Ouagadougou–Bamako Transport Corridor Logistics Analysis

Using FastPath

July 2012

This publication was produced by Nathan Associates Inc. for review by the United States Agency for International Development.

Ouagadougou–Bamako Transport Corridor Logistics Analysis

Using FastPath

SUBMITTED TO

United States Agency for International Development (USAID)

Cory O'Hara, COTR
USAID EGAT/EG Office

Brinton Bohling, Chief, Office of Trade and Investment, USAID/West Africa

SUBMITTED BY

Nathan Associates Inc. for
DAI/Nathan Group
2101 Wilson Boulevard, Suite 1200
Arlington, Virginia 22201
Tel.: 703.516.7798
Fax: 703.351.6162
E-mail: lyarmoshuk@nathaninc.com

April 2012

UNDER CONTRACT NO.
EEM-I-00-07-00009-00, Order No. 2

DISCLAIMER

This document is made possible by the support of the American people through the United States Agency for International Development (USAID). Its contents are the sole responsibility of the author or authors and do not necessarily reflect the views of USAID or the United States government.

Contents

Acronyms and Codes **vii**

Abstract **ix**

Executive Summary **xi**

1. Introduction **1**

Background 1

Objective 2

FastPath 2

2. Corridor Description **5**

Landocked Transit Country: Burkina Faso 5

Landlocked Destination Country: Mali 6

General Description of the Corridor 9

Road Infrastructure 9

Custom Procedures/Border Posts 12

Road Inventory of the Corridor 15

Import and Export Procedures in the Corridor 19

Scenarios for FastPath Analysis 19

Summary Statistics for Corridor Performance 19

3. Corridor Analysis **25**

Scenario 1: Inbound Containerized Transit Traffic (Burkina Faso to Mali) 25

Port Performance 28

Road Performance 28

Border Post and Customs Performance 30

Scenario 2: Outbound Containerized Transit Traffic (Mali to Burkina Faso) 34

Summary of FastPath Results 37

Scenario 1: Inbound Transit Traffic (Burkina Faso to Mali) 38

Scenario 2: Outbound Containerized Transit Traffic (Mali to Burkina Faso) 38

4. Results Interpretation 39

Ouagadougou–Bamako Corridor Performance and International Norms 40
Scenario 1: Inbound Containerized Transit Traffic (Burkina Faso to Mali) 40
Scenario 2: Outbound Containerized Transit Traffic (Mali to Burkina Faso) 44

Conclusions about Performance 46

5. Recommendations and Conclusions 49

Cost–Benefit Analysis and FastPath 50

Improvement Analysis 50
Implementation of an Electronic Transit Service 50
Strategy to Develop the Road Transport Sector 52
Adapting Road Design Standards to Cargo Corridor 53
Developing a Bilateral Logistics Strategy for Burkina Faso and Mali 54

Conclusions 55

Appendix A. Visual Appreciation of the Corridor

Appendix B. Summary of Transport and Logistics Procedures

Appendix C. Summary of West Africa Trade Hub Methodology

Appendix D. Estimation of Cost Savings to Users

Appendix E. Cost–Benefits Analysis Tables

Illustrations

Figures

Figure 2–1 Map of Mali and the Main Roads for Transit Cargo to Bamako from Ouagadougou 7
Figure 2–2 North– and Southern Routes from Ouagadougou to Bamako 10
Figure 2–3 Boborinter, Bobo Dioulasso 11
Figure 2–4 Customs Offices in Faladje, Bamako, Mali 14
Figure 3–1 Transit Flows Included in the FastPath Inbound Containerized Scenario (Scenario 1) 27
Figure 3–2 FastPath Schematic Display of Lomé–Bamako Corridor for Containerized Inbound Transit Traffic 28

Figure 3–3 FastPath Data Entry Screen for Waiting Time Due to Convoy Formation and Resting Time 29
Figure 3–4 FastPath Price Data Entry Screen for the Road Link Connecting Faramana with Koury 29
Figure 3–5 FastPath Transit Time Data Entry Screen for the Road Link Connecting Faramana and Koury 30
Figure 3–6 FastPath Data Entry Screen for Koury Border Post Inbound Operations 31
Figure 3–7 FastPath Summary Output Screen for Lomé–Bamako Inbound Containerized Traffic 32
Figure 3–8 FastPath Data Entry Screen for Faladje Customs Operations 33
Figure 3–9 Transit Flows Included in the FastPath Outbound Containerized Scenario (Scenario 2) 34
Figure 3–10 FastPath Schematic Display of Lomé–Bamako Corridor for Containerized Outbound Transit Traffic 35
Figure 3–11 FastPath Summary Output Screen for Lomé–Bamako Outbound Containerized Traffic 36
Figure 3–12 FastPath Lomé Port Performance for Outbound Traffic 37
Figure 4–1 FastPath Price and Time Comparison for Ouagadougou—Bamako Inbound Containerized Transit Traffic, 2011 41
Figure 4–2 FastPath Price and Time Comparison Graphics for Containerized Outbound Transit Traffic, 2011 44
Figure 5–1 GMCS Transit Module Components 51

Tables

Table ES–1 Logistics Scores for Inbound Containerized Cargo, Scenario 1 xiv
Table ES–2 Logistics Scores for Outbound Containerized Cargo, Scenario 2 xv
Table ES–3 Comparison of Corridor Performance–Logistics Scores for Containerized Freight xviii
Table ES–4 Summary of Improvement Evaluations xix
Table 2–1 Burkina Faso Basic Country Information 5
Table 2–2 Mali Basic Country Information 6
Table 2–3 Mali’s Main Imports and Exports. 2008 8
Table 2–4 Population of Main Cities along the Ouagadougou–Bamako Corridor, 2005 9
Table 2–5 Road Inventory for the Ouagadougou–Bamako Corridor 15
Table 2–6 Ouagadougou–Bamako Corridor FastPath Road Links Characteristics 17
Table 2–7 Summary of Problems Identified along the Corridor 18
Table 2–8 Scenario 1: Performance of Main Components of Inbound Containerized Transit Traffic by Subchain, 2011 20
Table 2–9 Scenario 2: Performance of Main Components of Outbound Containerized Transit Traffic by Subchain, 2011 20
Table 2–10 Scenario 1: Logistics Scores for Inbound Containerized Cargo 21
Table 2–11 Scenario 1: Logistics Subchains Scores for Direct and Stripped Inbound Containerized Cargo 22

Table 2–12 Scenario 2: Logistics Scores for Outbound Containerized Cargo 22
Table 2–13 Scenario 2: Logistics Subchains Scores for Direct and Consolidated Outbound Containerized Cargo 23
Table 3–1 Assumptions for FastPath Analysis 26
Table 3–2 Time, Cost, Reliability and Logistics Score for Lomé–Bamako Corridor 38
Table 4–1 Comparison of Inbound Road Transport Performance on Selected Segments of Selected Corridors for Containerized Freight 42
Table 4–2 Inbound Customs Clearance and Border Post Operations Adjusted for Malian Border Post and Faradje 43
Table 4–3 Comparison of Border Post Performance in Selected Corridors for Inbound Containerized Freight 44
Table 4–4 Outbound Customs Clearance and Border Post Operations for Faradje–Malian Border Post 45
Table 4–5 Comparison of Border Post Performance in Selected Corridors for Outbound Containerized Freight 45
Table 4–6 Comparison of Corridor Performance–Logistics Scores for Containerized Freight 46
Table 5–1 Summary of Improvement Evaluations 49

Boxes

Exhibit 2–1 Boborinter Main Facts 11
Exhibit 2–2 Customs Rules for Imports in Burkina Faso 13
Exhibit 2–3 Electronic Tracking with Multiple Applications 14
Exhibit 5–1 New GCMS Transit Module, Ghana 50

Acronyms and Codes

ASYCUDA	Automated Systems for Customs Data
Boborinter	Gare routière internationale de marchandises de Bobo Dioulasso (Dry Port)
CFA	Communauté Financière d'Afrique
CoC	Chamber of Commence
ECOWAS	Economic Community of West African Countries
ETS	Electronic Transit System
GMCS	Ghana Community Network Services Ltd
GPS	Global Positioning System
FGR	Road Guarantee Fund
IRR	Internal Rate of Return
ISRT	Convention A/P.4/5/82 relating to Inter–State Road Transit of Goods (ECOWAS)
km/h	kilometers per hour
N/A	not applicable
Ouagarinter	Gare Routière Internationale de Marchandises de Ouagadougou
PPP	private–public partnership
RRTC	Reduced Road Transport Costs
SDV	SCAC–Delmas–Vieljeux
TCBoost	Worldwide Support for Trade Capacity Building
TRIE	Inter–State Road Transport Convention
TS	Transit Slip or Transit Card
Ton	(= metric ton = 1,000 kilogram)
TEU	20–foot equivalent unit
UEMOA	Union Economique et Monétaire Ouest–Africaine
USAID	United States Agency for International Development

Abstract

At the request of USAID/West Africa, the Worldwide Support for Trade Capacity Building project (TCBoost) collaborated with the West Africa Trade Hub to develop a comprehensive analysis of the Ouagadougou–Bamako segment of the transport corridor between the port of Lomé in Togo and the capital of Mali, Bamako. The TCBoost team used FastPath, a transport corridor diagnostic tool developed jointly by Nathan Associates Inc. and USAID, to assess the variables of cost, time, and reliability of the port, road network, and border posts along the corridor. Comparing performance to international standards, logistics scores were generated for individual corridor links and nodes as well as for the corridor overall.

Two scenarios were analyzed to ensure that the direction of trade (inbound or outbound) was factored into the analysis of containerized cargo. Corridor performance was also compared with the performance of comparable developing–country corridors previously analyzed with FastPath. The TCBoost analysis recommends several courses of action to improve corridor performance. These range from relatively low–cost policy actions to major investments to upgrade port infrastructure. In some cases, further collaboration between TCBoost, the West Africa Trade Hub, USAID/West Africa, and the governments of Burkina Faso and Mali may be required.

Executive Summary

The USAID–funded West Africa Trade Hub Reduced Road Transport Costs (RRTC) initiative is researching and evaluating the logistics environment on a number of West African corridors and will recommend ways to improve efficiency. The West Africa Trade Hub corridor research started with the Tema (Ghana) to Ouagadougou (Burkina Faso) corridor and the Lomé (Togo) to Ouagadougou (Burkina Faso) corridor. This analysis concerns the extension of the two corridors, Ouagadougou (Burkina Faso) to Bamako (Mali). We will study the Ouagadougou–Bamako transport segment, applying data from the port of Lomé to reflect the real transit flows and the actual costs for the entire trip from the port in Togo to the landlocked country of Mali.

At the request of USAID/West Africa, the Worldwide Support for Trade Capacity Building (TCBoost) project collaborated with the West Africa Trade Hub on pioneering an approach to transport corridor analysis that leverages the best elements of the RRTC methodology with those of FastPath, a transport logistics diagnostic tool that Nathan Associates developed with USAID funding. USAID/West Africa also expressed a particular interest in using FastPath to learn more about how specific infrastructural deficiencies and processes and procedures increase costs in order to find ways to reduce these costs.

The FastPath model assesses the variables of cost, time, and reliability of key infrastructure components along a corridor in a consistent and replicable fashion. Each variable represents an indicator of performance by itself, but the three variables are also used to generate a summary performance measure, or logistics score. In the case of the Ouagadougou–Bamako corridor, the TCBoost team assessed the road network between Ouagadougou and Bamako, the border crossings at Faramana/Koury (northern road section) and Koloko/Hérémakono (southern road section) and the three dry ports at Ouagarinter, Boborinter (both in Burkina Faso), and Faradje (Mali). The team analyzed the segment as part of the Lomé–Bamako corridor (including the port of Lomé, the border posts between Togo and Burkina Faso (Cinkassé and Bittou) and the road segment between the port and Ouagadougou), but this report focuses on the Ouagadougou–Bamako section.

DESCRIPTION OF THE OUAGADOUGOU–BAMAKO CORRIDOR

The Ouagadougou–Bamako corridor serves the import–export flows between Mali and the transit country of Burkina Faso, also a landlocked country, to the ports of Lomé (Togo) and Tema (Ghana). The corridor is served by two different routes. Both of them share the segment between Ouagadougou and Bobo Dioulasso in Burkina Faso. The southern road from Burkina Faso to Mali is a 867 km route that from Bobo Dioulasso runs south to the border crossing in Koloko (Burkina Faso) and Hérémakono (Mali), then to the West to Bougouni through Sikasso, and

finally to Bamako. The northern road is a 958 km route that from Bobo Dioulasso goes towards the border crossing in Faramana (Burkina Faso) and Koury (Mali), then to Koutiala and from there to Bamako.

The border post infrastructure in both Faramana/Koury (north) and Koloko/Hérémakono (south) is simple. The procedures are national–one–stop border posts have not been put in place. There are problems with the supply of electricity which has incidence in the operations of the border posts.

On the studied transport segment are two dry ports in Burkina Faso and one in Mali. The Burkinabe dry ports are modern: one in Ouagadougou called Ouagarinter and another in Bobo Dioulasso called Boborinter; while the Malian dry port is in Faladje (close to Bamako). Transit noncontainerized cargo to Bamako through Burkina Faso from the port of Lomé (Togo) or the port of Tema (Ghana) is directed to Ouagarinter or Boborinter to wait for the Customs officer to review and release the transit truck and cargo documents to continue with the trip. Cargo arriving to Mali can be cleared at the borders or in Faladje depending on the type of goods and the total amount declared; no information was available on the percentage of goods actually cleared at the border. In Faladje, Customs infrastructure is close to being renovated but no radical change is expected in the short term.

After consulting with the West Africa Trade Hub and corridor stakeholders, we assumed that about 70 percent of inbound containers are stripped at the ports before undergoing the transit process. In the outbound direction (Mali to Burkina Faso), also only 30 percent of cargo is transported in containers. The remaining 70 percent is transported as noncontainerized cargo and consolidated before it is transferred to the ports.

The general practice of stripping containers at the port generates delays because Customs escorts must be organized subsequently, not only outside the ports but also at the landlocked transit country borders or dry ports. The inbound escort procedures in Burkina Faso to Mali can take up to three days. Outbound cargo from Mali to the port of Lomé is not officially escorted in Burkina Faso, but a fee is charged at the Malian–Burkinabe border post or at Boborinter.

In the field, we found that truckers choose the longer northern route when carrying inbound cargo but the shorter southern route when carrying outbound cargo or returning empty. The choice of the northern route for inbound cargo is based on (1) loading or offloading at Ségou (especially if the final destination of the cargo is in the north of Mali), (2) the presence of a weighbridge at Hérémakono border post where weighing is done per axle and fines are more likely to be imposed, and (3) the hilliness of the southern route, which increases fuel consumption.

ANALYSIS

Given these characteristics of transit cargo, two scenarios were created to analyze corridor performance: (1) inbound containerized and (2) outbound containerized. The scenarios were created using data provided by the West Africa Trade Hub and other stakeholders during the

TCBoost field visit to Burkina Faso and Mali.[1] For each scenario, logistics scores were generated for each infrastructure component (port, roads, dry ports, border posts), as well as for the corridor overall. This report presents the overall logistics score for the Lomé–Bamako corridor, but the analysis will focus on the Ouagadougou–Bamako section of the corridor. Logistics scores are computed by comparing the performance of a component of the transport/logistics chain to international standards and rating it as good, fair, poor, or very poor. This rating is then converted to a numeric score (80 for good, 60 for fair, 40 for poor, and 20 for very poor). Then the scores for price, time, and reliability are averaged to get the total score for a component.

These scores are then given a time–weighted average to compute each chain total, with reliability treated as variance with a special calculation of the chain total. A logistics score between 70 and 80 indicates that time, cost, and reliability in the total supply chain are efficient and competitive according to global standards. Reliability is measured in terms of average transit time, which accounts for 90 percent of the variation in transit times.

Scenario 1 (inbound containerized). Overall Lomé–Bamako corridor performance for Scenario 1 received a logistics score of 57, which is characterized as fair.

Port performance. The performance of the port of Lomé is described in Nathan Associates (2012)[2]. The activities at the port of Lomé cost seven times more than the good norm and procedures last more than 15 days than the good norm.

Road performance. Surface transport for inbound traffic has an intermediate–fair rating, with road travel time rated good–fair in many sections, particularly in Burkina Faso, and fair–poor in others. Reliability for road transit time is rated fair on the majority of segments and good in others. Price on the majority of road segments is rated fair, at about $1.30 TEU/km (relatively high). This is due to several factors, including the lack of backhaul cargo for the return trip, the age of the trucks used, and the condition of some road links. Inbound prices normally incorporate the expenses for the empty return trip–common practice in Africa and in other regions of the world where trade imbalance, due to small export volume, is experienced. This is particularly detrimental for landlocked countries.

---

[1] We drove both routes used by freight transporters on the Ouagadougou-Bamako corridor: first, a continuation of the trip from Lomé to Ouagadougou and Bobo-Dioulasso that crossed the border in Faramana and ended in Bamako (see table 2-6 for details); second, Ouagadougou via the southern route and the Koloko border—a trip taken with the West Africa Trade Hub and concluding with a workshop in Bamako, where we gathered information about corridor time, costs, and operational characteristics from stakeholders. We also interviewed private and public sector stakeholders at the border posts and in Ouagarinter.

[2] Nathan Associates (2012). “Lomé-Ouagadougou Transport Corridor Logistics Analysis: Using FastPath”. USAID.

Table ES–1

Logistics Scores for Inbound Containerized Cargo, Scenario 1

	TEU/Year	Average Price ($)	Average Time (hr)	Reliability (%)	Logistic Score	Rating
Total chain	9,829	3,474	614.0	90	57	Fair
LOGISTICS SUBCHAINS						
Direct containers north	2,064.3	3,275	576.0	95	59	Fair
Direct containers south	884.7	3,311	572.9	96	56	Fair
Strip containers north	4,816.0	3,544	631.0	88	57	Fair
Strip containers south	2,064.0	3,580	627.9	88	55	Fair

Node	Logistics Score	Rating	Link	Logistics Score	Rating
COMMON SECTION: OUAGADOUGOU–BOBO DIOULASSO					
Ouaga/Ouagarinter	40	Poor	Ouaga/Ouagarinter – Transit time in Burkina	73	Good–Fair
Transit time in Burkina (TT)	53, 40[a]	Fair–Poor/ Poor	Transit time in Burkina–Sabou	73	Good–Fair
Sabou	–	–	Sabou–Boromo	73	Good–Fair
Boromo	–	–	Boromo–Bobo Dioulasso	47	Poor–Fair
Bobo Dioulasso	–	–			
NORTHERN: OUAGADOUGOU–FARAMANA/KOURY–BAMAKO					
Faramana	67	Fair–Good	Bobo Dioulasso– Faramana	73	Good–Fair
Koury	70	Good–Fair	Faramana– Koury	53	Fair–Poor
Km 125	–	–	Koury–Km 125	47	Poor–Fair
Bla	–	–	Km 125–Bla	73	Good–Fair
Entry Foret Fanya	–	–	Bla–Entry Foret Fanya	73	Good–Fair
Exit Foret Fanya	–	–	Entry Foret Fanya– Exit Foret Fanya	53	Fair–Poor
Faladje	57	Fair	Exit Foret Fanya– Faladje	47	Poor–Fair
			Faladje–Bamako Direct N	73	Good–Fair
SOUTHERN: OUAGADOUGOU–KOLOKO/HÉRÉMAKONO–BAMAKO					
Moani	–	–	Bobo Dioulasso–Moami	47	Fair–Poor
Koloko	70	Good–Fair	Moami–Koloko	47	Fair–Poor
Hérémakono	70	Good–Fair	Koloko–Hérémakono	73	Good–Fair
Sikasso	–	–	Hérémakono–Sikasso	47	Fair–Poor
Niena	–	–	Sikasso–Niena	37	Poor–Fair
Koumantou	–	–	Niena–Koumantou	60	Fair
Faladje	57	Fair	Koumantou–Faladje	47	Fair–Poor
			Faladje–Bamako	73	Good–Fair

Note: [a] Logistics scores of 53 and 40 for direct and stripped inbound containerized cargo respectively.
Source: Nathan Associates' analysis.

Border post performance. The inbound operations at the border post are assessed separately for Faramana and Koury (northern route border posts), and Koloko and Hérémakono (southern route border posts). Performance at Faramana and Koloko is relatively good, at scores of 67 and 70 respectively. Performance at Koury and Hérémakono in Mali is also good, with both scoring 70, but activities conducted there may not include Customs clearance, but only a review of immigration documents, a preliminary review of the customs declaration, and the entry of import data into the Customs system. Most import cargo entering Mali must proceed to Faradje, the Customs facility in Bamako, to undergo Customs clearance.

Scenario 2 (outbound containerized). Overall Bamako–Lomé corridor performance received a logistics score of 66, which is characterized as fair–good.

Port performance. Performance at the port of Lomé is described in Nathan Associates (2012). Activities at the port of Lomé cost three times more than the good norm and procedures last only five hours more than the good norm.

Road performance. Road transport time, delays, and prices are considerably lower than those in the inbound direction. The trucker carrying outbound cargo does not have to wait at the Burkinabe border port for escort services to be arranged. Since there is less outbound cargo available, the roads are less congested and prices are more competitive than on the inbound route. The road transport logistics score for the outbound direction is fair–good and good–fair compared with international standards, except for four segments rated fair.

Border post performance. The border crossing activities in Mali include a combination of the activities undertaken at Faradje with those performed at the border post (Hérémakono or Koury).

Table ES–2

Logistics Scores for Outbound Containerized Cargo, Scenario 2

	TEU/Year	Average Price ($)	Average Time (hr)	Reliability (%)	Logistics Score	Rating
Total Chain	1,092	2,242	138.0	78	66	Fair–Good
LOGISTICS SUBCHAINS						
Direct containers north	98	2,155	135.0	80	66	Fair–Good
Direct containers south	230	2,146	132.0	81	67	Fair–Good
Consolidated containers north	229	2,288	142.0	76	65	Fair–Good
Consolidated containers south	535	2,279	139.0	77	65	Fair–Good

Node	Logistics Score	Rating	Link	Logistics Score	Rating
NORTHERN: BAMAKO–FARAMANA/KOURY–OUAGADOUGOU					
Faladje	67	Good–Fair	Faladje–Bamako	73	Good
Exit Foret Fanya	–	–	Faladje–Exit ForetFanya	73	Good
Entry Foret Fanya	–	–	Exit Foret Fanya–Entry	60	Fair
Bla	–	–	Entry Foret Fanya–Bla	73	Good

Node	Logistics Score	Rating	Link	Logistics Score	Rating
Km 125	–	–	Bla–Km 125	73	Good
Koury	60	Fair	Koury–Km 125	73	Good
Faramana	63	Fair Good	Koury–Faramana	60	Fair
			Faramana–Bobo Dioulasso	73	Good
SOUTHERN: BAMAKO–KOLOKO/HÉRÉMAKONO–OUAGADOUGOU					
Faladje	67	Good–Fair	Bamako–Faladje	73	Good
Koumantou	–	–	Faladje–Koumantou	73	Good
Niena	–	–	Koumantou– Niena	67	Good–Fair
Sikasso	–	–	Niena–Sikasso	57	Fair
Hérémakono	60	Fair	Sikasso– Hérémakono	73	Good
Koloko	63	Fair–Good	Hérémakono–Koloko	73	Good
Moami			Koloko–Moami	73	Good
			Moami–Bobo Dioulasso	73	Good
COMMON SECTION: BOBO DIOULASSO–OUAGADOUGOU					
Bobo Dioulasso	–	–	Bobo Dioulasso–Boromo	73	Good
Boromo	–	–	Sabou–Boromo	73	Good
Sabou	–	–	Sabou–transit time in Burkina	73	Good
Transit time in Burkina	53/40 [a]	Fair–Poor/ Poor	Transit time in Burkina–Ouagadougou	73	Good
Ouaga/Ouagarinter	40	Poor			

Note: [a] Logistics scores of 53 and 40 for direct and stripped inbound containerized cargo respectively.
Source: Nathan Associates' analysis.

INTERPRETATION

Table ES–3 summarizes how the performance of the Lomé–Bamako transport corridor (focusing on the Ouagadougou–Bamako segment) compares to other transport corridors in the developing world. On the basis of our analysis of the time, cost, and reliability of the Ouagadougou–Bamako corridor, we identified several potential interventions that can improve performance and raise logistics scores for the corridor. These interventions are presented in Table ES–4. To help corridor stakeholders prioritize interventions, we used FastPath's cost–benefit analysis tool. Full details of assumptions can be found in Chapter 3.

CONCLUSIONS

The four suggested improvements have varying potential and require varying levels of investment. An electronic transit service is highly feasible and could be implemented on a regional basis with neighboring countries. The service could be developed and operated through a PPP scheme, ensuring sustainability in the long term and promoting private sector participation.

The development of a road transport road strategy may not only have positive results; it may also have negative results for many participants of the trucking industry. It might be recommendable to analyze the implications of these strategies in a liberalized environment more carefully, identifying winners and losers from these strategies.

The other two improvements (adapting road design standards and developing a bilateral strategy for Burkina Faso and Mali) are in principle feasible but the benefits will vary depending on the solution identified and the impact on the segment of the corridor. The logistics strategy would bring benefits to the sector in the long term and the implementing activities would likely be low–cost policy actions.

All these improvements appear desirable but require further investigation to verify their potential.

Table ES–3

Comparison of Corridor Performance–Logistics Scores for Containerized Freight

Logistics Component	Lomé–Bamako	Lomé–Ouagadougou	Tema–Ouagadougou	Laem Chabang–Vientiane	Dacca–Chittagong*	Durban–Nelspruit*, **	Maputo–Nelspruit
INBOUND							
Overall logistics chain	57	54	51	64	59	63	62
Port	55	55	55	55	49	60	51
Road transport	56	57	55	70	58	65	51
Border post 1	70 (Burkina Faso)***	70 (Togo)	73 (Ghana)	67 (Thailand)	N/A	N/A	73 (Mozambique)
Border post 2	70 (Mali)***	33 (Burkina Faso)	20 (Burkina Faso)	63 (Laos)	N/A	N/A	73 (South Africa)
OUTBOUND							
Overall logistics chain	66	57	62	66	54	68	60
Port	69	69	72	65	52	70	57
Road transport	67	65	70	70	58	65	51
Border post 1	60 (Mali)***	40 (Burkina Faso)	53 (Burkina Faso)	63 (Laos)	N/A	N/A	63 (South Africa)
Border post 2	63 (Burkina Faso)***	53 (Togo)	53 (Ghana)	67 (Thailand)	N/A	N/A	67 (Mozambique)

** Overall logistics score does not include border post node scores*
*** Estimated from partial data in Maputo corridor analysis*
**** Border port data correspond to Ouagadougou–Bamako corridor*

Table ES–4

Summary of Improvement Evaluations

Improvement Action	Estimated Investment	Present Value of Benefits	Infrastructure Users' Estimated Savings / TEU		Cargo Owners' Estimated Savings /TEU		Evaluation of Investment
			In	Out	In	Out	
Implementation of an Electronic Transit Service	$8.5 million	$9.9 million	$57	N/A	$29	N/A	Highly feasible
Strategy to develop the road transport sector	$5 million	$7.9 million	$6	$6	$3	$3	Feasible
Adapting road design standards to cargo corridor	Varies by project	Varies by project	$4	$4	$2	$2	Varies by project
Developing a bilateral logistics strategy for Burkina Faso and Mali	Low–cost policy actions	Unknown, but outcome would contribute value creation, growth and job creation					Long–term benefits

1. Introduction

BACKGROUND

The USAID–funded West Africa Trade Hub Reduced Road Transport Costs (RRTC) initiative is researching and evaluating the logistics environment on a number of West African corridors and will recommend ways to improve efficiency. The West Africa Trade Hub and the Worldwide Support for Trade Capacity Building (TCBoost) collaborated on an assessment of the Tema–Ouagadougou Transport Corridor in 2009 and 2010 and had interesting results, presented in two reports–Transport and Logistics Cost on the Tema–Ouagadougou Corridor and West Africa Transport Logistics Analysis Using FastPath: Tema–Ouagadougou Corridor. As a result, USAID/West Africa requested that the programs continue collaborating on analysis of other West Africa transport corridors using the best elements of the RRTC and FastPath methodologies. This analysis concerns the corridor connecting Ouagadougou (Burkina Faso) to Bamako (Mali).

The RRTC methodology was developed by Carana Corporation (the implementer of the West Africa Trade Hub) for use in Latin America. It examines the costs of exporting, from the point of loading goods at an inland location to the point of departure of the ships carrying the goods to market, and compares them with developing–country norms. The West Africa Trade Hub also uses this methodology for imports. The methodology consists of tabulating costs along certain value chains, breaking the costs down into formal and informal and public and private sector, and establishing the weak links in the chain relative to global norms. The study determines the most serious deviations from the norms and identifies the causes: corruption, logistical mismanagement, red tape, poor infrastructure, weak institutions, poor coordination, or other reasons.

The West Africa Trade Hub is preparing a report on transportation costs and delays on the Ouagadougou–Bamako corridor (based on the alternative Tema–Bamako corridor data) and is conducting the RRTC analysis of the institutional arrangements, procedures, and activities related to transportation along the corridor calculating the range of logistics costs for imports and exports. The report is expecting shed light on many procedural bottlenecks. This report complements the RRTC analysis by assessing the state of the infrastructure (roads, border crossings), as well as the general condition of the environment influencing road capacity and consequently, generalized transport costs for the Ouagadougou–Bamako transport segment. The methodology used allows comparing the performance of the Ouagadougou–Bamako corridor with that of other corridors in West Africa, throughout the continent, and throughout the world.

At the request of USAID/West Africa, TCBoost collaborated with the West Africa Trade Hub to pioneer an approach to transport corridor analysis that leverages the best elements of the RRTC

methodology with those of FastPath, another transport logistics diagnostic tool. USAID/West Africa also expressed interest in using FastPath to learn more about how the infrastructure, processes, and procedures on the road between Ouagadougou and Bamako increase shipping costs and to make recommendations for reducing these costs.

This report reflects the collaboration between the West Africa Trade Hub and TCBoost to develop a comprehensive diagnostic for the Ouagadougou–Bamako transport segment of the Lomé–Bamako corridor. The TCBoost team would like to thank the West Africa Trade Hub for its assistance in developing a joint work plan, in providing and collecting data to feed the FastPath model, and in collaborating with the TCBoost team.

TCBoost expert drove the Ouagadougou–Bamako corridor and visited the south– and north–bound routes. During the visit, the expert inventoried and assessed the conditions of the corridor by direct observation. Appendix A presents several photos taken during the field trips.

The trip was done following the two routes used by freight transporters. The first trip was a continuation of the trip from Lomé to Ouagadougou for the analysis of the Lomé–Ouagadougou corridor. It originated in Ouagadougou and headed to Bobo–Dioulasso, crossed the border in Faramana, and ended in Bamako. Route details are included in Table 2–6. The second trip also originated in Ouagadougou but followed the southern route, through the border at Koloko. This trip was done with the West Africa Trade Hub team and concluded with a workshop in Bamako with stakeholders where we gathered information about time, costs, and operational characteristics on the corridor. Private and public stakeholders were interviewed at the border posts and in Ouagarinter as well.

OBJECTIVE

The objective of this report is to present an analysis of Ouagadougou–Bamako transport segment performance of the Lomé–Bamako corridor using FastPath. The report hopes also to demonstrate how the FastPath methodology can complement the RRTC methodology to deliver to USAID/West Africa an easily replicable and comprehensive corridor diagnostic to inform discussions with stakeholders and help determine priorities for technical assistance.

FASTPATH

FastPath, developed by Nathan Associates Inc., is a model for assessing performance along a transport corridor in a consistent and easily replicable fashion. The model focuses mainly on infrastructure–also referred to as the transport logistics chain. The main variables measured to assess performance are cost, time, and reliability. Each variable represents an indicator of performance by itself. In the analysis, the three variables are used to generate a summary performance measure, or logistics score. The flexibility of the FastPath software allows the user to break down the infrastructure components of the transport logistics chain into nodes and links and measure the three variables (cost, time, and reliability) for each component (e.g., port, road, border post).

The model allows analysis by selected commodity type, using different modes of transportation (road, rail, inland waterway, and coastal), which are grouped into corridors serving a single port.

Containers are used as the main unit of measurement for both imports and exports. Each corridor analysis is called a scenario and given a scenario name. Improvements to FastPath following recommendations received from other donors, including the World Bank, have been incorporated into the current version (v 1.2), with improved data for border posts and road performance.

Performance data for a scenario are compared with international norms during the input process and are used to create a logistics score for each component of the corridor. Bar charts show the contribution of each mode to overall price and time on the corridor and in comparison to the ideal case–international norms–for good performance. The economic importance of the corridor is calculated in terms of the value of freight traversing it and the total logistics price paid by shippers for the freight. All scenario data are stored in the FastPath database.

When the base case describing current conditions is created for a given corridor, the model allows the user to create several alternative scenarios with potential performance improvements. The tool estimates the impact of these improvements and creates an improved scenario. It compares the base case price and time bar charts with the ideal case and with the improved scenarios. A cost–benefit analysis module compares the benefits of the improvements with the costs of the improvements (estimated by the user). The cost–benefit framework enables the user to project future traffic and evaluate the information to determine the benefits expected from a particular improvement and net present value and economic internal rate of return (IRR) for the improvement.

In the next chapter, we describe the Ouagadougou–Bamako corridor base case scenarios as defined by the FastPath analysis and the logistics scores for each component and for the entire corridor.

2. Corridor Description

This chapter describes the key components of the Ouagadougou–Bamako transport corridor and focuses on the road, border posts, and dry ports in complement to the analysis already conducted by the West Africa Trade Hub.

LANDOCKED TRANSIT COUNTRY: BURKINA FASO

The Ouagadougou–Bamako corridor serves the import–export flows between Mali and the transit country Burkina Faso, also a landlocked country, to the ports of Lomé (Togo) and Tema (Ghana). The analysis presented in this report aims to identify major constraints in the transport and logistics system that potentially affect the competitiveness of the economy as a whole. Therefore, to give context to the analysis and recommendations, this section summarizes the main characteristics and trends of the economy.

In 2010 Burkina Faso had a population of 16.5 million inhabitants, high annual population growth of 3 percent, and GDP of $8.8 billion, growing at 9.2 percent in 2010. The structure of exports reflects heavy dependence on primary goods, especially cotton, which makes up 51 percent of the total[3] and nonmonetary gold, 13–21 percent. Industry makes up less than 5 percent of the total. As a consequence of the poorly diversified economy, imports are composed of a large variety of products, from consumer goods to luxury goods, with a predominance of petroleum derivates, building materials, and vehicles (luxury goods which make up one–third of imports). The main challenge for developing logistics services is that the trade balance is in deficit by nearly 40 percent by volume. Table 2–1 summarizes Burkina Faso's basic information.

Table 2–1

Burkina Faso Basic Country Information

	2009	2010
Population, total (millions)	15.8	16.5
Population growth (annual %)	3.4	3.0
GDP (current $) (billions)	8.1	8.8
GDP per capita (current $)	509.3	536.0
GDP growth (annual %)	3.5	9.2

Source: World Development Indicators. The World Bank.

[3] Source: *Balance commercial et commerce extérieure. Ministère du Commerce, de la Promotion de l'Entreprise et de l'Artisanat, Burkina Faso. Période 1997-2002. Août 2006.*

LANDLOCKED DESTINATION COUNTRY: MALI

Mali is a vast, landlocked country with limited natural resources and human capital, and a highly dispersed population. It is the largest by area among Economic Community of West African States (ECOWAS) countries and is bordered by seven countries: Senegal, Guinea, Ivory Coast, Burkina Faso, Niger, Algeria, and Mauritania. Mali is in the heart of the Sahel, a region threatened by drought and desertification (two–thirds of the surface is desert). In 2010 the total population was 15.4 million, double that of Burkina Faso. Population grows at the same rate, 3 percent, but GDP grows at half the rate of Burkina, 4.5 percent. The capital is more than 1,000 kilometers from any port, and so transport and transit costs for imports and exports are high. Table 2–2 summarizes Mali's basic information and Figure 2–1 shows a map of the country and the main roads for transit cargo coming from Burkina Faso.

Table 2–2

Mali Basic Country Information

	2009	2010
Population, total (millions)	13.0	15.4
Population growth (annual %)	2.4	3.0
GDP (current $) (billions)	9.0	9.3
GDP per capita (current $)	601.3	602.0
GDP growth (annual %)	4.5	4.5

Source: World Development Indicators. The World Bank.

The vast majority of Malians depend directly on the environment for their livelihoods (herding, farming, or fishing). Mali's economic base is composed of gold, cotton, and livestock. The country is looking for ways to develop its textile industry–it already exports cotton fiber with little added value–tourism and its agro–industry[4]. Malian cotton is of good quality;[5] the country is the biggest producer in Africa, but exporters have to compete with such large producers as the United States, Brazil, India, and China. The country is evolving toward the production of organic cotton.

[4] Snapshot Africa – Mali. Benchmarking Foreign Direct Investment Competitiveness Report. World Bank Group, 2007.

[5] African cotton has two comparative advantages in the world market: the intrinsic quality of its fiber and the fact that it is handpicked. Source: Quality and Marketing of Cotton Lint in Africa. Gérald Estur. Africa Region Working Paper Series No. 121. October 2008. The World Bank.

Figure 2–1

Map of Mali and the Main Roads for Transit Cargo to Bamako from Ouagadougou

Source: www.geographicguide.net

Mali depends on imports to meet its basic needs, and because it is landlocked and because of its distance from ports, Malians can expect to pay a high percentage of production costs in transport and logistics. For exports, Mali must reduce transport and logistics costs along the main corridors to improve the competitiveness of its products in the regional and foreign markets.

The following table shows the composition of foreign trade for Mali in 2008. Main imports are combustibles and cements, which are usually products that come from the region, namely Côte d'Ivoire for petroleum derivates and Togo for cement. Motor cars, other vehicles, and rice originate from countries out of the region. As for exports, gold is the most important product in terms of value, but in terms of volume, cotton and live animals–goat and sheep–predominate. Given the low production level in Mali and our knowledge of the region, we have assumed that processed food and manufactures come mostly from neighboring Côte d'Ivoire, Ghana, Senegal, and Nigeria.

Table 2–3

Mali's Main Imports and Exports. 2008

Imports			Exports		
Product	Total ($million)	Share of Total	Product	Total ($million)	Share of Total
Petroleum derivates	697.4	21%	Gold	1,437.1	75%
Cements	175.6	5%	Cotton	202.6	11%
Medicines	98.7	3%	Live animals	112.7	6%
Motor cars	72.7	2%	Petroleum derivates	28.5	1%
Rice	66.2	2%			
Motor vehicles	60.2	2%			
Mineral or chemical fertilizers	126.3	4%			

Source: UN COMTRADE.

In interviews with stakeholders in the region we learned the following logistics patterns:

- Petroleum derivates are transported in cisterns, usually through long–term contracts to logistics operators such as SDV (SCAC–Delmas–Vieljeux).
- Cements are bulk cargo, usually traveling in medium–size vehicles.
- Motor cars are generally transported by individuals driving the car.
- Rice arrives in containers but is usually stripped at the port.
- Mineral or chemical fertilizer travels as bulk cargo.
- Gold and medicines are transported by air.
- Cotton is stored in containers.
- Live animals are transported in small trucks.
- Manufactures are generally stripped cargo.

The road network suffers from lack of maintenance. The railway is very limited–only a link from Koulikoro to Dakar passing through Bamako. Inland waterway transport is not navigable all year because rapids limit traffic at Sotuba and Tossaye, according to the Ministry of Infrastructure and Transport.[6] The same report pointed out that access to urban areas from rural areas is restricted by a lack of transportation. Besides communities located along main roads, the rest of rural communities are extremely isolated.

The government has implemented several measures to address this problem on the basis of the Policy Declaration of 1993 (updated regularly), which establishes strategies for the sector. Maintaining and upgrading road infrastructure and transport from Mali to the port of Dakar, based on the concept of regional corridors, are spelled out in the policy. The promotion of competition in the transport services industry is also an objective to be met by the elimination of

[6] *Rapport sur le Secteur des Transports au Mali. Ministère de l'Équipement et des Transports.* August 2005.

regional quotas and the implementation of a freight exchange by the Conseil Malien des Chargeurs, expected since 2005 but still unfinished.

The government has invested in developing electric and water supply systems, which has contributed to reducing Mali's dependency on imported raw materials, in particular for the cotton and agro industries.

GENERAL DESCRIPTION OF THE CORRIDOR

The Ouagadougou–Bamako transport corridor is an extension of the Lomé–Ouagadougou and the Tema–Ouagadougou corridors. It consists of the road going north linking the capital of Burkina Faso, Ouagadougou, with the capital of Mali, Bamako, and is connected through two sets of border posts. The shared corridor segment is between Ouagadougou and Bobo Dioulasso in Burkina Faso. Southern is a 867 km segment that from Bobo Dioulasso runs south towards the border crossing in Koloko in Burkina Faso and Hérémakono in Mali, then west to Bougouni through Sikasso, and finally to Bamako. Northern is a 958 km segment that from Bobo Dioulasso goes to the border crossing in Faramana in Burkina Faso and Koury in Mali, then to Koutiala and from there to Bamako.

Along the corridor, the bigger cities are Ouagadougou, Bamako, and Bobo Dioulasso, following the pattern common in much of Africa of an almost nonexistent network of cities. It makes almost impossible to define a more complex hierarchy of roads than a single main axis connecting big cities. Table 2–4 presents the population estimates of the bigger cities served by the corridor.

Table 2–4

Population of Main Cities along the Ouagadougou–Bamako Corridor, 2005

Common Segment (Burkina Faso)		Southern Route (Mali)		Northern Route (Mali)	
City	Population[a]	City	Population	City	Population
Ouagadougou (1st)	1,475,223	Sikasso (2nd)	92,000	Ségou (6th)	110,000
Bobo Dioulasso (2nd)	489,967	Bamako (1st)	850,000	Koutiala (4th)	99,662

Note: In parenthesis the city rank by size
[a]2006
Source: www.CityPopulation.de

Road Infrastructure

During the field visit the southern and the northern routes were visited because trucks use both to transport goods to and from Burkina Faso despite the longer distance of the second. The general condition of the road infrastructure along the corridor is between fair and good. Figure 2–2 shows both routes.

Figure 2–2

North– and Southern Routes from Ouagadougou to Bamako

Source: Google maps.

In the workshop organized by the West Africa Trade Hub in Bamako in January 2011, transporters complained about the lack of weight control at the port exits, which fails to prevent overloading. Nevertheless, field observation revealed that the degree of overloading is substantially lower than in other corridors in West Africa, for instance the Ghana–Niger corridor.

Both routes are served only by two–lane roads, with substandard–width lanes (less than 3.5 meters) and no access control when passing main towns, which is a frequent cause of delay. The Malian government plans to increase the width of the roadway to 7 meters in some segments but will not increase the number of lanes for the time being.

A more detailed description of the main alternative routes follows:

- Common segment: Ouagadougou–Bobo Dioulasso 345 km
- Southern route: Bobo Dioulasso–Koloko/Hérémakono–Bamako 522 km
- Northern route: Bobo Dioulasso–Faramana/Koury–Bamako 613 km

Common Segment: Ouagadougou–Bobo Dioulasso

The common segment for both routes, Ouagadougou—Bobo Dioulasso is 345 km long and falls completely within Burkina Faso's territory. The general condition of the road is fair and the topography is generally flat (flat–hilly in some segments). Close to Ouagadougou (14 km towards Bobo Dioulasso) is a parking lot used by trucks during the time of day when municipal regulations keep heavy vehicles from entering the urban area. There is also a rest area between Kokologo and Sabou, in Burkina Faso.

With the implementation of the dry port in Bobo Dioulasso, Boborinter, Burkinabe's Customs can control goods in transit and also clear at this port instead of having them all at Ouagarinter. This facilitates the organization of the escorts depending on the final destination and reduces congestion in Ouagarinter. The same applies for export goods; exporters now have the alternative of making the Customs declarations in both dry ports or being inspected if they are in transit from

other landlocked countries. The services offered in Boborinter are Customs and logistics warehousing and Customs clearance for import and export cargo. In the medium term a franc zone will be part of the complex. Exhibit 2–2 describes how Boborinter operates and how the project is organized.

Exhibit 2–1

Boborinter Main Facts

Boborinter is the international freight road station and dry port of Bobo Dioulasso—the equivalent to Ouagarinter in Ouagadougou. The objective of the new infrastructure is to clear goods that have Burkina Faso as final destination, as well as goods in transit awaiting formation of the onward transit convoy.

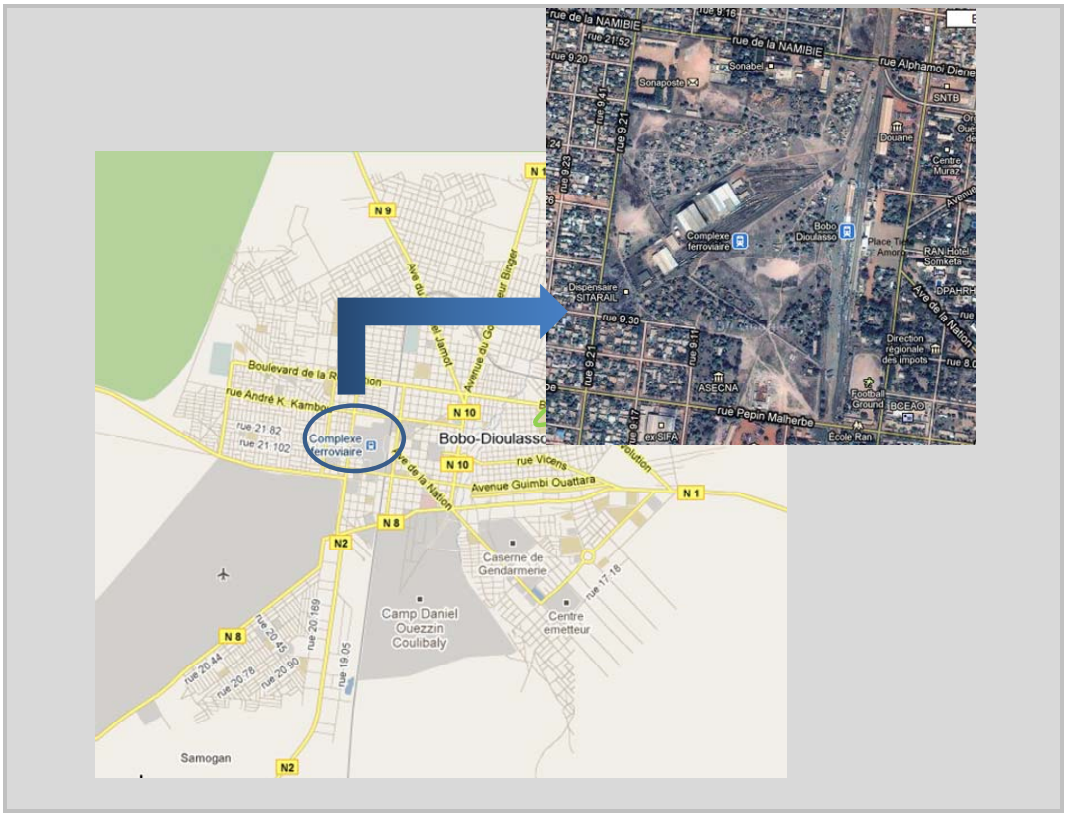
Boborinter, in the industrial zone, was inaugurated in January 2009. It has an area of 120 hectares and can be accessed by road through the ring road and by railway (from Abidjan). The multimodal platform for handling national and international goods is expected to eventually include a terminal that allows loading, unloading, and storing of goods in transit for industries targeting international markets.

Construction of this terminal was financed by the West African Development Bank with support from a consortium of banks in Burkina, and the Burkinabe Chamber of Commerce and Industry.

Source: Excerpted from Ministère de l'équipement et des transports, Burkina Faso, February 17, 2011

Figure 2–3

Boborinter, Bobo Dioulasso



Source: Google Map.

Southern Route: Bobo Dioulasso–Koloko/Hérémakono–Bamako

The southern route between Bobo Dioulasso and Bamako through the border at Koloko/Hérémakono is 522 km long, 91 km shorter that the northern route (Faramana/Koury border). From Bobo Dioulasso to Koloko at the Malian border the distance is 124 km.

During the field visit 80 percent of the road was in fair condition, even on segments with hilly topography (Moami–Orodara). On this route was seen only a truck rest area at the Burkinabe–Malian border. Traffic near Sikasso and Koumantou, the biggest towns in Mali in this segment, was relatively congested.

Northern Route: Bobo Dioulasso–Faramana/Koury–Bamako

The northern route between Bobo Dioulasso and Bamako via Faramana/Koury is 613 km long. From Bobo Dioulasso to the border in Faramana is a distance of 110 km. In Mali almost 50 percent of the road is in fair to fair–poor condition, but it is popular despite being longer and less well maintained than the southern route. One of the reasons is the possibility to load or offload cargo at Ségou (especially if the final destination of the cargo is in the north of Mali). Another reason is the presence of a weighbridge at Hérémakono where the weighing is done per axle and fines are more likely to be imposed. Finally, the northern route is less hilly than the southern, which improves fuel consumption.

We observed weighbridges and check points along the routes. Weighbridges on the northern route were in Bla and Koury, and on the southern route in Hérémakono.

Custom Procedures/Border Posts

The procedure for monitoring goods in transit to Mali is the same as throughout West Africa, except in Ghana, which has an electronic tracking system. Elsewhere, goods are escorted to the destination country by the Customs of the transit countries, and regular checks are performed at checkpoints along the way, which usually causes delays because of the lack of availability of Customs officials. A truck to Bamako spends four days at the port and the landlocked transit country border crossing (or dry port) waiting for a convoy to leave with a Customs escort.

Generally speaking, Burkina Faso follows UEMOA agreements on customs procedures: goods are declared in the first pertinent customs office, which depends on the nature and value of the goods. In fact, customs checkpoints on roads declared transit corridors are stipulated in the agreement and in countries' customs laws to ensure that the integrity of goods is not violated before the goods arrive at the customs office. See Exhibit 2–2 for rules according to the value of the imports. Containerized cargo, if the guarantee has been paid and customs has sealed the container, does not have to wait for an escort, so the cargo spends fewer days on the road–7 days instead of 10 from Tema or Lomé to Bamako.

Exhibit 2–2

Customs Rules for Imports in Burkina Faso

Customs Posts

- Customs value less than or equal to CFA150,000: Form C9 to be completed
- Customs value over CFA150.000: Customs escort to the pertinent office

Secondary Offices

- Customs value less than or equal to CFA 80,000: Form C9 to be completed
- Customs value over CFA 80,000 and less than or equal to CFA 100,000: Form C7 to be submitted.
- Customs value over CFA 100,000 and less than or equal to CFA 500,000: detailed declaration to be submitted
- Customs value over CFA 500,000: Customs escort to the appropriate office

Main Office, Second Category

- Customs value less than or equal to CFA 75,000: Form C9 to be completed
- Customs value over CFA 75,000 and less than or equal to CFA 1,300,000: Form C1 to be submitted
- Customs value over CFA 1,300,000: Customs escort or release under guarantee to the appropriate office

Main Office, First Category

- Customs value less than or equal to CFA 50,000: Form C9 to be completed
- Customs value over CFA 50,000: detailed declaration to be submitted

Source: Burkina Faso Customs' website.
Note: C1, C7, and C9 are Customs declaration forms and procedures. Customs offices rank from Customs posts to main offices 1st category depending on the declared cargo value.

The law is flexible about containerized cargo. When goods are loaded in containers and sealed by customs officials, the freight forwarder pays a guarantee for if the seal is broken. This means that, for our analysis, operational delays due to the organization and transfer of customs escorts exist because of the practice of stripping containers.

Following Ghana's model, the Malian government is implementing a pilot project for electronic tracking system for containerized cargo. Exhibit 3–2 describes the general characteristics of this system, which is in its pilot phase.

The system of quotas for the allocation of freight between service providers of different countries technically is applicable for Mali, but informal conversations and press releases point out that the system of allocation of freight is not followed.

Exhibit 2–3

Electronic Tracking with Multiple Applications

The Ministry of Infrastructure and Transport, in partnership with the company ITS Mali, has launched a pilot project for the electronic tracking of vehicles. This system, named E-BEMI, was developed mainly by young Malian engineers. It allows the movement of vehicles to be tracked and gives information about speed and fuel levels.

The test will be conducted for one year on 20 vehicles, including 5 passenger vehicles, on the Bamako-Dakar, Bamako-Abidjan, Bamako-Ouagadougou-Tema and Bamako-Gao corridors.

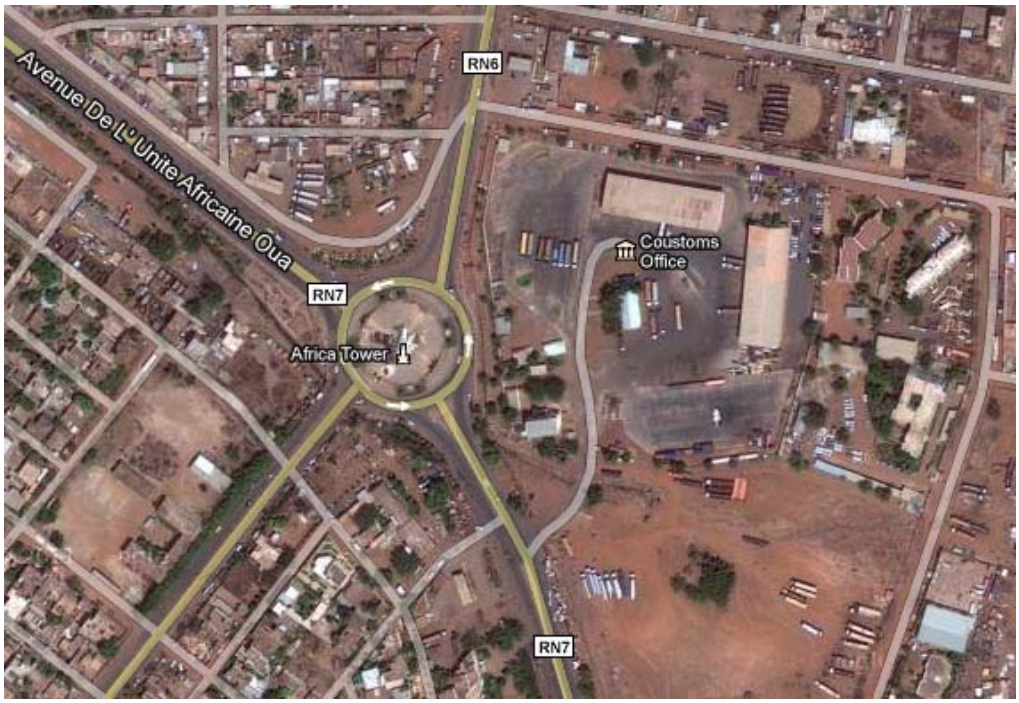
It will give detailed reports on the mean time of the route, the number of vehicles in transit, and the number of vehicles expected per day. The tool includes also an SOS button drivers can use in an emergency. The system will help customs, gendarme and police track the movement of goods and vehicles.

Source: Ministère de l'équipement et des transports, Mali. February 17, 2011

The Customs office in Faladje in the Bamako District is being renovated. This is the main Customs office in Bamako and is in charge of inspection and clearance. With help from the International Development Association the government is financing the Facilitation of Transport and Transit in West Africa project (which includes the modernization of the Customs office in Bamako).

Figure 2–4

Customs Offices in Faladje, Bamako, Mali



Source: Google Map

ROAD INVENTORY OF THE CORRIDOR

Table 2–5 presents the main characteristics and an inventory of the segments of the three road sections described above and is based on our observations. The road inventory from the port of Lomé to Ouagadougou is described in Nathan Associates' report (2012) on the Lomé–Ouagadougou transport corridor.

Table 2–5

Road Inventory for the Ouagadougou–Bamako Corridor

Section/Segment		Distance (Km)	Accumulated	Terrain	Condition	Towns on the Road	Comments
A Ouagadougou (Ouagarinter)–Bobo Dioulasso (Boborinter)		**345**	No. of accidents observed during the field visit: 1 No. of broken–down vehicles observed during the field visit: 7 No. of checkpoints observed during the field visit: 3				
A1	Ouagadougou–Kokologo	51	51	Flat	Good–Fair	4	Truck parking at 14 km from Ouagadougou. Segment of 7 km under works exiting Ouagadougou
A2	Kokologo–Sabou	41	92	Flat–Hilly	Good–Fair	4	Rest area for trucks
A3	Sabou–Boromo	82	174	Flat–Hilly	Fair	2	
A4	Boromo–Bobo Dioulasso	171	345	Flat	Good–Fair	6	
B Bobo Dioulasso–Koloko/ Hérémakono–Bamako		522					
Bobo Dioulasso–Koloko		124	No. of accidents observed during the field visit: 0 No. of broken–down vehicles observed during the field visit: 0 No. of checkpoints observed during the field visit: 1				
B1	Bobo Dioulasso–Moami	28	28	Flat	Good–Fair	3	
B2	Moami–Orodara	49	77	Hilly	Good–Fair	0	
B3	Orodara–Koloko	47	124	Flat–Hilly	Good–Fair	4	
Koloko–Bamako		398	No. of accidents observed during the field visit: 0 No. of broken–down vehicles observed during the field visit: 4 No. of checkpoints observed during the field visit: 5				
B4	Koloko –Hérémakono	7	131	Flat	Good–Fair	0	Truck resting area
B5	Hérémakono–Sikasso	62	193	Flat–Hilly	Fair	3	Weighbridge station in Hérémakono
B6	Sikasso–Niena	50	243	Hilly	Fair	5	Very congested
B7	Niena–Koumantou	58	301	Flat–Hilly	Good–Fair	6	Congestion at Koumantou
B8	Koumantou–Bougouni	84	385	Flat	Good–Fair	6	
B9	Bougouni–Bamako	137	522	Flat	Good–Fair	13	
C Bobo Dioulasso–Faramana/Koury –Bamako		**613**					

Section/Segment		Distance (Km)	Accumulated	Terrain	Condition	Towns on the Road	Comments
Bobo Dioulasso–Faramana		**110**	No. of accidents observed during the field visit: 2 No. of broken–down vehicles observed during the field visit: 3 No. of checkpoints observed during the field visit: 1				
C1	Bobo Dioulasso–Bama	22	22	Flat–Hilly	Good–Fair	3	Intense commercial activity
C2	Bama–Dande	30	52	Flat	Good–Fair	4	Capacity constraint at bridge
C3	Dande–Koukourouba	32	84	Flat	Fair	5	
C4	Koukourouba–Faramana	26	110	Flat–Hilly	Good–Fair	4	Short segment with road design problems (6%)
Faramana–Ségou		**277**	No. of accidents observed during the field visit: 0 No. of broken–down vehicles observed during the field visit: 1 No. of checkpoints observed during the field visit: 2				
C5	Faramana–Koury	22	132	Flat	Very Poor	1	Weigh bridge station and toll station at Koury
C6	Koury–Koutiala	92	224	Flat	Fair	3	
C7	Koutiala–Km 125 (Dansana)	33	257	Flat	Fair	4	Trucks usually stop at Koutiala to rest
C8	Km 125 (Dansana)– Bla	46	303	Hilly	Good–Fair	7	Toll station and weighbridge station at Bla. Speed bumps in small towns
C9	Bla–Ségou	84	387	Flat	Good–Fair	9	Speed bumps in small towns
Ségou–Bamako		**226**	No. of accidents observed during the field visit: 0 No. of broken–down vehicles observed during the field visit: 2 No. of checkpoints observed during the field visit: 3				
C10	Ségou–Konogougou	83	470	Flat–Hilly	Fair	5	Trucks usually stop at Ségou to rest
C11	Konogougou–Fana	27	497	Flat–Hilly	Good–Fair	2	Toll station, public market in the road
C12	Fana–Entry to Foret Fanya	50	547	Flat	Good–Fair	6	
C13	Foret Fanya	36	583	Flat–Hilly	Poor	0	Toll station at entry and exit. Poor road design standard
C14	Exit to Foret Fanya–Bamako	30	613	Flat	Fair	3	Truck parking at entrance to Bamako (traffic time constraint)

Source: Consultant elaboration based on field observation.
Notes: Official data from AR–FER identifies toll stations on the north– and southern routes: northern route: Bla 1 (RN6 Ségou–Bla–San), Bla 2 (RN12 Bla–Koury), and Koury (RN12 Bla–Koutiala–Koury); southern route: Bougouni (RN7 Bougouni–Sikasso) and Hérémakono (RN10 Sikasso–Hérémakono–F. Burkina Faso)

Some segments have similar characteristics, including terrain condition, road surface, and congestion. Therefore, for FastPath analysis we divided the corridor into fewer road links and nodes, presented in Table 2–6. The subdivision of the road links was determined on the basis of the physical characteristics of the road (terrain, road surface condition, congestion). These characteristics have an impact on travel speed, waiting time, and vehicle operating cost.

Table 2–6

Ouagadougou–Bamako Corridor FastPath Road Links Characteristics

Link	Length (km)	Terrain	Surface Conditions	Congestion	FastPath Road Factor
A OUAGADOUGOU–BOBO DIOULASSO					
Ouagadougou–Sabou	92	Flat–Hilly	Good	Light	1.1
Sabou–Boromo	82	Flat–Hilly	Fair	Light	1.2
Boromo–Bobo Dioulasso	171	Flat	Good	Light	1.0
B BOBO DIOULASSO–KOLOKO/HÉRÉMAKONO–BAMAKO (SOUTHERN ROUTE)					
Bobo Dioulasso–Moami	28	Flat	Good	Light	1.0
Moami–Koloko	96	Flat–Hilly	Good	Light	1.1
Koloko–Hérémakono	7	Flat	Good	Light	1.0
Hérémakono–Sikasso	62	Flat–Hilly	Fair	Light	1.2
Sikasso–Niena	50	Hilly	Fair	Heavy	2.5
Niena–Koumantou	58	Flat–Hilly	Good	Heavy	2.2
Koumantou–Faladje	220	Flat	Good	Light	1.0
Faladje–Bamako	1	Flat	Good	Light	1.0
C BOBO DIOULASSO–FARAMANA/KOURY–BAMAKO (NORTHERN ROUTE)					
Bobo Dioulasso–Faramana	110	Flat–Hilly	Good	Light	1.1
Faramana–Koury	22	Flat	Very Poor	Light	1.3
Koury–Km 125	125	Flat	Fair	Light	1.1
Km 125–Bla	46	Hilly	Good	Light	1.2
Bla–Entry Foret Fanya	244	Flat–Hilly	Good	Light	1.1
Entry Foret Fanya–Exit Foret Fanya	36	Flat–Hilly	Poor	Light	1.3
Exit Foret Fanya–Faladje	29	Flat	Fair	Light	1.1
Faladje–Bamako	1	Flat	Fair	Light	1.1

Source: Consultant elaboration based on field observation

Initial Observations for Road and Logistics Operations

With the information collected during field visits we identified the problems responsible for inefficiencies and poor performance shown in Table 2–7. We will analyze these problems in our interpretation of FastPath results.

Table 2–7

Summary of Problems Identified along the Corridor

Problem	Description	Potential Solution	Comment
OPERATIONAL ISSUES			
Delays during the trip due to the logistics of convoys	The convoy system creates delays because it is based on physical presence and depends on the availability of customs officers	Electronic transit service: implementation of pilot ongoing in Mali.	Burkina Faso is not implementing a similar system, but according to the Trade Hub containers do not have to be escorted in Burkina Faso.
Numerous broken vehicles along the road	The number of broken–down vehicles observed is alarming because they create risk of accidents and they are a clear sign of fleet deterioration	National strategies to assess the transport sector propose a combination of incentives to correct market distortions and promote a healthier system	Such a strategy would promote the diversification of transport services, to include value–added logistics services
Delays in cities and bigger towns	Almost no bypasses exist in main cities	Construction of bypasses of main cities, and shoulders and regulation of street commerce in some towns	Bypasses are needed for bigger towns (Sikasso, Oumantou, Koutiala) but minor centers could benefit from simpler solutions that are nonetheless more efficient than speed bumps, which damage vehicles.
Early container stripping	Containers are often stripped to reduce costs, which negates the benefits of container shipping	National strategies to assess the transport sector: Assessments of causes Development of incentives	Public sector must put in place incentives and publicize the benefits of such a practice.
Animal–drawn vehicles and bicycles on road	Local transport modes create delays and constant risk of accidents	Road design standards improved to include signals and progressive adaptation of road design standards close to towns	Roads should incorporate shoulders near towns to accommodate human–powered and animal–drawn vehicles more safely and reduce delays.
STRATEGIC ISSUES			
Trade deficit	Mali imports finished goods and exports commodities, cotton in particular. This trade imbalance influences the cost and availability of transportation.	National logistics strategy in Mali: Consolidation of logistics hubs in the region supported by a freight exchange system.	One potential solution for empty returns is the implementation of concentration nodes complemented by a freight exchange system to support daily operations.

Source: Nathan Associates' analysis.

Stakeholders in Mali and Burkina Faso are well aware of these problems, in particular those that affect costs and efficiency of transit operations. To mitigate these problems, Burkina Faso has been studying and gradually implementing a freight exchange. In discussions in 2011 stakeholders agreed to support transition to a fully automated system.

IMPORT AND EXPORT PROCEDURES IN THE CORRIDOR

The West Africa Trade Hub documented and analyzed detailed import/export procedures in the corridor, as well as time and delays and official and unofficial costs. We used this information for our analysis. In this section we summarize the factors influencing the transport and logistics system between Ouagadougou/Ouagarinter to Bamako. Appendix B presents a summary of the steps, costs, and times identified by the West Africa Trade Hub and Appendix C describes the methodology and definitions used by the West Africa Trade Hub.

SCENARIOS FOR FASTPATH ANALYSIS

Because performance at the port varies by direction of the cargo (inbound or outbound), we created two FastPath scenarios to assess corridor performance: inbound containerized and outbound containerized. A third inbound scenario could have been created taking onto account noncontainerized cargo, but because of the nature of the market between Ouagadougou and Bamako the results would not have varied significantly from the containerized inbound cargo scenario. As in other West African corridors, the majority of transit cargo (70 percent in this case) is transported outside containers outside the port in both inbound and outbound directions. This is a common practice that reduces the risk of incurring extra costs for container demurrage. To account for the time and cost incurred during the stripping (inbound) and consolidation (outbound) of containers, the two containerized scenarios (Scenarios 1 and 2) have different subchains. A detailed description and analysis of each scenario is presented in Chapter 3.

SUMMARY STATISTICS FOR CORRIDOR PERFORMANCE

Tables 2–8 and 2–9 summarize the cost, time, and reliability of the Ouagadougou–Bamako corridor's transport/logistics chain from a shipper's point of view for the two scenarios. The tables also show good global standards. Costs have been broken down into official and unofficial, in accordance with the information provided by the West Africa Trade Hub.

Table 2–8

Scenario 1: Performance of Main Components of Inbound Containerized Transit Traffic by Subchain, 2011

Component	Cost ($/TEU)			Time (hours)		Reliability	
	Official	Unofficial	Norm Range	Total	Norm Range	%	Norm Range
NORTHERN: OUAGADOUGOU–FARAMANA/KOURY–BAMAKO							
Lomé–Bamako road transport Northern	2,305.56	78.13	50–160	89.00	15–23	Varies by segment	5–100
Border crossing at Faramana	N/A	N/A	5–15	2.50	1–3	130	5–100
Border crossing at Koury	44.84	15.54	5–15	2.58	1–3	44	5–100
SOUTHERN: OUAGADOUGOU–KOLOKO/HÉRÉMAKONO–BAMAKO							
Lomé–Bamako road transport southern	2,305.56	78.13[12]	50–160	83.09	15–23	Varies by segment	5–100
Border crossing at Koloko	N/A	N/A	5–15	2.50	1–3	80	5–100
Border crossing at Hérémakono	44.84	67.00	5–15	2.45	1–3	77	5–100
COMMON NODE							
Faladje	33.31	66.61	30–100	3.58	2–6	113	5–40

Note: Informal payments on the Ouagadougou–Bamako Corridor are $117.2 per truck (i.e., $78.13 per TEU) (http://www.watradehub.com/sites/default/files/resourcefiles/mar10/10th–irtg–report–english.pdf).

Table 2–9

Scenario 2: Performance of Main Components of Outbound Containerized Transit Traffic by Subchain, 2011

Component		Cost ($/TEU)			Time (hours)		Reliability	
		Official	Unofficial	Norm Range	Total	Norm Range	%	Norm Range
COMMON NODE								
Faladje		33.31	11.10	30–100	0.25	2–6	133	5–40
NORTHERN: OUAGADOUGOU–FARAMANA/KOURY–BAMAKO								
Lomé–Bamako road transport Northern		1,321.19	78.13	50–160	47.07	15–23	Varies by segment	5–100
Border crossing at Faramana	Direct	37.10	57.20	5–15	3.83	1–3	108	5–100
	Consolidated	81.50	59.40	5–15	7.33	1–3	70	5–100
Border crossing at Koury		22.20	11.10	5–15	0.08	1–3	200	5–100
SOUTHERN: OUAGADOUGOU–KOLOKO/HÉRÉMAKONO–BAMAKO								
Lomé–Bamako road transport Southern		1,321.19	78.13	50–160	44.09	15–23	Varies by segment	5–100
Border crossing at Koloko	Direct	37.10	57.20	5–15	3.83	1–3	108	5–100
	Consolidated	81.50	59.40	5–15	7.33	1–3	70	5–100
Border crossing at Hérémakono		22.20	11.10	5–15	0.08	1–3	200	5–100

Note: Customs costs vary considerably according to nature of cargo. We used a representative cost for the purpose of the analysis.

The scenarios have been given logistics scores, computed by comparing the performance of a component of the transport/logistics chain and rating it as good, fair, poor, or very poor, according to international standards. This rating is converted to a numeric score (80 for good, 60 for fair, 40 for poor, and 20 for very poor). Then the scores for price, time, and reliability are averaged to get the total score for a component. These scores are then given a time–weighted average to compute the subchain total, with reliability treated as variance with a special calculation of the subchain total. If there is more than one subchain in a chain, the scores of the subchains are averaged to compute the chain total. The logistics scores for Scenarios1 and 2 are presented in Tables 2–10 to 2–13. A logistics score between 70 and 80 indicates that time, cost, and reliability in the total supply chain are efficient and competitive according to global standards. Reliability is measured in terms of average transit time, which accounts for 90 percent of the variation in transit times for different shipments. This reliability measure reflects the extent to which transit time can be predicted by shippers.[7]

In the next chapter, we explain in more detail how FastPath was used to model the scenarios and how the logistics scores for each scenario were generated.

Table 2–10

Scenario 1: Logistics Scores for Inbound Containerized Cargo

	TEU/Year	Average Price ($)	Average Time (hrs)	Reliability (%)	Logistic Score	Rating
Total Chain	9,829.0	3,474	614.0	90	57	Fair
LOGISTICS SUBCHAINS						
Direct containers north	2,064.3	3,275	576.0	96	59	Fair
Direct containers south	884.7	3,311	572.9	96	56	Fair
Stripped containers north	4,816.0	3,544	631.0	88	57	Fair
Stripped containers south	2,064.0	3,580	627.9	88	55	Fair

[7] For typical transport/logistics activities, less than 40 percent is very predictable or “good” reliability, 45–80 percent is considered relatively predictable or fair reliability, 90–150 percent is somewhat unpredictable or poor reliability, and more than 150 percent is considered highly unpredictable or very poor reliability. For shorter activities these thresholds are higher.

Table 2–11

Scenario 1: Logistics Subchains Scores for Direct and Stripped Inbound Containerized Cargo

Node	Logistic Score	Rating	Link	Logistic Score	Rating
COMMON SECTION: OUAGADOUGOU–BOBO DIOULASSO					
Ouagadougou/ Ouagarinter	40	Poor	Ouagadougou /Ouagarinter – transit time in Burkina	73	Good–Fair
Transit time in Burkina	53/40[a]	Fair–Poor/Poor	Transit time in Burkina–Sabou	73	Good–Fair
Sabou	N/A		Sabou–Boromo	73	Good–Fair
Boromo	N/A		Boromo–Bobo Dioulasso	47	Poor–Fair
Bobo Dioulasso	N/A				
NORTHERN: OUAGADOUGOU–FARAMANA/KOURY–BAMAKO					
Faramana	67	Good–Fair	Bobo Dioulasso–Faramana	73	Good–Fair
Koury	70	Good–Fair	Faramana–Koury	53	Fair–Poor
Km 125	N/A		Koury–Km 125	47	Poor–Fair
Bla	N/A		Km 125–Bla	73	Good–Fair
Entry Foret Fanya	N/A		Bla–Entry Foret Fanya	73	Good–Fair
Exit Foret Fanya	N/A		Entry–Exit Foret Fanya	53	Fair–Poor
Faladje	57	Fair	Exit Foret Fanya–Faladje	47	Poor–Fair
			Faladje–Bamako	73	Good–Fair
SOUTHERN: OUAGADOUGOU–KOLOKO/HÉRÉMAKONO–BAMAKO					
Moami	N/A		Bobo Dioulasso–Moami	47	Fair–Poor
Koloko	70	Good–Fair	Moami–Koloko	47	Fair–Poor
Hérémakono	70	Good–Fair	Koloko–Hérémakono	73	Good–Fair
Sikasso	N/A		Hérémakono–Sikasso	47	Fair–Poor
Niena	N/A		Sikasso–Niena	37	Poor–Fair
Koumantou	N/A		Niena–Koumantou	60	Fair
Faladje	57	Fair	Koumantou–Faladje	47	Fair–Poor
			Faladje–Bamako	73	Good–Fair

Source: Nathan Associates' analysis

Note:[a] Logistics scores of 53 and 40 for direct and stripped inbound containerized cargo respectively.

Table 2–12

Scenario 2: Logistics Scores for Outbound Containerized Cargo

	TEU/Year	Average Price ($)	Average Time (hr)	Reliability (%)	Logistic Score	Rating
Total chain	1,092	2,242	138.0	78	66	Good–Fair
LOGISTICS SUBCHAINS						
Direct containers north	98	2,155	135.0	80	66	Good–Fair
Direct containers south	230	2,146	132.0	81	67	Good–Fair
Consolidated cont north	229	2,288	142.0	76	65	Good–Fair
Consolidated cont south	535	2,279	139.0	77	65	Good–Fair

Table 2–13

Scenario 2: Logistics Subchains Scores for Direct and Consolidated Outbound Containerized Cargo

Node	Logistic Score	Rating	Link	Logistic Score	Rating
NORTHERN: BAMAKO–FARAMANA/KOURY–OUAGADOUGOU					
Faladje	67	Good–Fair	Bamako–Faladje	73	Good
Exit Foret Fanya	N/A		Faladje–Exit Foret Fanya	73	Good
Entry Foret Fanya	N/A		Exit Foret Fanya–Entry	60	Fair
Bla	N/A		Entry Foret Fanya–Bla	73	Good
Km 125	N/A		Bla–Km 125	73	Good
Koury	60	Fair	Km 125– Koury	73	Good
Faramana	63	Fair–Good	Koury–Faramana	60	Fair
			Faramana–Bobo Dioulasso	73	Good
SOUTHERN: BAMAKO–KOLOKO/HÉRÉMAKONO–OUAGADOUGOU					
Faladje	67	Good–Fair	Bamako–Faladje	73	Good
Koumantou	N/A		Faladje–Koumantou	73	Good
Niena	N/A		Koumantou– Niena	67	Good–Fair
Sikasso	N/A		Niena–Sikasso	57	Fair
Hérémakono	60	Fair	Sikasso– Hérémakono	73	Good
Koloko	63	Fair–Good	Hérémakono–Koloko	73	Good
Moami	N/A		Koloko–Moami	73	Good
			Moami–Bobo Dioulasso	73	Good
COMMON SECTION: BOBO DIOULASSO–OUAGADOUGOU					
Bobo Dioulasso	N/A		Bobo Dioulasso–Boromo	73	Good
Boromo	N/A		Sabou– Boromo	73	Good
Sabou	N/A		Sabou–Transit time in Burkina	73	Good
Transit time in Burkina	53/40 [a]	Fair–Poor/ Poor	Transit time in Burkina–Ouagadougou	73	Good
Ouagadougou/ Ouagarinter	40	Poor			

Source: Nathan Associates' analysis

Note:[a] Logistics scores of 53 and 40 for direct and stripped inbound containerized cargo respectively.

.

3. Corridor Analysis

The analysis of corridor performance was carried out using FastPath. In this chapter we describe the FastPath model and introduce the results that will be interpreted in Chapter 4. This analysis was conducted, for the most part, with data collected by the West Africa Trade Hub in the context of the RRTC analysis. Consequently, in some cases, we had to reorganize the data to adapt them to the variables used by FastPath. This is particularly relevant to data on transit traffic volume, containerized vs. stripped cargo, trade composition distribution, TEU/container ratio, and informal payments. We also needed to set assumptions about the characteristics of certain infrastructure components. Because data for this corridor are limited, we agreed with the West Africa Trade Hub on several assumptions on data input that we incorporated into the FastPath model, ensuring that our analysis considered the most relevant characteristics encountered on the Ouagadougou–Bamako corridor. The most important assumptions are listed in Table 3–1.

SCENARIO 1: INBOUND CONTAINERIZED TRANSIT TRAFFIC (BURKINA FASO TO MALI)

The transport network for this scenario begins at the Port of Lomé Container Terminal managed by SE2M and Manuport as the entry node to the corridor and Bamako as the hinterland destination node. In this paper, we report only results from Ouagadougou to Bamako. The analysis for the Lomé–Ouagadougou corridor is available in Nathan Associates (2012). For simplification in FastPath, four hinterland nodes and associated transport subchains were created to differentiate cargo transported directly in containers from stripped cargo traveling through the north route and the south route: the time, delays, and cost of stripping the containers are different as well as the route chosen by the trucker. Also, land transport for trucks carrying stripped containers is slightly cheaper than for trucks with containers when demurrage charges are not taken into account. All other characteristics along the corridor for northern or southern subchains remain constant. In each subchain (direct containerized or stripped), customs processing at the border in Mali starts when the cargo consignment is entered into the customs computer system, but clearance is done in Faladje.

Figure 3–1 shows the major characteristics of the inbound flow of containerized cargo coming into Mali through the Lomé–Bamako corridor. The estimated number of containers handled in this direction in 2009 accounted for about 9,829 TEU. Of this total, about 70 percent of the containers are stripped and the goods transferred to trucks.

Table 3–1
Assumptions for FastPath Analysis

Assumptions		Value
CARGO DISTRIBUTION		
Total transit containerize cargo arriving to Port of Lomé		42% of total transit cargo
Total transit containerize cargo striped at the port		70% of total transit containerize cargo
Transit cargo to Mali through port of Lomé		10% of total transit cargo (import/export)
Import transit cargo to Mali through port of Lomé		90% of total transit cargo to Mali through port of Lomé
Stereotyped trucks	Traveling inbound	20–ft container with cooking oil weights 17 tons 40–ft container with cooking oil weights 25 tons Two 20–ft container with cooking oil weights 30 tons
	Traveling outbound	20–ft container with shea nuts weighs 17 tons
North– and southern route choice	Inbound cargo transported through northern route	70% of inbound cargo
	Outbound cargo transported through southern route	70% of outbound cargo
TRANSPORT PRICE		
Road segment prices from Lomé–Bamako are the same as for Tema–Bamako. These prices come from the Road Association.	Inbound price per ton/km	CFA 70,000 (equivalent to $155.43 per ton/km)
	Outbound price per ton/km	CFA 35,000 (equivalent to $77.72 per ton/km)
Total transport price	Includes unofficial payments	
Travel Time		
Inbound road time schedule from Port of Lomé to Bamako (av. 10 days = 80 hours; min. 5 days; max. 14 days)[a]	Waiting time in Terminal du Sahel (convoy services)	1.5 days
	Terminal du Sahel–Ouagarinter	2.5 days
	Waiting time in Bitou/ Ouagarinter/ Boborinter (convoy services)	3 days
	Ouagarinter–Bamako (including time at the Burkina/Mali border)	3 days
Outbound road time schedule from Bamako to Port of Lomé (av. 6 days = 48 hours; min. 5 days; max. 8 days)	Bamako–Togo/Burkina Border (including time at the Burkina/Mali border)	3.5–4 days
	Togo/Burkina Border–Port of Lomé	2–2.5 days
Trucker resting time	12 hours per day	

Notes: Exchange rate is $/CFA 450.35.

[a] *Based on West Africa Trade Hub questionnaires, which did not distinguish between bulk and containerized cargo.*

Figure 3–1

Transit Flows Included in the FastPath Inbound Containerized Scenario (Scenario 1)

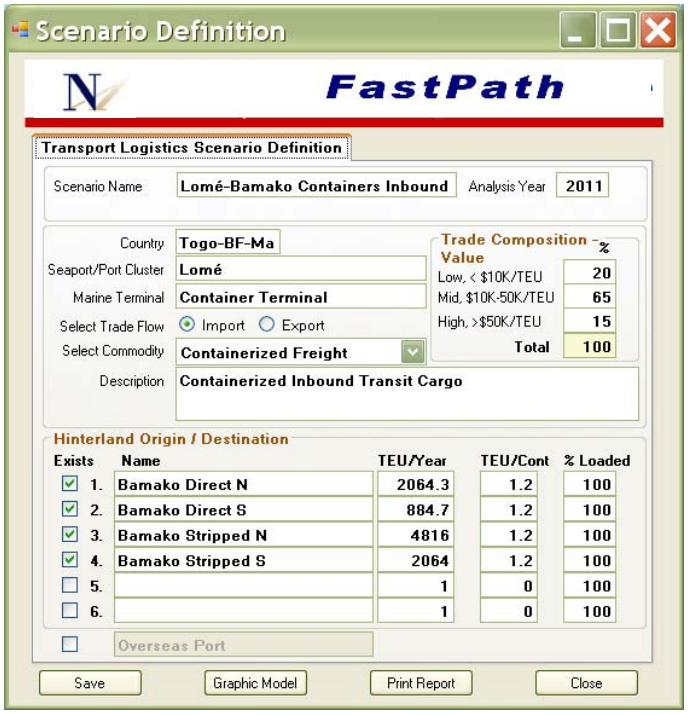
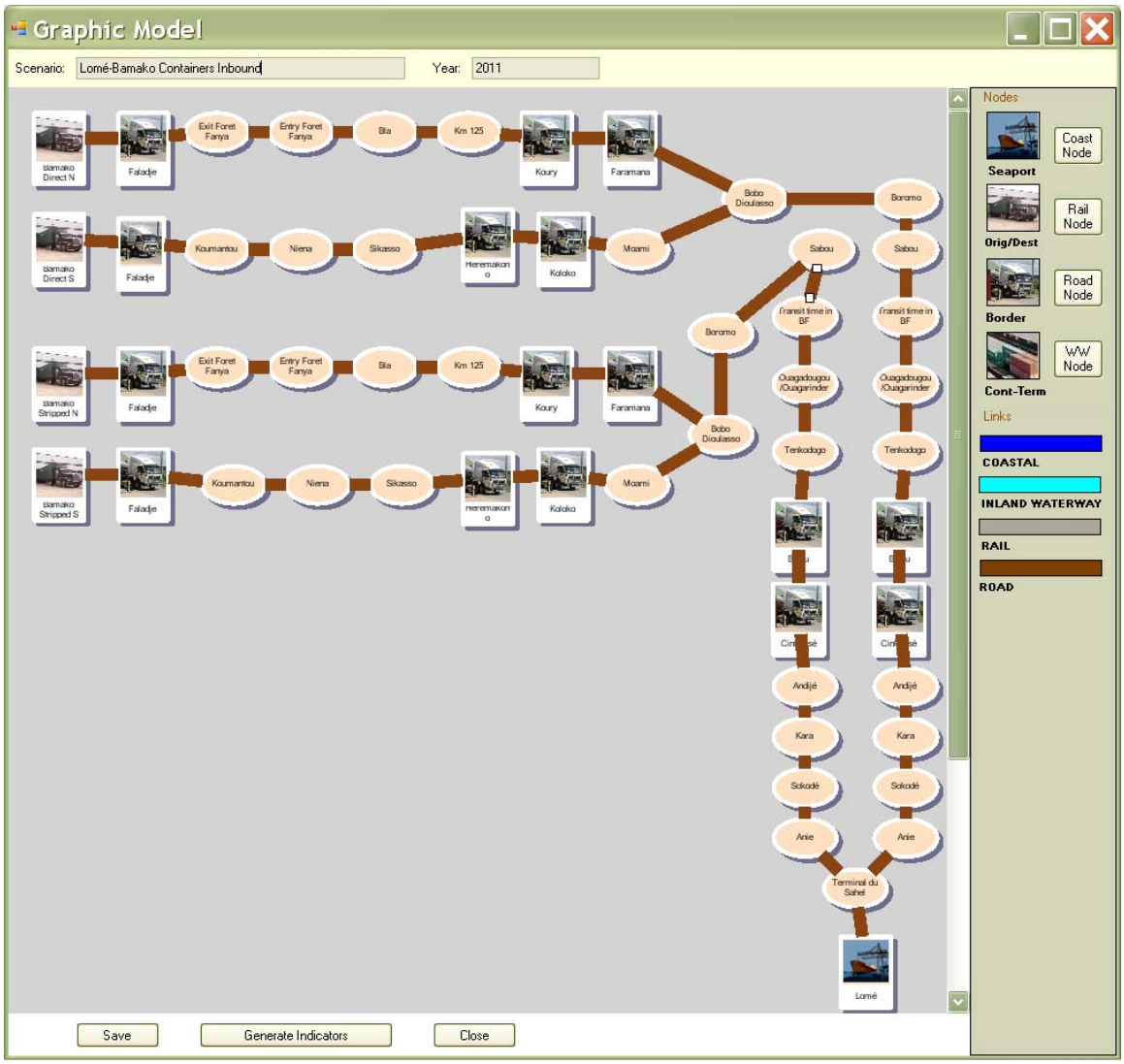


Figure 3–2 presents a graphic model of the four subchains for fully containerized and stripped cargo, northern and southern routes. Although the road characteristics of the links are the same up to Boborinter and then again between the two routes subchains, there are differences in cost and time in the port node–lower transport cost and higher transportation time per unit in the stripped subchain. The stripping process in Terminal du Sahel increases costs, increases the risk of breakage and loss, and risks compromising the bonded status of transit cargo. It also promotes the overloading of trucks to save on fixed costs, which results in damage to the road infrastructure. Nevertheless, this seems to be the preferred option for transporting transit cargo in West Africa.

Figure 3–2

FastPath Schematic Display of Lomé–Bamako Corridor for Containerized Inbound Transit Traffic



Port Performance

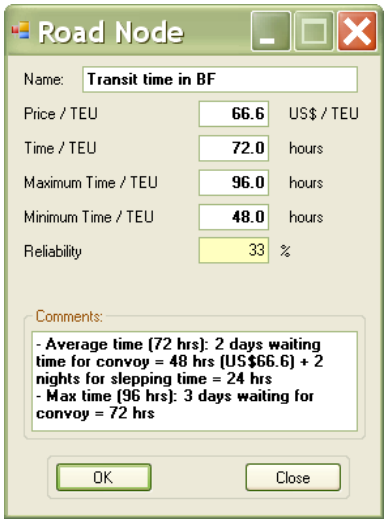
Port of Lomé information is available in Lomé–Ouagadougou report (Nathan Associates 2012).

Road Performance

When a truck arrives in Burkina Faso, transit cargo going to Mali must proceed to Ouagarinter or Boborinter to wait for a Burkinabe customs official to process the transit documents. Trucks spend up to three days waiting for the transit convoy to form. We included in our calculations time waiting for the convoy as well as time truckers need to rest while traveling from Ouagadougou to Bamako. On average, trucks spend two nights on the road. This information is incorporated into the model using a transit node (see Figure 3–3).

Figure 3–3

FastPath Data Entry Screen for Waiting Time Due to Convoy Formation and Resting Time

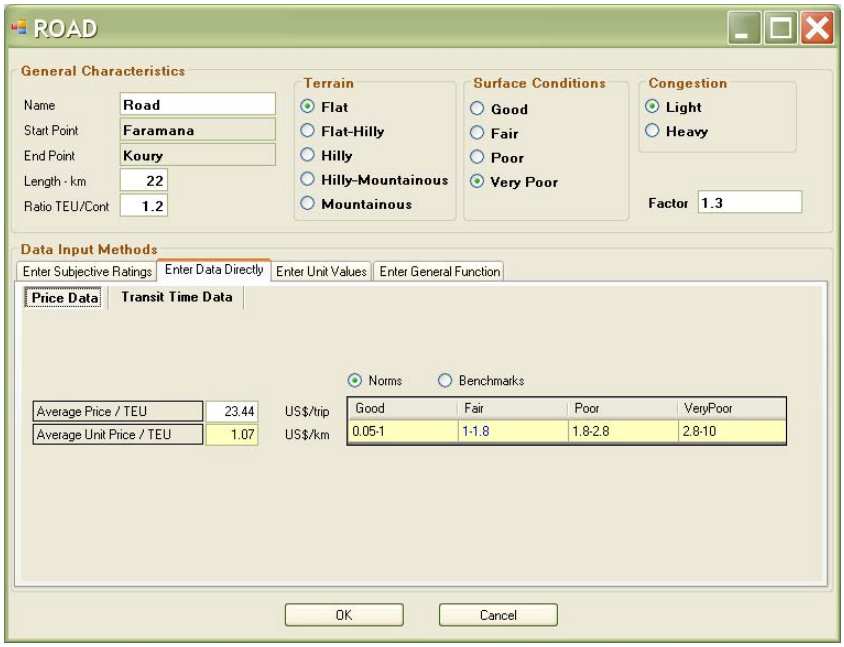


The convoy system creates delays because it is based on the physical presence of customs officers. The customs transit system must move toward electronic satellite tracking and less dependence on the presence of customs officers. An electronic system can include a risk management system with progressive transition to ex post document inspection.

Table 2–5 presented the characteristics of the road segments that informed the road component analysis, and Table 2–6 showed how the segments were reorganized for FastPath analysis. Each road segment had a separate data entry screen. For illustration purposes, Figure 3–4 presents the road segment connecting the border posts of Faramana with Koury.

Figure 3–4

FastPath Price Data Entry Screen for the Road Link Connecting Faramana with Koury



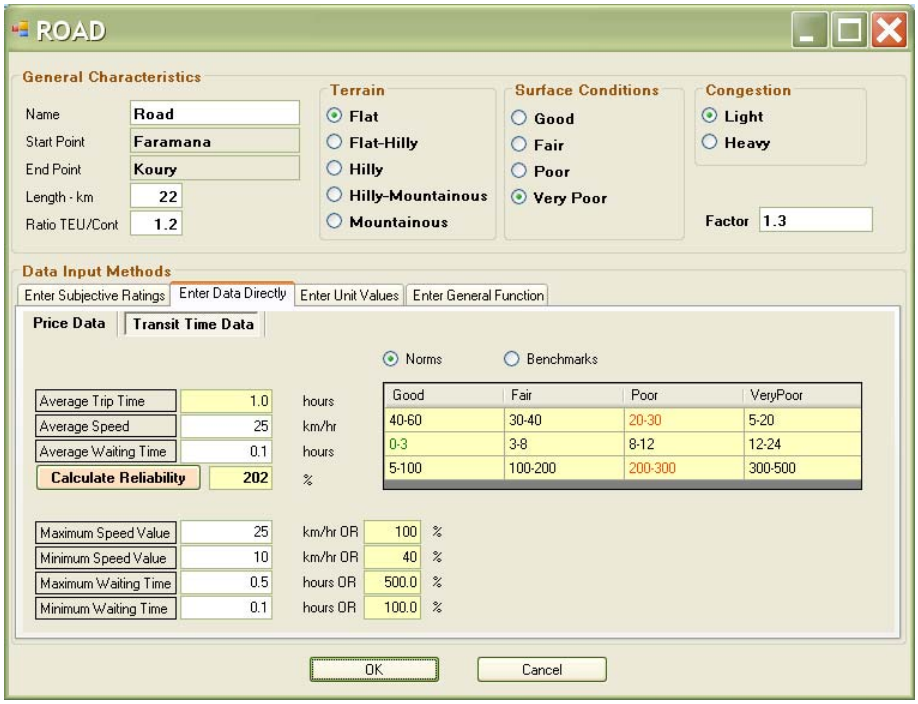
Total road transport cost must be broken down to establish cost per segment. We have reviewed the physical characteristics of each segment, including terrain, road surface condition, and congestion. With this information FastPath establishes a road segment factor, which is used to estimate cost associated with the use of this segment. For example, given the conditions of flat terrain, very poor surface condition, and light congestion along the segment Faramana–Koury, the road segment factor is 1.3. With the total length of the segment, the road segment factor, and the total road transport cost, we establish an average price of $23.44 per TEU. The unit price per

TEU–km is $1.07–in the fair range. We determine the average price for each road segment along each subchain and the entire corridor in a similar way.

Figure 3–5 shows the transit time data screen for the Faramana–Koury road segment. The information entered into the model was based on the average travel time collected during the field visit to Burkina Faso and Mali and cross–checked through interviews with cargo owners and truck drivers. For this link, the average trip time is about 1 hour and average wait time 0.1 hour (6 minutes). The average speed for this segment is therefore 25 km/h.

Figure 3–5

FastPath Transit Time Data Entry Screen for the Road Link Connecting Faramana and Koury

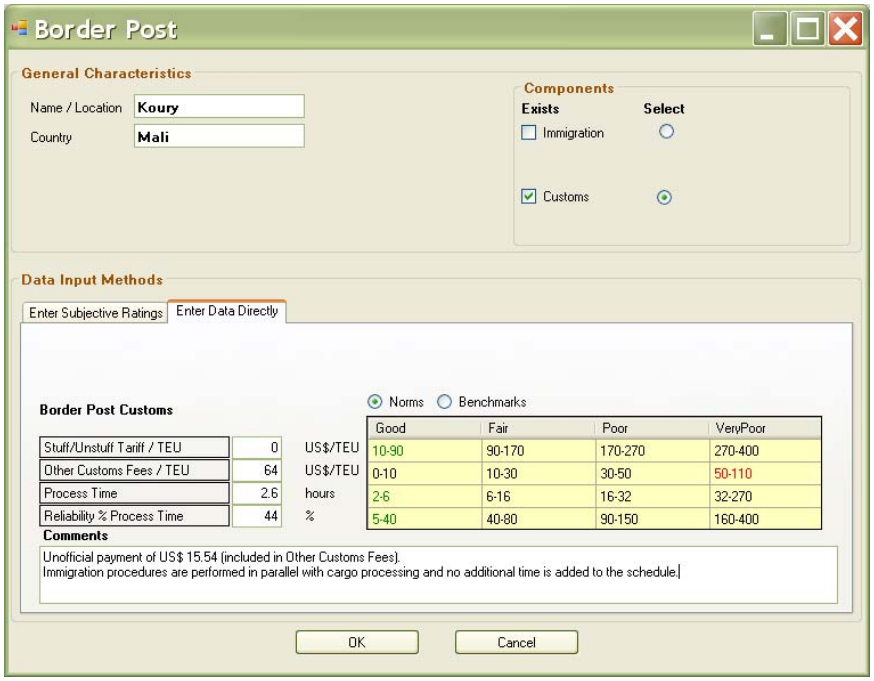


Border Post and Customs Performance

Besides customs clearance for transit cargo at Ouagarinter or Boborinter, three other processes are related to customs operations along the corridor: on the southern route customs clearance takes place at the Koloko (Burkina Faso) and Hérémakono (Mali) border posts; on the northern route customs clearance takes place at Faramana (Burkina Faso) and Koury (Mali); and all cargo is processed in Faladje in Bamako. The West Africa Trade Hub collected details on the time, costs, and delays associated with all the processes. This information was the basis for the data entered into FastPath (see Figure 3–6, the data entry screen for border operations at Koury for inbound transit cargo. Operations at Koury in the inbound direction are mainly to confirm that transit cargo is entering the country and to process immigration documents for trucks and truckers. In all border posts, immigration procedures are performed in parallel with cargo processing and no additional time is added to the schedule.

Figure 3–6

FastPath Data Entry Screen for Koury Border Post Inbound Operations

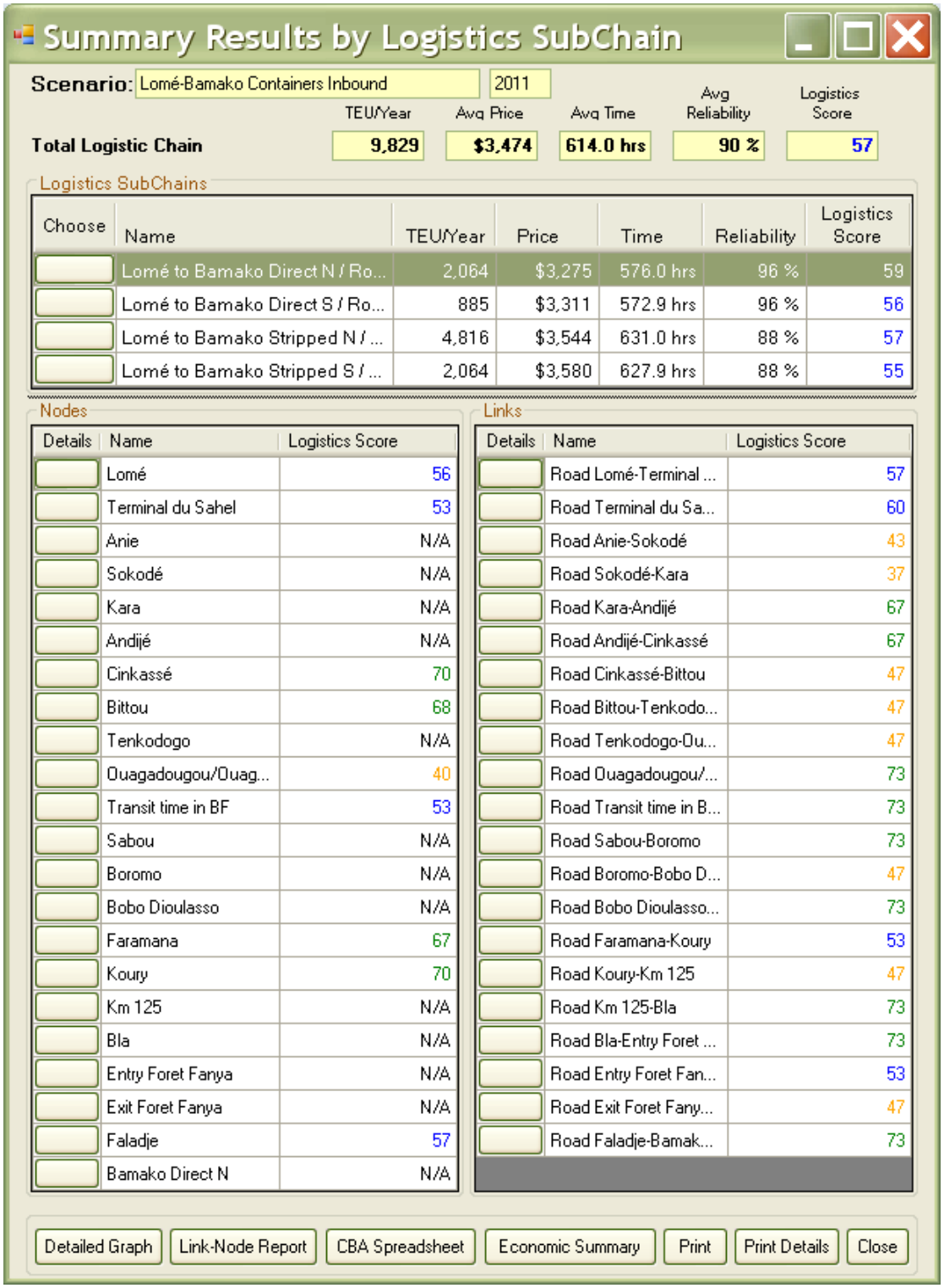


Total costs incurred at Koury in the inbound direction include $64.38 per TEU, of which $15.54 goes to unofficial payments. The process takes 2.6 hours on average, with average delays of about 4.25 hours, indicating that reliability is 44 percent. Performance for price, time, and reliability fall in the ranges of fair and good, as seen in Figure 3–7.

Figure 3–8 shows the data entry screen for customs at Faladje. The processes in Faladje account for a total of $99.92 ($66.6 official and $33.3 unofficial), 3.6 hours processing time, and reliability of 113 percent.

Figure 3–7

FastPath Summary Output Screen for Lomé–Bamako Inbound Containerized Traffic



Summary Results by Logistics SubChain

Scenario: Lomé-Bamako Containers Inbound 2011

	TEU/Year	Avg Price	Avg Time	Avg Reliability	Logistics Score
Total Logistic Chain	9,829	$3,474	614.0 hrs	90 %	57

Logistics SubChains

Choose	Name	TEU/Year	Price	Time	Reliability	Logistics Score
	Lomé to Bamako Direct N / Ro...	2,064	$3,275	576.0 hrs	96 %	59
	Lomé to Bamako Direct S / Ro...	885	$3,311	572.9 hrs	96 %	56
	Lomé to Bamako Stripped N / ...	4,816	$3,544	631.0 hrs	88 %	57
	Lomé to Bamako Stripped S / ...	2,064	$3,580	627.9 hrs	88 %	55

Nodes

Details	Name	Logistics Score
	Lomé	56
	Terminal du Sahel	53
	Anie	N/A
	Sokodé	N/A
	Kara	N/A
	Andijé	N/A
	Cinkassé	70
	Bittou	68
	Tenkodogo	N/A
	Ouagadougou/Ouag...	40
	Transit time in BF	53
	Sabou	N/A
	Boromo	N/A
	Bobo Dioulasso	N/A
	Faramana	67
	Koury	70
	Km 125	N/A
	Bla	N/A
	Entry Foret Fanya	N/A
	Exit Foret Fanya	N/A
	Faladje	57
	Bamako Direct N	N/A

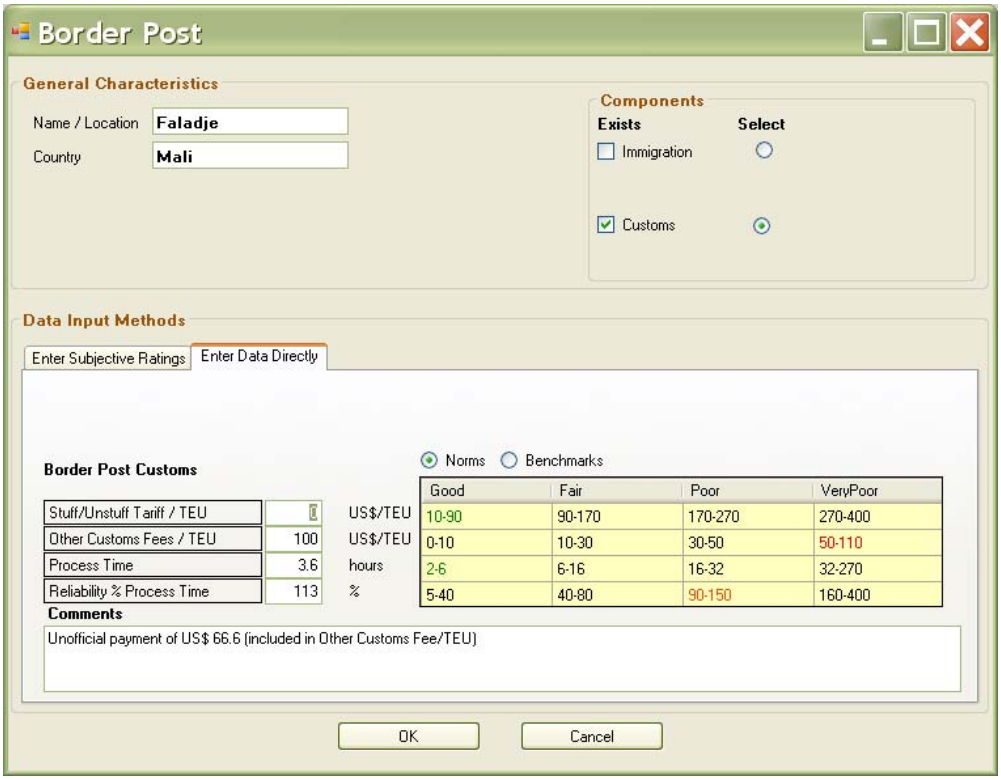
Links

Details	Name	Logistics Score
	Road Lomé-Terminal ...	57
	Road Terminal du Sa...	60
	Road Anie-Sokodé	43
	Road Sokodé-Kara	37
	Road Kara-Andijé	67
	Road Andijé-Cinkassé	67
	Road Cinkassé-Bittou	47
	Road Bittou-Tenkodo...	47
	Road Tenkodogo-Ou...	47
	Road Ouagadougou/...	73
	Road Transit time in B...	73
	Road Sabou-Boromo	73
	Road Boromo-Bobo D...	47
	Road Bobo Dioulasso...	73
	Road Faramana-Koury	53
	Road Koury-Km 125	47
	Road Km 125-Bla	73
	Road Bla-Entry Foret ...	73
	Road Entry Foret Fan...	53
	Road Exit Foret Fany...	47
	Road Faladje-Bamak...	73

Detailed Graph | Link-Node Report | CBA Spreadsheet | Economic Summary | Print | Print Details | Close

Figure 3–8

FastPath Data Entry Screen for Faladje Customs Operations



When all the information has been input into the model, FastPath generates indicators that summarize data (on price, time, and reliability) by subchain and for the total chain. For containerized cargo, FastPath also calculates an overall logistics efficiency score ranging from 20 (poor) to 80 (good). Figure 3–7 presents the FastPath summary output screen for Lomé–Bamako inbound containerized freight, including the performance of the different components of one of the subchains (direct containers northern route).

As mentioned in Chapter 2, the logistics scores are based on a comparison of the performance of a particular component with norms. The performance of each component in terms of time, cost, and reliability is assigned a score according to its rating–80 for good, 60 for fair, 40 for poor, and 20 for very poor. Then the component logistics score is determined as the average score of the three variables (time, cost, and reliability).

Score calculations are made for all components of the logistics chain. The overall logistics efficiency score for a logistics subchain is calculated as a weighted average of the individual logistics scores of the components of that subchain. The weighting factor is the time taken at each step.

A quick review of the logistics scores generated for the containerized inbound scenario show that the road segments connecting the Boromo–Bobo Dioulasso, Koury–Km 15, and Exit Foret Fanya–Bamako share the worst logistics score (47). Cost is the variable that lowers all road link scores. We present a more detailed interpretation of the score results in Chapter 4.

SCENARIO 2: OUTBOUND CONTAINERIZED TRANSIT TRAFFIC (MALI TO BURKINA FASO)

The direction of transit cargo on the Lomé–Bamako transport corridor tends to run one way–inbound. Furthermore, all outbound transit cargo handled through Lomé was exported in containers–a total of approximately 1,092 TEU. Assuming the same distribution as for inbound cargo between direct containers and stripped cargo, these included approximately 328 TEU transported directly from Bamako to Lomé and 764 TEU that are transported as breakbulk in trucks initially and then consolidated in containers at the shipping line yard in Lomé. Export volume requiring consolidation incurs additional time and charges before entering the port than full containers arriving directly from Bamako. Consolidation charges are incorporated into the subchain calculations for cost and time.

Trucks bringing noncontainerized cargo from Bamako to be consolidated in Lomé carry an average volume equivalent to one 20–foot container load. Therefore, charges that apply to a truck are accounted for in the equivalent charge for one 20–foot container (1 TEU). In determining the total TEU cost for outbound traffic and given that all cargo is handled at the port in containers, we assumed that SE2M or Manuport handles the container using the container terminal where all cargo is loaded. Therefore, the charges at the port used in the FastPath model are those associated with the SE2M or Manuport terminals. Figures 3–9 and 3–10 show the characteristics of the outbound flows and the schematic representation of the corridor for containerized outbound cargo, respectively.

Figure 3–9

Transit Flows Included in the FastPath Outbound Containerized Scenario (Scenario 2)

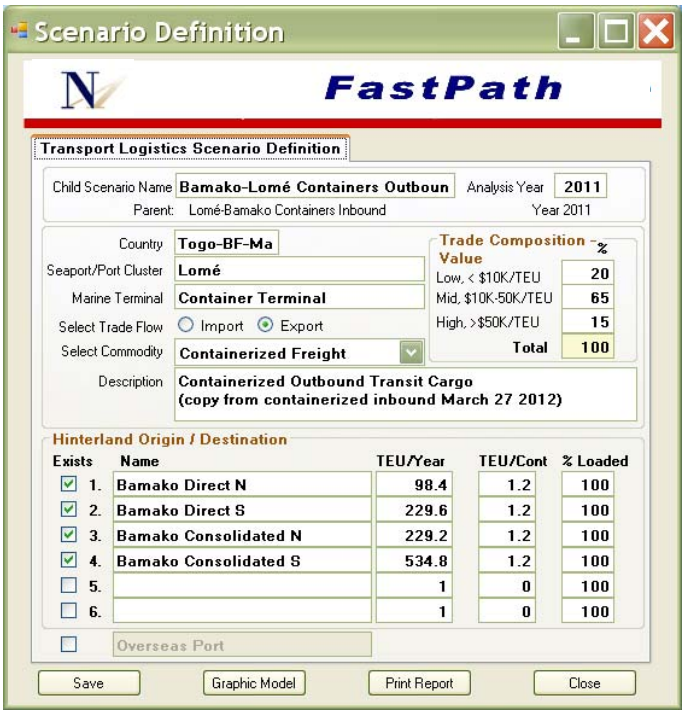
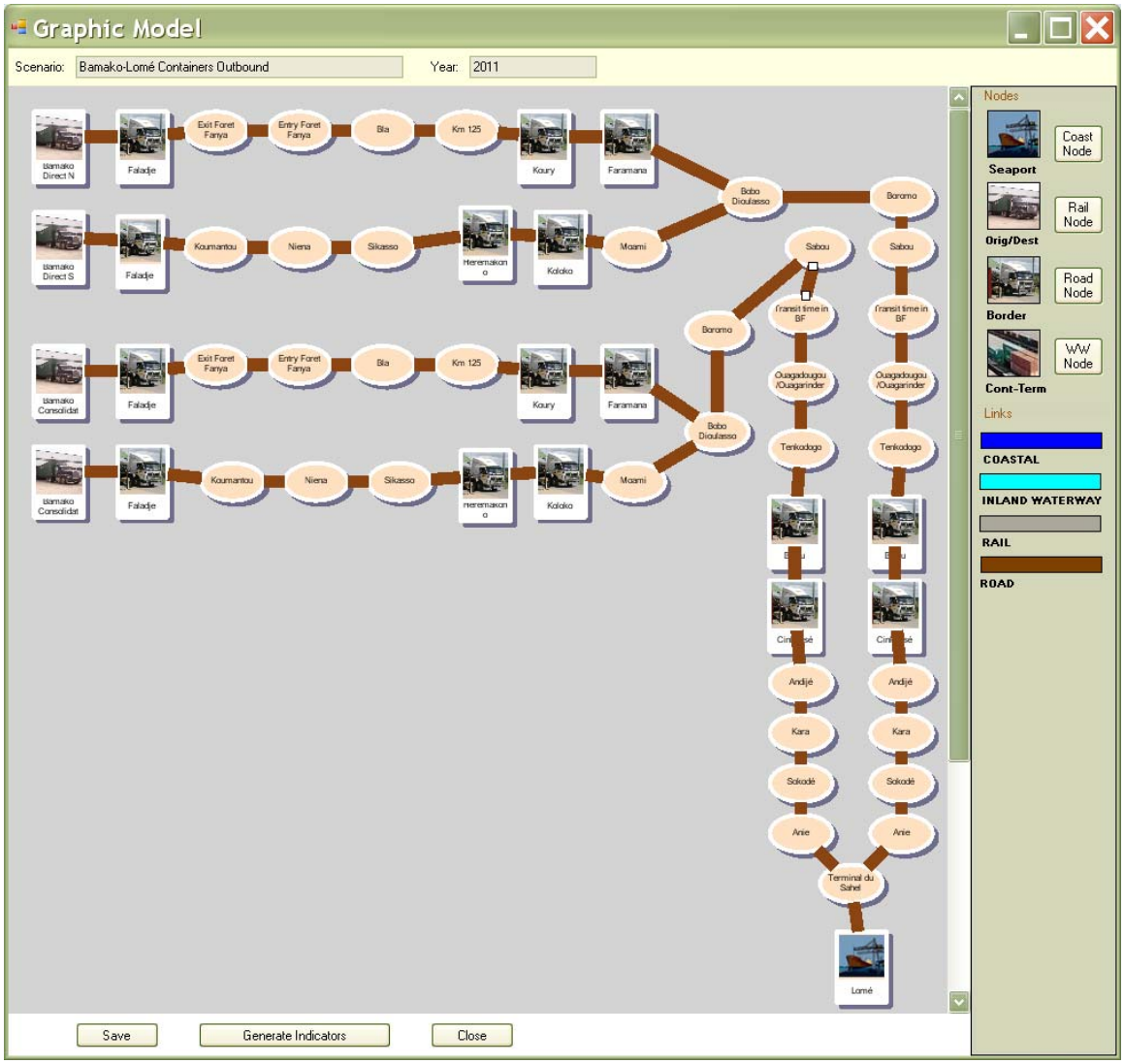


Figure 3–10

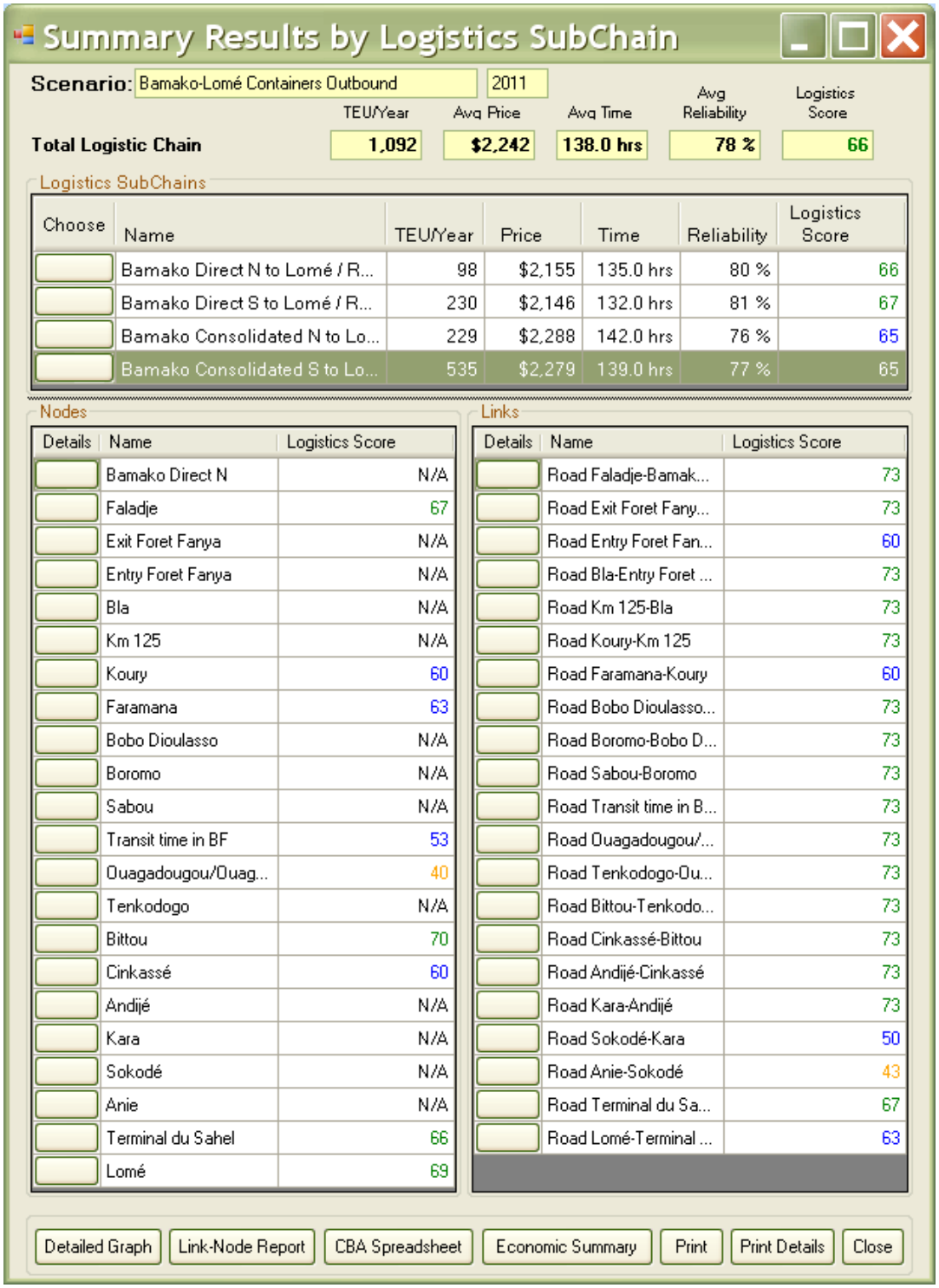
FastPath Schematic Display of Lomé–Bamako Corridor for Containerized Outbound Transit Traffic



Logistics scores for this scenario were generated following the same procedure described above. Figures 3–11 and 3–12 present the most relevant results for the outbound containerized scenario, including the logistics scores for the southern consolidated scenario.

Figure 3–11

FastPath Summary Output Screen for Lomé–Bamako Outbound Containerized Traffic



Summary Results by Logistics SubChain

Scenario: Bamako-Lomé Containers Outbound 2011

	TEU/Year	Avg Price	Avg Time	Avg Reliability	Logistics Score
Total Logistic Chain	1,092	$2,242	138.0 hrs	78 %	66

Logistics SubChains

Choose	Name	TEU/Year	Price	Time	Reliability	Logistics Score
	Bamako Direct N to Lomé / R...	98	$2,155	135.0 hrs	80 %	66
	Bamako Direct S to Lomé / R...	230	$2,146	132.0 hrs	81 %	67
	Bamako Consolidated N to Lo...	229	$2,288	142.0 hrs	76 %	65
	Bamako Consolidated S to Lo...	535	$2,279	139.0 hrs	77 %	65

Nodes

Details	Name	Logistics Score
	Bamako Direct N	N/A
	Faladje	67
	Exit Foret Fanya	N/A
	Entry Foret Fanya	N/A
	Bla	N/A
	Km 125	N/A
	Koury	60
	Faramana	63
	Bobo Dioulasso	N/A
	Boromo	N/A
	Sabou	N/A
	Transit time in BF	53
	Ouagadougou/Ouag...	40
	Tenkodogo	N/A
	Bittou	70
	Cinkassé	60
	Andijé	N/A
	Kara	N/A
	Sokodé	N/A
	Anie	N/A
	Terminal du Sahel	66
	Lomé	69

Links

Details	Name	Logistics Score
	Road Faladje-Bamak...	73
	Road Exit Foret Fany...	73
	Road Entry Foret Fan...	60
	Road Bla-Entry Foret ...	73
	Road Km 125-Bla	73
	Road Koury-Km 125	73
	Road Faramana-Koury	60
	Road Bobo Dioulasso...	73
	Road Boromo-Bobo D...	73
	Road Sabou-Boromo	73
	Road Transit time in B...	73
	Road Ouagadougou/...	73
	Road Tenkodogo-Ou...	73
	Road Bittou-Tenkodo...	73
	Road Cinkassé-Bittou	73
	Road Andijé-Cinkassé	73
	Road Kara-Andijé	73
	Road Sokodé-Kara	50
	Road Anie-Sokodé	43
	Road Terminal du Sa...	67
	Road Lomé-Terminal ...	63

Detailed Graph | Link-Node Report | CBA Spreadsheet | Economic Summary | Print | Print Details | Close

Figure 3–12

FastPath Lomé Port Performance for Outbound Traffic

Performance in the containerized outbound scenario suggests that outbound performance is better than inbound. This difference is common in corridors serving import–oriented countries. The nodes that have the lowest score are Customs in Ouagarinter (40) (mainly because of the cost of transit documents), the city of Annie where consolidation takes place, and the node that takes into account the transit time and convoy fee. The superior performance of outbound road links is due to lower transport costs in the outbound direction. Handling charges at the port are more expensive than international norms. Also berth productivity is relatively low, resulting in a fair–good score for berth operations.

SUMMARY OF FASTPATH RESULTS

Table 3–2 presents a summary of the time, cost, reliability, logistics score, and performance rating for all two scenarios generated for the Lomé–Bamako corridor. To demonstrate the economic importance of the corridor in the parameters of each scenario, we used FastPath's economic importance estimation tool to gauge the value of trade flows as a percentage of Mali's GDP. This also provides a measure of the significance of the logistics costs in the context of trade value. These estimates were derived by entering data on transit traffic volume, trade composition distribution, and TEU/container ratio into FastPath.

Table 3–2

Time, Cost, Reliability and Logistics Score for Lomé–Bamako Corridor

Component	Performance Measure					
	TEU/Year*	Average Price ($)	Average Time (hr)	Reliability (%)	Logistics Score	Rating
INBOUND CONTAINERIZED TRANSIT TRAFFIC (SCENARIO 1)						
Direct container north	2,064.3	3,275	576.0	96	59	Fair
Direct container south	884.7	3,311	572.9	96	56	Fair
Stripped container north	4,816.0	3,544	631.0	88	57	Fair
Stripped container south	2,064.0	3,580	627.9	88	55	Fair
Total chain	**9,829.0**	**3,474**	**614.0**	**90**	**57**	Fair
OUTBOUND CONTAINERIZED TRANSIT TRAFFIC (SCENARIO 2)						
Direct container north	98	2,155	135.0	80	66	Fair–Good
Direct container south	230	2,146	132.0	81	67	Fair–Good
Consolidated container north	229	2,288	142.0	76	65	Fair–Good
Consolidated container south	535	2,279	139.0	77	65	Fair–Good
Total chain	**1,092**	**2,242**	**138.0**	**78**	**66**	Fair–Good

Scenario 1: Inbound Transit Traffic (Burkina Faso to Mali)

Malian inbound transit traffic containers moved along this transport chain accounted for 9,829 TEU, with an estimated total value of $34.1 million–equivalent to 8.75 percent of Mali's GDP. Furthermore, the estimated value of trade flows accounted for $390.4 million, or about 4.35 percent of Mali's GDP. This scenario accounts for both direct and stripped containerized transit cargo.

Scenario 2: Outbound Containerized Transit Traffic (Mali to Burkina Faso)

Outbound transit traffic containers moved along this transport chain accounted for 1,092 TEU, with an estimated total value of $2.4 million–equivalent to 5.64 percent of Mali's GDP. The estimated value of trade flows accounted for $43.4 million, representing about 0.49 percent of Mali's GDP. This scenario accounts for both direct and stripped containerized transit cargo.

4. Results Interpretation

A key feature of a FastPath analysis is the comparison of corridor performance to international norms and benchmarks. Armed with this information, transport corridor stakeholders can develop action plans for improving corridor performance. FastPath generates diagnostic bar charts with the data entered for each scenario and with the norms from the database. These charts compare the existing situation to one in which the norms are all good. The price bar chart shows the breakdown of price by mode on the left side and compares it with good performance on the right. A similar bar chart is generated for transit times, including waiting times.

Transport and logistics chains are composed of similar activities, regardless of where in the world they occur. We benchmark transport and logistics performance in West Africa against performance in Southern Africa and other regions of the world to judge the performance of the Ouagadougou–Bamako corridor. In this chapter we compare the Ouagadougou–Bamako corridor performance to performance in the following corridors that have already been the subject of FastPath analysis:

- **Lomé–Ouagadougou (2011).** Nathan Associates, in collaboration with the West Africa Trade Hub, analyzed the second of three corridors, Lomé (Togo) to Ouagadougou (Burkina Faso), following the methodology used on Tema–Ouagadougou corridor. This analysis included a performance assessment of major transport infrastructure, including the port of Lomé, the road connecting Lomé with Ouagadougou, the border posts of Bittou in Togo and Cinkassé in Burkina Faso, and the Customs clearing facility in Ouagarinter. Comparing data between the Tema–Ouagadougou and Lomé–Ouagadougou corridors allows Burkinabe shippers to evaluate two options for shipping imports and exports.
- **Tema–Ouagadougou (2008).** Nathan Associates, in collaboration with the West Africa Trade Hub, conducted a FastPath analysis of the Tema–Ouagadougou corridor that included a performance assessment of major transport infrastructure, including the port of Tema, the road connecting Tema with Ouagadougou, the border posts of Paga in Ghana and Dakola in Burkina Faso, and the customs clearing facility in Ouagarinter.
- **Lagos–Kano–Jibiya (2009).** Supporting the Global Food Security Response program to help Nigeria increase agricultural productivity, expand market supply, and remove constraints to the transport and distribution of food supply within Nigeria, Nathan Associates conducted a logistics assessment of the corridor linking the port of Lagos with the city of Kano in the northern region of the country. The FastPath assessment will allow the comparison of the Lomé–Ouagadougou corridor with other countries in the region that will not be assessed by the West Africa Trade Hub. Although the assessment was at

the national level and therefore does not have a border post component, it will provide comparable performance information for port, customs, and roads.

- **Maputo (2007).** In 2007, Nathan Associates conducted a FastPath pilot analysis of the Maputo corridor in Southern Africa between the port of Maputo (Mozambique) and the inland depot of Nelspruit (South Africa), and between the port of Durban (South Africa) and Nelspruit. Comparing performance data between Southern and West Africa has strategic importance for West Africa to understand its competition on the continent.
- **Association of Southeast Asian Nations (ASEAN) region (2006)**
  - **Vientiane (Laos) to Laem Chabang (Thailand)–**Like Burkina Faso, Laos is a landlocked country that depends on the port infrastructure of neighboring countries. The transit route with the highest volume of freight movement is the route via the port of Laem Chabang, Thailand. This is a road–and–rail corridor that suffers from a number of impediments at border crossings. Laem Chabang is a popular port for goods transiting through Thailand on their way to Laos.
  - **Danang Port (Vietnam) to Mukdaharn (Thailand) via Sawanakhet (Laos).** This road corridor crosses three countries. Although the road has been upgraded, constraints on corridor efficiency remain. This corridor has always been considered to have high transit potential. Danang is a popular port for goods transiting through Vietnam on their way to Thailand.
- ***Dacca–Chittagong (2007).*** The Dacca–Chittagong corridor in Bangladesh has been selected as a basis of comparison because it is a relatively poor performer in the Asia region.

We also recommend concrete steps for improving Ouagadougou–Bamako corridor performance, analyzing the costs and benefits for some recommendation.

OUAGADOUGOU–BAMAKO CORRIDOR PERFORMANCE AND INTERNATIONAL NORMS

In this section we present the performance of the Ouagadougou–Bamako corridor for containerized cargo. Each scenario is compared with the ideal situation (in which all variables perform with a value rated good).

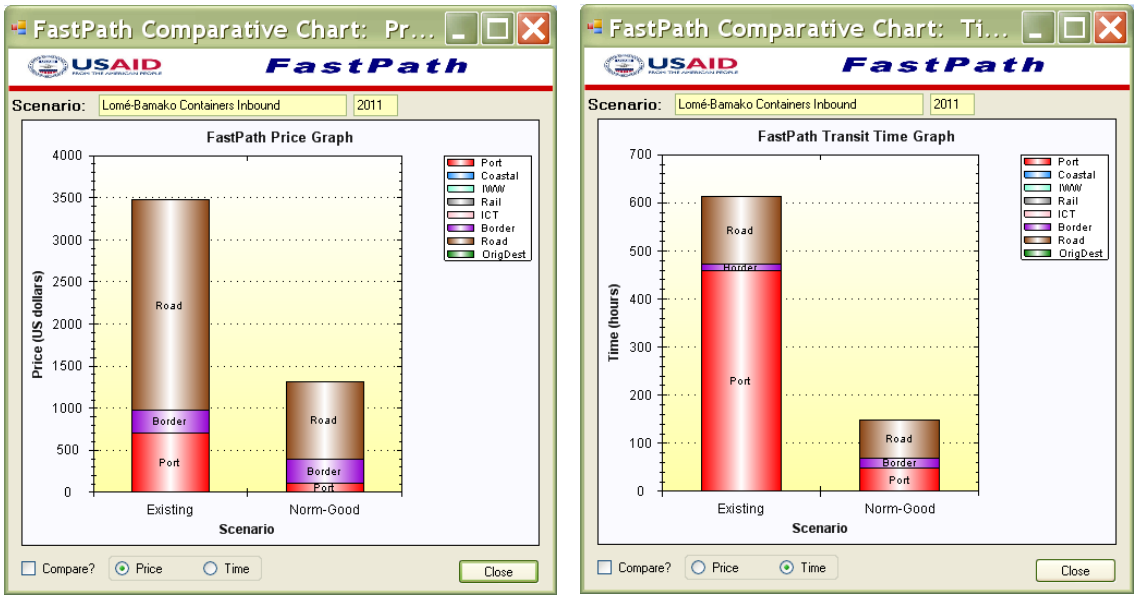
Scenario 1: Inbound Containerized Transit Traffic (Burkina Faso to Mali)

Figure 4–1 shows the performance in time and cost of inbound containerized traffic, comparing it with internationally accepted norms for good performance. The price graph (left) shows the high costs for all components of the corridor, especially for road transport; in the time graph (right) total time at Lomé port makes up almost 80 percent of the total time incurred along the transport chain.

Port performance. Performance at the port of Lomé is described in Nathan Associates (2012). Figure 4–1 summarizes the activities at the port and shows that they are priced seven times more than the good norm, and procedures take 15 days longer than the good norm.

Figure 4–1

FastPath Price and Time Comparison for Ouagadougou—Bamako Inbound Containerized Transit Traffic, 2011



Road performance. Surface transport for inbound traffic has an intermediate–fair rating, with road travel time rated good–fair in many sections, particularly in Burkina Faso, and fair–poor in others. Reliability for road transit time is rated fair on the majority of segments and good on others. Nevertheless, price on the majority of the road segments is rated fair, about $1.30 TEU–km (relatively high). This is due to several factors, including the lack of backhaul cargo for the return trip, which means that most trucks return empty, the age of the trucks, and the condition of some road components. Inbound prices normally incorporate costs for the empty return trip. This is common throughout the world in countries with low export volume and a trade imbalance. This is particularly detrimental for landlocked countries.

The average cost per container–km in the Lomé–Ouagadougou–Bamako corridor shown in Table 4–1 is lower than other West Africa comparators, but it is still high when compared with other regions of the world and with international best practices. Several factors contribute to the high prices for Lomé–Ouagadougou–Bamako corridor: the age of the trucks used, the lack of backhaul cargo, low productivity, and unreliable queuing systems at the port to assign cargo to trucking companies, among others.

The average speed of 50 km/h is fair and compares with Tema–Ouagadougou, also a fair performer. Average delay times are higher than for other corridors because of the time spent at the transit country border (Burkina Faso) waiting for escort convoys to Bamako to be formed. The reliability measure is similar to that of most African corridors in the table. The overall logistics score is 57, which is close to a fair rating, and comes in close to Dacca–Chittagong and slightly higher than Tema–Ouagadougou. Road conditions in Togo and Mali are considerably worse than conditions on the segments in Burkina Faso.

Table 4–1

Comparison of Inbound Road Transport Performance on Selected Segments of Selected Corridors for Containerized Freight

Component	Entire Lomé–Ouagadougou–Bamako Corridor	Lomé–Ouaga Corridor, Lomé–Togo Border Segment	Tema–Ouaga Corridor, Tema–Ghana Border Segment	Lagos–Kano Corridor	Laem Chabang–Vientiane Corridor, Laem Chabang–Thai Border	Entire Dacca–Chittagong Corridor	Entire Durban–Nelspruit Corridor	Maputo–Nelspruit Corridor, Maputo–Mozambique Border Segment
Average cost per TEU–km	$1.3[b]	$2.0	$2.4	$2.5	$1.2	$1.2	$2.0	$2.5[c]
Average speed	50 kph	36 kph	40 kph	20 kph	51 kph	35 kph	100 kph	60 kph
Average delay time	24 hrs [d]	1.1 hrs	4 hrs	30 hrs [e]	1 hr	1 hr	2 hrs	1 hr
Unofficial costs (%)	3.0%	5.4%	1.0%	10% (est.)	10% (est.)	15%	5% (est.)	10% (est.)
Reliability[a]	90%	94%	110%	100%	29%	83%	100% (est.)	105%
Logistics score	57	57	55	39	70	58	65	51

Note: [a] Percent of average transit time that would include 90% of shipments
[b] Very long haul distance (1,795–1,886 km).
[c] Very short haul distance (60 km). This drops to $2 per TEU–km for longer distances.
[d] Includes 2 overnight rests.
[e] Includes 3 overnight rests.

The efficiency of the Ouagadougou–Bamako corridor is attributable to low volume and light traffic from Ouagadougou to Bamako from the port of Lomé. If traffic increases, however, congestion will increase.

Border post performance. Inbound operations at the border post are assessed separately for Faramana and Koury (northern route border posts), and Koloko and Hérémakono (southern route border posts). Performance at Faramana and Koloko is relatively good, at scores of 67 and 70, respectively. Performance at Koury and Hérémakono in Mali is also good, at a score of 70 for both–good– but activities performed there may not include customs clearance but only a review of immigration documents, a preliminary review of clearing documents, and entry of import data into the customs system. Most import cargo entering Mali must proceed to Faradje, the customs facility in Bamako, to be cleared through customs. Therefore, to compare performance of customs clearance with that at other border posts, we made an adjustment of time and cost, taking into consideration that the process starts at the Malian border post and continues in Faradje. The adjustment combines the operations of each node, adding the time, cost, and reliability variables. The combined results and logistics scores are presented in Table 4–2.

Table 4–2

Inbound Customs Clearance and Border Post Operations Adjusted for Malian Border Post and Faradje

Price ($/TEU)	Price Score	Time (Hours)	Time Score	Reliability %	Reliability score	Logistics Score
82.1	20	8.0	60	137	40	40

Note: Performance based on 2009 data

The combined performance, with a logistics score of 40, is poor. The price per TEU is high even though it does not include a second guarantee fund charge equivalent to 0.25 percent of the value of the goods paid when entering Burkina Faso. Because this charge varies depending on the value of the products imported, it is not included in our price calculations. The average time for Customs clearance combining Hérémakono or Koury with Faradje is fair, at about 8 hours (i.e., 1 day of 8 working hours per day), and the reliability of this time is also poor, at 137 percent.[8]

The average cost per container to cross the Togo–Burkina Faso border for inbound traffic shown in Table 4–3 is significantly higher than for the comparison corridors, even when compared with a similar operation for the Tema–Ouagadougou corridor. Average cost takes into consideration that customs operations in Burkina Faso are performed partially at the border post (Bittou) and continue at Ouagarinter.

[8] Reliability is the percent of average transit time that would include 90 percent of shipments. “Good” reliability is in the 0-40 percent range. The time required for clearing goods at Faradje varies from 3 to 11 hours, explaining the poor rating for reliability.

Table 4–3

Comparison of Border Post Performance in Selected Corridors for Inbound Containerized Freight

Performance Component	Ouaga–Bamako	Lomé–Ouaga	Tema–Ouaga	Laem Chabang–Vientiane	Maputo–Nelspruit
Average cost per container[a]	$82.15	$752	$457	$180	$200
Average transit time[a]	6.2 hrs	29.9 hrs	90.7 hrs	3 hrs	4 hrs
Unofficial costs (%)[a]	57%	24%	25%	20% (est.)	10% (est.)
Reliability[b]	90%	127%	250%	125%	56%
Logistics score, border post 1, inbound	70/67 (Burkina Faso)	70 (Togo)	73 (Ghana)	67 (Thailand)	73 (Mozambique)
Logistics score, border post 2, inbound	40 (Mali)	33 (Burkina Faso)	20 (Burkina Faso)	63 (Laos)	73 (South Africa)

Note: To compare customs operations with those in corridors where clearance is conducted at the border, the border post in Mali and Burkina Faso was combined with dry port operations near the capital.

[a]*Numbers include border posts on each side of border for official and unofficial costs*

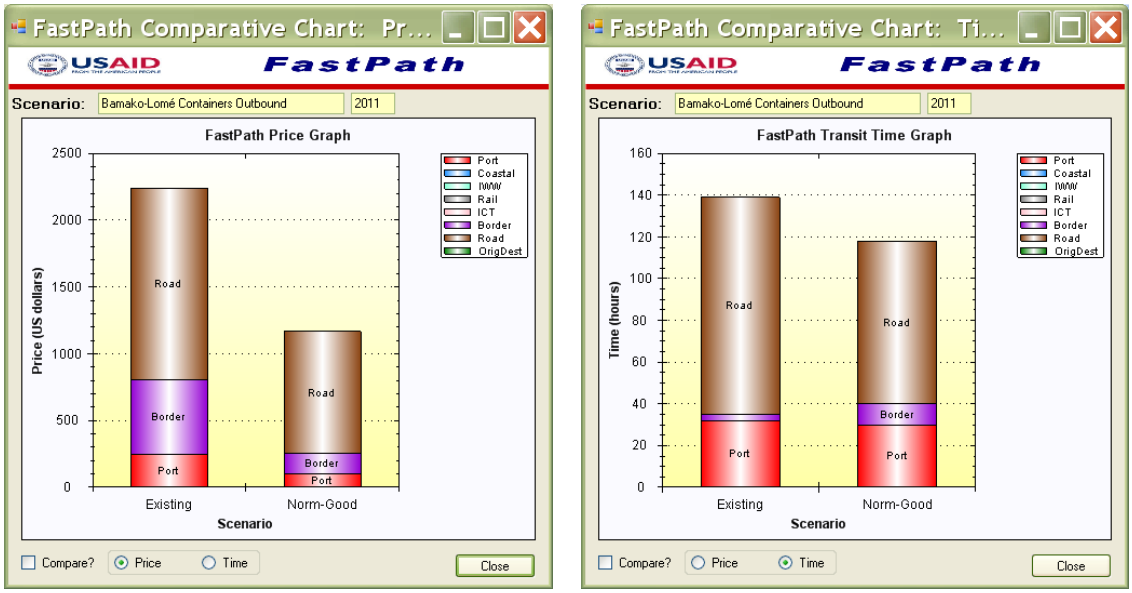
[b]*The percent of average transit time that would include 90 percent of shipments.*

Scenario 2: Outbound Containerized Transit Traffic (Mali to Burkina Faso)

Figure 4–2 shows the performance in time and cost of the outbound transit traffic in comparison with globally accepted norms for good performance. Although the price for road transport in the outbound direction is still high, it is considerably lower than in the inbound direction. The time chart also shows good performance for customs and road.

Figure 4–2

FastPath Price and Time Comparison Graphics for Containerized Outbound Transit Traffic, 2011



Port performance. The port performance at the port of Lomé is described in Nathan Associates (2012). Figure 4–2 summarizes the activities at the port of Lomé and shows that they are priced three times more than the good norm, and procedures take five hours more than the good norm.

Road performance. Road transport time, delays and prices are considerably lower than those in the inbound direction. The trucker carrying outbound cargo does not have to waiting at the Burkinabe border port for escort services to be arranged. Since there is less outbound cargo available, the roads are less congested and prices are more competitive than the inbound route. Road transport logistics score for the outbound direction is rated fair–good and good–fair compared with international standards, except for four segments rated fair.

Border post performance. The border crossing activities in Mali again include a combination of the activities carried out at Faradje with those at the border post (Hérémakono or Koury). Table 4–4 presents the adjusted scores for the Customs clearing process in Mali and Table 4–5 shows the combine indicator to cross the Burkina Faso–Mali border.

Table 4–6 summarizes how the performance of containerized freight of the Lomé–Bamako transport corridor compares to other transport corridors in both directions (inbound and outbound).

Table 4–4

Outbound Customs Clearance and Border Post Operations for Faradje–Malian Border Post

Price ($/TEU)	Price Score	Time (Hours)	Time Score	Reliability %	Reliability Score	Logistics Score
55.5	20	1.1	80	240	20	40

Note: Performance based on 2009 data

Table 4–5

Comparison of Border Post Performance in Selected Corridors for Outbound Containerized Freight

Component	Ouaga–Bamako	Lomé–Ouaga	Tema–Ouaga	Laem Chabang–Vientiane	Maputo–Nelspruit
Average cost per container*	$172	$549	$389	$180	$200
Average transit time[a]	1.6 hr	3.4 hrs	10.3 hrs	3 hrs	8 hrs
Unofficial costs (%)[a]	46%	4.8%	11%	20% (est.)	10% (est.)
Reliability[b]	117%	341%	186%	125%	77%
Logistics score, border post 1, outbound[c]	40 (Mali)	40 (Burkina Faso)	53 (Burkina Faso)	63 (Laos)	63 (South Africa)
Logistics score border post 2, outbound	63 (Burkina Faso)	60 (Togo)	53 (Ghana)	67 (Thailand)	67 (Mozambique)

[a] *Numbers include border posts on each side of border.*

[b] *The percent of average transit time that would include 90 percent of shipments.*

[c] *To compare customs operations with those in corridors where clearance is conducted at the border, the border post in Mali and Burkina Faso was combined with dry port operations near the capital.*

Table 4–6

Comparison of Corridor Performance–Logistics Scores for Containerized Freight

Logistics Component	Lomé–Bamako	Lomé–Ouaga	Tema–Ouaga	Laem Chabang–Vientiane	Dacca–Chittagong[a]	Durban–Nelspruit[a, b]	Maputo–Nelspruit
INBOUND							
Overall logistics chain	57	54	51	64	59	63	62
Port	55	55	55	55	49	60	51
Road transport	56	57	55	70	58	65	51
Border post 1	70 (Burkina Faso)[c]	70 (Togo)	73 (Ghana)	67 (Thailand)	N/A	N/A	73 (Mozambique)
Border post 2	70 (Mali)[c]	33 (Burkina Faso)	20 (Burkina Faso)	63 (Laos)	N/A	N/A	73 (South Africa)
OUTBOUND							
Overall logistics chain	66	57	62	66	54	68	60
Port	69	69	72	65	52	70	57
Road transport	67	65	70	70	58	65	51
Border post 1	60 (Mali)[c]	40 (Burkina Faso)	53 (Burkina Faso)	63 (Laos)	N/A	N/A	63 (South Africa)
Border post 2	63 (Burkina Faso)[c]	53 (Togo)	53 (Ghana)	67 (Thailand)	N/A	N/A	67 (Mozambique)

[a] *Overall logistics score does not include border post node scores.*

[b] *Estimated from partial data in Maputo Corridor analysis.*|

[c] *Border port data correspond to Ouagadougou–Bamako corridor*

CONCLUSIONS ABOUT PERFORMANCE

On the one hand, the performance of the Ouagadougou–Bamako segment of the Lomé–Bamako corridor is similar to the performance of other West African corridors. The Ouagadougou–Bamako corridor lags significantly behind other developing–country corridors used for comparison here with respect to

- The share of inbound containers stripped before the trip to the final destination and consequent low containerization rate;
- Average speed of road transport in Mali;
- Travel time for road transport, particularly in the inbound direction because of the three–day waiting time at Ouagarinter to prepare the transit convoy;
- The choice of longer route in the inbound direction to avoid the weighbridge at Hérémakono and increase the opportunity to overload.

The Ouagadougou–Bamako corridor, however, compares favorably with other corridors in

- Average speed of road transport in Burkina Faso;
- Customs clearing time at the Burkina Faso border (Faramana or Koloko) in the inbound and outbound directions; and
- Border post costs and transit time in the outbound direction.

For other aspects of performance, such as reliability, the Ouagadougou–Bamako corridor is about average.

5. Recommendations and Conclusions

With the information derived from FastPath, the operational review carried out during the field visit to the southern and northern routes of the Ouagadougou–Bamako corridor, and the different processes and procedures required to transport cargo along the corridor, we have identified potential actions to improve performance. The actions are elaborated on below, and Table 5–1 provides a summary.

Table 5–1

Summary of Improvement Evaluations

Improvement Action	Estimated Investment	Present Value of Benefits	Infrastructure Users' Estimated Savings / TEU		Cargo Owners' Estimated Savings /TEU		Evaluation of Investment
			In	Out	In	Out	
Implementation of an Electronic Transit Service	$8.5 million	$9.9 million	$57	N/A	$29	N/A	Highly feasible
Strategy to develop the road transport sector	$5 million	$7.9 million	$6	$6	$3	$3	Feasible
Adapting road design standards to cargo corridor	Varies by project	Varies by project	$4	$4	$2	$2	Varies by project
Developing a bilateral logistics strategy for Burkina Faso and Mali	Low–cost policy actions	Unknown, but outcome would contribute value creation, growth and job creation					Long–term benefits

The term "infrastructure users" in Table 5–1 refers to transport service providers, i.e. freight forwarders and trucking companies. Savings for infrastructure users and cargo owners are estimated from the FastPath analysis presented later in this chapter. For example, in regards to the implementation of the electronic transit system (ETS), a reduction of three days waiting time for trucks is achieved at Ouagarinter or Boborinter plus another hour along the corridor. This reduction improves truck productivity and reduces operating expenses to trucking companies, which might pass a share of the savings to shippers (see Appendix D). A conservative estimation of the total revenue for implementing the ETS would be $114 per trip or $57 per TEU. In a competitive environment, truck operations would transfer part of the addition income to their clients as a reduction in transport rates. We can assume that the trucker will share 50 percent of the additional income to shippers resulting in savings of $57 per trip or $29 per TEU.

COST–BENEFIT ANALYSIS AND FASTPATH

FastPath allows comparison of the costs of two scenarios in a spreadsheet. The user creates an improvement scenario with reduced costs for shippers and uses the FastPath cost–benefit analysis function to create a spreadsheet with cost data from the two scenarios, which then calculates the cost savings in the base year. Assumptions in the spreadsheet allow the user to set growth rates for cost savings and to enter investment costs for making the improvement. The spreadsheet then calculates the net present value to shippers of the improvement for the life of the project.

IMPROVEMENT ANALYSIS

In our analysis we present improvements that are connected particularly to infrastructure components that can complement the improvements suggested by the West Africa Trade Hub. Four potential improvements are analyzed below. Supporting summaries of the cost–benefit analysis components are provided in Appendix E. In this section we discuss order–of–magnitude benefits only; more detailed analysis would be needed to make more accurate estimates.

Implementation of an Electronic Transit Service

The customs corridor system for transit goods, *Solidarité sur la mer*, was put in place to avoid fraud and guarantee the security of transit goods but it creates substantial delays that hurt the transport sector and raises the prices that consumers pay for imported goods. This system is antiquated and should be replaced with satellite tracking that relies less on the presence of Customs officers. With an electronic service Customs can implement a risk management system with progressive transition to ex–post–documentary inspections. In considering an alternative, the electronic transit tracking system that Ghana has begun implementing should be high on the list of possibilities (see Exhibit 5–1 for a description of the system).

Exhibit 5–1

New GCMS Transit Module, Ghana

An enhanced Transit Cargo Module has been developed to integrate transit operations in GCNet/GCMS. The module, implemented in September 2006 for transactions using the Tema–Paga route, has the following features:

- It captures and processes transit declarations.
- Transit bonds are processed and issued electronically.
- It monitors and controls movement of transit goods.
- Transit insurance bonds are automatically released or discharged.

The project has two phases:

Phase 1

- Development and deployment of the Transit Cargo Module in GCMS
- Registration of foreign importers and vehicles used to transport transit consignments
- Connection of designated intervening stations to GCNet/GCMS
- Application of secure seals to containers and open trucks by Customs Excise and Preventing System.
- Installation of closed–circuit television surveillance systems at entry, intermediate and exit stations.
- Posting of transit information to secure website for access by neighboring counties. Registered declarants will also be able to track their consignments.
- Restricted use of escorts.

Phase 2

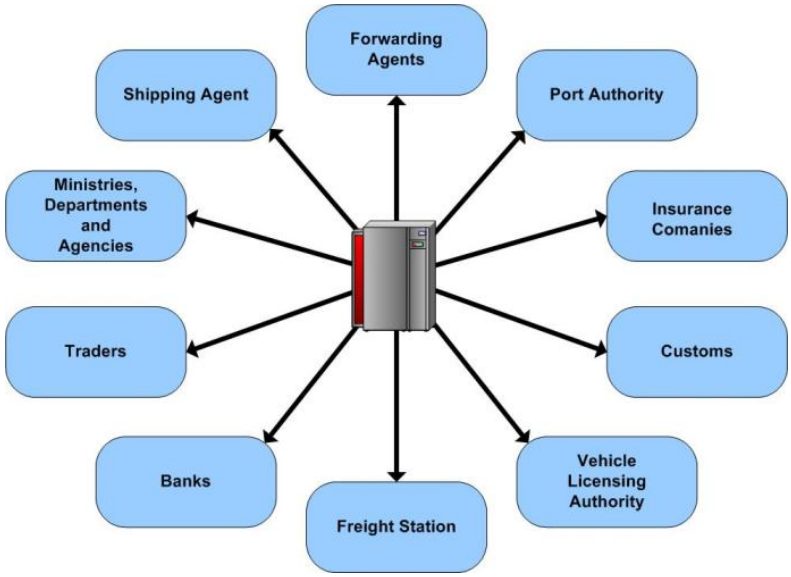
- Integration of electronic cargo tracking systems.
- Provision of weighbridge facilities to ensure vehicles conform to axle load specifications and also monitor weight of cargo as it moves along the route.
- Eventual phasing out of escorts in view of the introduction of customs seals and electronic tracking security systems.

Source: http://www.ghanacustoms.gov.gh

This service is based on a combination of a customs single window and GPS tracking. The project is a public–private partnership, with customs' contribution financed by the World Bank. Such a project requires a communications platform established for the various systems of the port, customs, truck companies, and others. Figure 5–1 shows the components of Ghana's GMCS Transit Module.

Figure 5–1

GMCS Transit Module Components



Source: Ghana Community Network Services Ltd

Another interesting alternative is the *Tránsito International de Mercancías* (TIM) project in Central America. This is an initiative derived from the original Plan Puebla–Panamá–today Mesoamerica Project–that facilitates border crossing for goods in transit. The system is based on the standardization of customs procedures, the adoption of risk management systems, and electronic tracing of goods along "fiscal corridors"–the equivalent of transit corridors in West Africa–by the capture of information in landmarks equipped with sensors and computers. The system generates alarms when an abnormal delay is detected and so also contributes to improved security. The average delay in border crossings that have adopted the system has declined from 1 hour to 8 minutes. This is a low–cost solution because it does not capture real–time information, although this is the long–term goal.

The solution selected must be agreed in the context of regional forum and after a proper cost–benefit analysis of alternatives to determine if the project has political and institutional feasibility. A TIM–like system is the quickest way to extend the benefits of electronic tracking to neighboring countries. A regional cooperation project can support its adoption by several West African countries.

A substantial reduction in transit time for containerized cargo must take place to encourage abandoning the practice of stripping containers. If the transit times for stripped and consolidated cargo remain close, and if prices do not reflect a benefit for keeping cargo in containers–which

must be observed to determine the appropriate measures to correct the market distortion–the practice of stripping will continue and the benefits of a transit system will not be fully realized.

The Ouagadougou–Bamako Electronic Transit System project will have several components:

- Implementation of a customs management system
- Implementation of a single window system
- Implementation of a satellite cargo tracking system

The preinvestment phase could cost $500,000. Investment costs are highly variable but can be estimated at 8 million. Operational costs would be much higher but would be compensated for by savings.

Implementation can be broken down into the following steps and timeframes:

- Fund raising: 12 months
- Diagnosis of situation, general design of the project and PPP arrangements: 18–24 months
- Full implementation: 3–5 years, depending on the degree of automation.

This improvement will benefit only transit cargo. If the project is implemented beginning 2013, it is expected to be fully operational in 2016. Savings to shippers for the first year of operations (2016) will amount to $1.3 million. Assuming that the potential growth for savings will have been reached by 2015 (meaning that no other expansion projects are implemented at the Port of Lomé and port reaches capacity), the present value of benefits would be about $9.9 million, with a 9 percent growth rate of benefits (same as the growth rate of container traffic) and a 12 percent discount rate. The net present value of this improvement would be $1.3 million (see Tables E1a and E1b in Appendix E for details).

Strategy to Develop the Road Transport Sector

Road transport services in the corridor, and in general in the West Africa region, are weak. As we saw during our field visit, vehicles are obsolete and poorly maintained. Constant customs and police roadblocks, low cargo demand, regional quotas, and other issues are among the causes of the problem. A regional strategy is needed to promote the growth of this sector, which can make a substantial contribution to GDP and generate low–skilled jobs. Such a strategy will help identify potential improvements at a national, and perhaps, regional levels and quantify the effects the improvements will have, including how this could affect other sectors of the economy. The strategy should include

- Design and implementation of incentives for sector formalization with control measures, and ways to improve transport network efficiency
- Incentives aimed at keeping cargo in containers as long as possible
- Design and implementation of the legal and institutional framework, perhaps deregulation of the transport sector

The strategy development phase would require about $5 million at the regional level. The establishment of the institutional framework for the implementation of the strategy will require

the participation of ministries of infrastructure and transport. Also the ministry of commerce should be involved in the development of the strategy with the participation of the private sector. The setting–up of a coordination committee with participants from both the public and private sector is recommended.

The time required for preparing such a strategy has been broken down as follows:

- Development of a national strategy for the development of transport and logistics services—6 months
- Fundraising for the design of detailed measures—6 months
- Studies aimed at the design of specific measures—12 months
- Implementation of solutions—24 months.

In the short term, the implementation of some regional measures can be implemented at a national or corridor level strategy and this will contribute to the reduction of delays caused by broken vehicles along the corridor and the cost of these delays, reduction of the difference between transport costs of containerized and loose/breakbulk cargo, elimination of stripping practices, among others. In the long term, the main benefit of these measures is to contribute to the strength of the sector.

It is estimated that savings of up to five hours in each direction could be achieved by the reduction of delays resulting in additional income to truckers of $6 and potential savings to shippers of $3 per TEU.

The development of national and regional strategies for the road transport system will benefit not only transit cargo but the entire transport sector. However, for the purpose of our analysis, we estimated only the benefits associated with transit cargo. If the development of the strategy starts in 2013, results for the implementation of solutions could begin in 2016. Savings for the first year of operations will total about $1.9 million for shippers. Assuming that the potential growth for savings will have been reached by 2015 (meaning that no other expansion projects are implemented at the Port of Lomé and port reaches capacity), savings will occur only for the actual cargo volumes that the port can handle. The present value of benefits would be about $13.9 million with a 9 percent growth rate of benefits (same as the growth rate of container traffic) and a 12 percent discount rate. The net present value of this improvement would be $7.9 million (see Tables E2a and E2b in Appendix E for details)

Adapting Road Design Standards to Cargo Corridor

The condition of the road along the corridor is highly variable, reflecting a weak maintenance management system. Furthermore, service centers to meet the needs of long–distance truckers (rest areas, restaurants, communication centers, vehicle maintenance) are lacking. A cargo network must be defined to promote uniformity of maintenance and services along the corridor, including common design standards and criteria for the solution for crossing urban areas (such as building bypasses or posting better signage), and for service centers for truckers.

Such an improvement project would have the following components:

- Definition of cargo corridors
- Definition of criteria and standards applicable to:
    - Road design standards, shoulders in urban centers,
    - Service centers and facilities for transporters
    - Implementation of management system to maintain minimum maintenance standards
    - Design of typical facilities and other standards

The diagnosis, definition and detailed design will require $300,000–500,000. Implementation will depend on the results of the diagnosis, progress on ongoing projects, and the scope of a pilot phase. If recommended adjustments can be made by current projects and absorbed into their project costs, any additional cost would be minimal. If not, implementation could add up to $150,000 to $250,000 per km of road.

The institutional framework for this improvement will require the participation of ministries of infrastructure and transport in Mali and Burkina Faso and municipalities of large urban areas. The time required has been broken down as follows:

- Fundraising—6 months
- Assessment and definition of the cargo network—6 months
- Design of standards and facilities—8 months
- Legal support for establishing rules and standards
- Implementation of pilot cases

This improvement will increase the speed on various sections of the road, reducing the total travel time by as much as three hours in each direction. Potential savings to truckers and shippers are estimated at $4 and $2 respectively.

A more detailed analysis of the actual projects would be needed to determine the feasibility of this improvement.

Developing a Bilateral Logistics Strategy for Burkina Faso and Mali

Burkina Faso and Mali suffer from inefficiencies affecting the quality and variety of logistics services and/or the competitiveness of their exports. Both countries could benefit from aligning their logistics strategies with the export diversification strategies by having each dry port specialized in different type of cargo.

This suggested improvement consists of the design of bilateral strategy to develop logistics services in Burkina Faso and Mali to further promote the use of the Ouagadougou–Abidjan corridor. Estimated cost for this activity is $1.5 million.

Ideally a bilateral logistics committee or a “Corridor Management Group” would be formed with representatives from the ministries of infrastructure, transport, production, and agriculture, as

well as from customs, importers, producers, exporters, and logistics service providers of each country. The timing of implementation steps are as follows:

- Fundraising—6 months
- Definition of scope and responsibilities of the committee—6 months
- Execution of the Strategy—8 months

The benefit of this measure is long term. By developing a strategy for developing logistics and distribution services, new services are expected to emerge that will contribute with value creation, growth, and over time, job creation.

CONCLUSIONS

These four recommendations have varying potential and require varying sizes of investment. Table 5–1 summarizes the benefits and costs of each investment and its feasibility. The implementation of an electronic transit service is highly feasible and could be implemented on a regional basis with neighboring countries. It could be developed and operated under a PPP scheme, ensuring sustainability in the long term and promoting the participation of the private sector.

The development of a road transport sector strategy may not only have positive results but also could have negative effects on many participants of the trucking industry. It might be recommendable to analyze more carefully the implications of these strategies in a liberalized environment, identifying winners and losers from these strategies.

The other two improvements (adapting road design standards and developing a bilateral logistics strategy for Burkina Faso and Mali) are in principle feasible, but the benefits will vary according to the solution identified and the segment of the corridor affected. The logistics strategy would bring benefits to the sector in the long term and the implementing activities would likely be low–cost policy actions.

All these potential improvements appear desirable but require further investigation to verify their potential.

Appendix A. Visual Appreciation of the Corridor

This section illustrates the corridor, highlighting the main elements described in the report. The corridor has two routes (northern and southern) that share a common segment between Ouagadougou and Bobo Dioulasso. These pictures were taken during a field visit in November 2009.

COMMON SEGMENT: OUAGADOUGOU–BOBO DIOULASSO

Exit from Ouagadougou toward Bamako from Ouagarinter

Maintenance exiting Ouagadougou

Vehicles parked along the road create congestion.

Pedestrians and bicycles cross the road at any point far beyond the legal limits of the town.

Segment of the route in very good condition due to recent maintenance works

Accidents caused by overloading in Burkina Faso were seen but not as frequently as in some other West African corridors, thanks to the enforcement of axle load control.

Broken–down vehicles were observed along the corridor .

Road in fair condition

Human– and animal–powered vehicles are common along the corridor during the day.

Road in fair to bad condition

Roads that have recently undergone major maintenance usually have shoulders for pedestrians and bicycles.

Entrance to Boborinter, the dry port in Bobo Dioulasso, the second customs warehouse in Burkina Faso.

SOUTHERN ROUTE: BOBO DIOULASSO–KOLOKO /HÉRÉMAKONO–BAMAKO

Exiting Bobo Dioulasso

Hilly terrain, fair condition in the segment Bobo Dioulasso–Koloko/Hérémakono, the border crossing between Burkina Faso and Mali on the southern route

Abandoned toll station

Towns along the corridor cause delays because of the commercial activity that takes place beside the roadway.

Entrance to Sikasso, Mali

Some segments in Mali are in good condition but the design standards are inferior to those in Burkina Faso.

Road in very bad condition, Mali

Segment under preparatory maintenance works, Mali

NORTHERN ROUTE: BOBO DIOULASSO– FARAMANA /KOURY–BAMAKO

Barrier at the exit of Bobo Dioulasso

Trucks parked outside Bobo Dioulasso

Constraint created by a narrow bridge

Road in fair condition

Accident on the road. Road in bad condition

Weigh bridge under construction at Faramana

Trucks parked at Faramana

Faramana/Koury border crossing

Temporary works after Koury border crossing

Toll station in Koury (Mali)

Weigh bridge at the toll station in Koury

Overweight truck.

Road in good condition in Mali

Toll station and weigh bridge at Bla

Entering Ségou

Ségou

Outskirts of Bamako

Appendix B. Summary of Transport and Logistics Procedures

IMPORT PROCEDURES

Segment/procedure		Description	Costs		Time	
			Formal	Informal	Real	Delay*
A Ouagadougou–Koloko/Hérémakono and Faramana/Koury Borders						
A1	Ouagarinter or Boborinter	(Optional) The forwarder/driver pays to Customs CFA 30,000 per truck for escort. The escort usually travels after the last vehicle leaves. The transit truck can leave either from Ouagarinter or Boborinter, but needs the convoy up to the border. Trucks carrying containers are not obliged to stay in the dry ports	$67 (opt escort services)		3 days (opt escort services)	4 days (opt escort services)
		Transit fee	$33.3		30 min	1 hr
A2	Transport segment	Checkpoints (the presence of customs does not keep authorities from asking for unofficial payments)		$117.20		3 hr 35 min
		Weighbridge rates Responsible: Chamber of Commerce	$15.83		5 min	10 min
B KOLOKO AND FARAMANA BORDERS						
B1	Border procedures at Koloko and Faramana (Burkina Faso)	Hours: 7:30am to 12:30 pm and 2:30pm to 5:30pm. Immigration is done while cargo is processed (no additional time required) Checking of ISRT card Verification of transit–declaration documents and digitization of details Customs enter data in the ASYCUDA system Physical inspection of cargo and truck (scanner)			2h 30 min	4h in Koloko 8h 30 min in Faramana
C KOURY AND HÉRÉMAKONO BORDERS						
C1	Border procedures at Koury (Mali)	Opening hours are from 8:00am to 6:00pm. Immigration is done while cargo is processed (no additional time required)	$48.84 + 0.25% of the customs' value	$15.54	2h 35 min	4hr 15 min
		The forwarder takes the documents from Burkina Faso customs in order to get the Transit Card to Mali (CFA 12,000). Responsible: Forwarder	$26.64		1hr 30 min	2h 35 min
		Customs enter data in the ASYCUDA system		$4.44	5 min	10 min

Segment/procedure		Description	Costs		Time	
			Formal	Informal	Real	Delay*
		Payment guarantee fund (Customs Transit Card CFA 10,000 + road guarantee fund 0.25% of the customs' value). Responsible: customs cashier	$22.2+0.25% of the customs' value		5 min	10 min
		Transmission of declaration to customs office's main chief l for verification. Sometimes unavailability of the customs chief creates delays because delegation of authority is not authorized. Responsible: Chief of customs office.			45 min	1 hr
		Physical inspection of cargo and truck. Responsible: Customs		$11.1 (Payment to accelerate the procedure)	10 min	20 min
C2	Border procedures at Hérémakono (Mali)	Open 8:00am to 6:00pm. Immigration is conducted in parallel with cargo processing (no additional time required)	$48.84 +0.25% of the customs' value	$67	2hr 27 min	5hr 45 min
		Forwarder takes documents from Burkina Faso customs to get Transit Card to Mali (CFA 12,000) replacing Burkina's. Responsible: Forwarder	$26.64		5 min	15 min
		Forwarder fills in customs declaration T1 in ASYCUDA ++ and prints it. Usually fast, but depends on number of items in the declaration. Responsible : Forwarder			5 min	15 min
		Payment of the Road Guarantee Fund (FGR). Amount CFA 10.000 + FGR 0.25% of the CAF value. Responsible: Forwarder	$22.2 +0.25% of the customs' value		10 min	20 min
		T1 declaration is submitted at the scanner office and wait for the turn. Responsible: Forwarder.			2 min	7 min
		Scanning of truck, depending on place of arrival. Time depends on the number of trucks and acceptance or not of the results by the forwarder. Responsible: Customs' scanning agent			1 hr	4 hr
		Submission of scanning results to customs' chief of Brigade for signature and stamp. Depart authorization. Responsible: Chief of Brigade		$67	1 hr	3 hr
		Retrieval of results of scanning, departure of truck. Forwarder takes the documents and gives them to the driver so he can leave. Responsible: Forwarder			5 min	15 min

Segment/procedure		Description	Costs		Time	
			Formal	Informal	Real	Delay*
D FALADJE–BAMAKO						
D1	Final customs procedures at Faladje, Mali	Open: 7:30am to 12:30 pm and 2:30 pm to 5:30pm. Weekends, 8 am to 2 pm. A limited number of forwarders (Boloré) pay CFA 19,000; Forwarders with limited traffic (90%) pays CFA 30,000.	**$33.3**	**$42.2 –66.6**	**3hr 35 min**	**11hr 5min**
		Reception and validation of manifests. Time is subject to reliability of Internet connection. Responsible: Customs and manager of parking lot			10 min	60 min
		Retrieval of T1 and TRIE card to prepare the declaration. Responsible: Forwarder			5 min	10 min
		Fill in the declaration. Despite connection problems, this procedure does not take long. CFA 500 for IT charges and CFA 10,000 for Transit Slip or Transit Card. Responsible: forwarder	$11.1 + $22.2		5 min	10 min
		Submission of the declaration for the control of funds. Informal payments of 10,000 CFA take place in order for the procedure to be executed. Responsible: Customs officer		$22.2	30 min	2h 30 min
		Physical inspection of goods. The customs officer takes less time if informal payments of 2000 to CFA 5,000 are made. Responsible: Customs officer and forwarder.		$4.4–$11.1	30 min	1h 30 min
		Payment slip. The procedure takes an average of 1 hour and a maximum of 2 hours. Responsible: Customs accountability office		$4.44– $11.1	1h	3h
		Payment to the Treasury. Several factor influence delays: solvency of the importer, number of people waiting to pay. There is a Treasury office in Faladje. Responsible: Treasury accountability, forwarder and/or importer			45 min	1h 45 min
		Delivery order (BAE). At this phase steps should be over but once the BAE is obtained the final exit authorization gives place to informal payments of CFA 5,000 to 10,000. Responsible: Customs (Enquiries and Transit office)		$11.1–$22.2	30 min	1h 30 min

*Note: * includes real time.*

EXPORT PROCEDURES

Segment/procedure		Description	Costs per truck/container		Time	
			Formal	Informal	Real	Delay*
A Bamako–Faladje						
A1	Data entry of customs' declaration at ASYCUDA	Responsible: Forwarder Informatics royalty CFA 5,000 and CFA 10,000 for customs' Transit Slip or transit card	$33.3		5 min	15 min
A2	Inspection of goods	Responsible: Customs and forwarder Exportations are encouraged by customs; however some officials find the way to get CFA 5,000 for the physical inspections of the goods		$11.1	10 min	25 min
B HÉRÉMAKONO AND KOURY BORDERS						
B1	Border procedures at Koury and Hérémakono	Open 8:00am to 6:00pm Immigration is done while cargo is processed (no additional time required) Registration of truck with the export declaration E1, the invoice and the packing list. Responsible: Driver Intervention of a forwarder is not necessary. Responsible party: driver.	$22.2	$11.1	5 min	20 min
C KOLOKO AND FARAMANA BORDERS						
C1	Border procedures at Koloko and Faramana	Open 7:30am to 12:30 pm and 2:30pm to 5:30pm. Immigration is done while cargo is processed (no additional time required)	$37.1 + 0,25% of the customs' value (opt escort $81.5)	$52.7 (opt escort $59.4)	1 hr 15 min (opt escort 3 hr 5 min)	3 hr 50 min (opt escort 7 hr 20 min)
		The forwarder fills in the loading status (printed document from the Chamber of Commerce, CoC) and makes the pre–declaration at ASYCUDA ++ in the custom's computer reserved for this purpose. Responsible: Forwarder. Possible delays due to only one computer available and one electricity generator to supply when there are cutoffs.			30 min	1 hr 30 min
		The loading status goes to the custom's writing section. The customs generates the manifest and gives a registration number Usually the trucker pays informally CFA 10,000 / truck to the office's chief and CFA 5,000/ truck to the custom's officer. Responsible: Forwarder. Electricity cut–offs can generate delays		$30.3	5 min	35 min

Segment/procedure		Description	Costs per truck/container		Time	
			Formal	Informal	Real	Delay*
		With the registration number, the forwarder validates his declaration on ASYCUDA ++. The forwarder gives the goods' documents (invoices, packing list, loading status and export declaration from Mali) to verifiers that confirm the value of the goods. The forwarder usually pays CFA 10,000/ truck to the verifier who normally has up to 72 h to process the file. Responsible: Customs verifier		$20.2 (expedite fee)	3 min	1 hour
		Printing of declaration and payment of fees: • Computer royalty: CFA5,000 (+optional CFA 1,000 by additional article) • Printed document from the CoC: CFA 2,530 • Customs Transit Card: CFA 9,100 • Road guarantee fund 0.25% of commercial value Responsible: Customs cashier.	$37.1 + 0,25% of the customs' value + $2.22 * additional article (opt)	$6.7	5 min	10 min
		(Optional1) Purchase of the verification veto of phytosanitary form according to fee scale to the Water and Forestry Ministry. Responsible: Water and Forestry Ministry agent.	(opt)		5 min	10 min
		Verifier prints the declaration and gives it to the forwarder/driver if there is no need for convoy or transmits it to the office in charge of organizing the escort if there is. Responsible: Customs			30 min	45 min
		(Optional2) Forwarder or driver pays CFA 20,000 per truck for Customs escort. (Escort not needed for containers and products such as vehicles, metallurgic products, salt, cement, rice, medicines, perishable goods, donations). There is a daily departure to Bobo Dioulasso before 4:30 pm.	$44.4 per truck (opt2 if no container or specific products)	$2.2 (if no container or specific products) (opt)	1 hour 50 min	3 hours 30 min
D BORDER–OUAGADOUGOU						
D1	Transport segment	Weighbridge rates Responsible: Chamber of Commerce	$15.83		5 min	10 min
		Transit fee	$33.3		30 min	1 hr

Source: Own elaboration and West Africa Trade Hub inputs

*Note: * includes real time.*

Appendix C. Summary of West Africa Trade Hub Methodology

This section summarizes the methodology and definitions that the West Africa Trade Hub team used in the report "Transport and Logistics Costs on the Tema–Bamako corridor"[9].

As said in the introduction, it is worth noting that transport & logistics cost and steps referred to in this study–as well as on the West Africa Trade Hub's one–are only a part of the whole set of logistics activities along a logistics chain. In fact, they refer to transport and logistics activities that take place in the international transport segment of the chain, and concern only direct costs: only transport costs, handling along the transport segment of the logistics chain, and documentation. This in part due to: a) logistics chains are very short and make very limited use of added–value logistics services; b) logistics services that take place so far in public infrastructure are very limited–only some storage in Ouagarinter, Boborinter and Faradje; c) the study deals with extra–costs that public services and infrastructure cause on logistics chain, not with the performance of chosen logistics chains.

COSTS

- Formal costs: All receipted costs
- Informal costs: All un–receipted costs
- Trucking costs: All formal and informal charges associated with the organization of trucking, and the price of the trucking journey
- Customs processing costs: All formal and informal charges payable to Customs authorities and other government agencies at the port, at borders and at the point of departure (exports) or destination (imports), as well as the fee for the bond required by the Burkinabe and Malian Customs for all goods transiting through Burkina Faso (commonly referred to as the "guarantee" premium)
- Forwarding costs: all formal and informal costs payable to forwarders for clearing goods and organizing transport
- Duties and taxes: Customs duties and taxes

[9] West Africa Trade Hub Technical Report. USAID. Ongoing.

- Opportunity costs: The cost of capital locked up while goods are transported or, in the case of trucks owners, when trucks are being unnecessarily delayed.

EXCHANGE RATE

The exchange rate used for this study was based on an average rate of 1.00 USD = CFA 450.35

STANDARD TIME, DELAYS AND UNCERTAINTY

- Standard time: respondents were asked to give the average time spent on an activity, considering that procedures took place normally
- Delays: respondents were asked the average lag experienced beyond what they considered justifiable
- Final data: West Africa Trade Hub team determined a final average based on the origin of the information, unweighted means, and the team members' own experience. These data were validated at several workshops
- Driving time: 8 hours

CUSTOMS DUTIES AND TAXES

The analysis excludes duties and Customs taxes since they are not part of the transport and logistics costs.

Appendix D. Estimation of Cost Savings to Users

Based on the results presented in Chapter 3 and 4, we know that the inbound road trip from Lomé to Bamako takes in average 44 hours (not including average waiting time on the road due to congestion). Therefore, the road trip will require an average of eight nights per trip along the road. Assuming an average night time stop of 10 hours each, the adjusted time would be 80 hours. If we then add the time associated with waiting at Terminal du Sahel, Ouagarinter or Boborinter, border crossing time, and country clearance time in Mali, the total time incurred by a truck for cargo deliver is approximately 232 hours. If we then take into consideration the time of the return trip (6 days), the total time spent by a trucker in a round trip journey from cargo pick–up to cargo delivery and return to Lomé is approximately 376 hours. With these figures, a truck dedicated to serve this route will be able to make about 18 round trips per year assuming a conservative estimation of truck availability of 289 days per year (truck requires maintenance during 1 week every 3 months and truck does not travel on Sundays).

It is also known that the average price per truck load (2 TEU) is $2,305.49 and the travel distance is 1,886 km (north–bound). Previous road transport industry studies in West Africa[10],[11] show different distribution of variable costs, fixed costs and profitability in West African corridors depending on several factors including the specific corridor, type/size of truck, and level of professionalism of trucking companies (formal vs. informal) among others. For the purpose of our analysis, we will use a distribution of the transport price of 49 percent for variable costs, 22 percent for fixed costs and 29 percent profitability. With this information, one can estimate the variable cost to be $1,130 per trip or $0.60 per km, the fixed cost are $507 per trip or $0.27 per km, and profitability is $669 per trip or $1.78 per hour using the 376 hours per trip.

With the above information, we could estimate the additional income that a trucker would make if the round trip time is reduced. For example, for the implementation of an Electronic Transit Service in Burkina Faso, the round trip will be reduced an average of 3 days (72 hours) plus one hours along the road, allowing the trucker to undertake almost 23 round trips per year (around additional 5 round trips per year). Considering that fixed costs remain constant per year, these 5 extra trips will result in additional revenues of $5,226 per year or an average of $228 per trip.

---

[10]Terevaninthorn, S. and Raballand, G (2009*). Transport Prices and Costs in Africa: A Review of the International Corridors*. The World Bank.

[11] West Africa Trade Hub Technical Report No. 32, *Trucking to West Africa's Landlocked Countries: Market Structure and Conduct*. United States Agency for International Development (USAID).

These calculations assume that the trucker is actually able to undertake the additional trips. The actual business environment in West Africa indicates that there is seasonality and trucking services exceed transport demand approximately half of the year. Therefore, truckers will not be able to make the additional trips during peak season where demand is higher than truck availability. A conservative estimation would result in 50 percent of the additional revenues estimated above, or $114 per trip.

In a competitive environment, truck operators would be in position to transfer part of the additional income to their clients as a reduction in transport rates. One can assume that the trucker will share 50 percent of the additional income reducing transport rates, resulting in savings, to shippers of $57 per trip.

Similar calculations are made for other improvements.

Appendix E. Cost–Benefits Analysis Tables

Table E1a. Evaluation of an Electronic Transit Tracking System
FastPath
Summary Comparative Investment Evaluation Form

Base Scenario Name:	Lomé-Bamako Containers Inbound	**Year:**	2011
Improved Scenario Name:	Lomé-Bamako Electronic Transit System	**Year:**	2011

Performance Indicator	Base	Improved	Difference	
1. Unit Transport Price to Shipper	$3,474	$3,339	$135	
2. Av. Transit Time for Trip	614	580	34	hours
3. Reliability (% of mean time)	90	95	-5	%
4. Total Containers Per Year	9,829	9,829	0	
5. Total Logistics Cost	$34,147,027	$32,821,980	$1,325,047	
6. Investment Costs for Improvements (US$)	N/A	$8,500,000	N/A	
7. Discounted Cost Savings for Shippers (US$)	N/A	N/A	$9,897,368	
8. Net Present Value (US$) (discounted savings - costs)			$1,247,650	

Data input by user
Data imported from database
Numbers calculated in spreadsheet

Table E1b. Evaluation of an Electronic Transit Tracking System
FastPath
Cost-Benefit Analysis Sheet

Base Scenario Name:	Lomé-Bamako Containers Inbound	**Year:**	2011
Improved Scenario Name:	Lomé-Bamako Electronic Transit System	**Year:**	2011

Assumptions:

Investment Year:	2013
Opening year:	2016
Base Case Total Shipper Price	$34,147,027
Improved Total Shipper Price	$32,821,980
Total Shipper Savings	$1,325,047
Growth Rate of Savings (%/yr)	9%
Year of Maximum Savings:	2015
Discount Rate (%)	12%

Annual Costs and Savings

Year	Investment	Savings	Net Savings
2013	$8,500,000		-$8,500,000
2016		$1,325,047	$1,325,047
2017		$1,325,047	$1,325,047
2018		$1,325,047	$1,325,047
2019		$1,325,047	$1,325,047
2020		$1,325,047	$1,325,047
2021		$1,325,047	$1,325,047
2022		$1,325,047	$1,325,047
2023		$1,325,047	$1,325,047
2024		$1,325,047	$1,325,047
2025		$1,325,047	$1,325,047
2026		$1,325,047	$1,325,047
2027		$1,325,047	$1,325,047
2028		$1,325,047	$1,325,047
2029		$1,325,047	$1,325,047
2030		$1,325,047	$1,325,047
2031		$1,325,047	$1,325,047
2032		$1,325,047	$1,325,047
2033		$1,325,047	$1,325,047
2034		$1,325,047	$1,325,047
2035		$1,325,047	$1,325,047
Net Present Value:		$9,897,368	$1,247,650

Data Input by user on this sheet
Data Imported from database
Data calculated by spreadsheet

Table E2a. Evaluation of a Strategy to Develop the Road Transport Sector
FastPath
Summary Comparative Investment Evaluation Form

Base Scenario Name:	Lomé-Bamako Containers Inbound	**Year:**	2011
Improved Scenario Name:	Lomé-Bamako Road Transport Sector Strategy	**Year:**	2011

Performance Indicator	Base	Improved	Difference	
1. Unit Transport Price to Shipper	$3,474	$3,286	$188	
2. Av. Transit Time for Trip	614	575	39	hours
3. Reliability (% of mean time)	90	96	-6	%
4. Total Containers Per Year	9,829	9,829	0	
5. Total Logistics Cost	$34,147,027	$32,294,556	$1,852,472	
6. Investment Costs for Improvements (US$)	N/A	$5,000,000	N/A	
7. Discounted Cost Savings for Shippers (US$)	N/A	N/A	$13,836,932	
8. Net Present Value (US$) (discounted savings - costs)			$7,890,118	

Data input by user
Data imported from database
Numbers calculated in spreadsheet

Table E2b. Evaluation of a Strategy to Develop the Road Transport Sector
FastPath
Cost-Benefit Analysis Sheet

Base Scenario Name:	Lomé-Bamako Containers Inbound	**Year:**	2011
Improved Scenario Name:	Lomé-Bamako Road Transport Sector Strategy	**Year:**	2011

Assumptions:

Investment Year:	2013
Opening year:	2016
Base Case Total Shipper Price	$34,147,027
Improved Total Shipper Price	$32,294,556
Total Shipper Savings	$1,852,472
Growth Rate of Savings (%/yr)	9%
Year of Maximum Savings:	2015
Discount Rate (%)	12%

Annual Costs and Savings

Year	Investment	Savings	Net Savings
2013	$5,000,000		-$5,000,000
2016		$1,852,472	$1,852,472
2017		$1,852,472	$1,852,472
2018		$1,852,472	$1,852,472
2019		$1,852,472	$1,852,472
2020		$1,852,472	$1,852,472
2021		$1,852,472	$1,852,472
2022		$1,852,472	$1,852,472
2023		$1,852,472	$1,852,472
2024		$1,852,472	$1,852,472
2025		$1,852,472	$1,852,472
2026		$1,852,472	$1,852,472
2027		$1,852,472	$1,852,472
2028		$1,852,472	$1,852,472
2029		$1,852,472	$1,852,472
2030		$1,852,472	$1,852,472
2031		$1,852,472	$1,852,472
2032		$1,852,472	$1,852,472
2033		$1,852,472	$1,852,472
2034		$1,852,472	$1,852,472
2035		$1,852,472	$1,852,472
Net Present Value:		$13,836,932	$7,890,118

Data Input by user on this sheet
Data Imported from database
Data calculated by spreadsheet