CAREC Corridors for Seamless Connectivity

CAREC Transport and Trade Facilitation: Corridor Performance Measurement and Monitoring

2009 Third Quarter Report: July – September 2009

Senior Officials' Meeting on
Central Asia Regional Economic Cooperation
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Manila, Philippines

ABBREVIATIONS

AAFFCO	–	Association of Afghanistan Freight Forwarders Companies
ABADA	–	Azerbaijan International Road Carriers Association
ABBAT	–	Association of International Automobile Carriers of Tajikistan
ADB	–	Asian Development Bank
ADBL	–	Business Development Logistics Association of Uzbekistan
AIRCUZ	–	Association of International Road Carriers of Uzbekistan
BCP	–	border crossing point
BOMCA		Border Management in Central Asia
CAREC	–	Central Asia Regional Economic Cooperation
CIFA	–	China International Freight Forwarders Association
CPMM	–	Corridor Performance Measurement and Monitoring
CV	–	coefficient of variation
EU	–	European Union
FOA	–	Freight Operators Association of Kyrgyz Republic
IMAR	–	Inner Mongolia Autonomous Regional Logistics Association
IRU	–	International Road Transport Union
KFFA	–	Kazakhstan Freight Forwarders Association
kph	–	kilometer per hour
MNCCI	–	Mongolia National Chamber of Commerce and Industry
NARTAM	–	National Road Transport Association of Mongolia
PRC	–	People's Republic of China
QR	–	Quarterly Report
SITPRO	–	Simplifying International Trade Procedures
TCD	–	time-cost-distance
TEU	–	twenty-foot equivalent unit
TIR	–	Transports Internationaux Routiers
UNDP	–	United Nations Development Programme
UNECE	–	United Nations Economic Commission for Europe
UNESCAP	–	United Nations Economic and Social Commission for Asia and the Pacific
XUAR	–	Xinjiang Uygur Autonomous Region

NOTE

In this report, "$" refers to US dollars.

OVERVIEW AND KEY FINDINGS

This 2009 Third Quarter Corridor Performance Measurement and Monitoring (CPMM) Report or 3QR is the second part of a series of reports based on an ongoing exercise to collect and analyze the data on the time and cost incurred when traveling along each of the six CAREC corridors. The data will provide basis for actions to remove bottlenecks.

This report covers the data collected from July-September 2009. Preliminary findings indicate that:

- Average road transport speed recorded on 6 corridors for a 20-ton cargo varies from 35 to 86 kilometer per hour (kph). The wide fluctuation in speed indicates different development state of the corridors and different border management processes. Rail transport speed is considerably slower compared with roads, averaging only about 4.5 to 9 kph on 6 corridors, but more consistent.

- Corridors 2, 4, and 6, have high uncertainty in cargo transport speed, as indicated by their high coefficient of variation. Such uncertainty leads to higher inventory levels and higher logistics cost for the firm, which in turn reduce their competitiveness.

- Frequent stops and long waits reduced gross road speed on CAREC corridors by 14% to 31%. They cause a substantial increase in transit time, which also leads to higher inventory levels and higher logistics cost for the firm.

- Queuing at border crossing points is a major cause of delay for both road and rail transport. Waiting time consumes about 14.22 hours for road cargo, and 11.74 hours for rail cargo on average. These waiting times are six to seven times higher than the 2 hours average waiting time at European borders.

- BCP activities and stops along the corridors account for 42% of the total cost of transport. Cost of escort is a major cost item for both road and rail transport in the CAREC region.

- Preliminary statistical tests showed that using the TIR transit system was found to reduce time spent on customs related procedures.

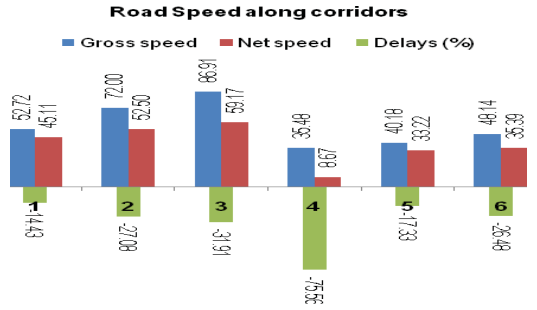
Key findings by corridor are presented in the CPMM Executive Dashboard.

CPMM Executive Dashboard

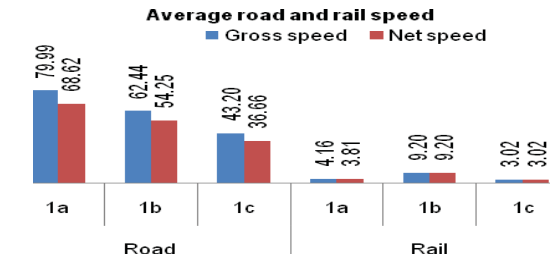
Data Description

- Based on 574 transit data forms
- 394 of the forms involved road transport, 121 involved rail transport, and 59 involved multi-modal transport
- 408 of the cargo movements involve border crossing
- TIR carnets are used in half of the goods transport by road
- Perishables is a major commodity group and accounts for 18% of the goods transported.

Average speed across CAREC Corridors



CAREC Corridor 1



- Escort time (averaged 9 days) and escort charge are both high
- Loading/unloading time at sub-corridor 1c averaged 11 hours; waiting time about 11.41 hours
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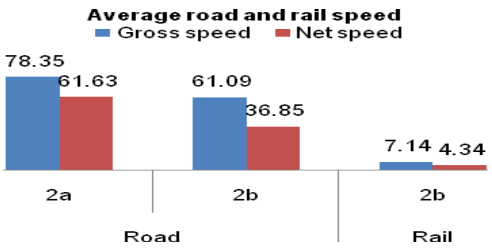
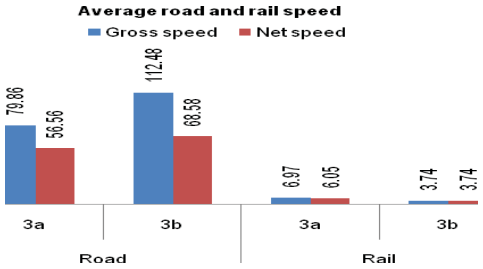
CAREC Corridor 2



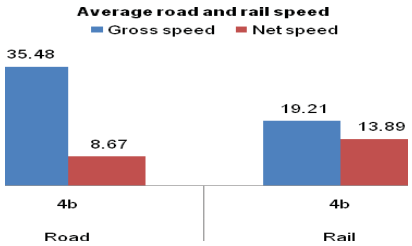
- Waiting time (roads) is about 7.31 hours in 2a
- Escort charge is a major cost item

CAREC Corridor 3



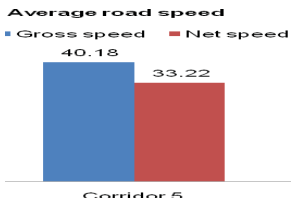
- Waiting time at borders averages about 4.82 hours in 3a and 1.58 hours in 3b.
- Loading and unloading time were the most time consuming while customs clearance and documentation were the most costly activity

CAREC Corridor 4



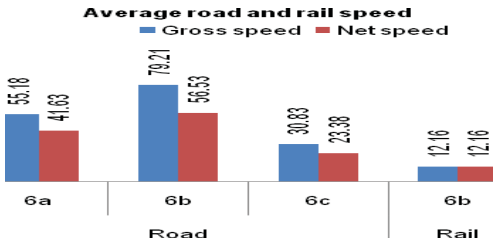
- For road transport, waiting time accounts for the majority of delay, with ,phytosanitary inspection and customs clearance principal delay causes
- For rail transport, waiting time; and border control processing time are about equal, averaging about 13 hours

CAREC Corridor 5



- Escort consumes 7.72 hours while waiting time at borders consumes about 2.93 hours.
- Loading/unloading and escorting activities were main cost items

CAREC Corridor 6



- Waiting time is a major cause of delay
- Customs clearance and documentation were main cost items

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I. INTRODUCTION

1. The Corridor Performance Measurement and Monitoring (CPMM) 2009 Second Quarter Report (2QR) summarized the observations and assessment of the data collected from partner associations from April to June 2009. The report was endorsed by the Seniors Official Meeting and the Ministers of Central Asia Regional Economic Cooperation (CAREC) countries last 18-19 October 2009 in Ulaanbaatar, Mongolia. The previous report discussed the main causes of delays and costs along the corridors. It also highlighted the need for infrastructure improvements at border crossings, and showed progress achieved in customs modernization and harmonization. Furthermore, it signaled the potential of single window schemes, which the majority of CAREC countries have started to develop.

2. This report continues the same monitoring procedure using the modified Time-Cost-Distance (TCD) methodology[1]. In addition to the same graphs, new indicators were developed for this report to better capture corridor performance. These new indicators deal with reliability, time and cost efficiency, and border crossing point (BCP) performance for each of the corridors which was not dealt with in the 2QR due to limited data. Rail and road indicators are also now disaggregated to capture and examine the differences between these two modes of transport. More data were also gathered, including weight in TEU units for rail, and classification of goods as perishable or not, among others.

3. This summary report provides an assessment of the six CAREC corridors based on the data collected from July-September 2009.

II. DATA DESCRIPTION

4. TCD submissions by partner associations[2] between July to September 2009 totaled 574 which cover certain sections of each corridor (Table 1). Afghanistan, Mongolia, People's Republic of China (CIFA) and Uzbekistan complied with the 30 per month TCDs submission. NARTAM and XUAR were not able to submit TCDs for the 3QR due to weather conditions in Mongolia and recent reported unrest in XUAR.

5. Comparing the routes taken in the 2QR and the 3QR, most of the reported routes in 2QR are within the universe of routes in this report although there are also a number of routes in 2QR that are not in this report. In contrast, about 130 TCDs for the 3QR used routes not reported in the 2QR. This presents some difficulty in comparing the results of the 2QR with the 3QR. In this regard, only those charts and figures in Part III of this report will be compared with the 2QR. Other indicators and results in this report will be compared with the succeeding reports.

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[1] The TCD methodology has been widely used for assessing corridor performance. Details are outlined in the previous report available at www.carecinstitute.org.

[2] The partner association includes: AAFFCO=Association of Afghanistan Freight Forwarders Companies; ABADA = Azerbaijan International Road Carriers Association; KFFA = Kazakhstan Freight Forwarders Association; FOA = Freight Operators Association of Kyrgyz Republic; NTTFC = Mongolia National Chamber of Commerce and Industry NARTAM = National Road Transport Association of Mongolia; CIFA= China International Freight Forwarders Association; IMAR = Inner Mongolia Autonomous Region Logistics Association; XUAR= Xinjiang Uygur Freight Forwarders Associations; ABBAT = Association of International Automobile Carriers of Tajikistan; ADBL= Business Logistics Development Association; AIRCUZ = Association of International Road Carriers Association of Uzbekistan

Table 1: Number of TCD Submissions by association by month

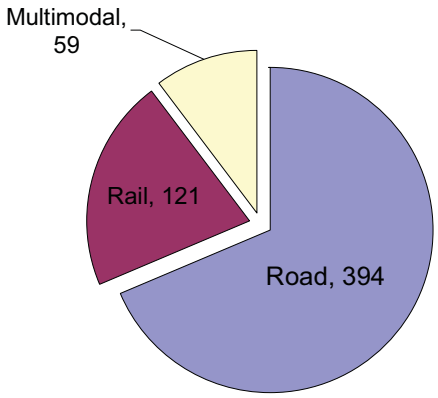
Country	Association	MONTH			Total
		July	August	September	
Afghanistan	AAFFCO	30	30	30	90
Azerbaijan	ABADA	9	0	0	9
Kazakhstan	KFFA	30	30	0	60
Kyrgyz Republic	FOA	18	8	2	28
Mongolia	NTTFC	30	30	30	90
PRC	CIFA	30	30	30	90
PRC	IMAR	6	5	5	16
Tajikistan	ABBAT	30	20	10	60
Uzbekistan	ADBL	30	11	0	41
Uzbekistan	AIRCUZ	30	30	30	90
Total		**243**	**194**	**137**	**574**

6. Road was the principal mode of transportation for all six corridors taken as a whole. Almost 68% of the survey forms submitted (Figure 1) covers road transport. The remaining forms cover rail (21%) and multimodal transport (10 %). However, rail is the dominant mode in Corridors 1 and 4, with intermodal shipments originating mostly from PRC, particularly from Suzhou in PRC to Kunzevo in Russia. Of the 574 TCD forms submitted, about 71% involved cross–border movement.

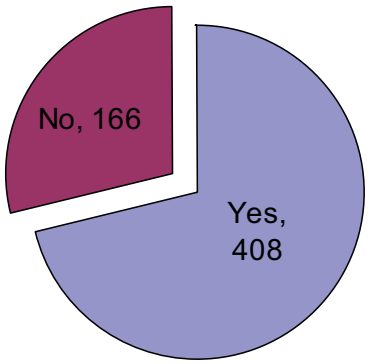
7. Almost half of the highway moves (about 47%) were conducted under the Transport Internationaux Routiers (TIR), as compared to about 30% in the 2QR. After eliminating TCDs from PRC and Afghanistan (as these two countries are not signatories of TIR), the TIR shares rise up to 50.53%. About 26% of the survey forms did not indicate whether the travel was made under TIR or not.

Figure 1: Number of observations by mode and scope of transport, TIR and type of goods

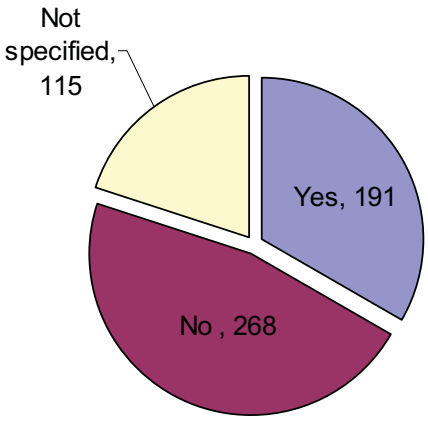
1.a. Number of observations by mode of transport



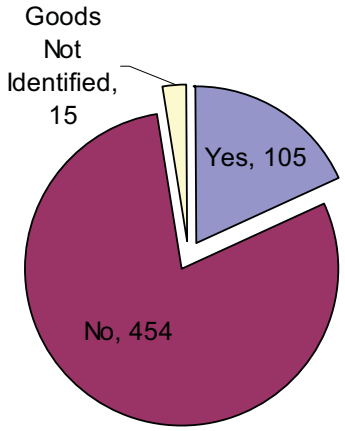
1.b. Number of observations involving cross-border movements



1.c. Number of observations traveling with TIR



1.d. Number of observations classified to be perishables



8. TIR carnets are issued by the International Road Transport Union (IRU) to national road carrier associations. In 2008, Kazakh carriers associations issued the most TIR carnets (32,150 units) (Table 2). KFFA, one of the Kazakh partner associations, reported that all of its transport vehicles travel with TIR carnets. The same is true for the partner association AIRCUZ from Uzbekistan. A more detailed discussion of the TIR system, and its impact on the cost and duration of activities at the borders can be found in Chapter IV.

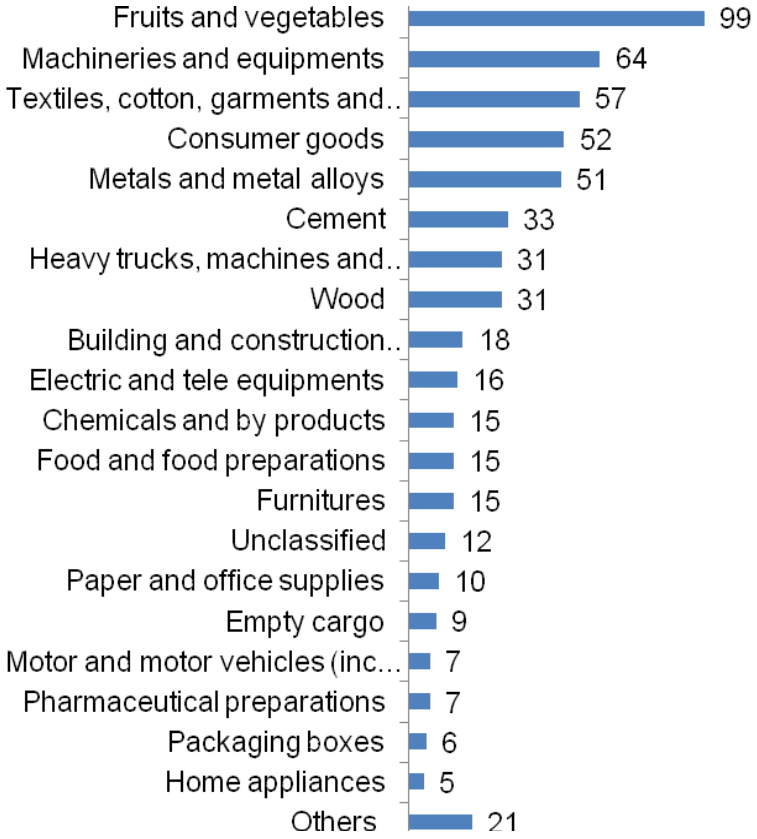
Table 2: TIR Carnets Issued by the IRU to National Associations

Countries	2001	2002	2003	2004	2005	2006	2007	2008
Azerbaijan	3,600	1,300	1,900	3,950	5,000	5,500	9,000	9,500
Kazakhstan	9,100	6,400	17,400	17,000	19,600	32,650	39,050	32,150
Kyrgyzstan	550	1,250	2,700	4,900	6,250	11,450	18,100	17,050
Mongolia	-	-	-	150	0	0	50	0
Tajikistan	-	-	-	0	50	300	500	400
Uzbekistan	600	500	900	2,400	1,800	4,500	7,000	5,000

Source: UNECE

9. In terms of types of goods transported, 17.24% of the goods transported are considered as perishables (Figure 2). In 2QR, perishables were also on the top of the list of goods transported (16.23%). Fruits and vegetables are the most commonly transported commodities particularly in Afghanistan, Kazakhstan, Uzbekistan, and the Kyrgyz Republic. The movement of perishable goods is mostly intra-CAREC, but a substantial amount also goes to Russia. Box 1 illustrates the cumbersome amount of paperwork involved in the movement of perishables.

Figure 2: Number of observations by types of goods carried (n=574)



Box 1: Cumbersome Paperwork in the Perishable Food Supply Chain

The perishable food supply chain is generally considered to be the most complex in terms of movement of goods because of its temperature-sensitive nature and the great amount of time involved in document preparation, clearance, and technical and border controls.

According to Simplifying International Trade Procedures (SITPRO, 2008), a single complete consignment transaction, from seller to buyer, can require some 150 documents with duplicate information to be entered 42 times. In 2006, SITPRO, conducted research on the cost of maintaining paper-based supply chains, focusing on perishable foods. Perishable foods present a greater risk of spoilage costs that could result from missing or delayed documentation.

The research revealed that:
(i) A typical complete consignment transaction from grower to retailer requires 150 documents.
(ii) Over the course of 1 year, 1 billion paper documents are generated.
(iii) Thirty percent of the data are entered more than once.
(iv) Duplicate consignment data are keyed in at least 189 million times each year.
(v) Over 90% of the paper documents used are destroyed.
(vi) The cost of document-related administration is around 11% of the supply chain value per annum.

Source: ADB 2009 citing SITPRO. 2008.

10. A wide variety of goods is transported along the CAREC corridors:

- Machineries, capital equipments and construction materials from China,
- Textiles and apparel from Mongolia and Uzbekistan.
- Wood from Russia transported through Mongolia and Kazakhstan to China (Figure 3)

Figure 3: Russian Timber transloaded at China Railway's Alashankou Border Station

III. OVERVIEW OF RESULTS ACROSS CORRIDORS

A. Speed / Travel Time

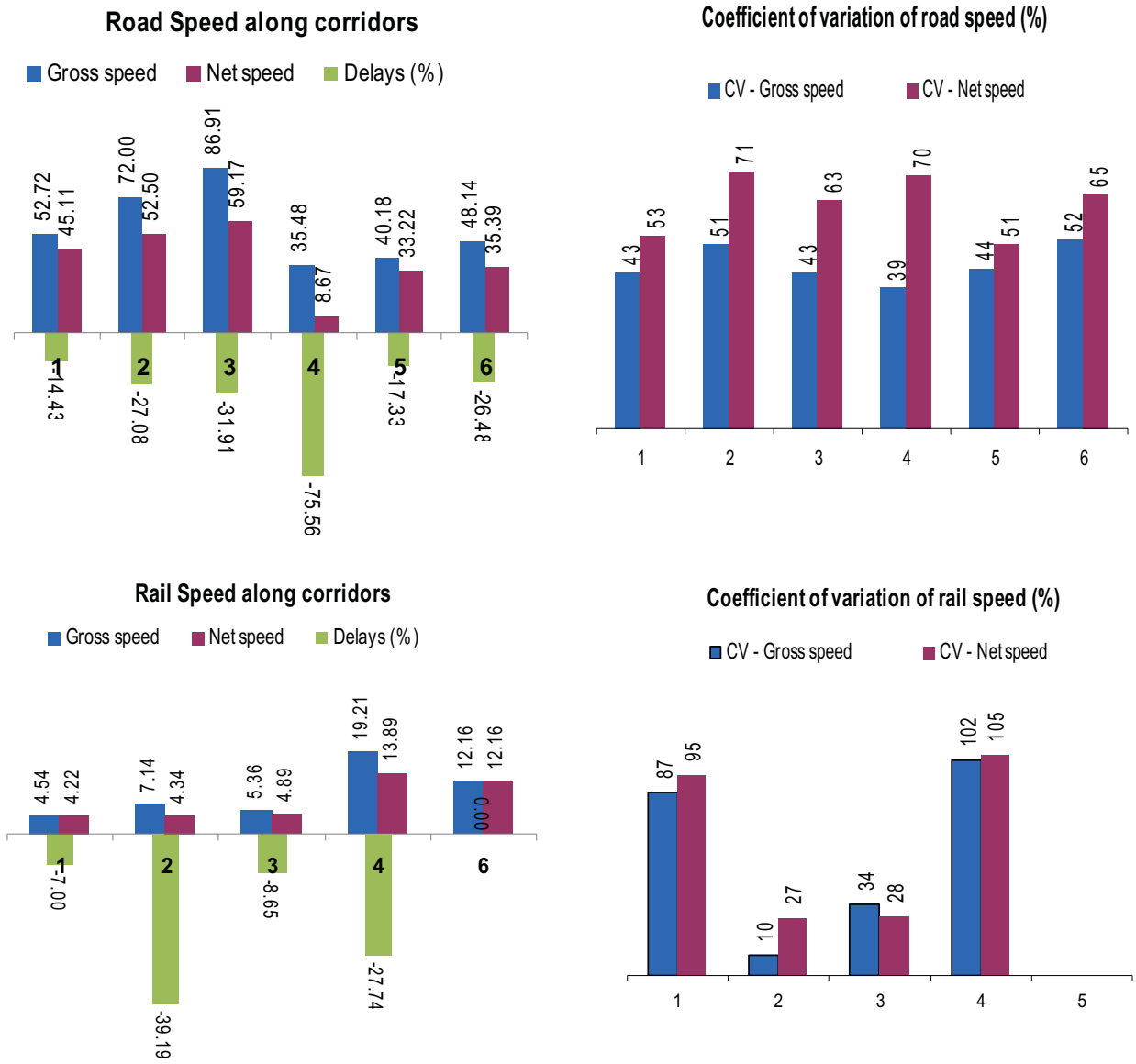
11. For this quarter, speed indicators were disaggregated for rail and for road data, since different factors affect each mode of transport. Figure 4 shows the average speed of a 20-ton cargo and the delays related to monitored activities. For rail, speed is expressed for every 1-TEU (which is a common measure of weight for rail transport). Speed is further classified into gross speed and net speed. ***Gross speed*** refers to the total distance over time while in transit (i.e. the vehicle is actually moving) while ***net speed*** refers to the total distance over time while in transit plus the time spent at stops. Delays, which imply speed reduction as a result of additional time spent in stops, are expressed as percentages. A larger percentage implies more time spent in stops. Reliability indicators were also computed for each corridor based on the coefficient of variation (CV) of speed along that corridor. Coefficient of variation is a measure of consistency and reliability and is calculated as standard deviation divided by the mean. A higher coefficient implies that the speed in the corridor is more variable with respect to the average speed and hence more unpredictable.

12. Gross road speed for a 20-ton load is fastest in Corridors 3, 2 and 1. Gross road speed was lowest in Corridor 4 where more stops were reported. In all corridors, stops reduced gross road speed by 14% to 75% (Figure 4). NARTAM, the partner association in Mongolia, did not submit TCD forms for road transport given the difficulty in collecting road data during winter months. IMAR only reported activities along the route from Erlian in the PRC to the Train Station in Zamiin Uud, Mongolia covering a distance of only 16.5 kilometers. Since the observations submitted were limited to this short distance which takes a number of hours to cover as this is a BCP, very long delays are reported in Corridor 4.

13. CV was highest in Corridors 2, 4 and 6, implying that road speed is very unpredictable and variable in these corridors. As expected the delays happened along the BCP points (Appendix 2). Corridor 4 records the lowest average speed, but has a fairly high CV, which implies that the road transport in this corridor could deviate by as much as 70% from the average speed. These figures should, however, be considered with caution given the small number of observations gathered from this corridor.

14. With rail transport, speed for 1-TEU load was much slower than road transport and ranged from 4.50 kph to 19 kph across all corridors. Gross speed per 1-TEU was fastest in Corridor 4. However, the CVs suggest that rail speed in Corridors 1 and 4 were relatively variable compared to the rail speed of other corridors. In Corridor 1, where the Dostyk-Alashankou BCP is located, travel time was very sluggish. Rail transport in Corridor 4 passes through Tianjin to Erlian and then to the BCP of Erlian-Zamiin Uud, to Sainshand to Choir and finally to Ulaanbaatar. These trains usually run slowest at the Erlian-Zamiin Uud borders. Delays are more evident in Corridor 2, particularly in the Dostyk-Bukhara rail section.

Figure 4: Gross and net speed and delays of road and rail transport in CAREC corridors



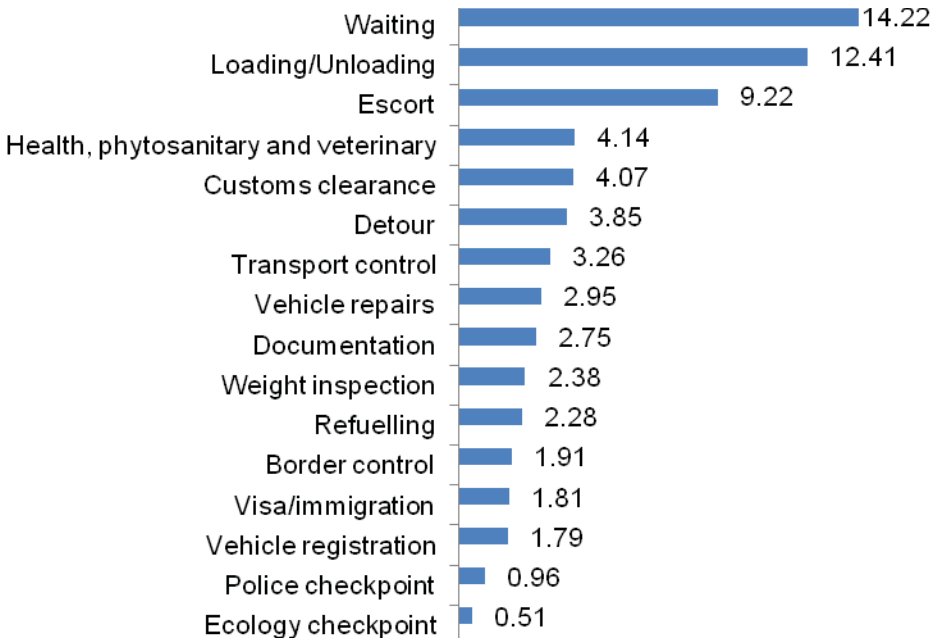
15. For all corridors, net road speed is approximately 39 kph while net rail speed is about 9.5 kph, for an average of 24.3 kph for both rail and road. In 2QR, net road speed for a 20-ton load is approximately 21.6 kph which is a little slower compared to the net road speed in this quarter. The net speed of 39 kph is only about half of the 75 kph intra-European speed. It would take a cargo truck traveling the CAREC corridors about twice as long to travel the same distance as a truck traveling along European routes.

B. Time and Stops for Inspection

16. Frequent and lengthy checks and inspections on each side of the border and ad-hoc checks made by a variety of agencies along routes added to non-physical barriers to trade and significantly increased travel time. For road transport, waiting time/idle time was a major cause of delay, consuming about 25.96 hours per 500 kilometers of travel. Loading and unloading activities, both at the borders and at particular departure or destination points, usually took 11.81 hours to complete. Other border activities, such as those for customs clearance and border control, took 4.10 hours and 1.85 hours, respectively. Police checkpoints per 500 kilometers of travel took about an hour. Escort activities, usually undertaken at borders, normally took 8.75 hours. In general, escort services are required: (i) as a security measure when goods are prone to theft; (ii) for oversized and heavy loads that must be checked from time to time to make sure they remain properly stowed; and (iii) as a customs requirement, particularly for road transport, when goods must be cleared in inland ports.

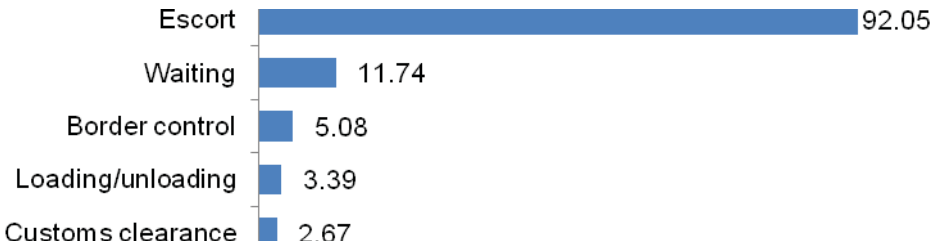
17. As in the 2QR, waiting time at the borders was still a major cause of delays in road transport in this quarter. The average waiting time in the previous quarter (18.01 hours) was higher than the 14.22 hours reported in this quarter (Figure 5). Loading and unloading and escort activities were also identified as significant causes of delays in this quarter. Few observations reported these activities in the previous quarter.

Figure 5: Average duration of road activities (hours) per 500 kilometers



18. Rail transport has generally less activities compared to road transport. Among reported activities, escort activities at the border took about 92.05 hours (or 3-4 days) per 500 kilometer, a very high figure (Figure 6). Waiting and delays at the border took about 11 more hours. Customs clearance and border control consumed about 2.67 hours and 5.08 hours, respectively.

Figure 6: Average duration of rail activities (hours) per 500 kilometers



C. Cost of Transport and Activities

19. As indicated in the 2QR, transport cost include labor, licenses, freight, insurance, depreciation, and overhead paid by trucking companies, road carriers, and forwarders.[3] Activities costs include payments for all border crossing activities and non-BCP activities such as repairs, vehicle registration, police checkpoints, and weight inspection. Both costs are standardized with respect to distance traveled.

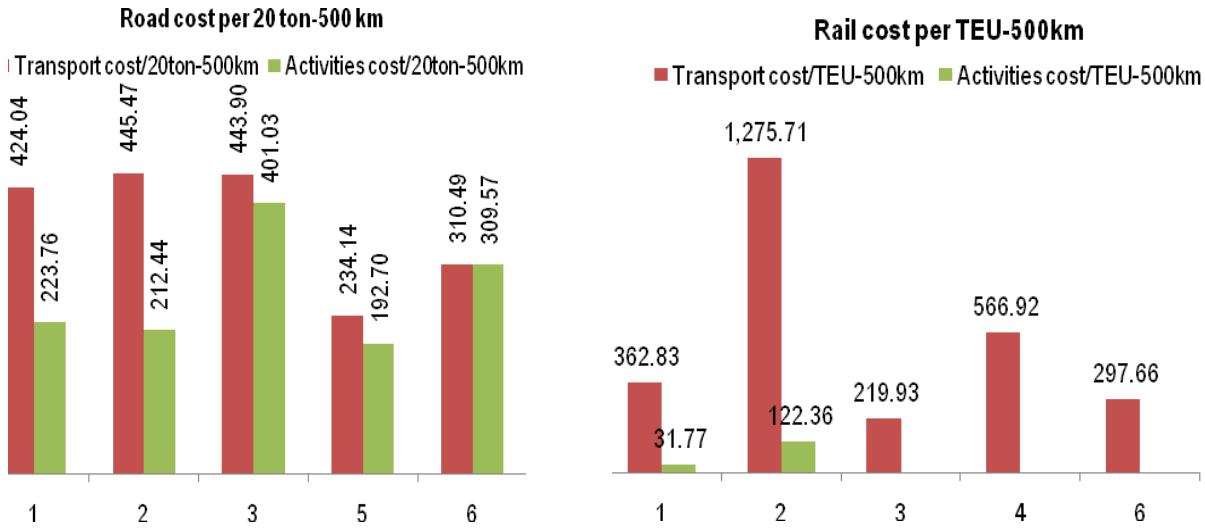
20. Across corridors, the average cost of road transport and the average cost of activities associated with road transportation were estimated at $375.05 and $270.63, respectively, per 500 kilometers normalized by 20-ton load. In the second quarter, the average cost of road transport was $405.58 and the cost of activities totaled about $263.99. The transport cost for this quarter was lower by about 7% than that in the second quarter. The cost of transport was about 58% of total cost; with the cost of activities accounting for the rest.

21. In general, road transport costs in Corridors 1, 2 and 3, were more or less the same, ranging from $424.00 to $445.00 per 500 km (Figure 7). Transport costs were lowest in Corridor 5 and amounted to $234.00 per 500 kilometers. In Corridor 6, the cost of transport and the cost of activities were almost identical, amounting to $310.49 and $309.57, respectively.

22. In rail transport, transport cost was highest in Corridor 2, amounting to $1,275.71 per 1 TEU-for every 500 kilometers. It was lowest in Corridor 3 and averaged $219.93. The high cost of rail transport in Corridor 2 is related to the cost of insurance, freight, wagons, taxes and other related charges. Cost of activities for rail transport is usually lower since there are fewer stops when traveling by train.

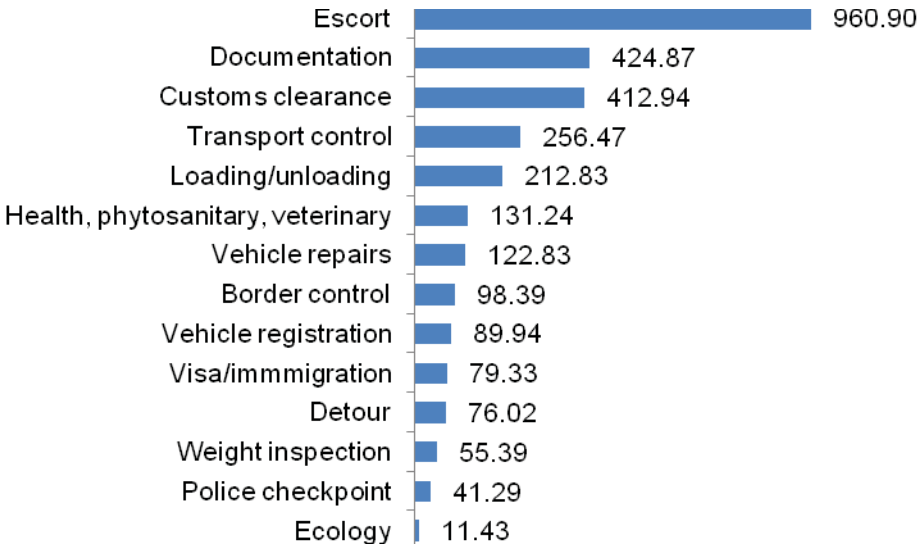
[3] Transport costs are provided by the associations as total cost without disaggregating since some partner associations want to keep detailed costing confidential. In some cases, partner associations do not provide even total cost. As a result, transport cost in this report might be highly underestimated.

Figure 7: Cargo cost per 500 kilometers (US$)



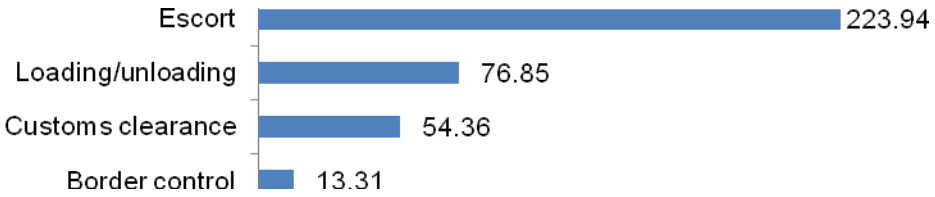
23. Across all corridors, escort activities along the road were the costliest, averaging $960.90 for every 500 kilometers (Figure 8). As described earlier, these escort activities are undertaken as a security requirement.

Figure 8: Average road cost (US$) by activity per 500 kilometers



24. Similar with those in road transport, escort activities in rail were the costliest, averaging $223.94 (Figure 9). Its main purpose is to prevent theft of goods, which is a significant problem in most CAREC rail routes. Transloading activities would normally cost $76.85. Border activities such as customs clearance and border control cost about $54.36 and $13.31, respectively. In general, these rail costs were incurred at the borders.

Figure 9: Average rail cost (US$) by activity per 500 kilometers



25. Looking at the causes of delays, more than half (56.0%) of the reported activities for road transport involved unofficial payments (Table 3). Activities for which unofficial payments were made include border control, police checkpoint, and customs clearance, with 99.3%, 97.2%, and 96.5% of observations reporting such payments, respectively.

Table 3: Distribution of official and unofficial activities: Road as mode of transport

Activities	Official		Unofficial	
	Number	%	Number	%
Health inspection	187	36.3	328	63.7
Phytosanitary inspection	142	24.6	435	75.4
Veterinary inspection	94	40.9	136	59.1
Border control	6	0.7	864	99.3
Visa / immigration	18	60.0	12	40.0
Customs clearance	34	3.5	941	96.5
Detour	22	100.0	0	-
Waiting	104	100.0	0	-
Loading / unloading	394	100.0	0	-
Rest / overnight stay	698	100.0	0	-
Escort	34	73.9	12	26.1
Weight inspection	41	13.2	270	86.8
Police checkpoint	65	2.8	2271	97.2
Vehicle registration	107	33.6	211	66.4
Vehicle repair	221	100.0	0	-
Refuelling	204	100.0	0	-
Documentation	-	-	154	100.0
Ecology checkpoint	10	100.0	0	-
Transport control	-	-	60	100.0
Meals	1,956	100.0	0	-
Others	40	81.6	9	18.4
Proportion	**44%**		**56%**	

26. Activities for rail transport such as border control, customs clearance, waiting, loading/unloading, overnight stays and meals reportedly did not involve unofficial payments.

27. Unofficial payments cause unnecessary expenditures and significantly increase the delivery costs of goods as is the case in the Kyrgyz Republic (Box 2).

Box 2: Barriers to Transit Trade: The Case of the Kyrgyz Republic

The efficiency of transit depends on many factors. A part from geographical position, institutions and infrastructure play a considerable role. ADB (2008) analyzed the transit trade barriers for Kyrgyz transit transport through Kazakhstan, and found the following major constraints that inhibit transit trade:

(i) weak legal framework;
(ii) complex and outdated border procedures and documentation;
(iii) lack of coordination among the border agencies;
(iv) lack of mutual recognition of customs control procedures and customs seals and stamps;
(v) weak private sector stakeholders such as transport and trade associations;
(vi) inadequate transit and guarantee systems; and
(vii) inadequate customs and transport infrastructure.

As a result of these weaknesses, the unofficial payment of Kyrgyz Republic transit goods was found to be as high as 140% of the price of fruits, 48% for vegetables, 13% for cotton fiber and 11% for tobacco. This unnecessary expenditure pushes the delivery cost very high.
Source: **Transport Costs for Difference Cargoes**

Item in Truck	Sale Price of Truckload	Kazakhstan Transport Cost (% of price)	Transport cost that can be Eliminated (% of price)
Tobacco	8,686	15	11
Cotton fiber	7,767	17	13
Fruits	705	186	140
Vegetables	2,073	63	48

Source: ADB and UNESCAP 2009 citing ADB 2008

28. Appendix 1 provides a summary of individual corridor performance.

IV. ANALYSIS OF TIR CARNETS AND PERISHABLE GOODS IN CAREC CORRIDORS

29. Box 1 noted that the transport of perishable goods, which account for 17% of all goods transported along the CAREC corridors, is delayed considerably by document preparation, clearance and technical and border controls. Using data that is available, tests were applied to verify whether or not perishable goods indeed undergo longer inspection time and other related stops along the road; and whether or not the costs associated with these checkpoints and stops are higher for perishable goods.

30. Tables 17a and 17b show the results of the t-tests that were conducted on data on perishable goods. These results indicate that time spent on inspections, checkpoints and related delays were lengthier for non-perishable goods, reducing gross speed by an average of 0.58 kilometer per hour. The duration for the same activities is shorter for perishable goods, reducing gross speed by 0.46 kilometer per hour. The tests showed that there is no significant difference between the duration of activities for perishable and non-perishable goods.

Table 17a: T-test Results on Perishable by Duration of Activities

Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
No	3099	.5808843	.0560828	3.122052	.4709212	.6908475
Yes	734	.4676343	.0654335	1.772752	.339175	.5960936
combined	3833	.5591975	.047045	2.912612	.466962	.6514331
diff		.11325	.086179		-.0557622	.2822623

diff = mean(**No**) - mean(**Yes**) t = **1.3141**
Ho: diff = 0 Satterthwaite's degrees of freedom = **1955.79**

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = **0.9055** Pr(|T| > |t|) = **0.1890** Pr(T > t) = **0.0945**

31. The cost of activities for perishable goods averaged $27.27 per kilometer while, for non-perishables, it averaged $23.75 per kilometer. Nonetheless, results of the t-test indicated that there is no significant difference between the cost of activities for perishables and non-perishable goods.

Table 17b: T-test Results on Perishable by Cost of Activities

Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
No	2437	23.75615	2.165834	106.9185	19.50908	28.00322
Yes	630	27.27856	4.229192	106.1519	18.97351	35.5836
combined	3067	24.4797	1.92764	106.7537	20.7001	28.25929
diff		-3.522407	4.751515		-12.84667	5.801853

diff = mean(**No**) - mean(**Yes**) t = **-0.7413**
Ho: diff = 0 Satterthwaite's degrees of freedom = **984.701**

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = **0.2293** Pr(|T| > |t|) = **0.4587** Pr(T > t) = **0.7707**

32. The TIR carnet facilitates the movement of goods in international trade while effectively protecting the revenue of each country through which such goods are carried. It was designed to eliminate delays in transit that occur when long-distance vehicles are held up for customs inspection at every frontier. The governing procedures and processes underpinning TIR are described in Box 3.

33. Given the benefits accruing from the TIR system, it is presumed that goods being transported with TIR carnets would take a shorter time going through customs related procedures. It is also presumed that the cost of customs clearance would be much lower compared to those for goods being transported without TIR carnets. Table 18 contains the results of a t-test comparing the duration and cost of customs clearance for those traveling

without and with TIR carnets. These results show that those with TIR carnets would normally take 1.74 hours to go through customs clearance procedures while those without TIR carnets would take an average of 4.83 hours. The TIR transit system results in faster border clearance by eliminating the need for examination. In addition, the TIR carnet is enough documentation for goods to avoid being required to secure supplementary documentation at every border they pass through. There should also be no requirement for customs convoys for TIR vehicles because potential risk is covered by the guarantee (EU-UNDP BOMCA, 2009).

Table 18a: T-test Results on TIR by Duration of Customs Clearance

Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
No	869	4.836958	.4022881	11.85897	4.047387	5.626529
Yes	609	1.748276	.1312691	3.23945	1.49048	2.006072
combined	1478	3.564287	.2457773	9.448851	3.082178	4.046397
diff		3.088682	.4231635		2.258336	3.919029

diff = mean(No) - mean(Yes) t = 7.2990
Ho: diff = 0 Satterthwaite's degrees of freedom = 1045.76

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = 1.0000 Pr(|T| > |t|) = 0.0000 Pr(T > t) = 0.0000

34. Meanwhile, goods with TIR carnets are levied more fees to get cleared by customs than those without TIR carnets. On the average, $176.23 is paid for goods with TIR carnets while $99.18 is paid by those without TIR carnets. On top of this, the cost for national transporters to use TIR is relatively high. It requires substantial capital investment or leases for modern equipment which complies with TIR certification requirements (EU-UNDP BOMCA, 2009).

Table 18b: T-test Results on TIR by Cost of Customs Clearance

Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
No	690	99.18949	5.040826	132.4117	89.29226	109.0867
Yes	521	176.2388	7.883768	179.9504	160.7508	191.7267
combined	1211	132.3379	4.575842	159.2367	123.3604	141.3153
diff		-77.04929	9.357549		-95.414	-58.68458

diff = mean(No) - mean(Yes) t = -8.2339
Ho: diff = 0 Satterthwaite's degrees of freedom = 916.482

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = 0.0000 Pr(|T| > |t|) = 0.0000 Pr(T > t) = 1.0000

Box 3: Transports Internationaux Routiers Convention

Transports Internationaux Routiers (TIR) is an international customs transit system that allows goods to transit from a country of origin to a country of destination in sealed load compartments with customs control recognition along the supply chain. The TIR system facilitates the movement of goods in international trade while effectively protecting the revenue of each country through which such goods are carried. The TIR transit system relies on five main pillars: (i) use of secure vehicles or containers approved for use by customs; (ii) an international guarantee chain to secure duties and taxes in case of irregularities; (iii) mutual recognition of customs control such that goods carried under the TIR procedure in sealed road vehicles or containers will not, as a general rule, be examined at customs offices en route[a] (iv) controlled access to the system, limited to qualified authorized operators; and (v) the TIR carnet, a single harmonized manifest issued in the country of departure and serving as a control document in the countries of transit and destination.

The TIR carnet system has been devised to prevent the wasted time that occurs when long-distance vehicles are held up for customs inspection at every frontier. The idea is to provide a document upon entry to a transit country to give a solid evidence of the goods arriving in that country. When a vehicle reaches the border of a transit country, the customs officer at the point of entry only needs to examine the seals on the vehicle to ensure they have not been broken, and check the rest of the vehicle to ensure that the framework of the container, the tilt, or other external cover is intact. The vehicle is then sent on its way. At the point where it leaves the transit country, the vehicle surrenders a second copy of the carnet. When these two copies arrive at the central office they can be compared to show that the goods arrived in and later left the country, and therefore a duty is not payable. I f the second copy does not arrive, duty is payable and a guarantor-the body authorized to issue carnets, usually a trade association-is required to pay the duty, and recovers it from the hauler whose staff was probably liable for the irregularity. If the country concerned is the country of destination, the goods will be liable to the import procedure for that country and duty will be collected from the appropriate person, usually the holder of the TIR carnet.

The United Nations has mandated the International Road Transport Union to manage the TIR Convention and issue TIR carnets to the national guaranteeing associations under conditions set out in a contractual commitment. E ach association, in turn, issues the TIR carnets to carriers in its country in accordance with the conditions set out in the declaration of commitment signed by the carrier with the association.

The TIR Convention traces its origin to an agreement concluded by several European countries in 1949 to hasten the reconstruction of countries ravaged by World War II. The convention was formalized under the auspices of the United Nations Economic Commission for Europe (UNECE) in 1959 and replaced by the current Customs Convention on the International Transport of Goods Under Cover of TIR Carnets (TIR Convention 1975). Amendments are introduced from time to time as agreed by contracting parties. The UNECE and the TIR secretariat maintain the TIR Handbook, which contains the convention agreement, succeeding revisions, and other practical information on the implementation of the TIR system.

Among recent initiatives are the worldwide application of the TIR system to include Asia and Middle East, and the computerization and adaptation of electronic data processing of the TIRS to provide faster cargo processing and security from fraudulent activities. As of 2008, there were around 66 contracting parties to the TIR system. From approximately 2.7 million TIR carnets issued in 2001, the number increased to 3.5 million in 2006 and more than 3 million in 2007.

[a]This does not exclude the right of customs offices to carry out spot checks in cases where they suspect irregularities, but it is understood, and even stipulated in the convention, that such checks should be exceptional.

Source: ADB and UNESCAP. 2009 citing UNECE data. *TIR Handbook*.

V. PRELIMINARY CONCLUSIONS AND RECOMMENDATIONS

35. Preliminary findings of the study indicate that:

- The average road speed for a 20-ton cargo is between 35 kph to 86 kph, a very wide range that implies that the CAREC corridors are in a highly varied stage of development. CV is high in Corridors 2, 4, and 6. Rail speed for 1-TEU is considerably slower compared with roads but is much more consistent, averaging only about 4.5 kph to 9 kph.

- The net road speed of 39 kph in the corridors is about half of the average intra-European speed of 75 kph.

- Activities at stops reduced gross road speed on each corridor by 14% to 31%. This is relatively less than the delays of 32% to 49% reported in the 2QR.

- Waiting at the borders is the major source of delay in both road and rail travel. Waiting at the borders takes about 14.22 hours for road, and 11.74 hours for rail. These figures are still considerably above the 2-hour waiting time at European borders.

- Transport cost for this quarter is lower by about 7% compared to the costs reported in the 2QR. The transport cost for road travel is about 58% of total cost while the cost of activities is 42%. Escort services are a major cost item in both road and rail transport.

- The majority (56%) of the reported number of activities for road transport involve unofficial payments. The number and amount of unofficial payments made for rail transport is insignificant.

- There is no significant difference in time and cost for the transport of perishable or non-perishable goods. On the other hand, use of the TIR transit system was found to reduce time spent on customs related procedures but incurred a higher cost.

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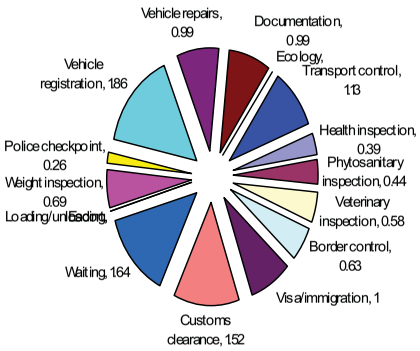
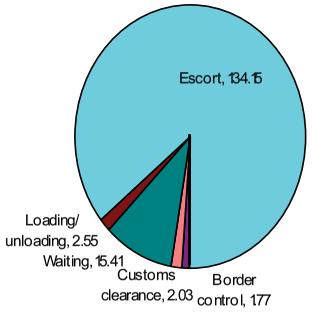
Appendix 1: Summary of Individual Corridor Performance

Delay by Activity

Average Duration by Road (hours)

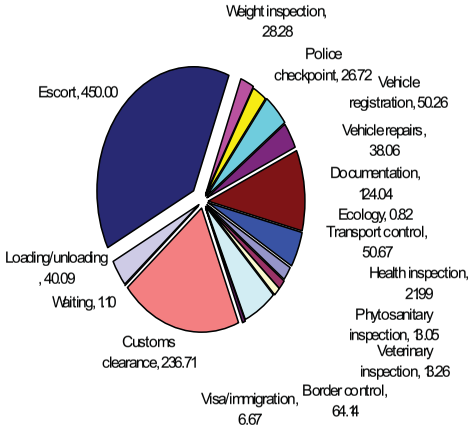


Average Duration by Rail (hours)

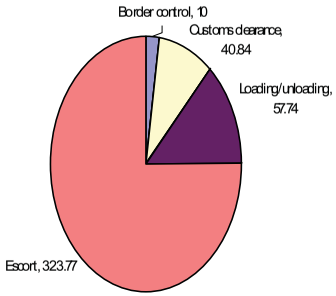


Cost by Activity

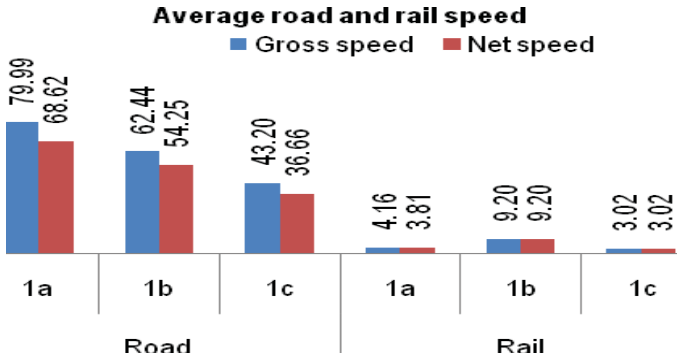
Average Cost by Road (US$)



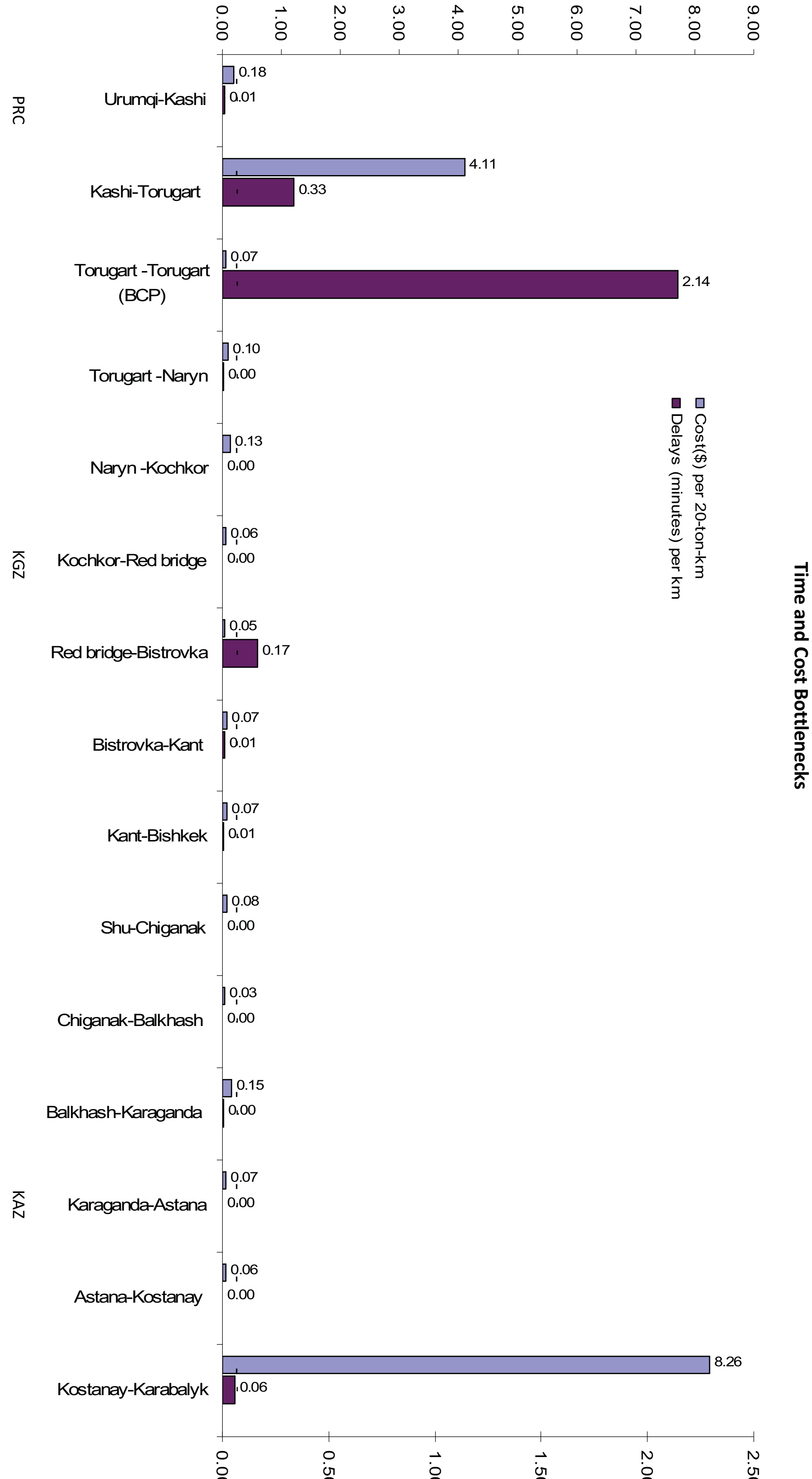
Average Cost by Rail (US$)



Speed

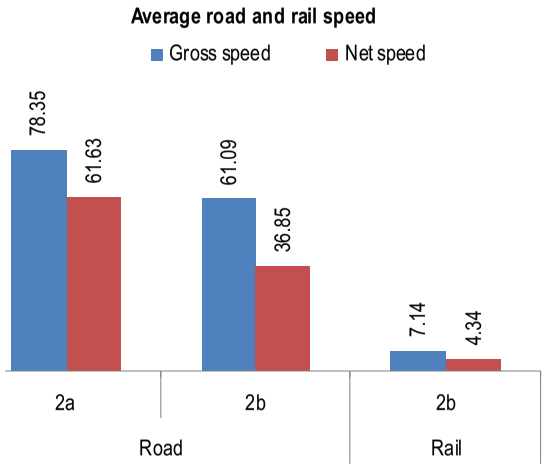


Corridor 1 Performance

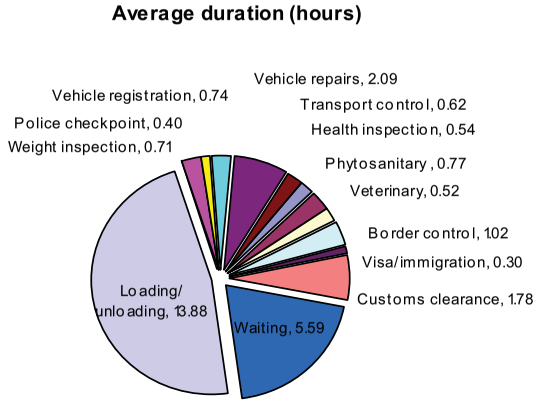


Corridor 2 Performance

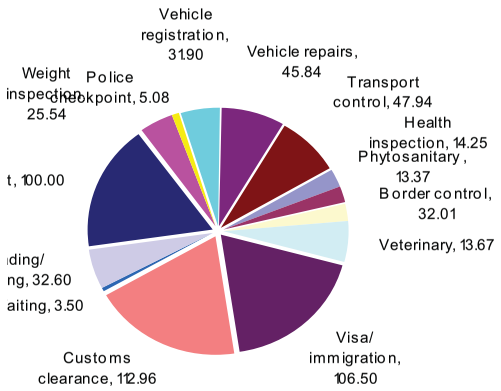
Speed



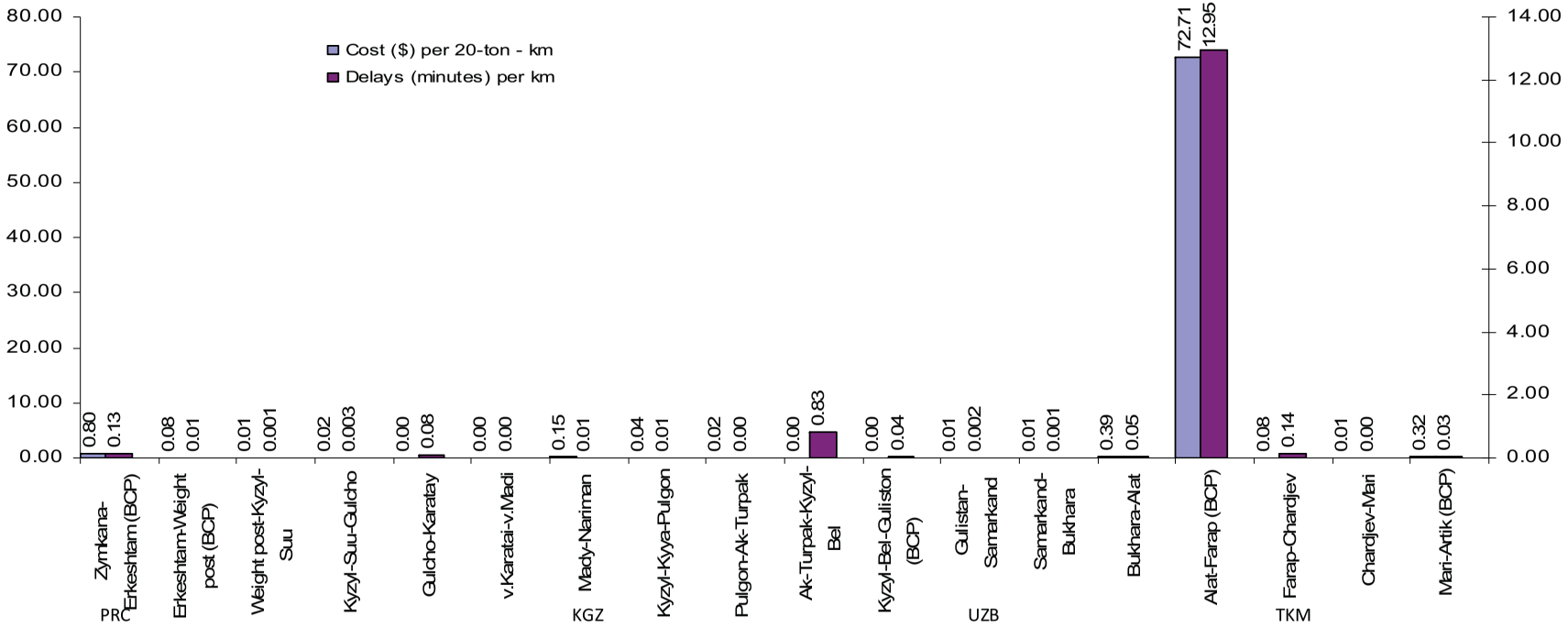
Delay by Activity (Road)



Cost by Activity (Road)



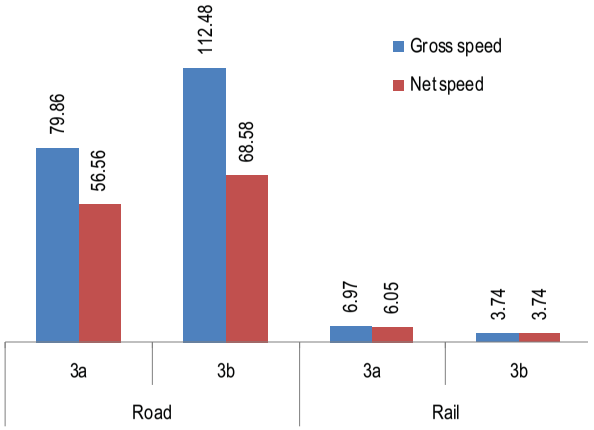
Time and Cost Bottlenecks



Corridor 3 Performance

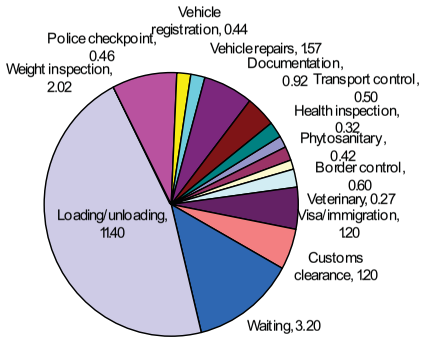
Speed

Average road and rail speed



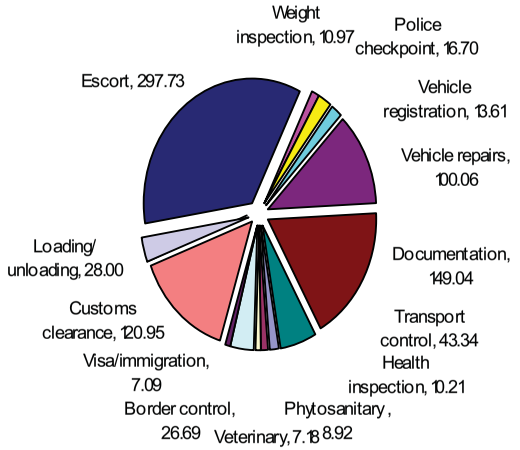
Delay by Activity (Road)

Average Duration (Hours)

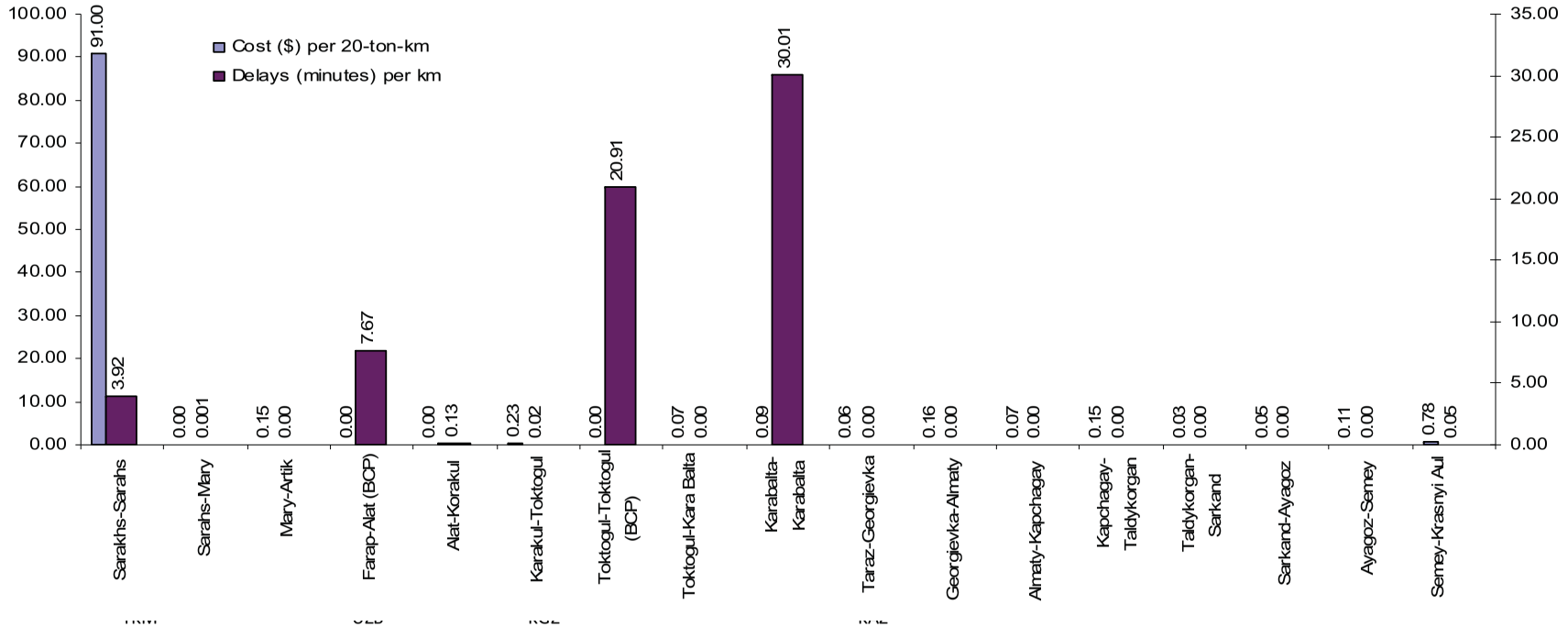


Cost by Activity (Road)

Average Cost (US$)



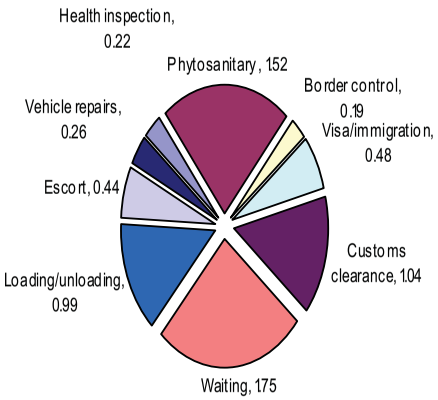
Time and Cost Bottlenecks



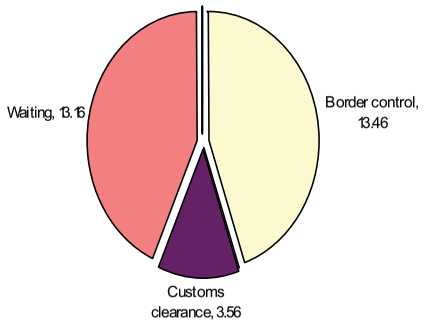
Corridor 4 Performance

Delay by Activity

Average Duration by Road (Hours)

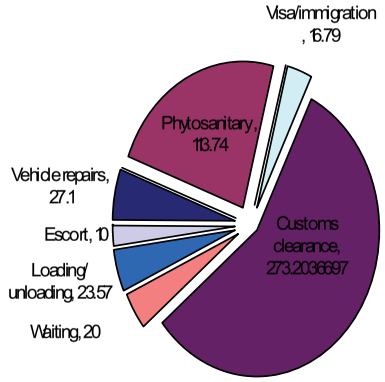


Average Duration by Rail (Hours)

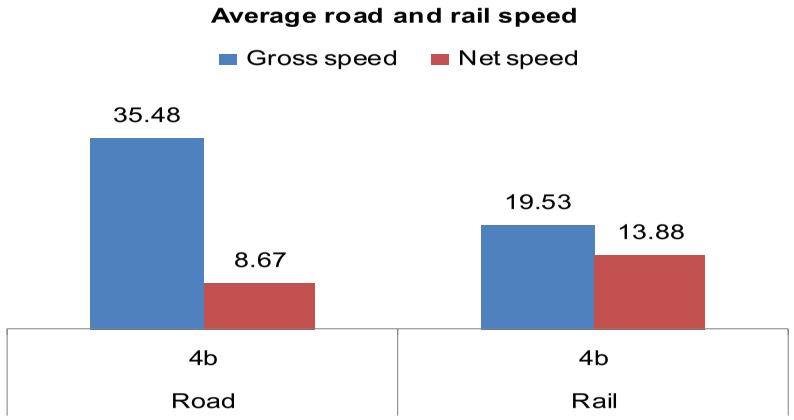


Cost by Activity (Road)

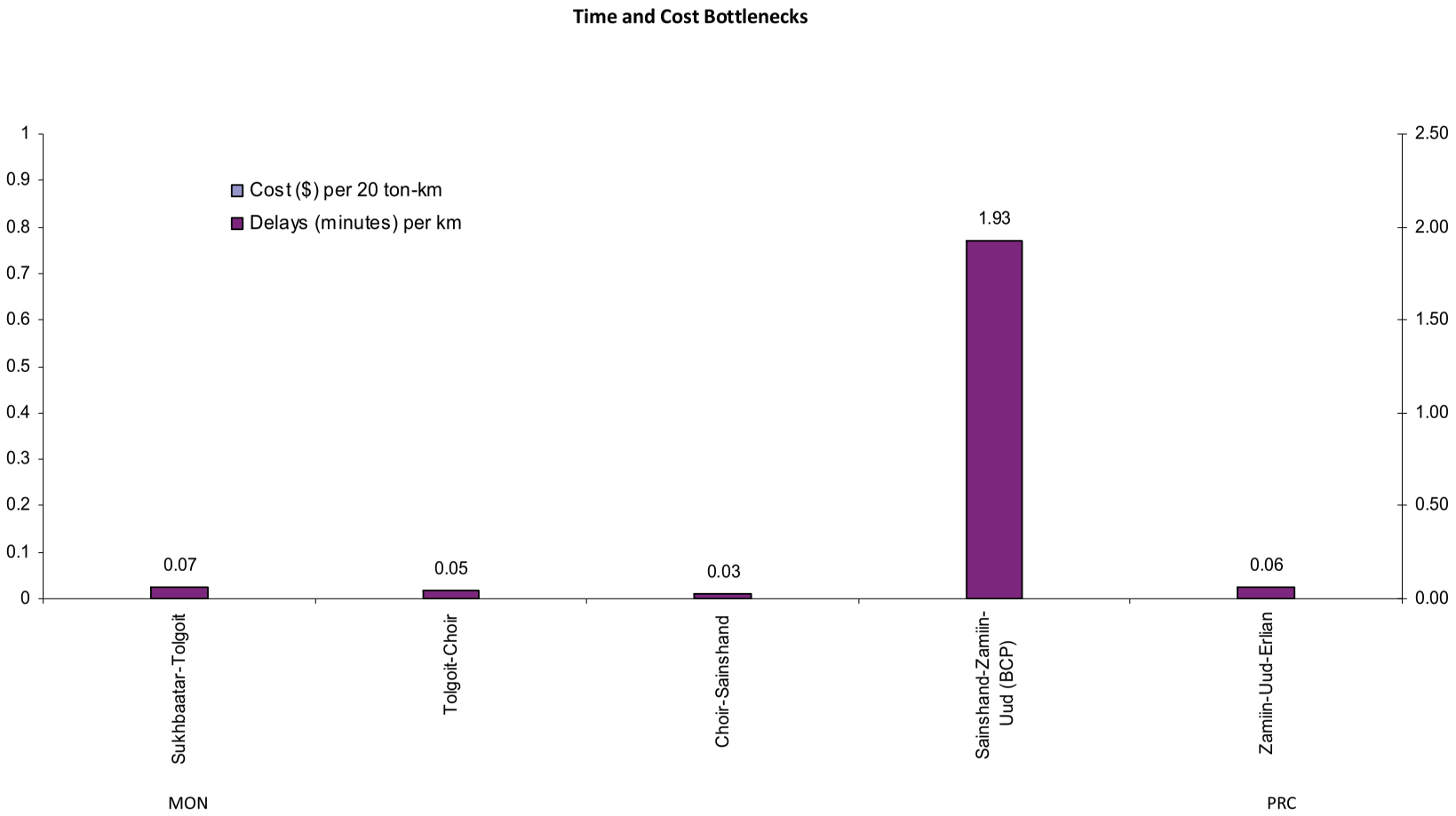
Average Cost (US$)



Speed

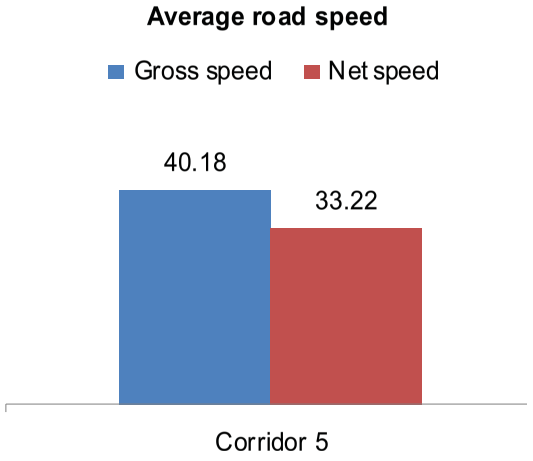


Corridor 4 Performance

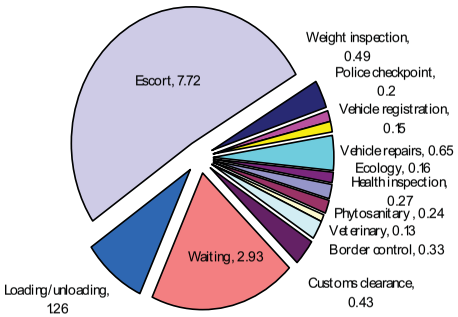


Corridor 5 Performance

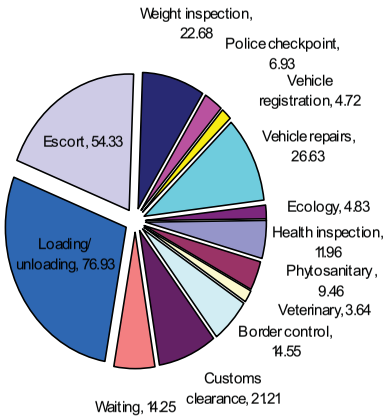
Speed



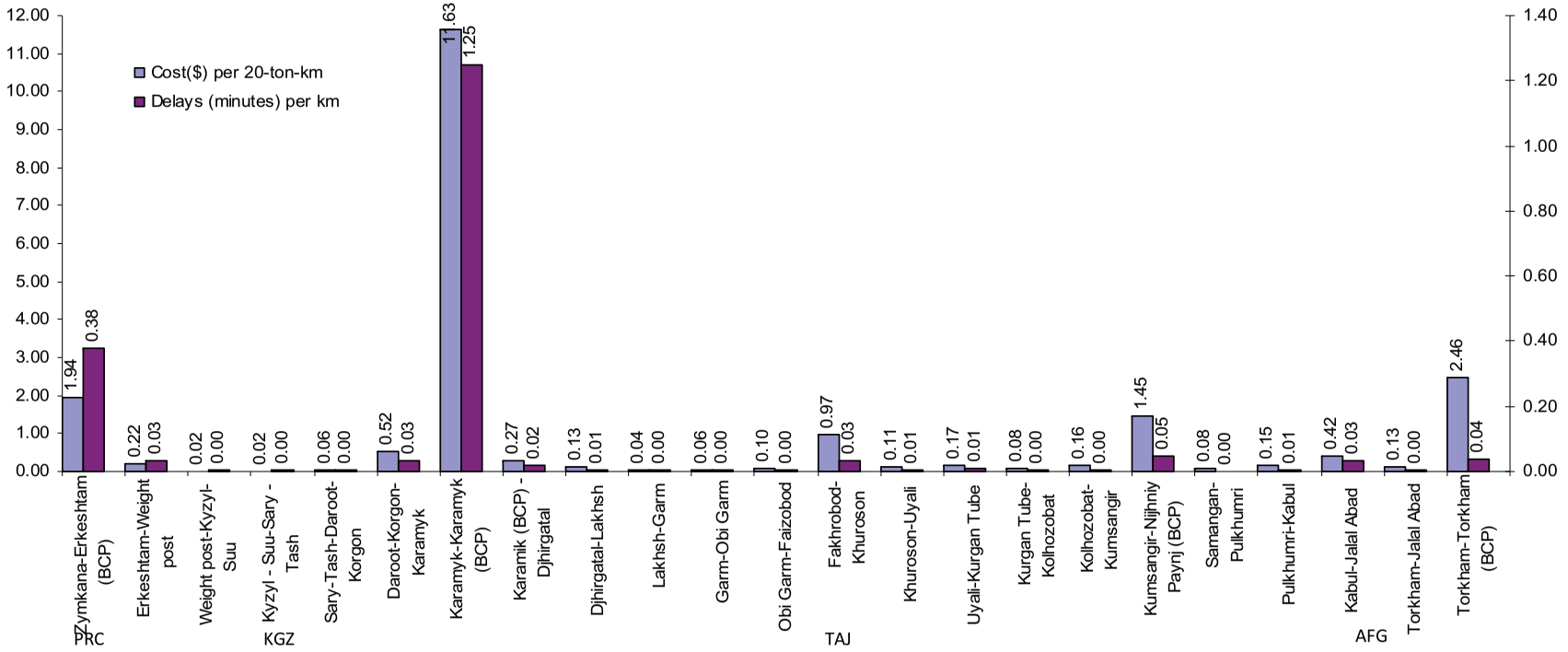
Delay by Activity



Cost by Activity

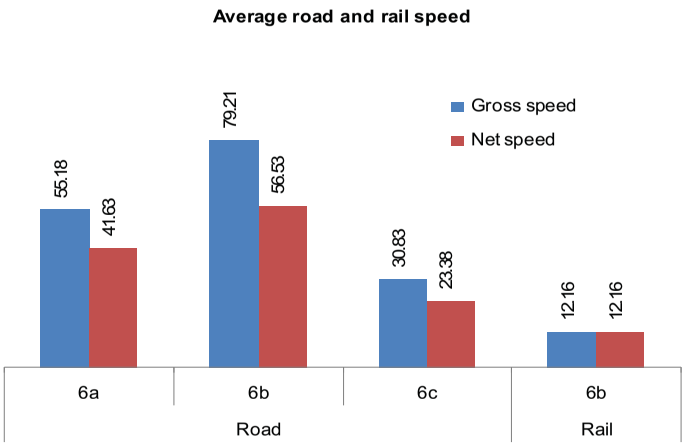


Time and Cost Bottlenecks

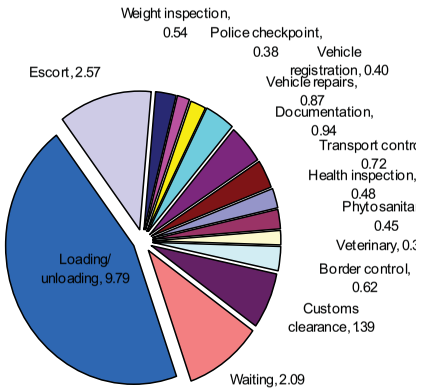


Corridor 6 Performance

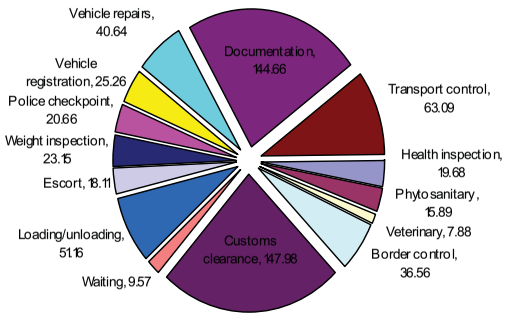
Speed



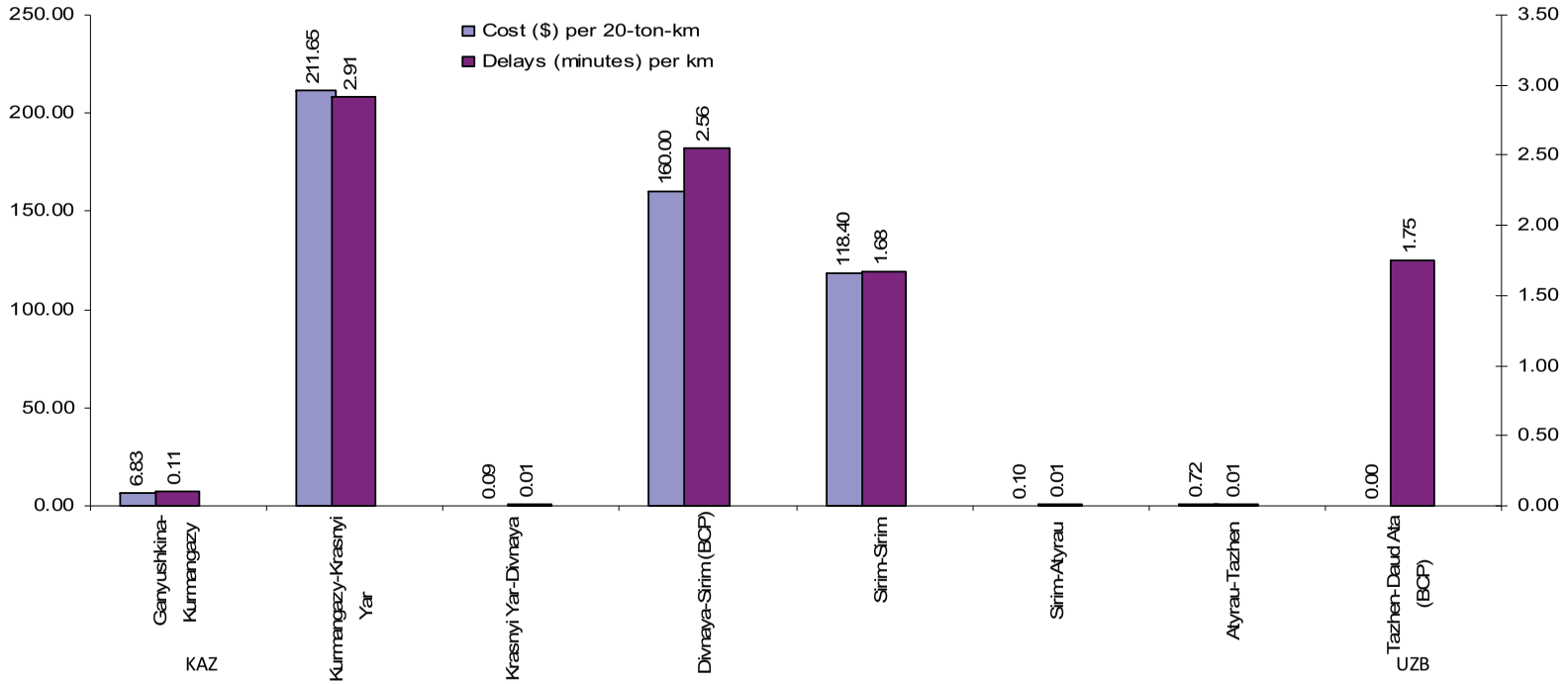
Delay by Activity



Cost by Activity



Time and Cost Bottlenecks



Appendix 2. Number of observations by BCPs in CAREC corridors

BCP 1	Country	Count	Corridor	BCP2	Country	Count	Mode
Dostyk	KAZ	86	1a	Alashankou	PRC	80	rail
Zamiin Uud	MON	75	4b	Erenhot/Erlian	PRC	32	rail
Torkham	AFG	51	5a/6c	Landi Kotal	PAK	0	road
Karamik	KGZ	42	5a/6c	Kichi Karamyk	TAJ	2	road
Daud Ata	UZB	40	2a/6a	Tazhen	KAZ	38	road
Hayratan/Hairatan	AFG	34	5a	Termez/Airatom	UZB	0	road
Alat/Alyat	UZB	24	2b/3a	Farap	TKM	31	rail/road
Sukhbaatar	MON	30	4b	Naushki	RF	0	rail
Torugart	KGZ	21	1c	Torugart/Topa	PRC	5	road
Aul/Krasnyi Aul	KAZ	16	3a	Veseloyarski	RF	5	road
Korgas	KAZ	15	1b	Korgos	PRC	0	road
Krasnyi Most	GEO	15	2a/6a	Krasnyi Most	AZE	3	road
Krasnyi Yar	RF	14	6a	Kurmangazy/Kotyaevka	KAZ	19	road
Nijhniy Paynz	TAJ	14	5a	Shirkhan Bandar	AFG	2	road
Zhaysan	KAZ	13	1b	Novomarkovka/Kos Aral	RF	0	road/rail
Saryagash	UZB? (KAZ)	10	3a	Keles//Chukursay	UZB	0	rail
Saryasia	UZB	9	3b	Pakhtaabad	TAJ	9	road
Jibek Joli/Zhibek Zoli	KAZ	9	3a	Gisht Kuprik	UZB	0	road
Erkehstam/Irkershtam	PRC	10	2a (1c?)	Yierkeshitan	KGZ	5	road
Chaldovar	KGZ	8	1c	Merke	KAZ	8	road
Troitsk	KAZ? (RF)	7	1a	Kairak	KAZ	0	road
Aktau	KAZ	1	2a	Baku/Torogvaya Pristan	AZE	0	port
		544				239	