loading of cargoes to locally registered vehicles because vehicle standards are different between countries.

Unharmonized procedures are also observed in rail transport. In order to perform international rail freight movements, shippers must deal with several railways for various services such as getting tariffs (due to the absence of common railway tariff), finding freight wagons, handling custom issues, and making security arrangements.

Moreover, there are three different rail gauge-groups within CAREC region: (1) 1,435 mm standard gauge used in the PRC; (2) 1,520 mm gauge used in CIS countries; and (3) 1,676 mm broad gauge used in Pakistan. These different technical standards hinder smooth long haul rail operations. This is not the case for railways within corridor 3. This corridor is characterized by 1,520 mm gauge only and is partly electrified. The railway on corridor 3a is mostly double-tracked and on corridor 3b is only single-tracked.

[43] CAREC Secretariat (2017).
[44] Based on CAREC's response on online survey undertaken by Fimotions (2017).

As such, investment projects on corridor 3 are focused on completing rail links, which counts around 60% of the total investment value in corridor 3, followed by road projects (around 30% of the total investment)[45]. This is in line with the Railway Strategy for CAREC 2017-2030 that recognizes the contribution of regional cooperation in railway development to increase interregional and intraregional trade. The vision behind this strategy is to make rail transport the preferred mode of choice for trade: quick, efficient, accessible to customers, and easy to use throughout the region. However, most CAREC countries have limited public resources to finance major rail investments.

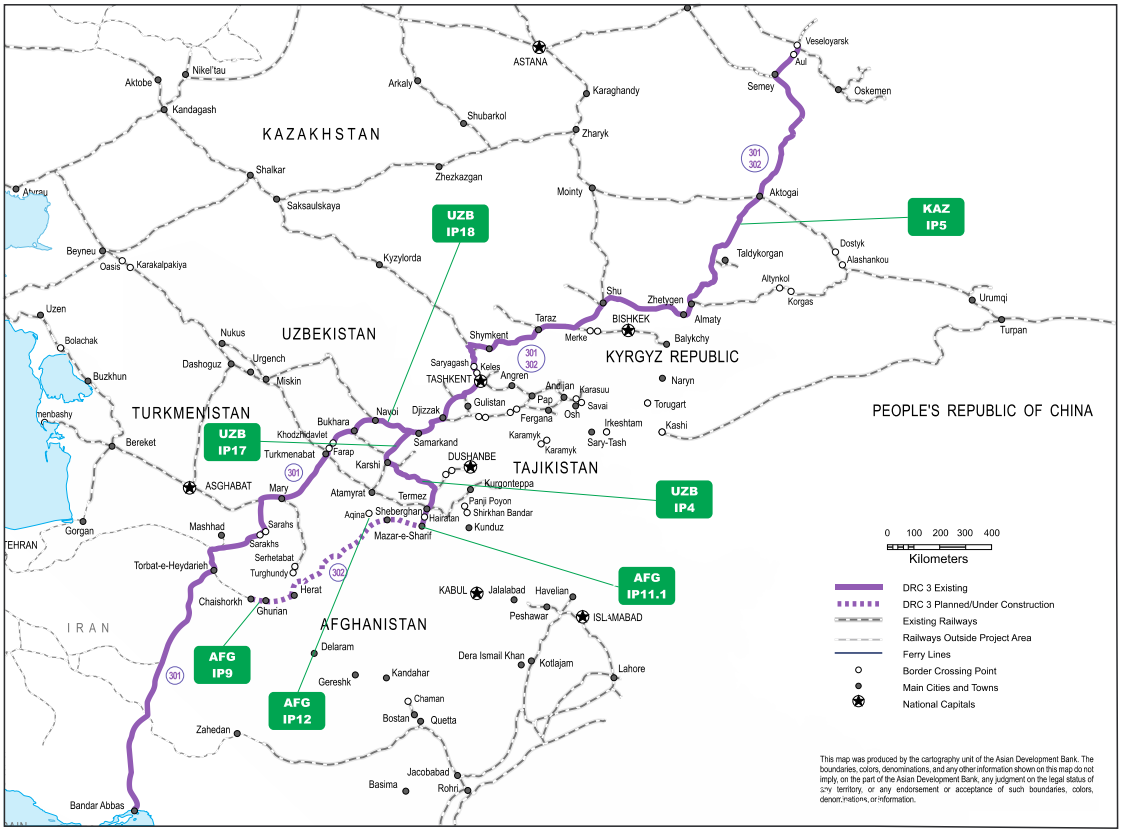
For corridor 3, there are 24 investment projects (valued at $7,456 million) that consist of road construction and rehabilitation projects, railway construction, BCPs improvement, equipment purchase, and airport projects. 14 projects are completed and the rest are ongoing. The list of the projects can be found in Appendix 4.

The majority of the railway projects will be in Afghanistan, completing the rail link between Andkhoy and Shirkhan Bandar, which will connect Tajikistan with Turkmenistan through Afghanistan. Currently the rail route on corridor 3 has low traffic volume. A future expansion of the use of this railway corridor is however expected given the strategic importance of the port of Bandar Abbas and the potential economic growth in Iran. Improvement of security and economic growth of Afghanistan are keys to realize it. This project is on-going and is expected to complete in 2018.

Given numerous economic and transport corridors in Eurasia, as well as existing and emerging IFIs, prioritization and complementarity of infrastructure investments can be an emerging issue[46].

[45] CAREC Transport and Trade Facilitation Strategy 2020, 2014.
[46] Based on CAREC's response on online survey undertaken by Fimotions (2017).

**Figure 40: Railway construction projects on CAREC 3**




*Source: Unlocking the Potential of Railways, A Railway Strategy of CAREC 2017-2030.*

### 4.4.8. Environmental and Energy Factors

The policy for CAREC corridors in general and corridor 3 in particular, on the environmental and energy issues in the transport sector, is still very premature. The only initiative in this region came from NAMA (Nationally Appropriate Mitigation Action), which is emerged as part of the negotiations under the United Nations Framework Convention for Climate Change (UNFCCC) for a long-term climate change agreement. For Kazakhstan, the proposed NAMA fosters the use of natural gas in the road transport sector— expanding the refueling infrastructure for compressed natural gas, vehicle conversion, and technical capacity support. However, it is still in the early stage and the formal institutional framework supporting NAMA development and implementation has yet to be established.

This initiative can be seen as a positive starting point to promote alternative-fuelled heavy-duty vehicles in the region. Since it is an initiative at the national level, its positive impacts on the corridor will not be seen in the near future. Adopting this initiative at the corridor level will face several barriers, which are the same barriers faced by successful transport corridors like TEN-T (see 2.10.1).

An attempt to put extra attention to the environmental issues is however shown in the CAREC Railway Strategy 2017-2030. It motivates that the goal to strengthen the railway sector is to promote a shift from road to rail, which eventually creates positive impacts on the nature, landscape, and climate.

#### 4.4.9. Corridor Performance Monitoring

In order to measure and monitor the corridor performance, CAREC uses four Trade Facilitation Indicators (TFIs):

1. TFI1: Time taken to clear a BCP (in hours)
2. TFI2: Cost incurred at border-crossing clearance (in USD)
3. TFI3: Cost incurred to travel a corridor section (in USD per 500 km, per 20-ton cargo). This cost is a sum of TFI2 and the non BCP cost (which refers to trucks operating cost or rail tariff rates). 500 km is chosen as the length of a "corridor section", as this is the average of distances in the CPMM sample. The same applies to 20 ton as a "unit of cargo".
4. TFI4: Speed to travel on CAREC corridors (in kph)

A report on Corridor Performance Measurement & Monitoring is published annually based on almost 3,000 collected data samples of commercial shipments across Central Asia. This is of great interest to both policy makers and the private sector operators as it answers questions as: What are the causes of delays in the CAREC corridors? Where do delays occur and what can be done to address those problems?

#### 4.4.10. Conclusion

CAREC corridor 3 can be considered as a successful corridor as it performs well among other CAREC corridors. However, this corridor has not met the set objective to promote intra-trade along the corridor. The intra trade on corridor 3 is only 8.5% of the trade with rest of the world. The low trade level justifies the need to increase the efficiency of the corridor, which is currently hindered by the following:

1. The political tensions among the corridor countries, which are barriers for efficient and smooth trade flows.
2. Unharmonized transit trade procedures that cause delays at BCPs, which subsequently causes substantial reduction in travel speed.
3. With the exception of Kazakhstan, automation and ICT application is still very low.

The maturity of the CAREC Overall Institutional Framework plays a very important role in the success CAREC corridor 3. The corridor management adapts two models: project coordination and legislative models. The corridor management is imbedded in the legislative committees that produce policies and legislation that support the corridor development.

#### 4.4.11. Recommendation

In order to improve the performance of CAREC corridor 3, the following actions are recommended:

1. Reviewing bilateral and regional trade agreements to determine whether they have incorporated relevant elements to remove non-physical barriers to trade.
2. Promoting political integration
   Problems of political integration are the most difficult problems to be tackled by a corridor secretariat as it falls beyond the power of the secretariat. Disseminating the positive impacts of a successful transport corridor on the country's economy and the lesson learned from other corridor developments can be pursued.
3. Increasing the efficiency of customs inspection
   Since all CAREC countries are transit countries and shipments have to cross multiple borders, networking and the interoperability of NSWs at the CAREC regional level needs to be improved. For this, automation and ICT infrastructure must be fully operated. Furthermore, improved risk management techniques, could greatly contribute to improving the flow of products. A way to realize such risk management is to offer 'green channels' for Authorized Economic Operators (AEO). Another improvement that can significantly reduce border-crossing time is providing an advance manifest.

### 4.5. Trans-African Highway 1

#### 4.5.1. General

The Cairo–Dakar Highway is Trans-African Highway 1 (TAH1) in the transcontinental road network being developed by the United Nations Economic Commission for Africa (UNECA). Participating countries and the given length of TAH1 are tabulated below. TAH1 has a length of 8,636 kilometers (5,366 mi) and runs along the Mediterranean coast of North Africa, continuing down the Atlantic coast of North-West Africa. It is substantially completed except for a few kilometers on the Western Sahara-Mauritania border where there is currently only a desert track. The Noudhibou-Nouakchott section was paved in 2005 to form a north-south route between Rabat and Monrovia across the Sahara and around the western extremity of the continent[47]. The borders between Algeria and Morocco are closed which costing $2 billion yearly to the Moroccan economy.

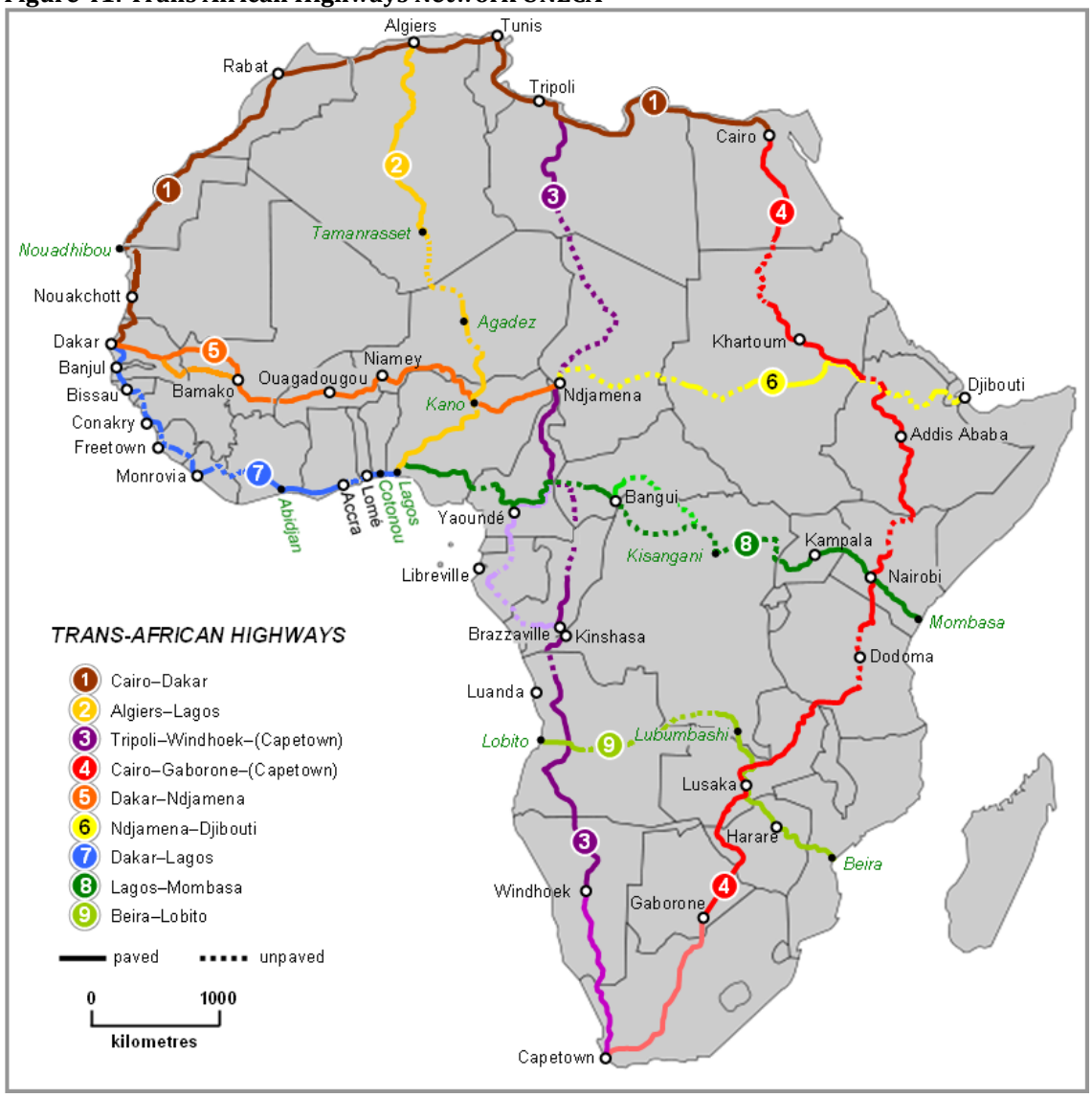
**Table 29: Corridor profile TAH1**

| Location | Countries covered | Length (km) | Secretariat |
|---|---|---|---|
| Mediterranean coast of North Africa, continuing down the Atlantic coast of North-West Africa | **Egypt, Libya, Tunisia, Algeria, Morocco**, Western Sahara, **Mauritania**, **Senegal** | 8,636 | None |

Note: Countries in bold are OIC Member Countries

[47] https://en.wikipedia.org/wiki/Dakar-Lagos_Highway

**Figure 41: Trans African Highways Network UNECA**




*Source: UNECA and https://en.wikipedia.org/wiki/Trans-African_Highway_network.*

## Spatial Analysis

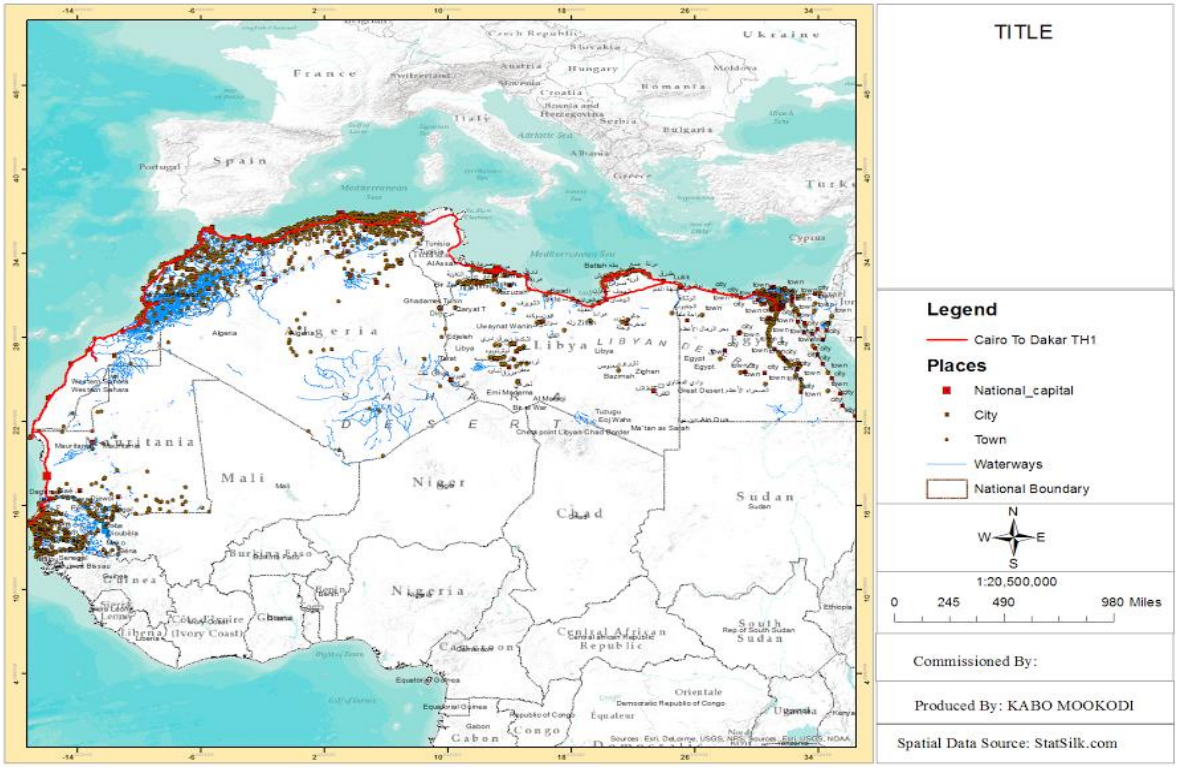
A spatial analysis was carried out to show all potential transport corridor of the TAH1 and how it fits into the overall geography of North Africa. The GIS mapping shows that TAH1 passes through almost all the important economic centers of activity of each country. The analysis revealed that TAH1 does not only consist of the direct road itself but also junctions and feeder roads to. When including these additional infrastructure components TAH1 may be said to consist of 9,712 km of roads. It is also to be noted that 569 km of the TAH1 remains to be paved in Mauritania/Western Sahara.

**Table 30: TAH1 roads per country**

| Country | TAH 1 Road (km) |
|---|---|
| Egypt | 1,519 |
| Libya | 1,824 |
| Tunisia | 826 |
| Algeria | 1,208 |
| Morocco | 1,572 |
| Western Sahara | 1,410 |
| Mauritania | 1,008 |
| Senegal | 345 |
| **Total** | **9,712** |

*Source: Fimotions (2017).*

**Figure 42: GIS analysis of TAH1**




*Source: Fimotions (2017).*

### 4.5.2. Political and Institutional Factors

TAH1 is not a Transport Corridor in the political and institutional sense. There being no common treaty between participating countries to develop the corridor or to integrate politically. Because of this, there is no coordinating secretariat. The development of TAH1 was funded and supported by the AfDB, JICA, The World Bank, and the African Union. The major part of the highway between Tripoli and Nouakchott has been constructed under a project of the Arab Maghreb Union. Funding through international financial institutions leveraged government funding, procurement complied with the procedures of the leading funding

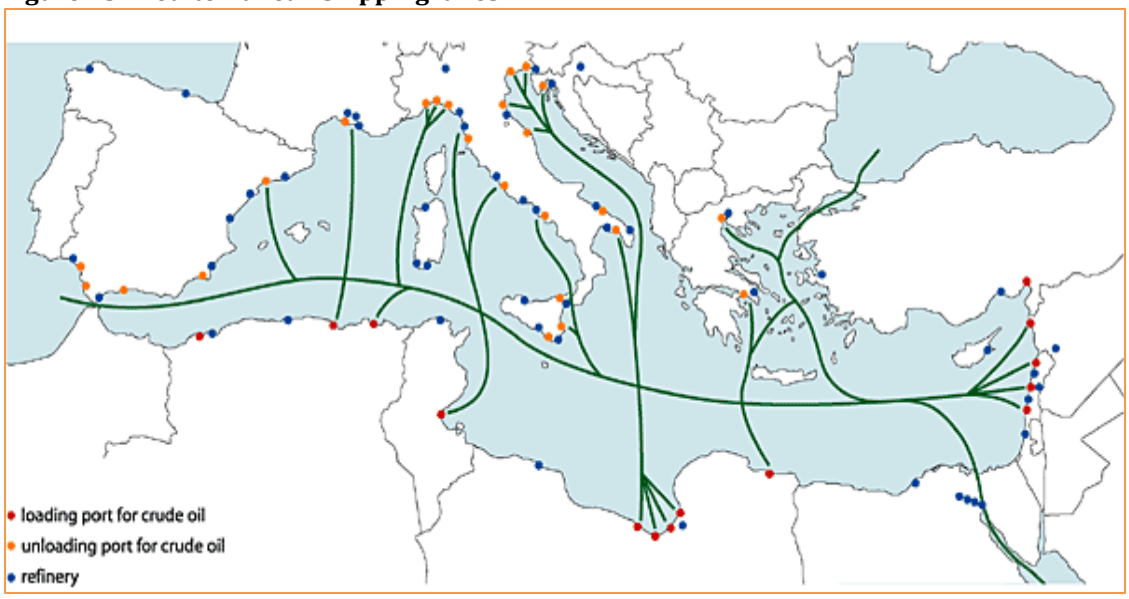
agencies. The need for international treaty is also well regarded by IFIs and private investors as it reduces political risk. The closer the political cooperation between participating countries, the more likely it is, that investment will be made in its interconnecting transport systems.

Other than TAH1, individual countries are developing their transport systems independently. For example, Tunisia has just started preparing its National Transport Master Plan for 2040 and is working on the development and rehabilitation of its road corridors funded by the World Bank[48], but the term corridor is applied very loosely. At the time of this report, Tunisia Transport Master Plan 2040 is at the first (Diagnoses) phase. It is too early to indicate the extent of TAH1 development. In the previous Master Plan, TAH1 was taken into consideration especially the trade and borders with Libya and Algeria[49].

Egypt perceives its primary transport corridor development as along the Nile Valley rather than following the Mediterranean coastline. Others also are orientated longitudinally to the sea and onward to Europe, as shown in Figure 43. But Egypt does perceive the benefits of regional integration that transport corridor can bring[50]. For Morocco, the most recent transport sector plan was produced in 1993, but like Egypt and others they were all part of the EU and G8 supported the MENA program that aimed, amongst other objectives, to promote regional integration. As mentioned previously, Algeria's borders are closed, while Libya remains unstable, the political conflicts or 2011/12 (so called Arab Spring) tended to shelve some MENA programs and diminish the support of the international community.

[48] http://www.tendersinfo.com/blogs/tunisia-road-transport-corridors-project-information/
[49] Director General Land Transport, Ministry of Transport Tunisia (2017)
[50] https://www.menatransitionfund.org/.../regional-integration-through-trade-and-transp...

**Figure 43: Mediterranean shipping lanes**




*Source: http://one-europe.net/the-challenges-of-europe-and-the-mediterranean.*

There is little evidence of interest in a transport corridor development in the participating countries according to the review of all TAH carried out by the African Development Bank in 2012. The interesting issue to unravel is whether it matters. Is it necessary for there to be in place multilateral agreements and implementing institutions to promote trade and economic development that is mutually beneficial to neighboring/contiguous countries? Evidence suggests from around the world, that for trade to be substantive, meaningful and sustainable, a high level of political integration is prerequisite. This is because trade is by no means an isolated matter for it relates to having common values, harmonized legislation and compatible and similar levels of development. This is not to say that bilateral trade between cooperating countries is not possible - it clearly is. But if services, human financial and physical resources and intellectual property are to be seamlessly transferrable, there should be a more substantive partnership. A common factor in transport corridor development is the existence of one or more landlocked countries and a limited number of say one or possibly two gateway ports. In this case, there are no landlocked countries, all countries are maritime, each with their own sea port.

There is no continuous international railway that parallels TAH1, though some national railway sections are in place. For example in 2008 work started on constructing a 554 km double-track railway parallel to the Mediterranean coast between Surt and Banghazi in Libya. There are some cross-border railway sections in Algeria, Tunisia and Morocco and a pipeline. Generally, for TAH1 to progress to become a classical multimodal transport corridor there needs to be more political cooperation.

**Figure 44: Railway link on potential corridor Libya**

*Source: Railway Gazette (2008).*

### 4.5.3. Economic factors

The socio-economic relationship between countries along TAH1 is not well developed. The driving force for African corridors historically has been to land link resources for external trade. In this case, each country has its own port, but, as with all African countries, trading relations are more with Europe and the rest of the world, than between themselves. It is expected that better connectivity between the countries will help to change this.

Due to its oil and gas exports, Algeria is the most open trading economy followed by Morocco. The least open trading economy is seen to be Egypt, yet it has access to the Suez Cannel and large container ports. The connection between transport infrastructure and trade may be less obvious in these countries, rather issues of governance and security are of greater relevance.

**Table 31: Openness of countries on the TAH1**

| Country | USD Billions | | | Openness |
|---|---|---|---|---|
| | GDP | Imports | Exports | |
| **EGYPT** | 331 | 33.5 | 12.6 | 14% |
| **LIBYA** | 92.6 | 9.5 | 10.65 | 22% |
| **TUN** | 131 | 25 | 16.7 | 32% |
| **ALG** | 166.8 | 48 | 77 | 75% |
| **MOR** | 100.4 | 35 | 18 | 53% |
| **W. SAHA** | 1 | N/A | N/A | N/A |
| **MAU** | 5.8 | 2.55 | 1.95 | 78% |
| **SEN** | 13.8 | 5.6 | 2.6 | 59% |

*Source: Fimotions (2017), analysis on data on www.trademap.org.*

Table 32 shows there to be wide disparity between TAH1 participants in term of EoDB. Generally the times taken and costs of completing border processes are very high indeed. In

Algeria, the total cost of export procedures would be over $1,000 while the time taken for the authorities to process documents, over 260 hours.

**Table 32: EoDB of TAH1 corridor countries in 2016**

| Country | Ranking | | Border Compliance | | Documentary Compliance | |
|---|---|---|---|---|---|---|
| | Overall | Trading across borders | Time to export (hours) | Cost to export (USD) | Time to export (hours) | Cost to export (USD) |
| **EGYPT** | 122 | 168 | 48 | 258 | 88 | 100 |
| **LIBYA** | 188 | 114 | 72 | 575 | 72 | 50 |
| **TUN** | 77 | 92 | 50 | 469 | 3 | 200 |
| **ALG** | 156 | 178 | 118 | 593 | 149 | 374 |
| **W. SAHA** | N/A | N/A | N/A | N/A | N/A | N/A |
| **MAU** | 160 | 137 | 72 | 749 | 51 | 92 |
| **SEN** | 147 | 130 | 61 | 547 | 26 | 96 |

*Source: World Bank.*

### 4.5.4. Trade Facilitation

In this section trade and logistics is looked at; trade because a normal pre-requisite of international transit transport corridors is that they generate intra-regional trade, not only facilitating trade with the rest of the world; and logistics performance because a major constraint for developing trade is poor logistics and correspondingly higher transport costs. There are a long list of non-physical and non-tariff barriers that normally require serious attention in all transport corridors and these are listed in Appendix 3.

Currently, NTBs are not big issues on this corridor as there are mutual procedures followed by Tunisia, Libya, Algeria, and Morocco. Freight transports between Tunisia and Libya for example, they only need to pass one document check at the border (Ra's Ajdir) as they already have advance manifests. The same goes for the border between Tunisia and Algeria In the past, before the war in Libya took place, the clearing time at Ra's Ajdir was less than one day (also due to the fact that there is one special lane for trucks). Now, it can take 3-4 days due to security checks in Libya. So currently the border crossing time in Libya is much longer than that in Algeria (Abid, 2017).

There is a classical asymmetry in trade in all the subject countries, will trading more externally with Europe than with themselves. The reasons are as follows:

4. Historic due to colonial relations;
5. Proximity (for most countries, European Markets are closer;
6. Due to the border closure between Algeria and Morocco, trade between Tunisia and Morocco must go via Marseille (France) and Genoa (Italy) through sea shipping. This is also the case between Tunisia – Egypt. Transit to Europe is chosen for the reasons of reliability, safety, guarantee/insurance, and above all to avoid the immobilization of vehicles at the Libyan borders (UTICA, 2017).

However, there is a growing interest in perpetuating trade relations across North Africa. The Trade Matrix in Table 33 shows that intra corridor trade to be small (6%) compared to trade with the rest of the World. Tunisia and Mauritania appear to be trading at a higher level with neighboring countries. This is also confirmed by the Ministry of Transport of Tunisia during the study visit.

Libya's high levels of exports are mostly of oil and gas. The potential for mutually beneficial development through trade remains very great in Africa in general and through Maghreb, in North Africa, in particular.

**Table 33: Trade Matrix TAH1**

| COUNTRY | | Imports (Millions USD) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | EGYPT | LIBYA | TUN | ALG | MOR | W. SAHA | MAU | SEN | Total | World | % |
| Exports (Million USD) | EGYPT | | 582 | 171 | 466 | 411 | 0 | 10 | 47 | **1,687** | **22,507** | **7%** |
| | LIBYA | 68.3 | | 19 | 8 | 89 | 0 | 0 | 2 | **186** | **8,584** | **2%** |
| | TUN | 84.8 | 540 | | 558 | 191 | 0 | 22 | 50 | **1,446** | **13,216** | **11%** |
| | ALG | 303 | 22 | 810 | | 236 | 0 | 57 | 8 | **1,436** | **28,812** | **5%** |
| | MOR | 273 | 11 | 99 | 615 | | 0 | 173 | 197 | **1,368** | **22,844** | **6%** |
| | W. SAHA | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | **N/A** | **1,896** | **0%** |
| | MAU | 2 | 0 | 2 | 0 | 211 | 0 | | 3 | **218** | **1,723** | **13%** |
| | SEN | 1 | 0 | 0 | 1 | 7 | 0 | 17 | | **26** | **2,640** | **1%** |
| | Total | **732** | **1,155** | **1,101** | **1,648** | **1,145** | **N/A** | **279** | **307** | **6367.1** | | |
| | World | **58,052** | **6,763** | **16,796** | **45,129** | **48,681** | **2,207** | **2,283** | **5,478** | | **102,222** | |
| | % | **1%** | **17%** | **7%** | **4%** | **2%** | **0%** | **12%** | **6%** | | | **6.0%** |

*Source: Fimotions (2017), analysis on data on www.trademap.org, based mostly on 2016 data or nearest year.*

The LPIs for TAH1 countries have been analyzed for years 2007/2015 as shown in Table 34.

**Table 34: Logistics Performance Index countries in the TAH1**

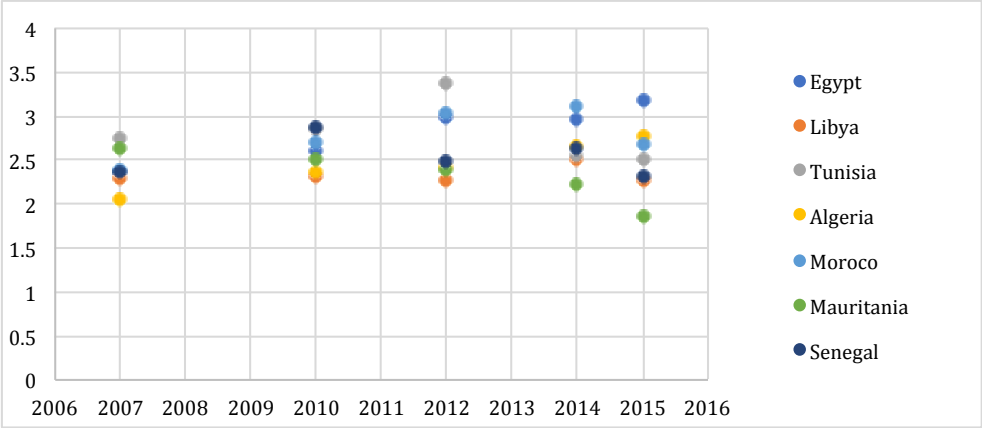
| | 2007 | 2010 | 2012 | 2014 | 2015 |
|---|---|---|---|---|---|
| ***All*** | 2.74 | 2.88 | 2.89 | 2.88 | 2.88 |
| **Egypt** | 2.37 | 2.61 | 2.98 | 2.97 | 3.18 |
| **Libya** | N/A | 2.33 | 2.28 | 2.5 | 2.26 |
| **Tunisia** | 2.76 | 2.84 | 3.37 | 2.55 | 2.5 |
| **Algeria** | 2.06 | 2.36 | 2.41 | 2.65 | 2.77 |
| **Moroco** | 2.38 | N/A | 3.03 | N/A | 2.67 |
| **Western Sahara** | N/A | N/A | N/A | N/A | N/A |
| **Mauritania** | 2.63 | N/A | 2.4 | 2.23 | 1.87 |
| **Senegal** | 2.37 | 2.86 | 2.49 | 2.62 | 2.33 |
| **Total** | **14.57** | **13** | **18.96** | **15.52** | **17.58** |

*Source: Fimotions (2017), data source: World Bank.*

One of the critical components of the LPI relates to customs procedures, which is below the global averages for all countries except for Egypt. Lack of common customs documentation and lack of sharing information for transiting goods leads to excessive delays and paperwork that typifies poor trade facilitation. However, there is growing recognition of the need for higher standards. When taken in total, there is an improvement collectively for all of the corridor

countries of about 18.5%. Exactly what attributed to the higher improvement on LPI in these countries is hard to say but better transit highway infrastructure and border processing procedures must have contributed. To this end, OSBPs are deployed along the new TAH1, these were planned as a part of the highway projects like Ras Adjir OSBP on the Tunisia / Libya border (planned to be completed by 2020) (Faten, 2017) and Morocco borders[51].

**Figure 45: LPI relative changes over time in TAH1 (2007-2015)**




*Source: Fimotions (2017), data source: World Bank.*

### 4.5.5. Social factors

The countries along TAH1 are mostly Arabic speaking and Islamic, thus having a common culture and language should facilitate regional integration. The population, unemployment and poverty HCR or Poverty Index for TAH1 countries are given in Table 35. Of a total population of 205 Million, 45 Million are in poverty, although poverty HCR is low in Algeria and Morocco. The HDI have also been complied, which show a wide disparity between the countries. It might be expected that as integration progresses overall standards of living will improve.

[51] www.icfafrica.org/news/one-stop-border-posts-to-be-complete-this-year

**Table 35: Social factors in TAH1 Countries**

| Country | Population (Millions) | Unemployment (%) | Poverty Index (%) | HDI |
|---|---|---|---|---|
| **EGYPT** | 91.5 | 12.7 | 27.8 | 0.691 |
| **LIBYA** | 6.3 | 20.6 | 40 | 0.716 |
| **TUN** | 11.4 | 15.5 | 15.5 | 0.725 |
| **ALG** | 40 | 10.5 | 5.5 | 0.745 |
| **MOR** | 35 | 10 | 8.9 | 0.647 |
| **W. SAHA** | 0.6 | N/A | N/A | N/A |
| **MAU** | 4.2 | 13 | 42 | 0.513 |
| **SEN** | 15.6 | 16.6 | 46.7 | 0.494 |

*Source: World Bank and UN for most recent years.*

### 4.5.6. Safety, security and the legal liability

Conflict in the countries along the corridor have been prominent affecting the ability for trade to flow smoothly therefore, sharing risk and intelligence information may not be developed, though there is no evidence. Some countries are in the process of building anti-terrorism fencing.

Road safety will have been much improved with the construction of a dual lane international highway, although the actual number of crashes specifically on the highway is not known, though national road safety figures will be available but are of no real relevance to this study.

Legal harmonization of conditions of carriage and transport documentation for road freight may also be limited. Discussions will be held with high level officials as to the impact of improved regional communications on conflict prevention and minimization. Only under conditions of peace, can other security measures follow including sharing intelligence and risk analysis at borders. A final step would be for corridor members to support harmonized conditions of carriage as well as the TIR agreements.

### 4.5.7. Technical and Operational Factors

Typical considerations for coordinated transport and operational development are interoperability, common technical standards and traffic legislation. In this regard, it is worth being reminded that a definition of transport corridor is a specified route, ideally intermodal, that can expedite the movements of goods and people across international borders by connecting key points in different countries. Certainly, TAH1 is a specified route in theory, whether it is signed as such in each country is another matter. Are the countrymen of Senegal aware that they have route passing through their territory that goes to Cairo 8,000 km away? Small issues, such as common road signing, are important. Apart from signage, road standards also vary along the route, in the Eastern sections carriageways are 3.5 M wide while in the Western sections they are 3 M wide. Shoulders also vary in width and construction.

Traffic levels generally are higher closer to urban areas than borders of course. Such that approach sections to Cairo have an AADT of 16,000 while the border 2,000. In Libya an average for the entire length of TAH1 is stated as being 2,600. In Morocco, AADT varies from

12,000 near the capital to a 800 vehicles per day at the border. Senegal and Mauritania traffic levels are less than 1,000 and only 50 at the border (SWECO, 2003).

TAH1 has proved to be used much more as for commuting and interurban traffic than international traffic. It is unavoidable of course, but that direct access to this international highway along peri-urban sections may have become too easy, due to lack of planning controls, considerably reduces its integrity and value. Any office, warehouse, shop, garage, or even large house wanting access to the main route, builds on an adjoining plot and constructs an access road. During the study visit, the Tunisian Confederation of Industry, Trade and Handicrafts (UTICA) as an industry representative indicated that this is the main challenge for transport companies on this corridor: improper infrastructure. It causes devastating impacts on the transport costs. This is also one of the reasons why Tunisia trades more with Europe. China is actually investing heavily in logistic center projects in Africa (more than any other countries like Russia and European countries), but the current infrastructure conditions hinder the investment progress.

TAH1 has reduced journey times by road between the principal cities of each country as shown in Table 36 which shows point to point and accumulated distances. The journey times prior to the construction of the TAH1 on single carriageway roads typically would have been at least 50% slower with many more road accidents. In Tunisia, for example, section travel time (195 km) was 4 hours on single carriageway reduced to 2 hours on dual carriageway. Similarly, accidents reduced from 0.47 deaths per accident to 0.27 deaths per accident[52]. The journey times between cities have been obtained from on line route applications and may not be that accurate. However, satellite imagery shows the route to have low levels of usage outside the conurbations and so high average speeds would be possible. The accumulated actual travel time Cairo to Dakar is 113 hours – add to this the average border processing time at 14 border crossings of 3 hours each, the total transit time is more of the order of 155 hours.

**Table 36: Distance and journey times between cities**

| Country | Distance (km) | | Time *(hours)* | Speed *(kph)* |
|---|---|---|---|---|
| | City to City | Corridor | | |
| **Cairo** | 0 | 0 | 0 | 0 |
| **Tripoli** | 2044.81 | 2044.81 | 24.5 | 83.5 |
| **Tunis** | 772.52 | 2817.33 | 9.6 | 80.5 |
| **Algiers** | 797.52 | 3614.85 | 10.5 | 76 |
| **Rabat** | 1423.53 | 5038.38 | 23 | 61.9 |
| **El-Aaiún** | 1167.85 | 6206.23 | 13.6 | 85.9 |
| **Nouakchott** | 1280.8 | 7487.03 | 14.75 | 86.8 |
| **Dakar** | 549.51 | 8036.54 | 7.6 | 72.3 |

*Source: Fimotions (2017), data source: http://www.worldatlas.com/travelaids/driving_distance.htm.*

[52] https://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/TUNISIA_-_Gabes-Medenine-Ras_Jedir_Highway_Construction_Project_.pdf

An ex-post evaluation of the section through Tunisia El Jem - Sfax Motorway – is worth looking at in more detail[53]. The average daily traffic of the El Jem - Sfax section as of 2011 was 7,800 vehicles/day, which is 79% of the projected volume for that year according to the JICA evaluation team. Although one of reasons for that was delay in opening to the public, the demand projection in the feasibility study was significantly overestimated. However, the traffic accident rate on the existing national road was lowered by half as may be expected because of low flow/capacity ratio of the new road. It is expected that this may be typical of other sections of the route. Improvements in accessibility invariably impact on land price. It is expected that completion of the project would improve the access to Tunis and promote the integrated economic development along the Tunis - Sfax section and beyond to the other countries. It is difficult to directly compare the economic situation between before and after the project in the qualitative terms. The economic development generated by improving accessibility along the TAH1 corridor was demonstrated by the changes in land prices, which had increased by 180% in real terms over a 10-year period before and after the completion of the motorway. This illustrated the enhanced attraction for investors to establish their businesses within the corridor. The number of foreign enterprises registered in the corridor section in Tunisia as of October 2010 was 973 of which 32% were foreign owned, though the country was unspecified. If they were mostly TAH1 nations, it would be noteworthy. Importantly the businesses created 94,000 employment opportunities.

A traffic analysis was carried out based on the trade matrix above. In the absence of border post data a proxy for the monetary value and origin and destination of trade can be seen in the trade matrix in Table 33. To covert into transit traffic, the first step in the process was to convert trade values to trade volumes using a global average value per ton of trade. The data used for this is given below.

- Global Value of Trade 16.5 Trillion[54]
- Global Volume 8.4 Billion[55]
- Average Value per ton 1,964.3 USD/Ton

The next step was to convert tons of trade per year to trucks per day. Important to note that there are no international railway connections, that coastal shipping will be used, as will pipeline for gas and oil, so it was assumed that 60% of trade goes by road, 30 tons per truck and 40% of trucks return empty. Consequently, the derived daily transit traffic flows from the process in Table 37 indicates that international road freight traffic is very light. This is corroborated from satellite imagery used in the spatial analysis.

[53] Ex-Post Evaluation of Japanese ODA Loan Project El Jem - Sfax Motorway Construction Project
External Evaluator: Yasuhiro Kawabata, Sanshu Engineering Consultant, 2007
[54] https://www.wto.org/english/news_e/pres16_e/pr768_e.htm
[55] http://www.un.org/en/development/desa/policy/wesp/wesp_archive/2012chap2.pdf

**Table 37: Origin - destination of international road transit traffic on TAH1**

| | | Imports vehicles per day | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | **Egypt** | **Libya** | **Tunisia** | **Algeria** | **Morocco** | **W. Sahara** | **Mauritania** | **Senegal** |
| **Exports Vehicles per day** | **Egypt** | - | 24 | 7 | 19 | 17 | - | 0 | 2 |
| | **Libya** | 3 | - | 1 | 0 | 4 | - | - | 0 |
| | **Tunisia** | 3 | 22 | - | 23 | 8 | - | 1 | 2 |
| | **Algeria** | 12 | 1 | 33 | - | 10 | - | 2 | 0 |
| | **Moroco** | 11 | 0 | 4 | 25 | - | - | 7 | 8 |
| | **W. Sahara** | - | - | - | - | - | - | - | - |
| | **Mauritania** | 0 | - | 0 | - | 9 | - | - | 0 |
| | **Senegal** | 0 | - | - | 0 | 0 | - | 1 | - |

*Source: Fimotions (2017).*

ITS such as vehicle actuated traffic management and signing is not likely to be built into this international highway. The only location for ITS will be urban and peri-urban locations and will have been installed not for transit traffic, but for commuters. Tolling was not revealed during the appraisal, although it is possibly used in some locations. Traffic levels for feasible tolling must be greater than 10,000 vehicles per day (WorldBank, 2013, Queiroz and Gautam, 1992) and this level is not experienced for most of TAH1.

It is also worth mentioning that the highway projects to connect Tunisia and Libya along TAH1 are planned to be completed by 2020. The projects to connect Tunisia and Algeria, especially the section between Jendouba and the border, are facing funding problems. The construction costs are very high due the mountainous terrain. At the time of this report, the Ministry of Equipment of Tunisia has not had any solution yet for this funding problem[56].

### 4.5.8. Environmental and Energy Factors

Freight is predominantly carried by road transport in Africa, including the study area. Road transport is more energy intensive than other modes, so ways of reducing dependency on road are needed. One way to reduce environmental impacts, emissions and improve energy efficiency from transport operations would be with great use of intermodal transport. Improved logistics organization, coordination, and corridor route planning could also reduce $CO_2$ emissions further. The development and use of intermodal transport corridors for transportation of goods helps reduce emissions of pollutants and environmental impacts. Given the lack of a corridor development approach, inter-modality and multimodal operations, opportunities to promote more environmentally sensitive and sustainable mobility are restricted.

### 4.5.9. Corridor Performance Monitoring

In the absence of a transport corridor there is, unfortunately, no systematic collection of corridor performance monitoring data. For the future, setting up permanent classified traffic

[56] Based on the interview with the Directorate General of Bridges and Roadways, the Ministry of Equipment of Tunisia, 2017.

counting stations would be a good project in which to invest[57]. Of high relevance is the routine collection of border crossing data from truckers and its centralized analysis for the entire route. As noted from Table 36, the transit times between border posts for the few trucks that use the corridor is very good. New OSBPs have been built along TAH1 as a part of the project, and these have proved to be successful in reducing waiting times. Despite the investment in infrastructure, trade has not evolved as would have been expected.

### 4.5.10. Conclusion

TAH1 is not a transport corridor and meets none of the criteria for such a corridor, including the absence of a treaty and a coordinating secretariat. Its virtue is that there is a well-constructed road that passes through the countries and border posts are OSBPs. Main conclusions to be drawn from the case study of the TAH1 are:

1. There is no evidence of any political initiatives to advance regionalization except MENA.
2. Mutual economic activity is reflected in low intra-regional trade, which is 6% of global trade. Whereas the EU is 60% of global trade.
3. The operating environment for TAH1 is very good and safe, the road being built to high international standards as required by IFIs. There is an inconsistency in design geometry with lane widths and shoulders.
4. There is no equivalent international rail route to the TAH1, though some sections of it would be in place.
5. The LPI is below the world average, meaning that the physical performance is undermined by lack of harmonized systems and excessive NTBs.
6. There is no evidence of increasing trade or traffic between participating countries.
7. The volumes of international trucking are very low.
8. As each country has access to its own port there is little drive to facilitate trade between them.
9. Conflict and unstable governance has undermined progress. During the study visit to Tunisia, the related ministries stressed the political issues between Algeria and Morocco as the main impediment of the success of the corridor. The ministries also agreed that the success factors for this corridor would be: political willingness, infrastructure improvement, corridor governance, and efficient border controls.
10. There is no TAH1 corridor management at all.

[57] http://www.syntell.co.za/Content/pdfs/Sensors/EIS/TRAFFIC%20REPORTER%20by%20EIS-ISS.pdf

#### 4.5.11. Recommendation

The main recommendations for TAH1 are as follows:

1. **To establish a TAH1 secretariat**
   This will enable the route to be promoted, monitoring data to be processed and, importantly, provide a forum for political issues to be dealt with. Note here that in post war Balkans the EU set up a transport observatory called SEETO[58]. Besides the obvious transport objectives, the overriding one was to create a platform upon which better international relations could be built following the very bloody war. SEETO still operates in 2017 and provides a very good model for a secretariat.

2. **To promote the opening of the Algiers border**
   The OIC and Arab League should promote the opening of the Algiers border, which is hampering the trade tremendously.

### 4.6. Northern Transit Transport Corridor

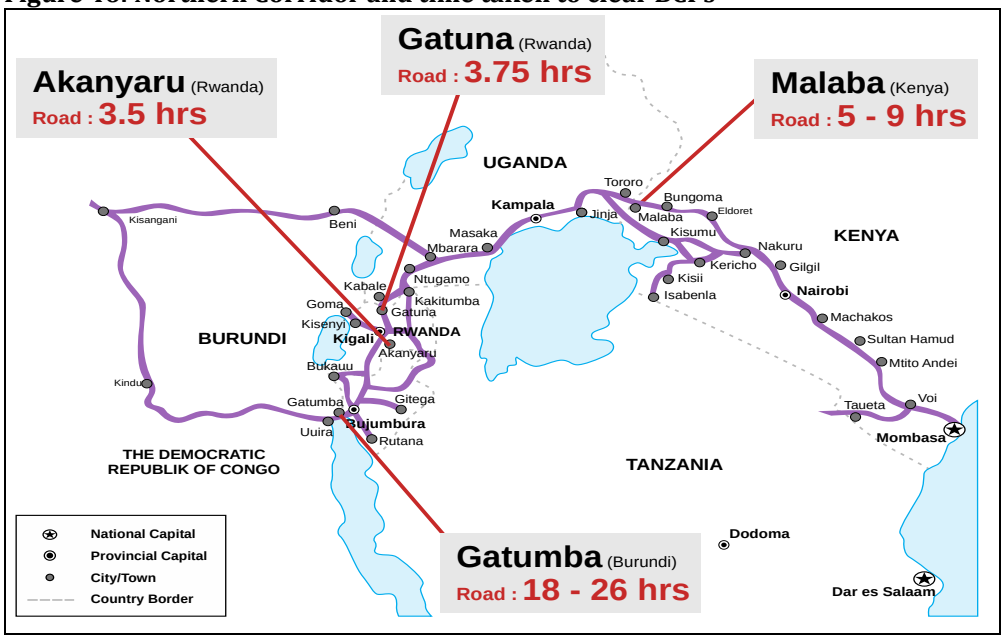
#### 4.6.1. General factors

Historically it is worth noting that Uganda, Kenya and Tanzania (UKT) were once members of the former colonial East African Community until 1972 and have a tradition of political cooperation, regional integration and harmonization. English provides the common language, legislation and education. The shilling is the currency in all the UKT countries though not economically related, at the present time. This has made it much easier to make progress with more contemporary political and economic initiatives.

The Northern corridor is the transport corridor linking the land locked countries of Uganda, Rwanda and Burundi with Kenya's maritime port of Mombasa. Uganda is the only OIC member state. The NTTC serves Eastern part of the Democratic Republic of Congo (DRC), Southern Sudan (S. Sudan) and Northern Tanzania[59]. The Northern Corridor infrastructure comprises road, rail, pipeline and inland waterways and connects all the five countries of the East African Community and beyond. The network is fed by the gateway Port of Mombasa and segmented by inland container terminals in Kenya. The map of the corridor is shown in Figure 46. In this review, the impact of NTTC on all five countries of the East African Community will be looked at. Data for this analysis has been obtained from numerous studies that have been carried out, more information has been collected from the NTTC secretariat.

[58] South East Europe Transport Observatory—set up under the EU in 2006 by the author refer to http://www.seetoint.org/
[59] http://www.ttcanc.org/news.php?newsid=75

**Figure 46: Northern Corridor and time taken to clear BCPs**




*Source: NCTTCA (2017), reproduced and adjusted by Fimotions.*

**Table 38: Corridor Profile NTTC**

| Location | Countries covered | Length (km) | Secretariat |
|---|---|---|---|
| Eastern Africa | **Uganda**, Rwanda, Burundi, Kenya, DRC, S. Sudan, Tanzania | Network 8,800 km of which main corridor = 2038 km | Mombasa, Kenya |

*Source: NCTTCA.*
Note: Countries in bold are OIC Member Countries

### 4.6.2. Political and Institutional Factors

The level / degree of cooperation among countries would appear to be high with an extensive and far reaching multilateral agreement. The NCTTCA was established under the legal framework of NCTTCA to coordinate implementation of the Agreement and to carry out decisions and resolutions reached by policy organs of the Authority. The Agreement mandates NCTTCA to promote co-operative transport policies and foster an efficient and cost-effective transit transport system within the Corridor.

The Vision and Mission Statements are as follows:

**Vision:** NCTTCA's vision is to contribute to sustainable social and economic development of the NTTC member States through an integrated transport system that promotes national, regional and international trade.

**Mission**: NCTTCA's mission is to transform the Northern Corridor into an economic development Corridor that offers internationally competitive transit transport services,

promotes national and regional trade and integration, and provides opportunities for private sector investments along the Corridor

NCTTCA's major target objectives are to promote use of the NTTC as the most effective transport network for surface transport of goods between the member countries and the sea and ensure that member states (a) grant each other the right of transit in order to facilitate movement of goods through their respective territories and (b) provide all possible facilities for traffic in transit between their territories. Other priorities include:

- Expedite movement of traffic and avoid unnecessary delays in the movement of goods in transit.
- Minimize incidence of custom fraud and avoidance.
- Simplify and harmonize documentation and procedures relevant to the movement of goods in transit.
- Improve transport infrastructure and facilities.
- Adopt Internet Communications Technology (ICT) technologies to enhance exchange of information and to monitor movement of cargo along the corridor.

All the above are classical requirements for the elaboration and formation of transport corridors.

**Transport Strategies and Planning**

In reviewing the national transport strategies and plans of each country, the most important aspect to determine is the extent to which international transport and corridor development features in them. Uganda prepared its National Transport Master Plan for 2008 to 2023 and being a landlocked country that has always been totally dependent on Mombasa Port, its plan should relate to the transport corridor. Sure enough, objective iii) of the plan is "To serve also as a key input to regional transport planning at East African Community, COMESA and African Union levels". One of the draft policy statements is also of relevance, 'To promote modal integration, including container transshipment facilities at interchange points between all modes'. To implement these, a near term investment project was to upgrade the Uganda section of international road corridor and construct transshipment points. It can be concluded that National Planning has considered the Northern Corridor to be very important.

For Kenya, one would hope to see that the policy accepts its role as a transit country and it certainly does do this. In the Strategic Transport Master Plan for Rwanda prepared in 2012[60], there was no reference to the Northern Corridor, only an oblique one to pay attention to the future needs of regional integration. However, in the Economic Development & Poverty

[60] Strategic Transport Master Plan for Rwanda Aurecon, 2012.

Reduction Strategy [61] the need for regional integration to reduce transport costs and stimulate trade and jobs was very prominent.

To conclude, the three main participating countries have embedded many of the principles of regional integration and transport corridor development into their national plans, as summarized in the table below.

**Table 39: Corridor Features in National Transport Plans of Corridor Countries**

| Country | Document reviewed | Transport and corridor development features |
|---|---|---|
| **Kenya** | Kenya Integrated National Transport Policy (2009) | It recognizes that trade within the Common Market for Eastern and Southern Africa (COMESA), which currently absorbs about 70 % of Kenya's total exports (2007) and where Kenya is a net exporter, is expected to grow considerably. Similarly, following 28 efforts to achieve a Customs Union among member States of the East African Community (EAC) and the accession of Rwanda and Burundi as its full members in (2007) trade within the EAC is also expected to increase substantially, given the rising demand for Kenyan goods in these countries as they also make efforts to develop their economies. Both import and export volumes are expected to rise substantially. |
| **Rwanda** | Rwanda Strategic Transport Plan – Economic Development & Poverty Reduction Strategy | Transport Strategies of the reduction of non-tariff barriers are, among others, as follows:<br>• To achieve and implement uniform transit transport policies and regulations by the member States;<br>• To take regional initiatives to reduce transit time in sea ports Strategic Transport Plan for EDPRS2;<br>• To take regional initiatives to expand the capacity of sea ports;<br>• To establish an efficient customs transit regime;<br>• To reduce time and costs associated with transporting goods along the international corridors ;<br>• To ensure faster clearance of Cargo from its discharge to exit at the port of Mombasa and Dar es Salaam;<br>• To ensure border crossings posts operating and working 24 hours a day along international corridor routes;<br>• To provide up-to-date information on stops, bribes, time delays, costs, security and safety encountered along the international corridor;<br>• To operationalize real-time information on stops and time delays monitoring on transport observatories;<br>• To develop improved quality of communications and advocacy with stakeholders;<br>• To establish more One-Stop Inspection Stations;<br>• To introduce Electronic Cargo Tracking System (ECTS) Inter-face (Interconnectivity) amongst Tanzania, Rwanda, Uganda and Burundi.<br>• |

*Source: Fimotions (2017), retrieved from national transport policies of each country.*

[61] Transport Sector Strategic Plan for Economic Development & Poverty Reduction Strategy EDPRS2

### 4.6.3. Economic factors

With respect to economic factors, an assessment of the following features has been prepared:

- Economic Openness
- Ease of doing business
- Cost Structure

OIs for each country has been compiled with data for the table taken from the IMF, UN, OECD and World Bank. It is apparent that land locked countries are generally less open than maritime countries though not significantly so in NTTC partly due to the existence of long established and well-functioning transport links to the ports.

**Table 40: Openness of Countries in NTTC**

| Country | USD Millions | | | | Openness |
|---|---|---|---|---|---|
| | GDP | Imports | Exports | Total | |
| **UGAN** | 26,195 | 4,677 | 2,755 | 7432 | 28% |
| **RWAN** | 8,406 | 1,961 | 538 | 2499 | 30% |
| **BUR** | 3,133 | 683 | 122 | 805 | 26% |
| **KENYA** | 68,919 | 14,700 | 5,679 | 20379 | 30% |
| **DRC** | 41,615 | 5,640 | 5,690 | 11330 | 27% |
| **S. SUDAN** | 9,000 | 426 | 12 | 438 | 5% |
| **N. TANZ** | 47,184 | 9,976 | 5,365 | 15341 | 33% |

*Source: Fimotions (2017), compiled relates to the latest years from available databases, this may differ from other sources.*

Corridor country data is compared with the global mean for 190 countries from the EODB database. Trading across borders is a part of the index and most pertinent to the study. Export processing times are extremely high in the DRC and in South Sudan – the latter expected as it is a new country and in the former, may well reflect the level and state of national governance. Costs of processing exports are very high in DRC and Tanzania and obviously affects the viability of trade. Import processing data is also available but has not been included, the analysis presupposing that export efficiency is more central to development.

**Table 41: EoDB in corridor countries in 2017**

| Country | Ranking | | Border Compliance | | Documentary Compliance | |
|---|---|---|---|---|---|---|
| | Overall | Trading across borders | Time to export (hours) | Cost to export (USD) | Time to export (hours) | Cost to export (USD) |
| **UGAN** | 115 | 136 | 71 | 287 | 64 | 102 |
| **RWAN** | 56 | 87 | 97 | 183 | 42 | 110 |
| **BUR** | 157 | 160 | 59 | 106 | 120 | 150 |
| **KENYA** | 92 | 105 | 21 | 143 | 19 | 191 |
| **DRC** | 184 | | 515 | 2223 | 698 | 136 |
| **S. SUDAN** | 186 | 177 | 146 | 763 | 192 | 194 |
| **TANZ** | 132 | 180 | 96 | 1160 | 96 | 275 |
| **WORLD** | | | 59 | 411 | 56 | 149 |

*Source: World Bank.*

**The Cost structure** to be investigated includes the cost of investment, labor, land, and energy, the rationale being that improvements in political, economic and social cooperation along the

corridor and hinterland will impact positively on these factors. The main question is whether Africa really is a low-cost site from which to run a business. According to the World Bank[62], although data on production costs are not easily available, a number of reports and anecdotal evidence clearly show that Africa is far from being a low-cost production site. A combination of factors linked to the institutional and physical business environment make the African continent one of the most expensive places in the world to produce. By some estimates as much as 25 percent of sales of firms in some African countries are lost because of impediments of the investment climate such as unreliable infrastructure, contract enforcement difficulties, crime, corruption, and poor regulation. These losses are, at times, much higher than taxes paid.

A compilation of prime costs in the economies of each corridor country is given in Table 42. The cost of investment is indicated by the prevailing base interest rate in each country. Rates are well above those in Europe and USA. Rates are lowest in Rwanda, a country that is making rapid progress to reform and modernize but they are highest in the DRC, which has the least reformist government. Labor rates in Africa are generally low at about 180 USD per month (2008). However, value added and productivity is also low, making low labor rates costlier than generally apparent. The rates shown in the table are current and indicate that African labor rates are relatively low.

**Table 42: Examples of prime costs in corridor countries**

| Cost Item | Uganda | Rwanda | Burundi | Kenya | DRC | S. Sudan | Tanzania |
|---|---|---|---|---|---|---|---|
| Cost of investment - Base Rate of Interest | 11% | 6.25% | 7.17% | 10% | 14% | 12.50% | 12% |
| Median cost of labor (USD net per hour) | 0.4 | 0.65 | 0.43 | 1.26 | 0.64 | 0.35 | 0.92 |
| Cost of industrial land (USD per Ha) | 650,000 | 620,000 | N/A | 650,000 | 850,000 | N/A | 640,000 |
| Cost of energy (USD per KWh) | 0.15 | 0.22 | 0.11 | 0.03 | 0.048 | 0.42 | 0.17 |

*Source: Fimotions (2017), from various sources.*
Notes to table:

i. Interest rates are current to 2017
ii. Cost of labor is inflated to current prices using latest exchange rates from latest available data
iii. Industrial Land is generally close to the capital city
iv. Energy prices are current to 2017

The cost of industrial land is rather similar in corridor countries, which may provide an early sign of leveling due to improvements in accessibility since land prices and location are closely linked. The price of energy varies a lot between TTCANC countries. The reasons is that energy markets remain firmly controlled by government, transmission and distribution networks are not linked and the energy sector is not commercialized / privatized. Agreements are in process to commercialize and regionalize energy generation and supply networks.

[62] http://siteresources.worldbank.org/EXTAFRSUMAFTPS/Resources/chapter4.pdf

### 4.6.4. Trade Facilitation

Northern Corridor operations are based on the NCTA. The NCTA, signed in 1985, came into force in 1986 after the necessary ratification and asserts the following:

- Ensure freedom of transit among the member states
- Safeguard right to access to/from the sea for landlocked countries
- Develop and integrate the regional transport facilities and services
- Facilitate inter-state and transit trade

The Democratic Republic of Congo became the fifth member after acceding to the Agreement in 1987.

Trade between member states and the rest of the world is shown in Table 43. The most important aspect to note is that intra-regional trade is 18% of total trade, so much higher than the 6% between TAH1 participants. The reason is more likely to historic than due to the transport corridor since Kenya, Uganda, and Tanzania were part of the East African Community for many years and also during British colonial era.

**Table 43: Trade matrix NTTC in 2015**

| COUNTRY | | Imports (Millions USD) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UGAN | RWAN | BUR | KENYA | DRC | S. SUDAN | N. TANZ | Total | World | % |
| Exports (Million USD) | UGAN | | 237.57 | 46.28 | 427.01 | 152.56 | 265.03 | 60.76 | **1,189** | **2,267** | **52.5%** |
| | RWAN | 9.37 | | 6.41 | 90.38 | 186.53 | 5.34 | 1.11 | **299** | **579** | **51.7%** |
| | BUR | 3.38 | 4.63 | | 13.43 | 28.27 | N/A | 2.19 | **52** | **114** | **45.6%** |
| | KENYA | 554.53 | 147.98 | 36.22 | | 239.23 | 225.75 | 237.32 | **1,441** | **5,628** | **25.6%** |
| | DRC | 3.64 | 11.02 | 36.22 | 2.96 | | N/A | 0.63 | **54** | **6,313** | **0.9%** |
| | S. SUDAN | 0.84 | 0.00 | N/A | 14.02 | N/A | | N/A | **15** | **2,335** | **0.6%** |
| | N. TANZ | 62.89 | 41.30 | 44.03 | 793.89 | 198.29 | 0.10 | | **1,141** | **5,854** | **19.5%** |
| | **Total** | **635** | **443** | **169** | **1,342** | **805** | **496** | **302** | **4191.1** | | |
| | **World** | **5,528** | **1,858** | **561** | **19,430** | **5,812** | **623** | **14,706** | | **23,091** | |
| | **%** | **11.5%** | **23.8%** | **30.2%** | **6.9%** | **13.8%** | **79.6%** | **2.1%** | | | **18.2%** |

*Source: Fimotions (2017), analysis on data on www.trademap.org.*

Trade Facilitation programs include:

- Simplification, rationalization, harmonization, standardization and modernization of trade business processes and documentation;
- Rationalization and minimization of trade transaction costs;
- Promotion of private sector participation in policy formulation and implementation of activities relating to trade and transport facilitation;
- Improving industry service standards and encouraging self-regulation;
- Harnessing ICTs towards a smart Corridor.

Because of this long-standing and ratified agreement, the analysis of the Northern Corridor has shown that its performance has improved and the delays experienced in 2009 have disappeared. It shows that through coordinated working the costs of trading can be reduced

and reliability improved. Some of the main features introduced on this corridor include following:

- Multiple security bonds not required under SCT;
- Multiple customs declarations not required under SCT;
- Differences in customs laws and instruments eliminated;
- Customs systems interfaced;
- One Stop Border Controls
- Multiple Customs verification replaced by joint verification;
- Road, police and customs roadblocks eliminated;
- Multiple weighbridges en-route reduced to two + high speed weigh-in-motion system;
- Congestion at the port and border posts eliminated (CPCS, 2015).

The case study focuses on road, rail, and port performance, as well as border crossings. The oil pipeline, while a significant asset, is not considered as it functions independently of the mandate of the Corridor and is not relevant to the general movement of traded goods.

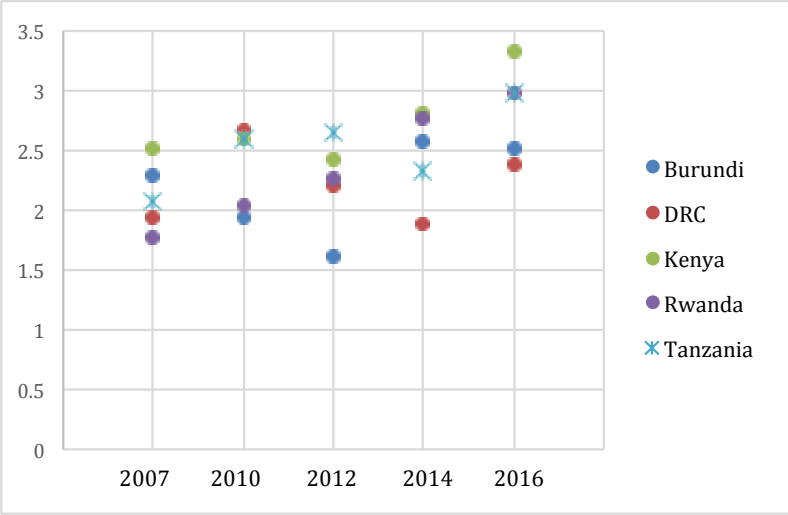
The time series data set for all years from 2007 has been obtained and extracted the LPIs for NTTC members as shown in Table 44. This is also shown graphically in Figure 47 clearly indicates that African countries on the corridor are starting to catch up.

**Table 44: Logistics Performance Index countries in NTTC**

| Year | 2007 | 2010 | 2012 | 2014 | 2016 |
|---|---|---|---|---|---|
| **All** | 2.74 | 2.88 | 2.89 | 2.88 | 2.88 |
| **Burundi** | 2.29 | 1.95 | 1.61 | 2.57 | 2.51 |
| **DRC** | 1.95 | 2.68 | 2.21 | 1.88 | 2.38 |
| **Kenya** | 2.52 | 2.59 | 2.43 | 2.81 | 3.33 |
| **Rwanda** | 1.77 | 2.04 | 2.27 | 2.76 | 2.99 |
| **Tanzania** | 2.08 | 2.6 | 2.65 | 2.33 | 2.99 |
| **Total** | **10.61** | **11.86** | **11.17** | **12.35** | **14.2** |

*Source: Fimotions (2017), data source: World Bank.*

**Figure 47: Logistics Performance Index in NTTC Countries**




*Source: Fimotions (2017), data source: World Bank.*

The total LPI is computed to provide some kind of indication of the general progress being made on the entire NTTC. The linear equation suggests an improvement of 31% from 2007 to 2017. It is incorrect to attribute these gains in LPI solely to the achievement of the mission goals and targets of the corridor, but it has certainly significantly contributed.

### One Stop Border Posts (OSBP)

**One Stop Border Post - Anecdotal evidence**

**Uganda Kenya - Busia BP**

The Kenya-Uganda trade, for a long time known for lengthy procedures, expensive processes, a lot of paperwork and middlemen, has changed considerably. Customs and other border control agencies from two states now operate under one roof to facilitate trade and collect revenues with ease. That is the concept of one-stop border post (OSBP). Kenya has converted seven borders into OSBP s to remove the barriers to cross-border trade. The Kenya Revenue Authority (KRA) state that custom collections have tripled and **clearance time cut from three days to just under one hour since it began implementing the OSBP** in June 2016. Simplified procedures have attracted traders into the cross-border business as well as reduced smuggling, increasing revenue collections. Kenya and Uganda Plans 15 OSBPs in the next few years.[63].

**Current data and statistics collection practices** have become steadily automated and harmonized in the Corridor. Information systems RADex (Revenue Authority Digital Data Exchange) and ASYCUDA are commonly used border processing software that provides revenue data as well as risk analysis and processing performance information. The need for uniform or compatible processing systems and information sharing is self-evident and that exchange of data electronically (EDI) requires complying with international agreements such as UN/EDIFACT[64]. As the corridor countries are also a part of the 27 country Preferential Free

[63] http://perilofafrica.com/uganda-kenya-trade-thrives-busia-border-post/
[64] https://www.hella.com/hella-com/assets/media_global/EDI_Agreement_Hella_Signature.pdf

Trade Area (PFTA) then monitoring non-tariff barrier issues is carried out continuously in real time[65].

The performance of the corridor is monitored through the Northern Transport Corridor Observatory. It is a monitoring tool that measures 30 indicators on the performance along the corridor. The Observatory tracks the indicators using raw data collected from the stakeholders in all the member states. Information provides clear picture on various indicators, enabling to identify the bottlenecks that needs to be resolved to improve on the efficiency and sequentially improving in the trade and operations along the corridor. The data is available on (http://top.ttcanc.org/) to trusted users on a subscription basis.

#### 4.6.5. Social factors

The five countries of the Northern Corridor have a total land area of over 3 million square kilometers and a population of approximately 140 million people, which offers further opportunities for economic development. These countries possess enormous economic potential, which is yet to be fully exploited. The potential is in several sectors including agriculture, fisheries, tourism and mining. The potential investment in infrastructure and other sectors would result in the reduction of poverty through employment generation and income creation, which would result in the improvement of the quality of lives of the people of the sub-region. This also means that the population may be able to afford and be willing to pay for infrastructure services such as water, electricity, telephones and public transport as well as other consumer goods, thus boosting the whole economy. Much depends on the mobility of labor, both internally within each country but also regionally as countries integrate further. There is a positive view taken of regional migration in the participating countries. The Regional Migration Policy Framework comprises the following key components, technical cooperation and capacity building, information collection, dissemination and sharing. The formulation and harmonization at the national and regional legislation, policies and administrative practices are with regards to management of both legal and illegal variants of labour migration; border management especially as it relates to irregular migration, human trafficking and smuggling and finally the mainstreaming of migration in development planning .[66] Actual data on regional movements of peoples between all the NTTC members has not been forthcoming however, one of the major benefits of migration is seen as remittances which, for Uganda alone received USD 245 million in untaxed revenues in 2015 from 6500 migrant workers. In this regard, it must be noted that migration to Europe and elsewhere will be lessened as African countries become more economically developed. The compilation of social indicators in Table 45 merely confirms the underlying socio-economic status of each country on the Northern Corridor that its incremental development aims to counteract. This is especially the case with South Sudan that still lacks all the essential components of connectivity that will enable it to develop and improve the quality of life of its citizens. It is to

[65] http://www.tradebarriers.org/active_complaints
[66] http://migration.igad.int/wp-content/uploads/2017/02/Report-of-the-5th-RCP-Meeting.pdf

be noted that South Sudan has a very serious refugee crisis due to the ongoing conflict there that has given rise to a very large population of refugees that are mostly accommodated by fellow partner countries in the corridor.

**Table 45: Social factors in NTTC countries**

| Country | Unemployment | Poverty HCR | Education Attendance Primary School Enrollment | Human Development Index |
|---|---|---|---|---|
| **Uganda** | 3.36% | 17% | 88% | 0.493 |
| **Rwanda** | 13.20% | 37% | 97% | 0.498 |
| **Burundi** | 6.60% | 65% | 61% | 0.404 |
| **Kenya** | 40% | 42% | 89% | 0.56 |
| **DRC** | 45% | 35% | 89% | 0.44 |
| **S. Sudan** | 20.00% | 35% | 91% | 0.467 |
| **N. Tanzania** | 10.30% | 30% | 22% | 0.531 |

*Source: Fimotions (2017), retrieved from available databases.*

Notes to the table:

i. Data current to 2014 /15 mostly
ii. Education – data is for enrollment, typically 30% leave by the age of 12 years
iii. HDI is a UNDP compilation of many social parameters

One of the objectives of the NTTC is to facilitate labor mobility. Tanzania having a relatively high HDI attracted 360,000 migrants and refugees mostly from the DRC and Burundi. Undoubtedly most would have used the corridor for transmigration. More analysis will be carried out on this issue.

All participating countries are signatories of the UN sustainable development goals and agenda 2030 and recognized through participation and integration national socio-economic agenda may be better achieved. As stated by (Volz, 2011) the purpose of regional integration is to secure long term global stability through economic development and better governance, the Northern Corridor provides the platform upon which long term social and economic improvements may be founded.

### 4.6.6. Safety, security and the legal liability

The Corridor has severe road safety challenges with fatalities (individual persons) in 2013 being Burundi 275, DRC 309, Kenya 3,179, Rwanda 308, Uganda 2,937 and South Sudan 96. Corridor participants recognized the vital importance of operational safety and agreed to a coordinated and prioritized program of interventions compiled by the Corridor Authority that included:

- Construction of parking spaces at Road Side Service Area
- Production of IEC materials developed on black spot maps
- Sensitize the Drivers against over speeding and reckless driving
- Conduct anti speeding campaigns
- Disseminate dangers of Drink driving and drug abuse

- Develop a charter on rules and responsibility and code of conduct for various stakeholders including drivers
- Control and harmonization of driver hours
- Build capacity of Unions to do their work better and do advocacy
- Promote mind set change and sharing good practices
- Promotion of two drivers per truck to reduce on fatigue
- Fire emergency plan in areas where the RSS will be constructed
- Emergency response improvements

**Axel loading and overloading** is and has been a major issue on African roads. The permissible axel loading on roads in Sub-Saharan Africa is 10 tons and the maximum gross vehicle mass is 56 tons over 7 axels. According to weighbridge data, 10% - 15% of trucks are overloaded in the corridor. Exceeding a vehicle's maximum permissible weight not only damages roads and bridges, but also endangers other road users. It is an offence which carries with it a range of risks and penalties from fixed fines of up to $4,000 and prison sentences of up to 4 years as provided for in the legal instruments regarding vehicle overload control that have been adopted by Corridor members. The solution advocated is more effective self-regulation and promoting voluntary compliance.

**Hazardous materials** moving along road and rail pose a potential danger and require a coordinated approach but evidence of such has yet to be found in the Northern Corridor. National regulations do exist and work is planned to harmonize these in the next 5 years or so.

**Health and Safety Legislation – driver's hours**, anecdotal evidence suggests that driving long periods without a break causes many accidents in the study area[67] and overturned vehicles area common sight as shown in Figure 48. The standardization of driver hours and practices is one of the priorities for the Corridor Authority, which also benefit from vehicle tracking technology with self-regulation being the preferred mode of enforcement.

[67] http://www.nation.co.ke/news/Northern-Corridor-trucks-project/1056-3340222-7fx1ohz/index.html

**Figure 48: Overturned truck Mombasa-Nairobi highway Northern Transport Corridor Kenya**

*Source: Beatrice Obwocha, Nation Media Group.*

The overturned truck shown in the photograph was taken on the Mombasa Highway. The accident was due to driver fatigue.

Transport corridors undoubtedly pose a **public health** hazard through the spread of communicable diseases. The NTTC is characterized by high HIV prevalence levels; there is heavy and frequent movement of people across the Corridor, and there are challenges in the health systems to meet the demand for HIV and AIDS services. Key drivers of HIV and AIDS pandemic along the Corridor include structural, bio medical and structural reasons. Gaps and challenges identified include poor access to health services, low level of HIV prevention awareness, tight working schedules, stigma and discrimination, alcohol and drug abuse, ignorance of individual HIV status, poverty, presence of commercial sex workers, irregular condom supply and inadequate funding. There are several lessons learned from the health interventions along the Corridor that can be replicated elsewhere if needed, but these are not repeated here but can be read on the link given[68].

**Phytosanitary controls** are applied to the movement of plants, food stuffs and livestock across borders, standards for which are not harmonized along the NTTC is a significant cause of avoidable delays. Such constraints are commonly grouped under the heading of non-tariff-barriers (NTBs). The UN Economic Commission for Africa, European Union and World Bank all support the deepening integration of the region and the gradual elimination of NTBs, part of which is the harmonization of sanitary and phytosanitary regulation and controls. These agencies make the point that Kenya, Uganda and others may be over-regulating their trade. Their research showed that frequency and coverage ratios for five different categories of rules and regulations were compared across a selection of SSA countries. The categories of rules and regulations, were (i) sanitary and phytosanitary (SPS), (ii) technical barriers to trade (TBT),

[68] http://www.roadsidestations.org/wp-content/uploads/2014/10/Safety-and-Health-Final-Report-Volume-1.pdf.

(iii) pre-shipment, (iv) price controls and (v) quantity controls. For Kenya and Uganda, the occurrence of pre-shipment measures, SPS measures (intended to protect humans, animals, and plants from diseases, pests, or contaminants) and TBT (which arise when standards, regulations, and assessments systems intended to ensure safety are not applied uniformly), significantly exceeded the levels of other examined African countries (Worldbank, 2012).

**Crime** tends to travel the same routes as trade and people, so that transport corridors become a conduit for criminal activity. Cross Border Cooperation is essential to fighting organized crime whether terrorism, drugs, arms or people trafficking. Though not part of the agenda for the NTTC development, it is a vital component for regional integration and one, which is high on the minds of decision makers. The exchange of intelligence and transfer of criminals between differing jurisdictions has continued in the EAC since its historic disbandment in 1967. A report on the use of small arms in crime covering these countries is an indication of the high level of cooperation[69].

**Armed Conflicts** unfortunately abound in the study area in Uganda, Rwanda, Burundi, Kenya, Sudan and the DRC. Conflict in one country inevitably affects others as both militants and refugees cross borders. Article 124 of The Treaty for the Establishment of the East African Community recognises the need for peace and security within the East African Partner States. The same article spells out wide-ranging approaches for implementation to inculcate a stable and secure environment within the region. The strategy covers collaboration on cross border crimes, auto theft, drug trafficking, terrorism, money laundering and other crimes. Strategies to improve peace and security in the region are vital to provide the low risk environment in which development and trade flourish.

Set in an evolving and somewhat risky climate having sound, consistent and enforceable **carriage of goods** regulations and rules for compensation is essential, without which insurance premiums and consequently transport costs are much higher. Currently passenger and freight transport is at the traveler's and owner's risk, which is not the case in more developed economies where the liability rests with the transport operator which has been proposed by the UNECA[70].

### 4.6.7. Technical and Operational Factors

**International traffic and trade on NTTC**

A review carried out (CPCS, 2015) captures much of the information needed to assess the performance of the corridor. International trade through the corridor all transits through Kenya. The volume of imports and exports in transit through Kenya increased from 4.9 MT in 2009 to 6.3 MT in 2014 an increase of 28.6%. The corridor also aims to increase inter-regional

[69] http://recsasec.org/wp/wp-content/uploads/2016/12/Armed-crime-PDF.pdf
[70] http://repository.uneca.org/bitstream/handle/10855/987/Bib-12861.pdf?sequence=1

trade, which rose from 3.6 to 5.5 MT. It can be assumed that almost all of this trade used the corridor. Thus, the volume of trade on the corridor increased from 8.5 MT to 11.8 MT.

A feature of trading patterns in Africa is the imbalance of imports and export of typically of around 7:1. Kenya, the most economically progressive and active country in the corridor imported 20 MT in 2014 but exported less than 3 MT. For transport, the costs of empty backhaul to the gateway port poses one of the largest costs on trade.

**Kenya Uganda railways** operated in tandem with the main highways to provide transport services in the corridor. The 1160 km single-track railway has 1000 mm-gauge and runs from Mombasa the gateway port through Nairobi, the capital of Kenya to Kampala the capital of Uganda. The volume of passenger traffic was 3.8 million in 2014, 5% less than the previous year, but the volume of freight increased from 1.2 MT in 2013 to 1.5 MT in 2014, an increase of 23%. Rail accounts for 20% of corridor freight traffic, almost all of it terminates in Nairobi. Average rail transit times for the route are between 7 to 9 days, the average operating speed for the route being just 6 km per hour. Because of this the volume of transit traffic using the rail route is negligible. To correct this the railway will be entirely reconstructed at the standard 1,435 mm gauge and new rolling stock purchased.

**The entire NTTC road network** covers approximately 8,800 km across Kenya, Uganda, Rwanda, Burundi, and the DR Congo. Approximately 70% of the network is paved. Road transport is fully liberalized and accounts for 80% of the total transit traffic flow within the NTTC. Key transit transport routes are from Mombasa to Bujumbura (the South-West terminus) covering about 2,000 km of road distance, and the Mombasa - Kisangani route which stretches for about 3,000 km. The bulk of imports and exports destined to and from countries in the Corridor are transported through either of these transit routes. The width of the main Northern Corridor road is distributed as follows: dual carriageway (2 x 7m): 104 km (5.1%) 7 m single carriageway: 1,186 km (58.2%) 6.5 m single carriageway: 393 km (19.3%) 6 m single carriageway: 355 km (17.4%). From Kenya to Uganda, the Mombasa - Malaba - Kampala road (1,170 km) is preferred due to the relative good quality of the network and availability of social amenities en route. Transit time averages 10 days. The alternative route is Mombasa - Kisumu - Busia - Kampala. From Uganda to Rwanda, the principal routes are Kampala - Kagitumba - Kigali and Kampala - Gatuna - Kigali, Bujumbura in Burundi is reached from Kampala through Rwanda. Bukavu, Goma and Kisangani are reached from Rwanda and Uganda as well[71]. Traffic surveys on critical border sections of the Corridor road network are presented in Table 46.

[71] http://www.ttcanc.org/page.php?id=28

**Table 46: Traffic flows on sections of the Northern Corridor**

| | Passenger Cars | Trucks | Minibuses | Buses |
|---|---|---|---|---|
| **Mombasa-Nairobi** | 1,995 | 1,187 | 54 | 78 |
| **Nairobi-Eldoret** | 1,897 | 943 | 75 | 95 |
| **Eldoret-Kampala** | 1,639 | 781 | 70 | 92 |
| **Kampala-Mbarara** | 1,883 | 596 | 150 | 60 |
| **Mbarara-Kigali** | 1,498 | 415 | 149 | 54 |
| **Kigali-Bujumbura** | 396 | 193 | 171 | 10 |

*Source: Fimotions (2017), data source: NTTCA and various studies.*

Note: Flows are average daily traffic volumes, two directions

The transit traffic is made up of imports for more than 90%. Uganda is by far the first destination, accounting for more than three quarters of the total transit traffic. The other countries (Tanzania, Rwanda, Sudan, and DR Congo) lag far behind, with shares ranging between 5 and 6%.

### Trade Related Traffic

An estimate has been made of the daily volumes of road freight due to intra-regional trade and trade also with the rest of the world. The method used was the same as for the TAH1 as follows:

- Converting the value of goods to volume of goods assuming the average value of all traded goods was just under $ 2,000 per ton;
- Applying an average load of 30 tons for international trucking in Africa;
- Empty running percentage of 85% based on very high ratio of imports to exports which is typical of Africa trade;
- Railway taking just 10% of the traffic – also typical of rail share of freight traffic.

The results of this analysis is given in Table 47. It shows that Uganda - Kenya two-way traffic would be about 79 trucks per day, add to this Uganda/World traffic of 121 trucks per day making a total 190 trucks per day in both directions.

**Table 47: Origin and destination of daily transit traffic on the Northern Corridor**

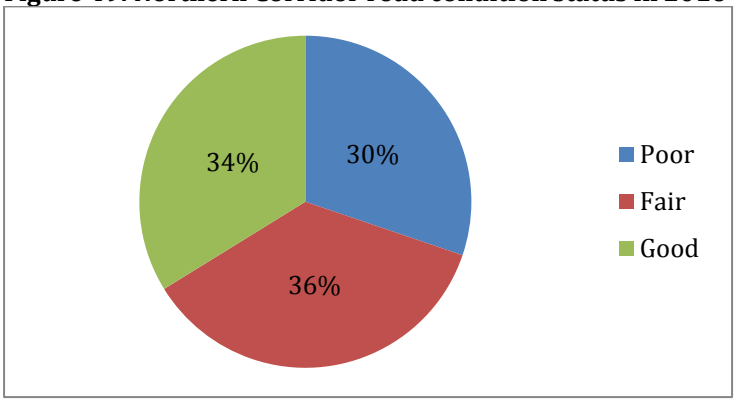
| | Uganda | Rwanda | Burundi | Kenya | DRC | S. Sudan | N. Tanzania | World |
|---|---|---|---|---|---|---|---|---|
| Uganda | - | 19 | 4 | 34 | 12 | 21 | 5 | 79 |
| Rwanda | 1 | - | 1 | 7 | 15 | 0 | 0 | 20 |
| Burundi | 0 | 0 | - | 1 | 2 | - | 0 | 3 |
| Kenya | 45 | 12 | 3 | - | 19 | 18 | 19 | 95 |
| DRC | 0 | 1 | 3 | 0 | - | - | 0 | 4 |
| S. Sudan | 0 | 0 | - | 1 | - | - | - | 1 |
| N. Tanzania | 5 | 3 | 4 | 64 | 16 | 0 | - | 75 |
| World | 42 | 29 | 11 | 89 | 53 | 33 | 20 | - |

*Source: Fimotions (2017).*

### Road Condition

The road condition data of 2016 used in the latest monitoring report of the Authority discloses that only 34% of corridor network of roads can be said to be in good condition as shown in Figure 49. It is well known that vehicle operating costs vary with road condition, so it will be incumbent on policy makers to address this issue.

**Figure 49: Northern Corridor road condition status in 2016**




*Source: www.ttcanc.org and Fimotions.*

**Road Side Services** are a vital feature of the road network that supports the overall goals of the corridor. A network of serviced stops that at planned to common standards is aimed to enhance the travelling experience as well as improve road safety. A report details the locations and levels of services in each of the participation countries[72].

**Border Crossing and Port Handling** times still constitute a substantial part of the overall transit time by both rail and road though they have improved. The main border crossings and time to clear BCPs can be found in Figure 46.

The Malaba border between Uganda and Kenya is by far the busiest border with traffic in 2013 accounting for 85% of all corridor traffic. The data showed that the average number of trucks in the outbound direction to average 631 trucks and inbound to be 469 trucks. The reasons for the difference between the two are that inbound conveys imported goods while outbound traffic is mostly empty vehicles as explained. The processing exigencies for imports are more exacting and truckers will seek longer routes to avoid various on-costs. The border operates 24 hours, but trucking companies usually do not allow nighttime driving. Usage of the border, records showed that 75%of the trucks arrived between 7:00am and 9:00pm, 15%between 9:00pm and 11:00pm, and only 10%between 11:00pm and 7:00am. Border processing times have improved substantially at Malaba due to the implementation of a program of support. Processing times have fallen from 48 hours in 2009 to 20 hours in 2012, 6 hours in 2015 but

[72]http://www.roadsidestations.org/wp-content/uploads/2014/10/Final-Report-1STVOLUMEed3.pdf

worsened to 9.5 hours in 2017 due to technical issues with the OSBP. There is little difference between processing times between containerized and bulk goods.

**Figure 50: Queuing traffic at the Malaba border post**

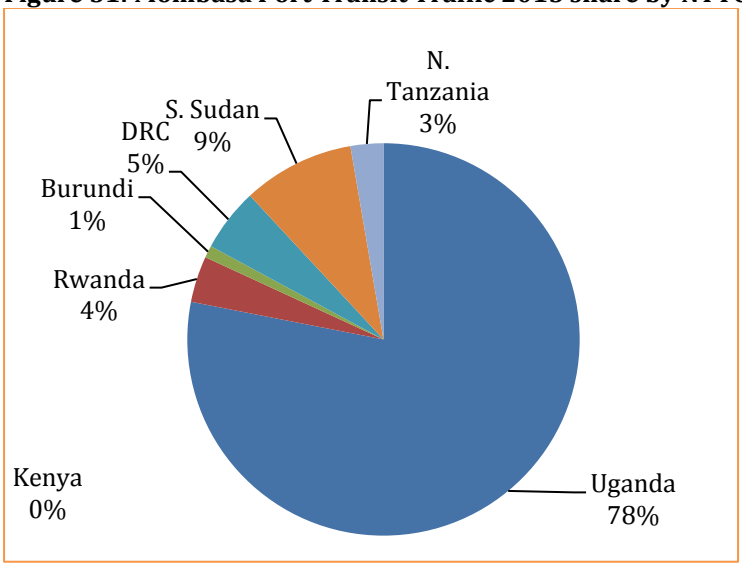
*Source: Abeingo Community Network INGONEWS Service.*

**Mombasa Port**

Mombasa Port is the main gateway port for the Corridor. Since 2012, cargo throughput has registered a steady annual growth of 5.7% from 21.92 million tons to 27.36 million tons in 2016. Similarly, container traffic has registered an impressive growth from 903,463 TEUs in 2012 to 1,091,371 TEUs over the last five years. Transit traffic recorded 4% growth to 7.75 million tons in 2016 up from 6.63 million tons in 2012. This growth was mainly supported by Uganda transit traffic, which grew by 7.1% over the same period. Economic growth in the Northern Corridor Region contributed significantly to the increased cargo throughput at the Port of Mombasa. In 2016, total cargo throughput recorded was 27.36 million tons against 26.73 million tons registered in 2015. This represented a 2.4% growth. It is important to record that the dwell time for containers in the Port was around 70 hours. Dwell time is the time taken from the container being unloaded from the ship to be transported from the Port. In 2015 the dwell time was 95 hours and in 2015 it was 115 hours, so a very good improvement can be seen. This is due to more integrated port management and operations and smarter customs clearance procedures.

To improve the cargo throughput of the Port, a new container terminal with an annual capacity of 550,000 TEUs per year was commissioned in 2016. The share of Port Traffic to each NTTA member (excluding Kenya) is presented in Figure 51. Uganda accounts for 78% of the transit traffic. The reason for this is historic. Uganda and Kenya were the main members of the East African Community and Mombasa Port was always used by Land Locked Uganda.

**Figure 51: Mombasa Port Transit Traffic 2015 share by NTTC Member**




*Source: Fimotions (2017), data source: Mombasa Port Authority Annual Report 2015.*

**Figure 52: Mombasa Port, gateway to the NTTC**

*Source: NCTTCA.*

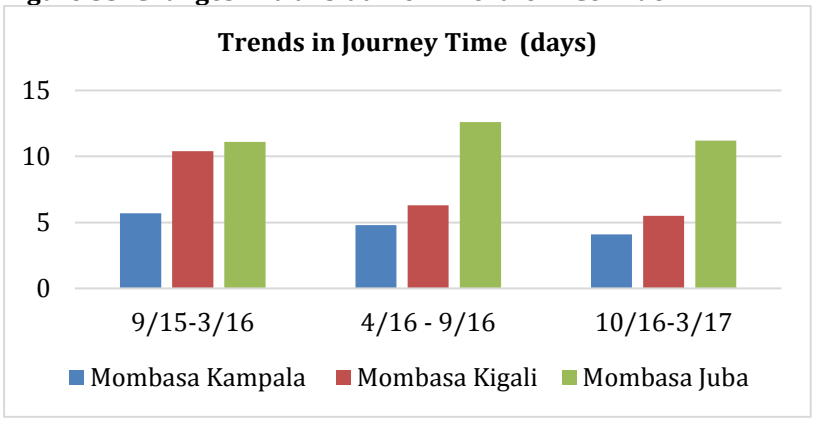
The use of **ITS** can potentially enhance the efficiency of a transport corridor. Although desirable, no record was found of ITS being used in the case study area. However, important amenities to improve corridor performance are smart signing, electronic data interchange between borders, real time traffic information broadcasting and vehicle tracking. A vital component to enable these amenities is, of course, the availability of Geographic Navigation Satellite Systems (GNSS). Internet penetration monitoring data best illustrates the issue of low

level of penetration and use of the internet that is problematic for Africa [73]. Generally, internet penetration is computed as being 27.7% of the population compared to the rest of the world of 54%. In the study area Kenya has the highest internet penetration in all of Africa of 77% while the DRC is the lowest at 3.8%.

### Transit times

Transit times from Mombasa to other destinations along the Northern Corridor are captured through Global Positions System devices that are installed on selected sample of trucks plying the Corridor. The GPS tracks time from when the truck leaves Mombasa up to arrival at the various destinations. The data shows that transit time from Mombasa to Kigali and Juba declined during the period from October 2016 to March 2017. The performance can be further improved given that the minimum recorded for the period were, 40 hours, 60 hours and 105 hours for Kampala, Kigali, and Juba respectively. An analysis of the change or trend in transit times was carried out – refer to Figure 53. Improvement in times are noted for Kampala and Kigali to Mombasa, due mostly to reduced border waiting time. Given the times and distances, the average commercial speeds have been computed ranging from just 6 to 13 kph. Almost certainly this is no better than rail of 100 years ago. It is to be noted that a typical truck in transit between Kampala and Mombasa may be stopped 20 times or more due to BPs, Road Blocks and Weigh Bridges

**Figure 53: Changes in transit time in Northern Corridor**




*Source: Fimotions (2017), analysis on data provided by NCTTCA.*

### Transit and Waiting Times

Some special analysis was carried out to see what amount of time was spent in motion or waiting, in the three main routes in the Corridor. Assuming an average speed in motion of 50 kph, the average time trucks spent waiting ranged from 75% to 88% of the total transit time

[73] http://www.internetworldstats.com/stats1.htm

(see Table 48). The difficulty is the allocation of this waiting time to border, welfare and rest. The actual border processing times seems surprisingly hard to locate in the NCTTCA data base and an enquiry from Fimotions only led to back to the total transit times, so it is not possible to say how long the border processing times were.

**Table 48: Transit and waiting times on selected route**

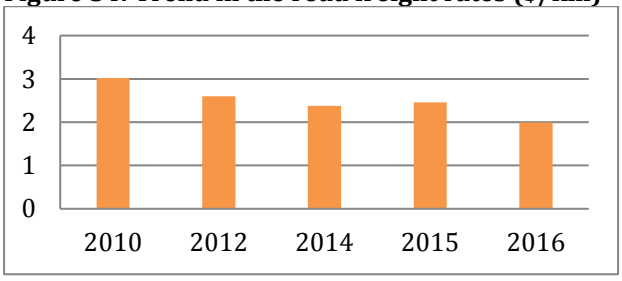
| Route | Total | Transit | Waiting | % |
|---|---|---|---|---|
| **Mombasa - Kampala** | 98.4 | 23.38 | 75.02 | 76% |
| **Mombasa - Kigali** | 132 | 33.64 | 98.36 | 75% |
| **Mombasa - Juba** | 268.8 | 33.24 | 235.56 | 88% |
| **Assumed average speed** | | 50 | | |

*Source: Fimotions (2017).*

### Trends in Road Freight Rates and Costs

A good indicator of overall improvement in the efficiency of the corridor, is the trend in freight rates. The main rate is that from Nairobi to Mombasa, for almost all national and international traffic in the corridor converges and uses this segment. From 2010 to 2016 the average cost of road freight has declined by about 5% per year as shown in Figure 54[74]. The rate from Kigali to Mombasa has also declined from $2.47 per km in 2014 to $1.76 per km in 2016 according to the same sources.

**Figure 54: Trend in the road freight rates ($/km)**




*Source: Fimotions (2017), analysis on data provided by TTNCA.*

These are financial costs or rates, which are declining due to improvements in the corridor. However, **the economic cost of transport along the corridor is estimated to be $384.00 more than it should be** due to poor road, excessive stops and waiting time at border crossings, according to NTTCA latest monitoring report[75]. This is not surprising since the commercial speeds are only 6 kph to 13 kph which generates excessive time-based costs. These costs add approximately $0.25 per veh-km and clearly the removal of these costs will generate significant economic benefits.

[74] http://top.ttcanc.org/indicators.php?indicatorviewid=2012042709383376241&indicatorgroupid=2
[75] TTNCA Monitoring Report May 2017 (draft)

**Regional corridor investment projects and measures** were identified and assembled into the Northern Corridor Master Plan in 2011[76]. The summary of planned expenditures by mode of transport and period is shown in Table 49.

**Table 49: Northern Corridor Master Plan Program (Cost in Million USD by Period)**

| Mode | 2011/15 | 2016/20 | 2021/30 | Total |
|---|---|---|---|---|
| Road | 825 | 1,161 | 9 | **1,995** |
| Railway meter gauge | 292 | 455 | 41 | **788** |
| Port of Mombasa | 600 | 300 | 0 | **900** |
| Other Ports | 233 | 360 | 0 | **593** |
| Inland Waterways | 90 | | | **90** |
| Pipelines | | | | **0** |
| Multi Modal | 21 | 20 | | **41** |
| Border Crossing | 12 | 6 | | **18** |
| Institution Building | 2 | | | **2** |
| **Total** | **2,075** | **2,302** | **50** | **4,427** |

*Source: The Northern Corridor Infrastructure Master Plan 2011.*

**Funding mechanisms and financial resources** for the development of transport corridor investments are enhanced if investment programs are formulated beyond the national boundary at a regional or sub-regional level. This is the case with investment in the northern corridor, where the benefits of a well-managed and supported coordinating agency are apparent through this case study. Multi-national funding agencies demand that investment is set in the context of both national and regional planning. The World Bank SSATP is a case in hand. Once projects have been approved and included in this regional program funding is almost guaranteed. An important point about funding is that while the coordinating authority is vital in preparing regionally integrated plans, it has no status to secure funding and repay loans. Funding must be done via national entities that can provide sovereign guarantees.

### 4.6.8. Environmental and Energy Factors

With regards to immediate impacts of corridor development to local populations, environmental assessment is mandatory in all countries. All freight and most passenger transport in the NTTC is powered by diesel fuel. There are no data available on energy consumption or emissions of $CO_2$ equivalent, nor does the NCTTCA collect such data at the current time. However, corridor development will certainly increase emissions of greenhouse gases, dust and other pollutants which should be monitored. Potential Impacts on climate change will be caused by increased emissions of carbon monoxide, hydrocarbons, and nitrous oxides from vehicular exhaust pipes and operations equipment. Air pollution will increase due to increase in traffic brought by improvements in the road condition. Measures that are on the table to be implemented include regular and adequate maintenance of diesel powered

[76] http://www.ttcanc.org/documents/The%20Northern%20Corridor%20Infrastructure%20Master%20Plan.pdf

equipment during construction, and regulations on vehicle fitness and use of over-age vehicles. Internationally acceptable limits will have to be adopted and monitored for impact.

While Transport Corridor development by its very nature aims to increase transport demand, there remains an increasing body of opinion that aims to reduce it. The economic philosophy emanated from environmental concerns especially due to global warming. The economic thinking is that transport demand and economic growth should be decoupled, so that growth and development should not automatically mean more transport demand. Processes that replace transport demand with communications are well accepted. In the case of long distance freight traffic, the containment and management of external costs is advocated. However, in most developing countries this has hardly advanced and as may be expected, the policy for the Northern Corridor Development appears silent on the issue. However, road pricing and user charging is most certainly an issue and at some point, in the future, road transporters may be expected to pay the full costs of road usage.

**Sustainability** is an issue for most transport systems in Africa and indeed elsewhere. Roads are generally underfunded and maintenance management is an issue while railways and airways are considered commercial entities so can be judged to be loss making. Convergence on the principles of funding transport is needed before progress can be made on a providing common way forward to generate the revenue needed to that will ensure the sustainability of transport systems. Most countries generate revenue from fuel levies that are ring fenced and administered by a road authority, the levies vary from one country to another. Kenya will also be the first to introduce tolling on its newest sections of highway. There are also a variety of other taxes and charges that apply to road users that cover a wider range of services, some of which are hidden costs. South Sudan for example has a wider range of such charges that are aimed to enhance its revenue stream such as gate passes, road blocks and document checking [77]. Each country also has its own transit tariffs and permit regulations. More desirable for trade and economic development is for there to be a common set of charges that are predictable and rationale.

### 4.6.9. Corridor Performance Monitoring

The NCTTCA has good website that includes GIS based monitoring data. The Corridor Authority issued its 10th annual monitoring report in May 2017 [78]. Monitoring data includes the following:

- Cargo throughput
- Volume per country of destination
- Rate of containerization
- Transport capacity by rail

[77] http://www.psfuganda.org/new/images/downloads/Trade/northern%20corridor%202.pdf

[78] NORTHERN CORRIDOR TRANSIT AND TRANSPORT COORDINATION AUTHORITY THE TRANSPORT OBSERVATORY REPORT 10TH ISSUE May 2017

- Road freight charges in each country
- Ship turnaround time
- Ship waiting time (hours)
- Road conditions in each country
- Weighbridge traffic weight compliance at the weighbridge
- Dwell time at Mombasa port
- Time for customs clearance at the Document Processing Centre (DPC)
- Time taken at Mombasa One Stop Centre (OSC)
- Transit time in each country
- Trade between Member States
- GPS tracking data
- Stoppages for cargo along the Northern Corridor

The increasing use of GPS tracking for monitoring should be of note.

Monitoring information is summarized as follows:

- The value of goods traded by members of the corridor group is about $27 Billion of $4.3 Billion is intra-regional or 18%.
- The volume of goods traded maybe 20 Million Tons most of which uses the transport corridor.
- These goods mostly use road, rail accounts for about 5%, pipeline is used for oil products. There is also inland water on Lake Victoria and, vitally, the gateway Port of Mombasa.
- Road traffic on sections of the corridor range from 3,300 per day between Nairobi and Mombasa to 800 per day between Kigaili and Bujambura. Trucks represent 30% of the traffic. Of this 25% is trade related. Uganda Kenya trade represents about 25% of intra-regional trade and that the Marimbula is busiest border crossing.
- Trade has been facilitated through the corridor by one-stop border posts that have reduced waiting time form 3 days to between 3 to 9 hours. But transit is hampered by 20 stops at BPs weighbridges and the Police as well as for welfare. None-the less, transit times between Kampala and Mombasa have reduced from 6 to 3 days.
- All of the above improvements have resulted in road freight costs reducing from $3.0 per ton in 2010 to $2.0 per ton in 2016.
- The NCTTCA is successful and well supported politically.

#### 4.6.10. Conclusion

- The Northern Corridor is viewed as generally being successful in bringing together countries around the common cause of economic and social development. The corridor has proven to be a catalyst to promoting integration and harmonization.
- Monitoring information is professionally and comprehensively carried out, supported by vehicle tracking using GPS. The need for such information is essential for informing policy makers and investors.

- Trade between corridor economies is not high, like the EU, but at 16% of global trade, it is moving in the right direction, but they have a long way to go exhibiting similar levels of openness of around 0.3, except for Kenya 0.5 (like Turkey).
- Border processing times have mostly halved since the introduction of more efficient practices.
- Yet transit times remain long, with commercial speeds of only 13 kph, which is not faster than railways were 100 years ago. The reason for such slow operations remain the excessive number of police checks and other stops.
- Processing times at border posts have been cut dramatically following the introduction of OSBS where processing time is 3 to 4 hours.
- The corridor has managed to leverage high levels of investment to support its further development, partly because of political consensus, partly because improving performance and partly because good governance.
- Despite the positive commentary, social development is still quite low as exhibited by HDI of between 0.4 and 0.6 with high levels of unemployment in some countries.

#### 4.6.11. Recommendation

The main recommendation is to institute risk management[79] and green channeling at border crossings for goods in transit to the Port. There is no reason to stop trucks that are in transit. Transit fees to paid online and in advance. Improving road condition is also important.

### 4.7. International North-South Transport Corridor

This case study is built on a literature review including scientific journal articles and grey literature, interviews with key persons and primary data collected during a field visit to the INSTC Secretariat in Tehran on 31 July - 1 August 2017. Findings from the field visit are emphasized rather than information from the open literature.

#### 4.7.1. General factors

INSTC is a multimodal transnational transportation corridor established in September 2000 in Saint Petersburg by three founding members namely the Islamic Republic of Iran (hereafter Iran), Republic of India (hereafter India), and Russian Federation (hereafter Russia). INSTC is a result of tightening relationships between India and Iran, and between Iran and Russia. India and Russia have a traditionally strong relationship. Within four years after its establishment, the membership is increased to 13 countries. The continuous goal is to promote transportation cooperation among the Member States.

This case study will focus on the multimodal corridor from India to Russia via Iran, which also includes Azerbaijan, as indicated in Table 50.

[79] Risk Management is a term used in Customs and Revenue Protection to assess the level of risk of particular transport entities; this normally requires close cooperation between the customs organizations of each country and shared database.

**Table 50: Corridor profile INSTC**

| Location | Countries covered | Length (km) | Secretariat |
|---|---|---|---|
| Russia, Iran, India | Russia, **Azerbaijan, Iran,** India | 7,200 | Tehran, Iran |

Note: Countries in bold are OIC Member Countries

The trade value between India and Europe is more than 70 billion Euros per year (Najafi, 2017). In terms of value, the potential trade volume on this corridor is nearly 10 million tons per year, of which 8.3 million is between India and Russia (Ashrafi, 2017).

The traditional route of the freight transport between India and Russia is a long sea route from the East Sea via the North Sea, the Mediterranean Sea, the Suez Channel to the Red Sea, the Gulf of Aden and finally crossing the Arabic Sea.

**Figure 55: Traditional vs. INSTC corridors**


*Source: INSTC Secretariat, adjusted by Fimotions.*

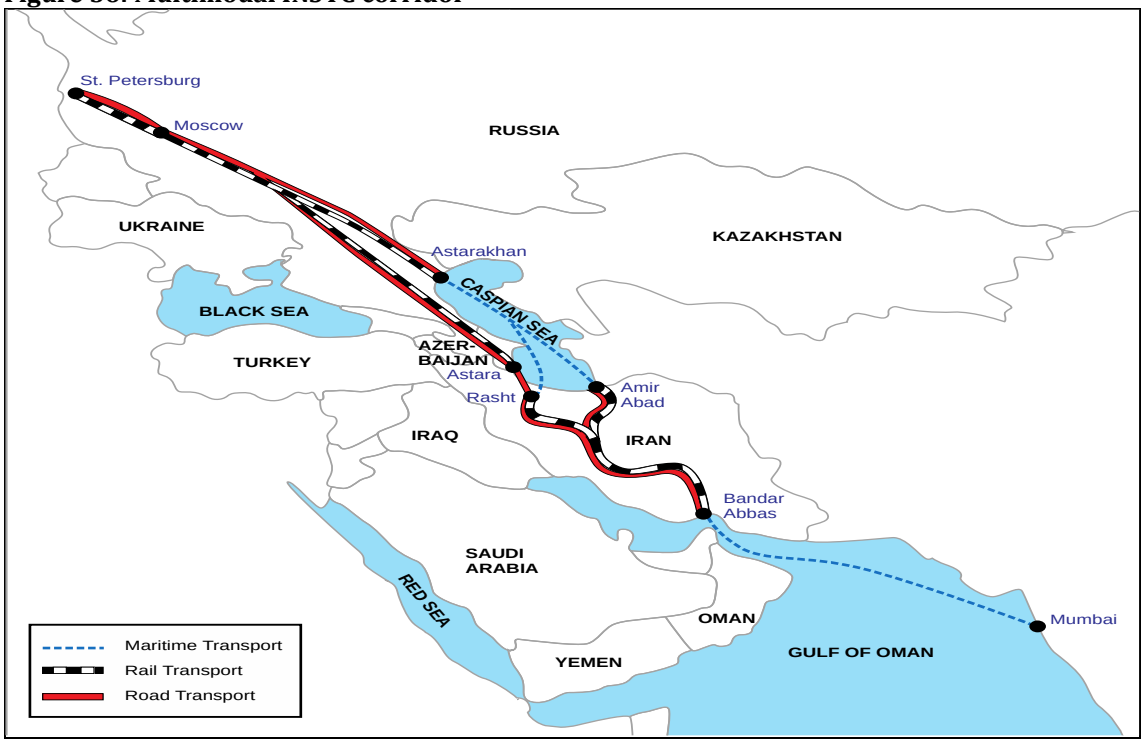
INSTC offers a shorter route between India and Russia with the following options:

**Table 51: INSTC routes**

| Route | Sub route | Mode | Distance |
|---|---|---|---|
| **1** | Mumbai (India) – Bandar Abbas (Iran) | Sea | 1,265 nm + 1,900 km + 2,600 km |
| | Bandar Abbas – Rasht (Iran) | Rail/road | |
| | Rasht – Astara (Iran) | Road | |
| | Astara (Iran) – Moscow (Russia) | Rail/road | |
| **2** | Mumbai – Bandar Abbas | Sea | 2,265 nm + 1,500 km |
| | Bandar Abbas – Amir Abad/Bandar-e-Anzali (Iran) | Rail/road | |
| | Amir Abad/Bandar-e-Anzali – Astarakhan (Russia) | Sea | |

*Source: Fimotions (2017), from various sources.*

**Figure 56: Multimodal INSTC corridor**




*Source: Fimotions (2017).*

The land part, covering the majority of the full distance has paralleled road and rail connections. Within the INSTC Iran plays a pivotal role, as it is the centerpiece of the corridor, and due to its port Bandar Abbas and the hub role in the rail logistics of the corridor (Dikshit, 2012).

The main goal of the establishment of the INSTC routes is to offer lower transit costs and times than the traditional route. Therefore, unlike many other transport corridors where politic is the main driver, **the main driver of INSTC is economy**.

### 4.7.2. Political and Institutional Factors

Along the INSTC, there is no political tension among the member states. As such, no border closing exists on this corridor. This is not only an advantage but also a very important precondition for a successful transport corridor.

From the organizational point of view, the policy maker of this corridor is the Coordination Council, which consists of the Deputy Ministers of the member countries that meet once a year (Soleimani, 2017). The INSTC Secretariat is based in Tehran. Focal points have been envisaged in New Delhi, Moscow and in Baku. In the period of 2001 – 2015, the secretariat was under the responsibility of the Iranian Road Maintenance and Transportation Organization. Since 2016, this falls under the responsibility of the Ministry of Road and Urban Development.

The Secretariat has a staff of approximately five persons; consist of experts in land transport, railway, and legal issues. This size is quite small; as such the Secretariat does not have sufficient capacity. This is due to the fact that that there is no membership fee to fund the work of the Secretariat. As a result, the INSTC Secretariat is not yet developed like that of TRACECA or CAREC. Currently, the role of the INSTC Secretariat is more defined as a "depository state". This situation is also reflected in the fact that the corridor developments are not incorporated in the Transport Master Plans of the member countries (Soleimani, 2017). The Secretariat plays a crucial role in promoting the importance of harmonizing the INSCT developments with the transport policy and plans of the member countries.

### 4.7.3. Economic factors

Table 52 presents the EoDB of the corridor countries. Azerbaijan performs best in terms of border compliance, while Russia is very efficient in terms of documentary compliance. Low efficiency is observed for Iran in both categories, most probably due to the economic sanctions.

In average, the total times taken and costs of exports in the corridor countries are very high. The average times and costs for Europe and Central Asia (except for documentary compliance costs) are at least 50% less.

**Table 52: EoDB of corridor countries in 2016**

| Country | Ranking | | Border Compliance | | Documentary Compliance | |
|---|---|---|---|---|---|---|
| | Overall | Trading across borders | Time to export (hours) | Cost to export (USD) | Time to export (hours) | Cost to export (USD) |
| **AZER** | 65 | 152 | 29 | 214 | 33 | 300 |
| **INDIA** | 130 | 143 | 106 | 413 | 38 | 92 |
| **IRAN** | 120 | 170 | 101 | 565 | 152 | 143 |
| **RUS** | 40 | 140 | 96 | 765 | 25 | 92 |

*Source: World Bank*.

The corridor countries are mainly maritime countries, which are generally more open than landlocked countries. However, this is not the case in INSTC, as shown in Table 53. The openness indices of the corridor countries are less than 50%, which shows that much of their trade is internal most likely because they are large countries.

**Table 53: Openness of corridor countries in 2016**

| Country | USD Millions | | | Openness |
|---|---|---|---|---|
| | GDP | Imports | Exports | |
| **AZER** | 53,047 | 9,211 | 11,327 | 38.7% |
| **IRAN** | 425,326 | 68,319 | 130,544 | 46.8% |
| **INDIA** | 2,073,543 | 356,704 | 260,326 | 29.8% |
| **RUS** | 1,326,015 | 182,257 | 285,491 | 35.3% |

*Source: Fimotions (2017), analysis on data on www.trademap.org.*

### 4.7.4. Trade Facilitation

INSTC is expected to provide faster and more efficient trade connectivity between Europe and South East Asia. On this "New Asia Transport Bridge" the cargo will travel in sealed containers. The corridor is also expected to transport approximately 5 million tons of cargo per year in the initial stage, expanding over the years to approximately 10 million tons of cargo per year.[80] Currently, only less than 5% of this volume is passing INSTC (Soleimani, 2017). This is the main challenge that is currently faced by this corridor: how to increase trade volume on this corridor?

This situation is also shown in Table 54 that outlines exports and imports data between the corridor countries. The analysis shows that intra trade is only 2.4% of total trade. The new investments on the INSTC are expected to increase this figure.

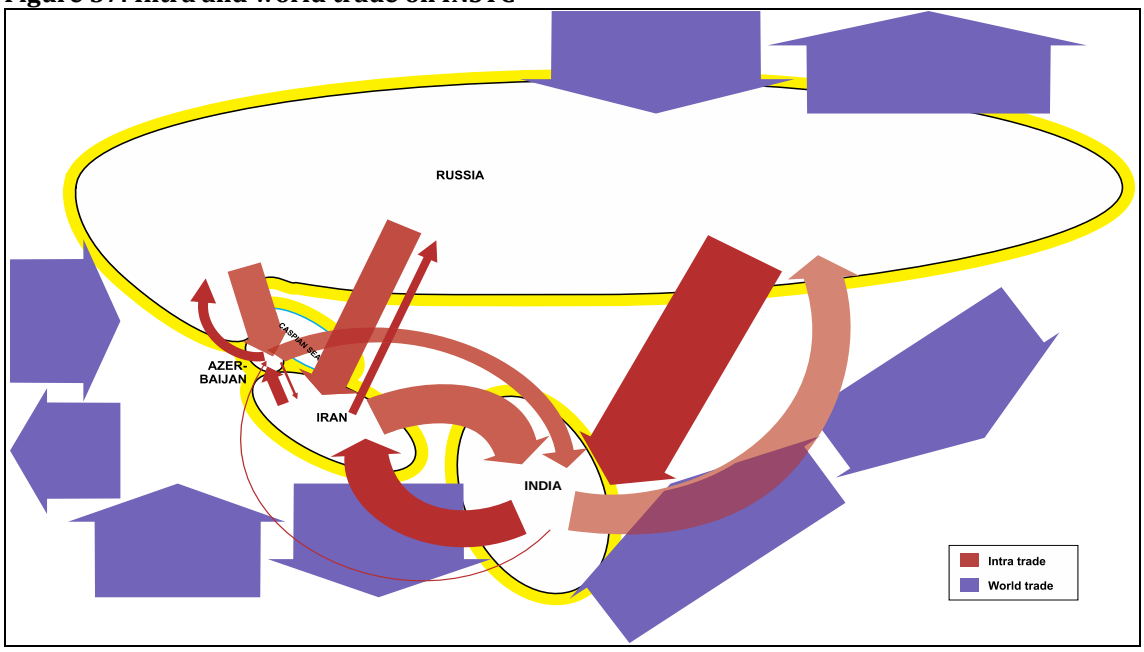
**Table 54: Trade matrix INSTC**

| COUNTRY | | Imports (Million USD) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | AZER | INDIA | IRAN | RUS | Total | World | % |
| Exports (Million USD) | AZER | | 765.71 | 139.00 | 412.46 | **1,317** | **12,637** | **10.4%** |
| | INDIA | 31.63 | | 2,412.54 | 1,813.88 | **4,258** | **260,327** | **1.6%** |
| | IRAN | 434.99 | 2,593.54 | | 375.74 | **3,404** | **46,347** | **7.3%** |
| | RUS | 1,508.07 | 5,312.79 | 1,881.77 | | **8,703** | **285,491** | **3.0%** |
| | **Total** | **1,975** | **8,672** | **4,433** | **2,602** | **17,682** | | |
| | **World** | **7,157** | **356,705** | **46,129** | **182,257** | | **604,802** | |
| | **%** | **27.6%** | **2.4%** | **9.6%** | **1.4%** | | | **2.9%** |

*Source: Fimotions (2017), analysis on data on www.trademap.org.*

[80] Construction of Rasht-Astara railway may be launched this year, in Azernews 8 January 2017 https://www.azernews.az/business/107321.html

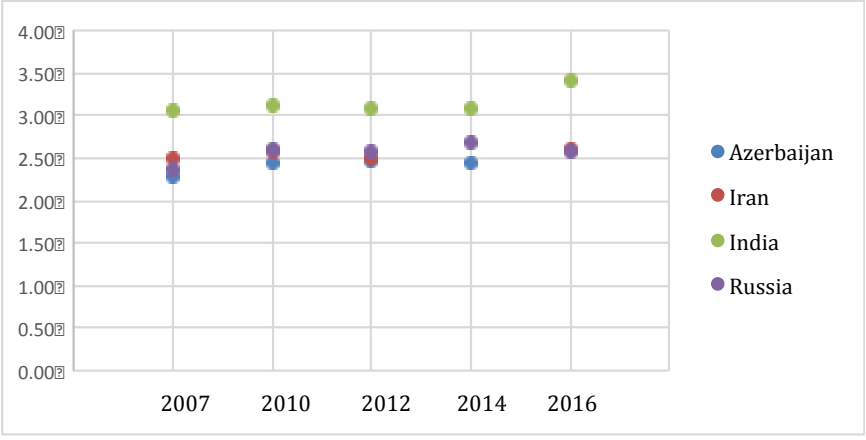
**Figure 57: Intra and world trade on INSTC**




*Source: Fimotions (2017), analysis on data on www.trademap.org.*

Considering the total trade volume as shown in Table 54 and Figure 34, India and Russia are clearly the biggest players in the region. This fact is also confirmed by the LPIs of these countries, which are higher than those of Iran and Azerbaijan as presented in Figure 58. India's LPI is showing an increasing trend, and the index in 2016 is even close to the average LPI of EU-28 (3.61) and above the world average (2.88). Exactly what attributed to the higher improvement on LPI in these countries is hard to say but better transit highway infrastructure and border processing procedures must have contributed.

**Figure 58: Logistics Performance Index in INSTC countries**




*Source: Fimotions (2017), data source: World Bank.*

### Dry runs on INSTC routes

In July – August 2014, the Federation of Freight Forwarders Association in India (FFFAI) conducted two dry runs on two INSTC routes with two physical 20ft shipping containers. The results of the dry runs are summarised in the following table.

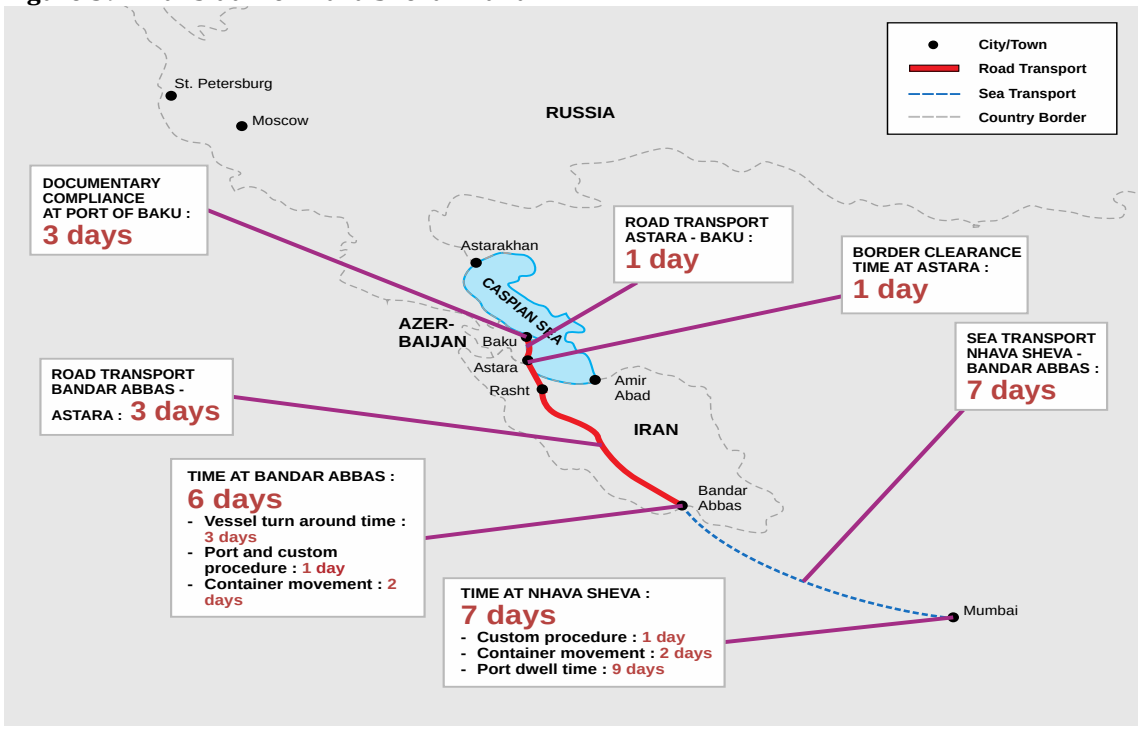
**Table 55: INSTC vs traditional route**

| Route | Origin – Destination | Sub route | Mode | Distance | Transit time | Total cost |
|---|---|---|---|---|---|---|
| **1** | Nhava Sheva (India) – Baku (Azerbaijan) | Nhava Sheva – Bandar Abbas | Sea | 1,265 nm | 28 days | USD 3,132 |
| | | Bandar Abbas – Astara | Road | 1,900 km | | |
| | | Astara - Baku | Road | 320 km | | |
| **2** | Nhava Sheva (India) – Astarakhan (Russia) | Nhava Sheva – Bandar Abbas | Sea | 1,265 nm | 41 days | USD 5,245 |
| | | Bandar Abbas – Amir Abad | Rail/ road | 1,500 km | | |
| | | Amir Abad – Astarakhan | Sea | 1,000 nm | | |
| **Tradi-tional** | Nhava Sheva (India) – St. Petersburg (Russia) | Nhava Sheva – Hamburg Hamburg – St. Petersburg | Sea | 8,675 nm | 30 days | • USD 955 - 1,400 per 20ft dry container<br>• USD 1,500 - 1,900 per 40ft dry container<br>• USD 2,000 – 2,500 per 40ft Reefer for perishables |

*Source: Fimotions (2017), analysis on the information provided in (FFFAI, 2014).*

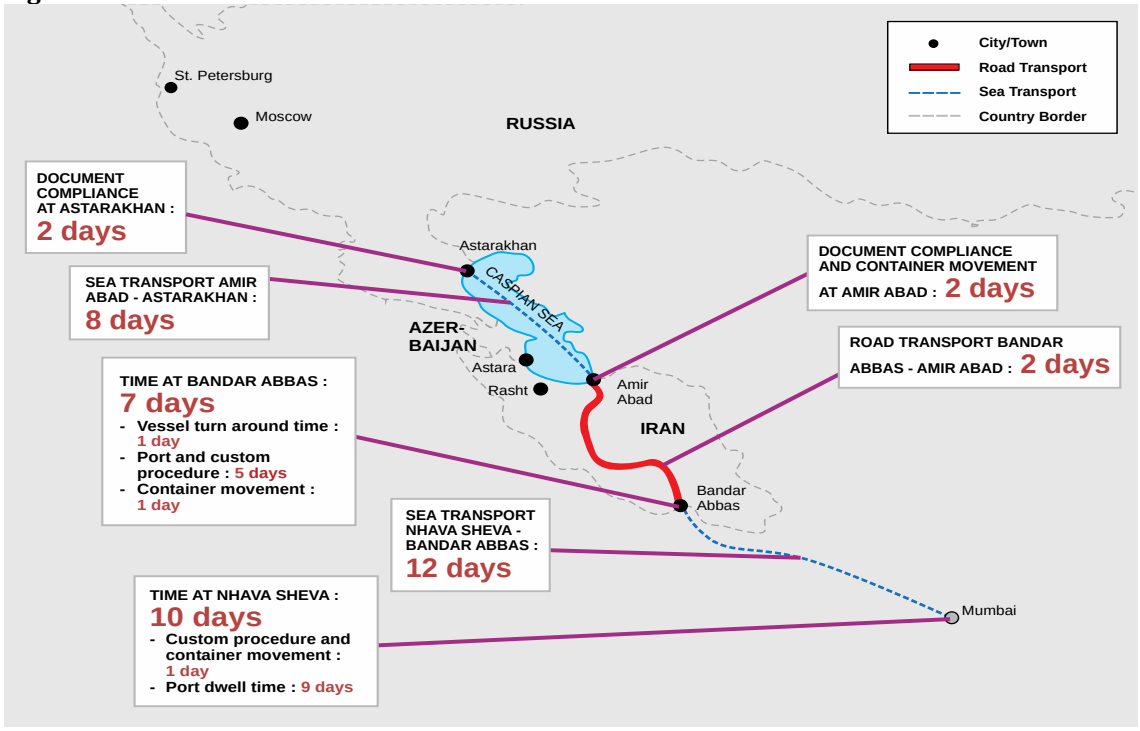
The transit time for route 1 is almost the same with that of the traditional route and the transit time for route 2 is 50% longer. During the dry runs several circumstances happened such as bad weather in Arabian Sea and unavailability of custom officers in Baku for cargo clearance. However, these do reflect circumstances that can happen in reality.

**Figure 59: Transit time Nhava Sheva - Baku**




*Source: Fimotions (2017), analysis on INSTC Dry Run Report (2014).*

**Figure 60: Transit time Nhava Sheva - Astarakhan**




*Source: Fimotions (2017), analysis on INSTC Dry Run Report (2014).*

The following tables indicate the costs involved during the dry run on each route.

**Table 56: Cost breakdown for route Nhava Sheva - Baku**

| Item | Cost per 20ft container (USD) |
|---|---|
| **Charges and fees at Nhava Sheva** | **1,913** |
| Cargo transportation to Container Freight Station | 25 |
| Stuff and move to Port Container Yard | 100 |
| Custom clearance fee | 25 |
| Port Terminal Handling Charges (THC) | 100 |
| Bill of Lading charges/agency fee | 75 |
| Sea transport Mumbai – Bandar Abbas | 1,588 |
| **Charges and fees at Bandar Abbas** | **949** |
| Transit THC | 129 |
| Agency fee | 50 |
| Custom clearance fee | 20 |
| Road transport Bandar Abbas – Baku+ return of empty container to Bandar Abbas | 750 |
| **Cross border fees at Astara** | **270** |
| **Border fee (formal)** | 100 |
| **Agency fee** | 50 |
| **Custom fee** | 20 |
| **Border fee (informal)** | 100 |
| **Total Costs** | **3,132** |

*Source: Fimotions, 2017 (analysis on INSTC Dry Run Report, 2014).*

**Table 57: Cost breakdown for route Nhava Sheva - Astarakhan**

| Item | Cost per 20ft container (USD) |
|---|---|
| **Charges and fees at Nhava Sheva** | **2,100** |
| Cargo transportation to Container Freight Station | 25 |
| Stuff and move to Port Container Yard | 100 |
| Custom clearance fee | 25 |
| Port THC | 100 |
| Bill of Lading charges/agency fee | 50 |
| Sea transport Mumbai – Bandar Abbas | 1,800 |
| **Charges and fees at Bandar Abbas** | **931** |
| Transit THC | 129 |
| Agency fee | 50 |
| Custom fee | 20 |
| Road transport Bandar Abbas – Amir Abad | 732 |
| **Charges and fees at Amir Abad** | **509** |
| Transit THC | 89 |
| Agency fee | 50 |
| Custom fee | 20 |
| Sea transport Amir Abad - Astarakhan | 350 |
| **Charges and fees at Astarakhan** | **1705** |
| Transit THC | 400 |
| Agency fee | 600 |
| Storage charges | 5 |
| Custom duty | 700 |
| **Total Costs** | **5,245** |

*Source: Fimotions, 2017 (analysis on INSTC Dry Run Report, 2014).*

To compare the result of the dry runs with the transit time and costs on the traditional route (see Table 55), comparing these elements for the same origin and destination is crucial. Using Nhava Sheva – Moscow as the case, means that the transit time and cost for the three routes should be increased. Table 58 is an attempt to estimate the additional transit time and cost to Moscow, using the aforementioned data.

**Table 58: Transit time and cost Nhava Sheva - Moscow**

| Route | Transit time | Transit cost/TEU |
|---|---|---|
| **INSTC route 1** | 32 days | USD 3,882 |
| **INSTC route 2** | 44 days | USD 5,765 |
| **INSTC route (sea and rail)**[81] | 26 days | USD 3,550 |
| **Traditional route** | 32 days | USD 3,133 |

*Source: Fimotions (2017).*

It is obvious that the INSTC routes do not really offer higher efficiency. In fact, the costs are higher than the traditional route. One of the inefficient parts is the return of empty containers to Bandar Abbas, which is a key concern recognized by various stakeholders. This is due to a lack of information about the Indian market among Russian businesses (Passi, 2017). However, looking at the trade figures presented in Table 54, Russia exports more to India than the other way around. It is clear that this export volume does not utilize the INSTC routes. Activating the INSTC routes and promoting them among the Russian businesses are clearly one of the room of improvement.

The transit time of route 2 is much longer than that of the traditional route due to intermodal transport on the INSTC routes and inefficient border crossing procedures. Loading and unloading activities when changing transport mode, obviously consume time. The traditional route involves only maritime transport.

The most efficient route is actually the combination of sea route (Nhava Sheva – Bandar Abbas) and rail route (Bandar Abbas – Moscow). This is the only INSTC route that can compete with the traditional route in terms of transit time. The transit cost is more or less the same as the traditional route. However, a fixed cargo train schedule from Bandar Abbas is currently absent which makes the rail transport is less attractive.

**Low attractiveness of INSTC**

17 years after the formalization of the INSTC, this corridor is still facing challenges to make the corridor more attractive. For the biggest user like Indian forwarders, the Custom Administration of Iran has already defined a special mechanism to attract them to use the INSTC (Moghadasian, 2017). With INSTC stamps, the Indian forwarders can pass the green

[81] This route consists of sea route (Nhava Sheva – Bandar Abbas) and rail route (Bandar Abbas – Moscow). The transit time and cost by rail is provided by the Iranian Railways.

path. However FFFAI did not accept this and asked for reductions on charges and fees instead. The Government of Iran cannot meet this expectation as it means that they need to convince the Custom. In order to guarantee this, first it should be evident that the trade volumes from India are significantly high to reduce the charges and fees.

Other efforts have been initiated by the Government of Iran to increase the attractiveness of the corridor, such as:

1. Ports & Maritime Organization (PMO) is giving the maximum benefits to transit cargos, in terms of tariffs, port services, and investments. The benefits among others are:
    - In other countries, transit cargos normally have long waiting times to be cleared due to the maximum quotas applied by the ports. This is not happening at the Iranian ports as transit cargos are prioritized over captive cargos. Furthermore, special yards are dedicated for transit and exports.
    - PMO is ready to dedicate a piece of land to countries that are willing to set up their factories in Iranian ports (free taxes and custom duties).
    - In order to make transit cargos more attractive, PMO gives incentives to its port service providers that are targeting transit cargos (lower price, longer contract). Consequently, shippers of transit cargos also pay less.
2. The Railways of the Islamic Republic of Iran has initiated the following:
    - Iran, Azerbaijan, and Georgia have an agreement to decrease the rail tariff and to improve the speed of the trains.
    - Iran, Azerbaijan, and Russia have an agreement for handling cargos from Mumbai to Moscow. The agreement is focusing on transit time and tariff. In terms of transit time, the strategies are to adjust the train timetables to create an efficient total transit time and to reduce the waiting times at the borders. These three countries have also decreased the tariff with more than 50%. In Iran, there is no price increase since 2008 despite the inflation and economic situation. Iran has also managed to convince the neighboring countries to have a **fixed common railway tariff** in ton-km and container-km for INSTC.
3. The Government of Iran has created Port Special Economic Zones (SEZs) that offer advantages and legal facilities such as entry and exit of cargo without being charged (port dues, customs tariffs and commercial interests), exemption from all other tariffs payable inside the country, and possibilities for extending cargo resting time within these zones.

Yet the cargo traffic through INSTC is still very low, most probably due to issues like banking connections and documentation and procedures for cargo.

**Figure 61: Amir Abad Port Special Economic Zone**


*Source: Ports and Maritime Organization of Iran (2017).*

### 4.7.5. Social factors

The countries along INSTC are diverse in terms of language, religion, and cultural background. A common culture that can normally facilitate regional integration is not the case in this corridor. According to (Moghadasian, 2017), social factors like movement of labors almost do not play a role in INSTC.

Table 59 indicates the social profile of the corridor countries. Russia has the highest standard of living followed by Iran, although Iran has a high rate of unemployment. India has the lowest HDI but also the lowest unemployment rate. The success of the INSTC will have positive impacts on the economic development of the region, which subsequently will have positive social effects such as decreasing unemployment rates, improving overall standards of living, and improving human resources development along the corridor.

**Table 59: Social factors of corridor countries in 2015**

| Country | Population (Million) | Unemployment (%) | Poverty Index (%) |
|---|---|---|---|
| **AZER** | 9.7 | 5.1 | 6 |
| **IRAN** | 79.1 | 11.3 | N/A |
| **INDIA** | 1,311 | 3.5 | N/A |
| **RUS** | 144.1 | 5.7 | 13.3 |

*Source: World Bank and UNDP.*

In sum, in the case of INSTC, it is not the common culture that facilitates regional integration, trade is.

### 4.7.6. Safety, security and the legal liability

(FFFAI, 2014) recorded that the safety and security along the route Bandar Abbas - Baku is good. Hence escorting is not necessary. This is also not required by the Law.

In terms of legal liability, damages of cargo that passing through INSTC within Iran are well documented and well monitored. According to the Iranian Railways, for rail transport, the current figures are very low. In the past 10 years, there are only 5 damages registered. This is much lower than in the road transport, thanks to the fact that the rail transport is more stable because it involves the governments on the higher levels. In the road transport, there are many parties involved, such as truck companies and freight forwarders. Hence, the coordination is more complicated.

In terms of cargo insurances, due to the international sanction, the Iranian government has an agreement with an Iranian insurance company to insure all the transit cargos that passing through Iran. This is the strategy to ensure the convenience and comfort of the users. Transit insurance is usually 1% of cargo value.

Three important private sectors with whom the Iranian Railways has agreements are Tarkib Haml-o-Naghl (Iran), ADY Express (Azerbaijan), and RZD (Russia).

#### 4.7.7. Technical and Operational Factors

**Interoperability**

Interoperability issues in railway exist along the corridor, e.g. between Iran, Turkmenistan, Azerbaijan, and Russia, due to the gauge difference. The rail gauge in Iran is 1,432 mm, while that in the CIS countries is wider (at least 1,435 mm). Along the INSTC, there is only one gauge change needed.

In terms of road transport, the INSTC countries are members of TIR. As such no interoperability problem is observed (Abutalebpour, 2017).

**Mode share**

The main transport modes used on the corridor are maritime and road transport. The current mode share of railway is very low, less than 10% ≈ 40,000 ton per year (Abutalebpour, 2017). The Secretariat does not expect that this will be increasing in the near future. The low competitiveness of the rail transport is among others caused by the followings:

1. The absence of a fixed schedule. Movements are only arranged when there is a sufficient amount of containers at Bandar Abbas.
2. Longer transit time. A rail journey from Bandar Abbas to Amirabad, for example, takes 5-6 days (due to the steep gradient along the route), whereas a road journey takes 2-3 days.
3. Missing rail link Rasht – Astara. Due to this missing link, it is currently not possible to have a through rail connection between Bandar Abbas, Baku, and further to Russia. When this gap is closed, the transit time will be further decreased.

### Corridor capacity

As discussed previously, maritime transport is one of the main transport modes on the corridor. Bandar Abbas as the main port has a capacity of 80 million TEUs per year. Iran has the potential to attract 100 million tons of transit sea cargos per year (in different classes). But currently only 10% of this potential is utilized.

In terms of road transport, the quality of roads on the Iranian section is excellent and well maintained with 4 lanes on each side. On some road sections, there are separate lanes for commercial and private vehicles (FFFAI, 2014).

Once INSTC will be fully aligned and operational, a long list of missing links will have been "bridged". Table 60 lists the major recent and ongoing investments on INSTC. Export Import Bank of India has expressed interest in financing projects in the infrastructure sector and joint ventures involving Indian companies to improve the prospects of INSTC.

**Table 60: Investments on INSTC**

| Location | Type of infra-structure | Total investment (in USD) | Project description |
|---|---|---|---|
| Baku (Azerbaijan) –Yalama (Azerbaijan) | Rail and Road | 200 million | Azerbaijan invests approximately USD 200 million in rail and in road infrastructure in order to close missing links Baku-Yalama railway line, approximately 200 km along the Caspian coast, on the border with Russia[82] |
| Qazvin (Iran) - Rasht (Iran) - Astara (Azerbaijan/ Iran) | Rail | 1,100 million | Missing link Qazvin (Iran) - Rasht (Iran) - Astara (Azerbaijan) rail connection has almost been completed, including 22 new tunnels and 15 bridges.[83] The Rasht (Iran) - Astara (Azerbaijan) section of the railway project (164 km along the Caspian coast) requires an investment of US$ 1.1 billion, with a USD 500 million loan from Azeri banks and an option of Russia's participation in financing the project.[84] The Qazvin (Iran) - Rasht (Iran) section of the rail route (41 km) is expected to be completed by the summer of 2017[85] |
| Astara (Azerbaijan/ Iran) | Sea Port | 22 million | Iran has invested USD 22 million in the Astara port (joint venture between a private company and Iran State port and maritime organization). The capacity is 600,000 tons, with the ambition to increase this to 3 million tons. The port has been integrated with the INSTC to improve its maritime connectivity across the Caspian Sea.[86] |

*Source: Compiled from various sources.*

[82] ADB: Feasibility study of North-South Corridor project to be ready by late 2017, 17 May 2017 in Azernews https://www.azernews.az/business/113235.html
[83] Rouhani Pushes INSTC in Baku, in Financial Tribune, August 08, 2016 https://financialtribune.com/articles/national/47109/rouhani-pushes-instc-in-baku
[84] Railroad Connecting Iran, Azerbaijan Comes into Operation, in Iran Business News 6 March 2017, http://www.iran-bn.com/2017/03/06/railroad-connecting-iran-azerbaijan-comes-into-operation/
[85] Iran likely to launch Qazvin-Rasht railway in summer, in Trend News Agency 4 May 2017 17:14 (UTC+04:00) http://en.trend.az/iran/business/2750164.html
[86] North-South corridor to reduce cargo delivery period in Azeri News 13 January 2016, https://www.azernews.az/business/91581.html and https://en.wikipedia.org/wiki/North–South_Transport_Corridor

### 4.7.8. Environmental and Energy Factors

As many other transport corridors, environmental issues are not prioritized in the development of INSTC. However, the INSTC secretariat does recognize the importance of promoting the use of rail transport to be an alternative mode to road transport. According to (Mohammadi, 2017), long haul transport is more economical with rail transport, while road transport is more economical for 700-800 km of transit (depending on the infrastructure).

(Malekan, 2017) indicated that each rail freight wagon can carry around 65 tons of cargo, which equals to 3 trucks. Each freight wagon on rail can therefore reduce 3 trucks on the road, which results in safer roads and less $CO_2$-emissions due to less use of fossil fuels.

### 4.7.9. Corridor Performance Monitoring

Considering the continuous efforts of the INSTC secretariat to increase the traffic volume on this corridor, a systematic collection of corridor performance monitoring data is not yet prioritized. For the future, setting up permanent classified traffic counting stations would be a good project in which to invest. Of high relevance is the routine collection of border crossing data from truckers and its centralized analysis for the entire route.

### 4.7.10. Conclusion

Even though it has been established more than 15 years ago, the INSTC is still in the development phase and has not met the set objective to promote intra trade along the corridor. The following features are characterizing this corridor:

1. Apart from the missing links that currently exist along the corridor, INSTC offers good infrastructures, high safety and security, and efficient custom procedures.
2. The main challenge faced by the INSTC is to improve the attractiveness of the corridor in order to increase the trade volume passing through the corridor. Trade between corridor economies is also very low.
3. Compared to the traditional route, INSTC offers shorter routes but higher costs due to inefficient intermodal transfers.
4. The capacity building of the INSTC secretariat is very limited due to the absence of membership fees to finance its work.

### 4.7.11. Recommendation

In order to improve the performance of INSTC, the following actions are recommended:

1. Strengthening the capacity building and institutional frameworks of the INSTC secretariat. When this is achieved, the Secretariat can fulfill its role to be the driving force of political initiatives among the member states to advance regionalization. As a start, an annual membership fee needs to be determined.
2. Increasing the efficiency of intermodal transfers at the Iranian ports, the Port of Baku and Astarakhan.

3. Institute risk management[87] and green channeling at border crossings for goods in transit to the Port. There is no reason to stop trucks that are in transit. Transit fees to be paid online and in advance.

## 4.8. Mashreq North-South Corridor

### 4.8.1. General factors

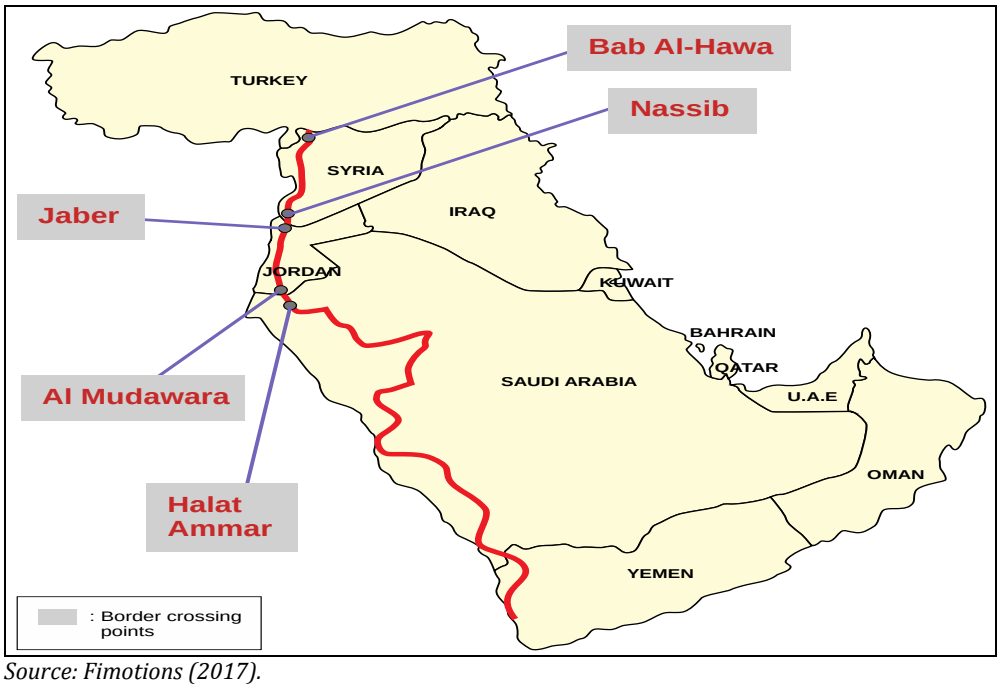
The Agreement on International Roads in the Arab Mashreq was adopted on 10 May 2001 and entered into force on 19 October 2003. It must be noted that this international road network is not a Transport Corridor in the political and institutional sense. A common treaty between participating countries to develop the corridor or to integrate politically is absent. Because of this, there is no coordinating secretariat.

The Arab countries of the Mashreq consist of 13 countries namely Syria, Iraq, Jordan, Palestine, Lebanon, Kuwait, Egypt, Saudi Arabia, Bahrain, Qatar, UAE, Oman, and Yemen. In the Mashreq region, there are 20 road and 16 railway routes that connect the Mashreq countries and provide links to the rest of the world. This is further evidence that a corridor cannot be looked at in isolation to the network that supports it. However, this study will focus on route M45 that runs north to south through Syria, Jordan, Saudi Arabia, and Yemen. It is important to note that there is a railway system that parallels the road. The railway was built by the Ottomans and is well known as the Hedjaz Railway. When open, it connects Turkey, Syria, Jordan and Saudi Arabia. Therefore, Turkey is included in this case study.

The European Union and MEDA[88] have prepared a good report on the current status of the railways of the Mashreq[89]. The main railway line is of the 1,435 mm standard gauge, except through Jordan where it is 1,050 mm. Unfortunately, the corridor is mostly dysfunctional because of the war in Syria, which affects road and rail.

[87] Risk Management is a term used in Customs and Revenue Protection to assess the level of risk of particular transport entities; this normally requires close cooperation between the customs organizations of each country and shared database.
[88] MEDA was the acronym for a Mediterranean Special program (launched in 1996 and amended in 2000 as MEDA II) that aimed to introduce financial and technical measures in parallel with economic and social structural reforms in the Euro-Mediterranean partnership (A Dictionary of the European Union, 2013).
[89] Status Report on the Implementation of RTAP Rail Transport Actions In the MEDA Mashreq Countries, 2010.

**Figure 62 Alignment for the M45 route encompassing North - South direction**




*Source: Fimotions (2017).*

**Table 61: Corridor profile Mashreq North-South Corridor M45**

| Location | Countries covered | Length (km) | Secretariat |
|---|---|---|---|
| Mashreq North-South Corridor | **Turkey, Syria, Jordan, Saudi Arabia, Yemen** | 2,654 | None |

Note: Countries in bold are OIC Member Countries

### 4.8.2. Political and Institutional Factors

By the time the European Common Market was created by the treaty of Rome in 1957, the Arab League states had signed among themselves a treaty for joint defense and economic cooperation, a convention to facilitating trade and regulating transit trade, and an Arab Economic Unity Agreement. In addition, they had created the Arab League in 1945 as an institution for political coordination. Ironically, though the Arab states pioneered regional economic and political integration, the Middle East today has the least trade within itself of any region in the world (refer to the trade analysis below). This said, the Arab economic cooperation process also provided concrete projects, actions and regional or sub-regional trade and road transport.

In view of this, for trade and transport facilitation, the United Nations Economic and Social commission for Western Asia (UN-ESCWA) developed in 1999, adopted the Integrated Transport System for the Arab Mashreq (ITSAM) as a regional transport network. This aims to modernize the road network in the region and to build a network of railways, which connects the Arab Mashreq with Europe and the Arab Gulf region. In this regard, a map of the major

roads, railways, seaports and airports, which are of international importance, was thus created. As an outcome of ITSAM, ESCWA Member States adopted the agreement on International Roads in the Arab Mashreq in 2001, and the Agreement on International Railways in the Arab Mashreq in 2002. The subsequent development in international trade and logistic performances are followed by this development.

As mentioned in the introduction, the Hedjaz railway connecting Turkey, Syria, Jordan, and Saudi Arabia also must be a firm part of the strategy to stabilize the Mashreq Region in general and Syria in particular. An excellent model for the transport being used as a catalyst for conflict resolution and regional stabilization is the Balkan region of South East Europe. The short history is of the Federation of Yugoslavia breaking apart in the 1990s due to political, religious and ethnic diversity. Following the end of hostilities, the EU urged the parties to enter into a stability pact, a component of which was to focus on matters of common interest, which were largely non-political. These were energy, environment and transport. The rationales being that these three subjects are truly international. Energy generated in one former Yugoslav territory was consumed in another; environment issues cannot be confined to one territory and transport connectivity depended on international cooperation. The lessons learned from this exercise will surely resonate with those anxious to end the conflict and build a lasting peace.

Mashreq North-South Corridor countries are members of the League of Arab States, which has historically taken the lead on integration efforts in the region. The League's objective is to "draw closer the relations between member States and co-ordinate collaboration between them, to safeguard their independence and sovereignty, and to consider in a general way the affairs and interests of the Arab countries." Through its various institutions, the Arab League helps to facilitate political, economic, cultural, scientific, and social affairs among its members. Since its inception in 1945, the League has served as a forum for member states to coordinate their policy positions, to deliberate on matters of common concern, and to settle disputes. The OIC and the Arab League have a crucial role to play in peace process in Syria and beyond. They, as with the Balkans may also see that international transport can be used as a catalyst to build peace. This is what the EU managed to do in South East Europe by setting up SEETO – The South East Europe Transport Observatory[90].

The Arab League is purely a political body with no operational resources. As such, it cannot perform the duties of a corridor secretariat, but it can urge the parties to enter into stability pact part of which can be the setting up of a transport corridor authority or a transport observatory.

[90] www.seetoint.org. Established by EU. Project Manager Douglas Rasbash (Consultant at Fimotions).

### 4.8.3. Economic factors

Based on EoDB compiled annually by the World Bank, Turkey performs best among the corridor countries. However, if only Mashreq countries are considered, it is Jordan. As shown in Table 62, the times taken to complete border and documentary processes in Jordan are the lowest, much lower than the other countries. Jordan appears to have very efficient customs clearance procedures. The cost to export is also the least. This is also confirmed by its OI, which is the highest among the corridor countries, as indicated in Table 63.

**Table 62: EoDB of corridor countries in 2016**

| Country | Ranking | | Border Compliance | | Documentary Compliance | |
|---|---|---|---|---|---|---|
| | Overall | Trading across borders | Time to export (hours) | Cost to export (USD) | Time to export (hours) | Cost to export (USD) |
| **TURKEY** | 69 | 70 | 16 | 376 | 5 | 87 |
| **SYR** | 173 | 176 | 84 | 1113 | 48 | 725 |
| **JORD** | 118 | 50 | 38 | 131 | 2 | 16 |
| **SAUDI** | 94 | 158 | 69 | 264 | 90 | 105 |
| **YEMEN** | 179 | 189 | N/A | N/A | N/A | N/A |

*Source: World Bank*

**Table 63: Openness of corridor countries in 2016**

| Country | USD Millions | | | Openness |
|---|---|---|---|---|
| | GDP | Imports | Exports | |
| **JOR** | 37,517 | 19,207 | 7,509 | 71.2% |
| **SAUDI** | 646,002 | 129,796 | 207,572 | 52.2% |
| **SYR** | N/A | 17,561 | 11,353 | N/A |
| **TURKEY** | 718,221 | 198,602 | 142,606 | 47.5% |
| **YEMEN** | 35,955 | 6,753 | 509 | 20.2% |

*Source: Fimotions (2017), analysis on data on www.trademap.org.*

### 4.8.4. Trade Facilitation

#### Trade Agreements

Member States of the Economic and Social Commission for Western Asia (ESCWA) adopted the Integrated Transport System in the Arab Mashreq North-South Corridor (ITSAM). ITSAM aims to facilitate trade and transport between the countries of the region, in order to enhance regional integration and trade flows. ITSAM includes the following: (a) an agreement on international roads in the North-South Corridor; (b) priority routes M40 and M45; (c) an agreement on international railways in the Mashreq North-South Corridor; (d) a memorandum of understanding on maritime transport cooperation in the North-South Corridor; (e) national committees for the facilitation of transport and trade; (f) road safety; (g) a regional transport information system; and (h) an agreement on multimodal transport of goods between Arab countries.

Of the five Mashreq North-South Corridor countries, only Jordan is a member of the World Trade Organization (WTO). However, several countries in the Mashreq participate in bilateral and regional integration agreements or in sub regional economic blocs.

As a result of a comprehensive discussion over two consecutive sessions of the intergovernmental meeting of the ESCWA Committee on Transport, a manual for the establishment of national transport and trade facilitation committees (NTTFCs) was adopted at its fourth session, held in Beirut on 14-16 January 2003, with the aim of assisting countries to establish such committees. Ten member countries established NTTFCs between 2003-2012, namely, Egypt, Iraq, Jordan, Lebanon, Oman, Palestine, Saudi Arabia, the Sudan, the Syrian Arab Republic, and Yemen.

### Trade Volumes

Most of the Mashreq North-South Corridor region's external trade involves three distinct markets, Europe, the Persian Gulf, and Asia. Each presents a unique challenge not only because of their geographic location but also because of the limited transport mode choices available. All three markets can be served by airfreight, but at considerable cost. In addition, Asia is served by maritime routes, the Gulf primarily by road, and Europe by road and sea.

As shown in Table 24, intra trade on this corridor is only 6.3% of the total trade. There is no evidence that this will be increasing, mainly due to the fact that each country has access to its own port.

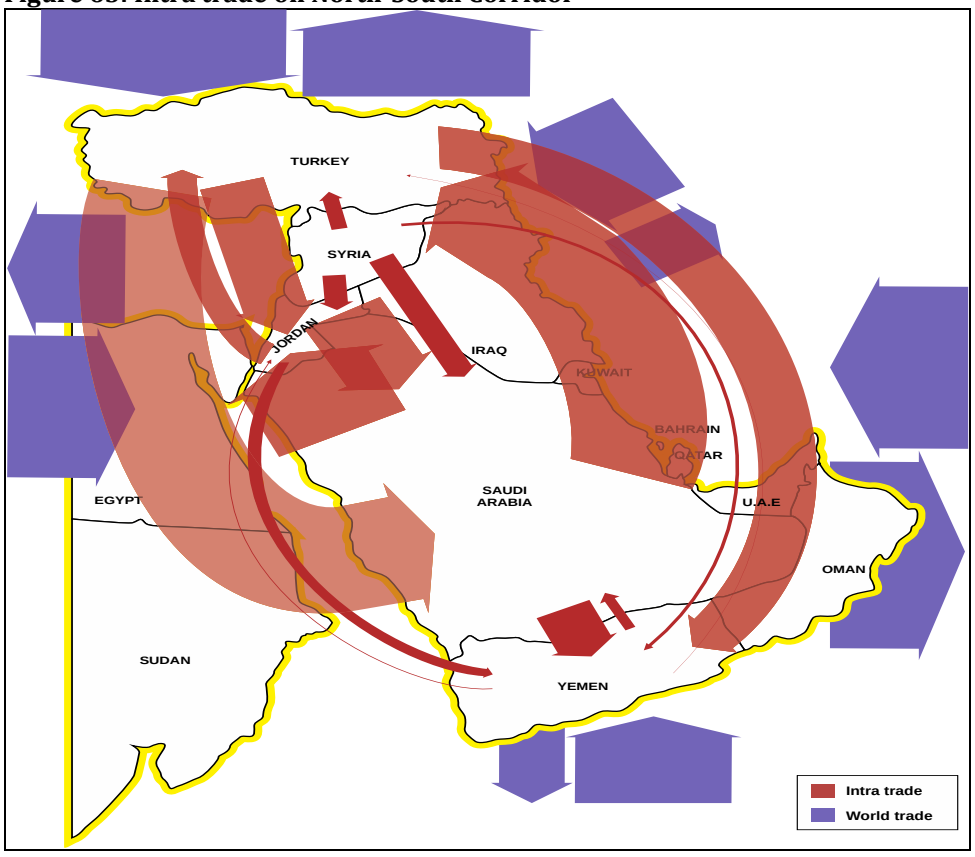
The LPI of the corridor countries is showing a slight negative trend in the last decade, as shown in Figure 64. In 2016, the average LPI of the corridor countries is 2.79, which is lower than the world average 2.88. This means that the physical performance is undermined by lack of harmonized systems and excessive NTBs.

**Table 64: Trade Matrix between corridor countries in 2015**

| COUNTRY | | Imports (Million USD) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | JOR | SAUDI | SYR | TURKEY | YEMEN | Total | World | % |
| Exports (Million USD) | JOR | | 914.01 | N/A | 102.26 | 35.14 | **1,051** | **7,509** | **14.0%** |
| | SAUDI | 2,325.50 | | N/A | 1,835.23 | 563.63 | **4,724** | **207,572** | **2.3%** |
| | SYR | 89.10 | 95.48 | | 65.39 | 12.40 | **262** | **732** | **35.9%** |
| | TURKEY | 664.76 | 2,905.08 | N/A | | 452.53 | **4,022** | **142,606** | **2.8%** |
| | YEMEN | 3.06 | 39.07 | N/A | 0.02 | | **42** | **664** | **6.3%** |
| | Total | **3,082** | **3,954** | **-** | **2,003** | **1,064** | **10102.7** | | |
| | World | **19,207** | **129,796** | **4,304** | **198,602** | **6,424** | | **359,083** | |
| | % | **16.0%** | **3.0%** | **0.0%** | **1.0%** | **16.6%** | | | **2.8%** |

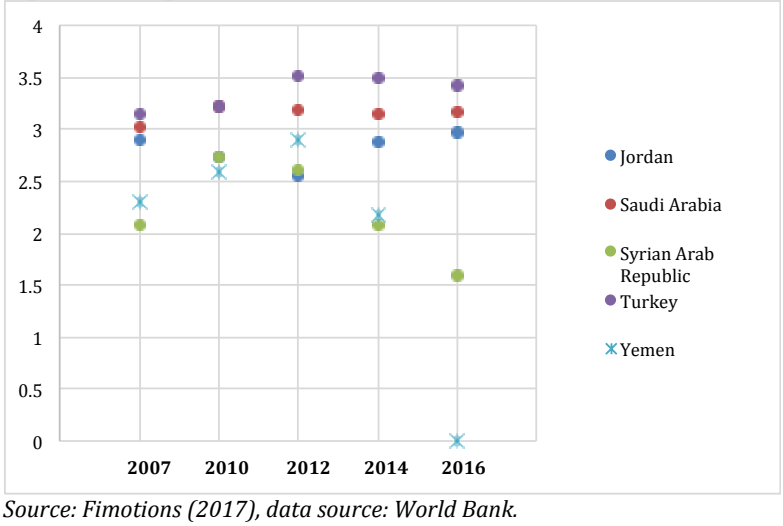
*Source: Fimotions (2017), analysis on data on www.trademap.org.*

**Figure 63: Intra trade on North-South Corridor**




*Source: Fimotions (2017), analysis on data on [www.trademap.org](http://www.trademap.org).*
Note: the thickness of the line represents the trade volume

**Figure 64: Logistics Performance Index of corridor countries**




*Source: Fimotions (2017), data source: World Bank.*

### Trade Facilitation Indicators

ESCWA initiated work on a Single Window (SW) for Trade Facilitation in 2010. An assessment was carried out on the status of the SW development in ESCWA countries. Nine factors required for the establishment of a Single Window in member countries were identified, namely: (a) a one-stop shop; (b) a trade promotion portal; (c) electronic customs declaration (EDI); (d) a government formalities single window; (e) an integrated formalities single window; (f) port shipping services; (g) a port community network; (h) a port/logistics single window; and (i) a national single window.

Inefficient trade facilitation processes and procedures and, to a lesser extent, underdeveloped transport infrastructure constrain the ability of Mashreq North-South Corridor countries to trade more with each other, with the region, and with the world. According to the World Bank's Regional Cross-Border Trade Facilitation and Infrastructure Study, these impediments impose greater trade losses than formal trade tariffs or quota restrictions. While many of the constraints are technical in nature, others such as the lack of infrastructure require investment in new facilities and carefully selected locations.

### Border crossing

Coordination between border agencies within countries is still in its early stages and behind that of competing countries. Even the idea of "one-stop border agencies" is still largely limited to concentration of customs procedures in a single location rather than a similar concentration of all border agencies in the same location.

Despite a simplification of customs procedures and reduced clearance times, the efficiency of the Mashreq North-South Corridor cross border procedures is falling behind those of its trading partners and neighbors. This is due to a slow and ineffective introduction of risk management, little effort to monitor the performance of customs at the border, and insufficient improvements of facilities at the border crossings. Rather than reducing inspections and increasing the proportion of cargoes cleared on submission of documents, the approach of customs is often to use risk management as an additional level of control. Many of the Mashreq North-South Corridor countries face significant challenges, due to extensive misrepresentation of cargo type and value by traders and customs brokers and widespread corruption. There has been limited effort to break out of the heavy handed and largely unsuccessful mechanisms of enforcement, through physical inspection. Only minimal efforts have been initiated to introduce risk profiles and collaboration with large shippers, such as the Authorized Economic Operators program.

### Common standards for favored trader status

Many developed countries (including the EU and the US) have established favored trader regimes, through which goods of selected traders are not subject to the same level of inspections as those of other traders. Several Mashreq North-South Corridor countries have established "Golden Lists" of traders with similar privileges. However, with the exception of

Jordan, the standards required for entry to the list, and the penalties for non-compliance, are too low for the lists to be acceptable to other countries.

**Harmonization of standards for imported goods**

Harmonization of standards for imported goods between Mashreq North-South Corridor countries is weak, with widely different acceptance of quality certificates issued by laboratories and agencies in other countries.

### 4.8.5. Social factors

Social and economic inequalities remain among the most pressing developmental issues for the Mashreq North-South Corridor region. These inequalities are indicated by the large and persistent disparities that exist in ownership and control of economic wealth, access to resources and markets, and the exercise of political power. They are found both within and between states, and have profound and complex connections to violence and conflict. This contribution examines some of the quantitative and qualitative trends in inequality for the Arab world, and explores their relationship to contemporary political dynamics.

The corridor countries are mostly Arabic speaking and Islamic, thus having a common culture and language should facilitate regional integration. The population, unemployment and HDI for the corridor countries are given in Table 65. The HDIs of Jordan, Saudi Arabia, and Turkey are similar. A wide disparity is shown between these countries and Syria and Yemen. The low HDIs of these two countries are most likely caused by political conflicts. Without considering this situation, it might be expected that as integration progresses overall standards of living will improve. Improving physical transport infrastructure is a driver for increased trade and foreign investments, which ultimately reduce unemployment and results in poverty reduction.

**Table 65: Social factors of corridor countries**

| Country | Population (Million) | Unemployment (%) | Poverty Index (%) |
|---|---|---|---|
| **JOR** | 7.6 | 13.2 | 0.74 |
| **SAUDI** | 31.5 | 5.5 | 0.84 |
| **SYR** | 18.5 | 14.3 | 0.54 |
| **TURKEY** | 78.7 | 10.3 | 0.77 |
| **YEMEN** | 26.8 | 17.1 | 0.48 |

*Source: World Bank.*

### 4.8.6. Safety, security and the legal liability

Considering the recent war-torn images of the Middle East as gripped by instability, it is worth saying that the countries in Mashreq North-South Corridor region, especially Syria and Yemen, are struggling with security that hampers the functioning of corridor to promote trade.

In terms of road safety, the actual number of crashes specifically on the corridor is not known, though national road safety figures will be available but are of no real relevance to this study.

### 4.8.7. Technical and Operational Factors

Among the various categories of physical infrastructure, the most relevant to regional integration are those needed to facilitate the movement of goods and individuals (for example, roads, railways, and ports). Other important infrastructure needs center around the exchange of services (such as pipelines, power grids, and telecommunication lines). The corridor countries are well connected through roads and air transport, but substantial investment is needed to improve the quality of road transport. The interconnectivity of energy (through electricity grids and gas pipelines) is limited, but a number of investment projects are under development. Telecommunications is relatively well advanced. Most of the 31,000 km of roads called for in the Agreement on International Roads are in use, but they are not always of good quality. Rehabilitation and upgrading of certain sections of the existing network have become an imperative in many member countries.

Although the corridor countries have a relatively good road infrastructure, trucking services are unsatisfactory because of the continued use of outdated vehicles, excess capacity and an inappropriate industrial structure of the road freight industry. Road transport has the potential to be the least cost alternative and the fastest time mode for most freight movements between the corridor countries. Yet, significant restructuring of road freight industries is needed for this potential to be realized. Improvement in trucking services has a greater potential to better facilitate trade than most other proposed measures, and therefore merits most attention. The demand for road transport in the Arab world remains high mainly due to high-standard road infrastructure in the region, the low cost of fuel in some Arab countries, the absence of significant fees for road transport and the insufficiency of the existing railway network to cope with the demand for land transport.

Rail freight transport is negligible (other than for Jordanian and Syrian phosphate exports). Rail services in the region are underdeveloped but could provide shorter times and comparable costs for routes to Europe. Within the corridor countries, many of the transit distances are too short for rail to be competitive with road transport. Combined road/sea services between Iraq and Europe have the potential to offer shorter times and lower costs than all-sea or combined road-sea alternatives. However, once investment in Jordan is made to upgrade its narrow gauge (1,050mm) railways to standards gauge, then Turkey, Syria, Jordan, and Saudi Arabia will be connected. Once this is done the transit distance that benefit the economics of rail will surely be realized. Oil products, phosphates, other minerals, as well as containerized goods will be attracted to use the railway.

Although some free trade zones have managed to attract manufacturing and distribution industries, the region still lacks an effective distribution center for import goods or for their reprocessing into value-added export products. There are programs to develop production clusters for both domestic markets and exports in all corridor countries but Jordan has progressed to implementation while the other countries are still in the planning stage.

**Updating of customs data system to Asycuda World**

Jordan and Syria have already embarked on this process, but are at different stages of progress with Jordan being more advanced. Technical assistance would be provided to develop a coordination center to facilitate harmonization between the Asycuda systems for all Mashreq North-South Corridor countries that use this system.

**Common technical standards**

Common technical standards are already in place in the Mashreq region, due to the application of the ESCWA Road Agreement that entered into force in 2003. These include road signs and signals, dual carriageways, and service facilities along the corridor. Other common standards like vehicles standards, driving licensing requirements, and road signage are also in place[91].

### 4.8.8. Environmental and Energy Factors

In all information sources that have been reviewed, environmental and energy issues are completely missing. The low cost of fuel in the corridor countries explains this. As discussed before, freight on this corridor is predominantly carried by road transport. When discussing energy efficiency, reducing dependency on road transport is needed. However, this solution seems to be unfeasible in the near future. The road transport demand will remain high due to high-standard road infrastructure in the region and the insufficiency of the existing railway network.

### 4.8.9. Corridor Performance Monitoring

Based on the Road Transport Consultancy Services for Developing a LAS Trade and Road Transport Facilitation Strategy (2013), the average driving speed on this corridor is 63.3 km/h, which shows that the roads are in good condition and/or do not face major problems with traffic jam. However, the average speed including stops is 18.5 km/h, which is very low. Major problems are related with border crossing and waiting queues with very long waiting times. The waiting time in queue and the duration of border control is around 46% of the total travel time.

The costs en route are relatively low compared to other corridors in Asia and Africa with an average of USD 529 per truck trip. Unofficial costs are also very low with an average of only 24 USD per truck trip.

The following table concludes the above-mentioned information. There is no information whether such monitoring/study is being undertaken regularly. This is also due to the fact that this corridor is not a transport corridor; as such systematic collection of corridor performance monitoring data is absent.

[91] Based on online survey conducted by Fimotions in 2017.

**Table 66: Corridor performance**

| | |
|---|---|
| Average driving speed (without stop) | 63.3 km/h |
| Average driving speed (with stop) | 18.5 km/h |
| Total travel time | 6 days |
| Waiting time in queue | 55.1 hours |
| Duration border control | 10.1 hours |
| Travel costs | USD 356 per truck trip |
| Unofficial costs | USD 19 per truck trip |

*Source: Road Transport Consultancy Services for Developing a LAS Trade and Road Transport Facilitation Strategy (2013).*

### 4.8.10. Conclusion

Mashreq North-South Corridor is not a transport corridor and meets none of the criteria for such a corridor. As such, there is no corridor management at all. Its virtue is that there is a well-constructed road that passes through the countries. Main conclusions to be drawn from this case study are:

1. There is evidence of political initiatives to advance regionalization such as the Arab League. However, conflict and unstable governance has undermined progress.
2. Mutual economic activity is reflected in low intra-regional trade, which is 6.3% of global trade, whereas this number is 60% in the EU. There is no evidence that the intra trade will be increasing, mainly due to the fact that each country has access to its own port.
3. The average LPI of the corridor countries is lower than the world average, which means that the physical performance is undermined by lack of harmonized systems and excessive NTBs.
4. Common road technical standards are in place, which makes the operating environment for the corridor is very good.

### 4.8.11. Recommendation

The main recommendations for this corridor are as follows:

- To **establish a corridor secretariat**. This will enable the route to be promoted, monitoring data to be processed and, importantly, **to restore its integratory**. The transport corridor can then play its role as a catalyst for peace, to resolve the conflict.
- The next step is to set up a transport observatory and to come up with a master plan for rebuilding road and rail, as well as one stop border posts and harmonized controls.
- One of the first things that OIC and Arab League need to do post conflict is to promote the international road and rail corridor as a vehicle to improve international relations and rebuild the affected economies.

## 4.9. Multi Criteria Analysis

Multi Criteria Analysis (MCA) is used for structuring decisions influenced by different criteria that are not readily comparable on the same scale by giving the different criteria different weights and values and then use an algorithm for arriving at a recommendation. Versions like MAMCA (Multi-Actor, Multi Criteria Analysis) (Bergqvist *et al.*, 2015) also consider that different stakeholders values different things.

Where disparate and mixed quantitative and qualitative aspects of different projects require to be compared in a systematic way, MCA proves to be a very useful method. It has been used by many government as well as private institutions to rationalize choices and decisions on various levels. For this assignment, an MCA is conducted to assess the performance of the six case study corridors, using the seven framework areas as criteria.

**Step 1: Criteria weighting**

As the first step, the corridor experts that have participated in the online survey (see 3.9) were invited to assign weights (from 1 to 10) to the seven criteria based on their professional opinion on the importance of each criterion to the corridor success. The total weighting must add to exactly 10. In order to ensure the same level of understanding on what each criterion refers to, all the experts were given a one page document contained the definition of each criterion. Technical and operational factors for example, cover harmonizing technical standards, interoperability, multimodality, and intermodality.

Table 67 presents the weights given by 12 corridor experts (academics, policy makers, and policy advisors). Each expert undertook this process individually without having any knowledge of the scores given by the other experts.

It must be remarked from the outset that the MCA process benefits from a larger sample size than 12 that have so far contributed. The desired statistical goal being convergence, such that the addition of another respondent will make no obvious difference to the final ranking. Having remarked on the limited sample size, the weighting part of the MCA process shows that technical and operational factors have the highest weight as the most important factor for the corridor success, followed by political and institutional factors. Here once again, it must be said that if technically minded experts are the sole source of weighting data, then unsurprisingly the technical weighting is higher.

**Table 67: Criteria Weighting**

| Criteria | Corridor Experts | | | | | | | | | | | | Average Score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| Political and Institutional Factors | 2.0 | 3.0 | 1.0 | 2.0 | 2.5 | 4.5 | 0.0 | 1.5 | 1.0 | 1.5 | 2.0 | 2.0 | **1.9** |
| Economic Factors | 1.5 | 1.0 | 1.0 | 2.0 | 1.0 | 1.5 | 0.5 | 1.5 | 2.0 | 1.5 | 3.0 | 3.0 | **1.6** |
| Trade Facilitation | 2.0 | 1.0 | 2.0 | 1.5 | 1.5 | 1.5 | 0.5 | 2.0 | 2.0 | 1.5 | 0.5 | 1.0 | **1.4** |
| Social Factors | 1.0 | 0.5 | 1.0 | 1.0 | 1.0 | 0.5 | 1.0 | 1.5 | 0.5 | 0.5 | 0.5 | 1.0 | **0.8** |
| Safety, Security & Legal Liability | 1.0 | 1.0 | 1.0 | 1.5 | 1.0 | 0.5 | 1.0 | 1.0 | 2.0 | 1.0 | 2.5 | 1.5 | **1.3** |
| Technical and Operational Factors | 2.0 | 2.0 | 3.0 | 1.0 | 2.0 | 1.0 | 6.0 | 2.0 | 2.0 | 3.0 | 0.5 | 1.5 | **2.2** |
| Environmental and Energy Factors | 0.5 | 1.5 | 1.0 | 1.0 | 1.0 | 0.5 | 1.0 | 0.5 | 0.5 | 1.0 | 1.0 | 0.0 | **0.8** |
| *Weighting must add to exactly 10* | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |

**Step 2: Assigning corridor performance score**

The second step in the MCA process is to assign scores (in a range of 1 – 10) to each of the six case study corridors for its performance in each criterion, as shown in Table 68. This step is done by Fimotions who has researched the corridors.

**Table 68: Corridor performance score**

| Criteria | TRACECA | CAREC | NTTC | TAH1 | INSTC | Mashreq |
|---|---|---|---|---|---|---|
| Political and Institutional Factors | 8.0 | 6.0 | 6.5 | 2.5 | 6.0 | 2.0 |
| Economic Factors | 5.0 | 6.5 | 3.0 | 1.5 | 5.0 | 2.0 |
| Trade Facilitation | 6.0 | 7.0 | 4.5 | 4.0 | 3.5 | 3.0 |
| Social Factors | 5.0 | 6.0 | 2.5 | 1.5 | 2.0 | 3.5 |
| Safety, Security & Legal Liability | 4.0 | 8.0 | 2.5 | 1.0 | 8.0 | 2.5 |
| Technical and Operational Factors | 7.0 | 7.5 | 2.0 | 2.5 | 6.0 | 6.0 |
| Environmental and Energy Factors | 3.0 | 2.5 | 0.5 | 0.5 | 0.5 | 1.0 |

**Step 3: Weighted score**

The last step is multiplying the average weight (Table 67) by the corridor performance score of each criterion (Table 68). The result is shown in Table 69. TRACECA performs the best among the case study corridors, followed by CAREC. Both corridors score the highest on the political and institutional factors. Their mature and well established secretariats clearly play an important role. The ADB must have also contributed to the success of these corridors in this area. In its role not only as the CAREC Secretariat but also a financial institution, the ADB takes an important lead in monitoring the commitments of the member countries. This situation can also be seen in the fact that, compared to the other transport corridors, the TRACECA and CAREC countries are more keen in incorporating the corridor features in their transport strategies and plans (see 4.3.2 and 4.4.2). TAH1 and Mashreq score the lowest in this criterion simply due to the absence of a proper corridor secretariat.

African transport corridors have developed mostly in Eastern and Southern Africa, the reasons are mostly due to the high proportion of land locked countries seeking efficient trade routes to the port and also the history of colonization that tended to build roads and railways from the interior to ports. This is certainly the case with NTTC, which for 75 years until 1976 was a part of the colonial East African Community.

**Table 69: Weighted Score**

| Criteria | TRACECA | CAREC | NTTC | TAH1 | INSTC | Mashreq |
|---|---|---|---|---|---|---|
| Political and Institutional Factors | 15.3 | 11.5 | 12.5 | 4.8 | 11.5 | 3.8 |
| Economic Factors | 11.3 | 8.5 | 9.2 | 3.5 | 8.5 | 2.8 |
| Trade Facilitation | 9.8 | 11.4 | 7.3 | 6.5 | 5.7 | 4.9 |
| Social Factors | 4.0 | 5.0 | 2.0 | 1.2 | 1.6 | 2.8 |
| Safety, Security & Legal Liability | 3.2 | 6.3 | 2.0 | 0.8 | 6.3 | 2.0 |
| Technical and Operational Factors | 8.8 | 9.4 | 2.5 | 3.1 | 7.5 | 7.5 |
| Environmental and Energy Factors | 6.5 | 5.4 | 1.1 | 1.1 | 1.1 | 2.2 |
| **Total Score** | **59** | **58** | **37** | **21** | **42** | **26** |

All corridors score relatively low on the social factors and environmental and energy factors. Both of these areas are given low weights by the experts, showing that these do not play an important role in the success of a transport corridor. Moreover, the corridor performance scores given by Fimotions on both criteria are also low, showing that they are not prioritized in the development agenda of the studied transport corridors.

The results of the MCA clearly show the power of the method as being robust and intelligent. It has been suggested that the questionnaire be circulated more widely to increase the scope of the sample. A feature of the subsequent analysis is that the MCA final scoring- may be disaggregated by expert category, country and organization – such as government and non-government. If there was more time and resources then a much more robust MCA could have been carried out.

# 5. Conclusions and Recommendations

This chapter starts with a summary of the key findings of the study. In addition, this chapter provides recommendations and identifies prioritized possible policy options to implement these recommendations using the framework developed in the literature review chapter. The recommendations build upon the analysis of the previous chapters and aim to provide a concrete basis for understanding the transport corridor challenges in the OIC region.

## 5.1. Conclusions on OIC Transnational Transport Corridors

Conclusions on the OIC transport corridors are drawn based on the literature review and the six case studies, following the framework areas that have been used in the previous chapters.

1. Political and Institutional Factors
   These factors are the most important factors when it comes to OIC transport corridors. It is very clear that transport corridors demand a high level of political cooperation for them to be successful and, as such, can be a driver to improve political relations between different territories along its route.

   Tensions and even conflict affect some OIC member states. As a result, trade restrictions and limitation applied to one or more corridor countries. These interruptions of the transport flow create uncertainty, reduce transport efficiencies, increase transportation costs and consequently the competitiveness of the goods. Moreover, they reduce the OIC member countries' competitiveness as trading partner.

   In terms of institutional factors, there is significant room for improving the governance of the OIC transport corridors. Of 50+ OIC countries only 20+ are on formal transport corridors. By formal it is meant that there is a common treaty and secretariat. The other OIC countries do not have corridors relate through bilateral trade agreements. The lack of transport corridors in most OIC countries is recognized which provides the rationale for the study.

   The OIC corridors that do have a secretariat face mostly low institutional capacity, as such it cannot function properly. Among the three OIC regions, Asia has the most well performed transport corridors.

2. Economic factors
   The success of a transport corridor has a positive impact on the economy of its member countries. This is evident in the successful transport corridors in the developed countries. OIC countries belong to the developing world and their transport corridors perform less than those in the developed world. The average EoDB of OIC countries is only better than that of Sub-Saharan Africa, but less than the rest of the world. It indicates that OIC countries are still struggling with simplifying and streamlining their business processes, which reflects high constraints on trade As a result of this it is likely that the transport component of the cost of trade is higher than it should be and that development may be

constrained in various ways. It may also be difficult for some OIC countries to fully perceive the benefits of deep collaboration in matters of trade and transport due to the fortunate position they may have with respect to being providers of oil products. None the less, transport corridor development does have demonstrable benefits in lowering transport costs that should be of interest.

3. Trade facilitation

   Trade facilitation plays a very important role in the success of a transport corridor. It includes many attributes ranging from trade agreements to travel time and transport costs. Which attribute is more important than the others really depends on the objectives of the transport corridors development. Most transport corridors in Asia and Africa have an objective to open-up the trade potential of many landlocked countries. In the MENA region, transport corridors are mainly catalysts to enhance regional integration and trade cooperation, although this is not yet achieved.

   The OIC transport corridors are characterized by many non-physical barriers such as unofficial payments (corruption) and cumbersome border crossing. All OIC countries have at least one bilateral FTA and being participants of international transport conventions. However implementation of and compliance with the agreements vary among countries, resulted in low common standards.

   Low intra trade is also characterizing the OIC transport corridors. The average is less than 10% of the total trade, while it is 50-60% in the EU. A major objective of multinational transport corridors is thus to stimulate and facilitate trade between countries along the corridor rather than seeing at a means to access trading partners on other continents.

4. Social factors

   A transport corridor does not only mobilize trade, but also materially affected the quality of people's lives. Increased trade and foreign investments will ultimately result in poverty reduction. The freedom of movement relates to work opportunities.

   A successful transport corridor like TEN-T plays its role very well in accommodating and promoting these factors. Several OIC transport corridors like CAREC and TRACECA are also successful in this sense, although to a lesser extent. With about 10% of the workforce active in transport in a wide meaning, improvements of the transport systems obviously affect the daily working lives of millions of truck drivers, railway workers and those servicing the transport sector.

5. Safety, security and the legal liability

   Road safety in general is a crucial issue for the OIC countries as many of them are suffering from high mortality rates on the streets and traffic related injuries. National road safety figures are largely available, but this is not the case with road fatalities along OIC transport corridors. This reflects the importance of including this aspect in the corridor data and statistics collection system.

   In terms of internal security and especially legal liability, especially with respect to liability for damage, theft, and other causes of loss, is not yet well developed in the OIC

transport corridors. As such, commercial risks and insurance premiums are high, and consequently so are trading costs and inertia to trade. This situation partly explains why the OIC corridor countries trade mainly with Europe and the rest of the world (where legal liabilities are more advanced) than with the neighboring countries.

6. Technical and Operational Factors
   A common characteristic of OIC transport corridors in terms of technical and operational factors, is a significant shortage and underutilization of rail infrastructure. Low interoperability and lack of interconnections are the main challenges, although these are not only the domains of the OIC corridors. Several TEN-T corridors are still facing road and rail interoperability issues.
   In terms of custom controls harmonization, many OIC countries have been utilizing the ASYCUDA systems although at different stages.

7. Environmental and Energy Factors
   Awareness or at least discussions and regulation on environmental and energy efficiency issues are almost absent in the OIC transport corridor development, most likely due to wide availability of oil. Whilst oil remains affordable, alternative fuels are viewed as expensive and unnecessary and there is little discussion on modal choice based on environmental consideration.

Table 70 summarizes how the transport corridors of each OIC region perform in the seven framework areas. It can be seen that Asian region performs best among the three OIC regions. Both African and the Middle East regions perform less than Asia. As such, should a prioritization be made, for example to disperse funding, the order should be : 1) Middle East; 2) Africa; and 3) Asia.

**Table 70: Performance of transport corridors in each OIC region**

| Framework area | Asian region | African region | Middle East region |
|---|---|---|---|
| Political and institutional factors | + | 0 | - |
| Economic factors | + | - | 0 |
| Trade Facilitation | + | 0 | - |
| Social factors | + | - | - |
| Safety, security and legal liability | 0 | - | - |
| Technical and operational factors | + | - | 0 |
| Environmental and energy factors | - | - | - |

Notes: + (good), 0 (neutral), – (bad)

## 5.2. Recommendation

Although it is not suggested that problems or solutions are the same for all OIC corridors, this recommendations section is an effort to consolidate the results of the analysis and provide some specific suggestions about the future steps to be taken, based on our research, observations, and best practice examples.

Table 71 outlines a summary of the recommended policy actions to improve the performance of OIC transport corridors.

**Table 71: Recommended policy actions to improve OIC corridors' performance**

| Framework area | Key actions |
|---|---|
| Political and institutional factors | • Transforming transport routes to transport corridors with a corridor secretariat<br>• Develop a Corridor Treaty template for members to use or benchmark with.<br>• Corridor secretariat to disseminate the positive impacts of successful corridors in order to promote political integration |
| Economic factors | • Promoting simplification of business processes among member states |
| Trade Facilitation | • Reviewing the existing trade agreements to determine the incorporation of relevant elements to remove non-physical barriers to trade<br>• Stimulate intra-trade along corridors<br>• Increasing the efficiency of customs inspection by improving risk management techniques, green channeling, encouraging an advance manifest, etc.<br>• Developing an efficient trade statistic collection system<br>• Promoting electronic single window facilities |
| Social factors | • Facilitating common passport |
| Safety, security and legal liability | • Developing a data collection system related to fatalities along the corridors |
| Technical and operational factors | • Improving road conditions<br>• Improving rail interoperability |
| Environmental and energy factors | • Promoting intermodal transport<br>• Improving logistics organization, coordination, and corridor route planning |

## Appendix 1: Non Physical Barriers to Trade

Most countries are bound by all WTO Agreements, Ministerial Decisions and Understandings, adopted as a Single Undertaking. Through the WTO, corridor members will have participated in successive multilateral trade negotiations aimed at progressive liberalization of trade. WTO Agreements cover trade issues such as border control, trade in services, intellectual property rights, product standards, investment policy, trade defense measures and agricultural policy. National policies are required to be consistent with WTO obligations related to Agreements on Agriculture, Trade Related Investment Measures (TRIMS), Trade Related Intellectual Property Rights (TRIPS), the General Agreement on Trade in Services (GATS), and the General Agreement on Tariffs and Trade (GATT). Compliance with WTO rules is assessed through the Understanding on the Trade Policy Review Mechanism (TPRM). There are a large number of transport related Non-Tariff Barriers or NTBs that need to be addressed if integrated regional markets are to be established.

WTO list of NTBs that will be tackled during the next 10 years

1. Documentation Requirements at Customs for Export of Botswana Goods:
2. Parking List and Invoice
3. Weighbridge procedures and fees
4. Certificate of Rules of Origin; Some not recognized by Other Countries and interstate or international livestock movement permit is issued only by headquarters of the relevant ministries
5. Sector Specific and Trade Certificates e.g. Phytosanitary Certificate
6. Entry Form and Delivery Note
7. Bill of Lading
8. Import Declaration Form from the Importing Country
9. Use and abuse of Clearing Agents
10. Vehicle Registration and Licensing
11. Incompatible Technical Standards
12. Traffic Management Law enforcement variable
13. National standards not recognized by other countries
14. Many technical standards; some un-harmonized
15. Driver hours unregulated or not enforced
16. Some goods do not/said not to meet required standards;
17. Inspection capacity of national standards bureaus is limited and focuses on finding faults
18. Standards/codes for some goods are not available
19. Quality control is weak in certain countries e.g. No animal feed policy, regulation and compliance
20. Lack of equipment for testing and examination at the border
21. Road Blocks Mounted By local governments
22. Lack of through railways services, need to change trains and crews at borders
23. Technical standards of railways equipment

24. Customs officials focus on revenue collection and not trade promotion
25. Lack of harmonized trade and transport documentation
26. Certificates are not recognized by some member countries
27. Long list of sensitive /restricted goods
28. Too many agencies interested in trade, and sometimes not coordinated
29. Non-uniform working hours e.g. between countries, customs and clearing agents
30. Taxes, Subsidies and Licensing:
31. Consumption tax, warehouse tax, withholding tax, VAT and subsidies pre-inspection charges
32. Variable payment for certificates or certificate of origin:
33. Lengthy and time-consuming registration and licensing processes
34. Quotas
35. Road and Aviation user fees charged and variable
36. Locations for clearance of goods different
37. Business visa and requirements
38. Overlap in trading blocs e.g. COMESA, SADC, EAC,
39. Other trade barriers facing exports
40. Immigration Requirements:
41. Valid travel documents
42. Filling exit/entry forms at crowded places.
43. Restricted crossing times, exit/entry points are different
44. Regular travelers having their passports stamped frequently
45. Long time Spent for Customs Clearance
46. Trucks must be spotted and recorded in a book before clearance
47. Release of goods is done in inland and clearance process is lengthy
48. Goods may need to be off-loaded and re-loaded at the border at the cost of exporters
49. Administrative procedures take between 3-24 hours especially where manual system is used.
50. Many check points at border post
51. Road Blocks - Police Road Blocks
52. Other Trade Barriers (OTBs) (Not Import Targeted and not Necessarily Legislative)
53. Police, Revenue Authority and Isolated Harassment of drivers
54. Weighbridges/Axle Load:
55. Many, un-standardized and intra-country and inter-countries
56. Bribery/corruption at weighbridges
57. Takes time especially during peak hours due to jams
58. Internet Failures at all Border Points or no internet connection
59. Lack of interface in software systems, limiting information sharing
60. Power Failure/Lack of it
61. Language: English Arabic French
62. Limited public awareness, including by exporters
63. Limited office space
64. Inadequate and expensive

65. Parking space for trucks
66. Customs staff not available
67. Traffic jams of up to 10KMs and queuing
68. Staff integrity/Corruption e.g. bribery at border posts and along the way
69. Powerful lobby groups e.g. ministers and business persons
70. Lack of Security where drivers park on the way
71. Capacity and manpower gap
72. Delays at the airport for perishables √
73. Fluctuations and unpredictability in exchange rates
74. Weak monitoring mechanisms to ensure exported goods are not sold in the exporting country's local market
75. Lack of computerization due to lack of power
76. Delays caused by drivers.
77. Deliberate delays in issuing import permits.
78. Third party insurance requirement variable
79. Overt protectionism by governments especially of airlines and railway operations
80. Xenophobia, restrictions on the mobility of labor and narrow immigration regulations
81. Permits limited for non-national carriers
82. Anti-Cabbotage regulations
83. Balance of trade issues
84. Lack of trade
85. Lack of alternative efficient trade routes and gateway ports other than those other than through RSA
86. Favoritism by port authorities to national carriers and to processing and handling national goods.
87. Over pricing of transit routes and certain sections such as new bridges
88. Low domestic demand and market size and lack of economies of scale
89. Too many transport operators and not enough consolidation at the regional level
90. Lack of enforcement of technical standards
91. Driver hours not-enforced and tachometers not legalized
92. Lack of framework for cross-border investments
93. Poor maintenance of transport infrastructure and low technology
94. Over investment, excess capacity and issues of sustainability
95. Excessive government controls and lack of private sector participation in the management of infrastructure
96. Differential user charges for road and airports
97. Lack of reform, market liberalization and deregulation
98. Lack of long term planning and integration with other sectors.
99. Lack of integration between land use and transport nationally and regionally.
100. Lack of regionally consistent and contemporary transport policies

# Appendix 2: Transport Corridors and Routes in OIC Region

| | Initiative | Corridors | Number of routes | Secretariat |
|---|---|---|---|---|
| **Arab Region** | | | | |
| 1 | UNESCWA | Road/ Rail | 35 | - |
| 2 | INSTC | Road/ Rail | 1 | Tehran, Iran |
| 3 | MASHREQ | Road/ Rail | 22 | - |
| **Asian Region** | | | | |
| 4 | UNECA | Road/ Rail | 9 | - |
| 5 | SPECA | Road/ Rail | 1 | - |
| 6 | UNESCAP | Road/ Rail | 5 | - |
| 7 | TRACECA | Road/ Rail | 2 | Baku, Azerbaijan |
| 8 | CAREC | Road/ Rail | 5 | ABD, Manila, Philippines |
| 9 | EURASEC | Road/ Rail | 1 | - |
| 10 | IRU/ NELTI | Road/ Rail | 3 | - |
| 11 | OSJD | Road/ Rail | 13 | - |
| 12 | SAARC | Road/ Rail | | Tridevi Marg, Kathmandu Nepal |
| 13 | NELTI Corridors (IRU) | Road/ Rail | 3 | - |
| 14 | ECO | Rail | 7 | - |
| **African Region** | | | | |
| 16 | UNECA | Road/ Rail | 20 | - |
| 17 | NTCA | Road/ Rail | 1 | Mombasa, Kenya |
| 18 | CCTTFA | Road/ Rail | 1 | - |
| 19 | Dar Es Salaam Corridor | Road/ Rail | 1 | - |
| 20 | Walvis Bay Corridor (WBCG) | Road/ Rail | 1 | - |
| 21 | Trans-Caprivi Corridor (TCC) | Road/ Rail | 1 | - |
| 22 | Trans-Cunene Corridor (TCuC) | Road/ Rail | 1 | - |
| 23 | Mapoto Development Corridor | Road/ Rail | 1 | - |
| 24 | Abidjan-Lagos Corridor | Road/ Rail | 1 | - |
| 25 | Trans-African Highways | Road/ Rail | 9 | - |
| 26 | SADC | Road/ Rail | | Gabarone, Botswana |
| 27 | LAPSSET | Road/ Rail | 2 | Nairobi, Kenya |

## Appendix 3: Trade agreements in CAREC 3

| | Agreement | Countries | Signed and in effect | Content of Agreement |
|---|---|---|---|---|
| **1** | Bilateral Free Trade Agreement | **Kyrgyz Republic**<br>**Kazakhstan** | 11-11-1995 | N/A |
| **2** | Bilateral Free Trade Agreement | **Kyrgyz Republic**<br>**Uzbekistan** | 20-3-1998 | N/A |
| **3** | Bilateral Free Trade Agreement | **Uzbekistan**<br>**Kazakhstan** | 1-1-1997 | N/A |
| **4** | Bilateral Free Trade Agreement | **Tajikistan**<br>**Kyrgyz Republic** | 1-1-2006 | N/A |
| **5** | Bilateral Free Trade Agreement | **Tajikistan**<br>**Uzbekistan** | 1-1-1996 | N/A |
| **6** | Economic Cooperation Organization Trade Agreement (ECOTA) | Islamic Republic of Iran<br>**Tajikistan**<br>**Afghanistan**<br>Pakistan<br>Turkey<br>Azerbaijan<br>**Kazakhstan**<br>**Kyrgyz Republic**<br>Turkmenistan<br>**Uzbekistan** | 2008 | http://www.worldtradelaw.net/document.php?id=fta/agreements/ecota.pdf<br><br>http://artnet.unescap.org/APTIAD/viewagreement.aspx?id=ECOTA |
| **7** | CIS FTA | Armenia<br>Azerbaijan<br>Belarus<br>Georgia<br>**Kazakhstan**<br>**Kyrgyz Republic**<br>Moldova Republic<br>Russian Federation<br>**Tajikistan**<br>Ukraine<br>**Uzbekistan**<br>Turkmenistan | 20-9-2012 | https://www.azernews.az/region/65752.html |
| **8** | Eurasian Economic Union | Belarus<br>**Kazakhstan**<br>Russian Federation<br>Armenia<br>**Kyrgyz Republic** | 1-1-2015 | N/A |

*AFG = Afghanistan, KAZ= Kazakhstan, KGZ, Kyrgyz Republic, TAJ = Tajikistan, UZB = Uzbekistan*
*Source: CAREC Secretariat.*

## Appendix 4: Investment Projects in CAREC Corridor 3

| No. | Country | IP No. | Project title | Cost ($ Million) | Status |
|---|---|---|---|---|---|
| **1.** | AFG | IP 1 | Qaisar–Bala Murghab Road | 407 | Completed |
| **2.** | AFG | IP 3 | Laman–Armalick Road | 39 | Completed |
| **3.** | AFG | IP 9 | Rozanak/Ghorian–Herat Railway Line Construction (Iran–Afghanistan) | 1,330 | Ongoing |
| **4.** | AFG | IP 11.1 | Construction of Shirkhan Bandar–Kunduz–Kholam–Naibabad– Andkhoy–Herat Railway | 2,000 | Ongoing |
| **5.** | AFG | IP 12 | Construction of Aqina–Andkhoy Railway (Turkmenistan–Afghanistan) | 50 | Ongoing |
| **6.** | KAZ | IP 2 | Almaty–Kapchagay (Kapshagai) Road Rehabilitation | 408 | Completed |
| **7.** | KAZ | IP 5 | Electrification of Almaty–Aktogay Railway Section | 984 | Planned in 2020 |
| **8.** | KAZ | IP 17 | Shymkent–Tashkent Road | 658 | Completed |
| **9.** | KAZ | IP 106 | BCP Improvement for Road Vehicles at Konysbaeva | 3 | Completed |
| **10.** | KGZ | IP 4 | Electrification of Lugovaya–Bishkek (Alamedin) Railway | 250 | Completed |
| **11.** | KGZ | IP 5 | Rehabilitation of Balykchy–Chaldovar–Lugovaya Railroad | 66 | Completed |
| **12.** | KGZ | IP 6 | Equipment Purchase for Wagon Repair/Maintenance Facility for Rail | 18 | Completed |
| **13.** | KGZ | IP 7 | Reconstruction of Osh International Airport | 105 | Completed |
| **14.** | KGZ | IP 8 | Kyrgyz ATC System Capacity Enhancement | 15 | Completed |
| **15.** | KGZ | IP 9 | Rehabilitation of Bishkek–Osh Road | 192 | Ongoing |
| **16.** | KGZ | IP 11 | Construction of the Northern Bypass Road (Bishkek–Kara-Balta) | 350 | Ongoing |
| **17.** | KGZ | IP 105 | LC Osh | 15 | Ongoing |
| **18.** | TAJ | IP 7 | Dushanbe–Tursunzade–Uzbekistan Border Road (62 km) | 189 | Completed |
| **19.** | TAJ | IP 102 | CAREC Corridors 3 and 5 Enhancement Project | 89 | Completed |
| **20.** | UZB | IP 3 | Acquisition of New Cargo and Passenger Locomotives | 122 | Completed |
| **21.** | UZB | IP 27 | Reconstruction of Airport Complex in Termez Airport | 4 | Planned 2019-2020 |
| **22.** | UZB | IP 33 | Construction of Centralized Filling Station in Navoi Airport and LC Navoi | 157 | Completed |
| **23.** | UZB | IP 101 | BCP Improvement for Road Vehicles at Yallama | - | Completed |
| **24.** | UZB | IP 102 | BCP Improvement for Road Vehicles at Alat | 5 | Completed |
| **Total investment** | | | | **7,456** | |

*AFG = Afghanistan, KAZ= Kazakhstan, KGZ, Kyrgyz Republic, TAJ = Tajikistan, UZB = Uzbekistan*
*Source: CAREC Secretariat*

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