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Trade Logistics in the Arab Region

Challenges and Policy Options

ECONOMIC AND SOCIAL COMMISSION FOR WESTERN ASIA (ESCWA)

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CHALLENGES AND POLICY OPTIONS

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Executive summary

Experience in recent decades shows that countries which have integrated most successfully into the world economy have also tended to record the highest growth rates. Greater integration helps firms to access expanded product and factor markets and exposes them to intensified competition and new technologies, designs and products, leading to improved allocation of resources, benefits from economies of scale and scope, and enhanced productivity. However, an open trade regime will only foster competitiveness and trade integration if a range of complementary policies is in place. One of the most important is a trade logistics system (customs, ports, freight, etc.) that offers transparency, predictability and speedy clearance of goods.

Many factors related to trade logistics and facilitation are linked to trade performance. They include institutional quality, time to import or to export, infrastructure and inventory levels. The evidence that trade logistics and facilitation measures can greatly reduce trade costs is overwhelming. Addressing poor trade logistics and infrastructure gaps, and simplifying, modernizing and harmonizing procedures in order to lower trade costs can yield sizable gains by engaging countries more fully in global and regional value chains and production networks.

Fragmentation of production, intense competition and a high degree of specialization are hallmarks of the contemporary business world. The landscape demands policies and strategies conducive to mass production and low cost. Success in international markets depends on the ability to import inputs on time and as planned at the lowest cost possible, which in turn requires efficient trade logistics.

Logistics inefficiencies hamper trade and integration into regional and global markets, and undermine competitiveness by directly and adversely affecting trade costs and time, especially for exporting firms. Persistently inefficient logistics might be perceived as a considerable entry barrier for domestic and foreign investors. Improving trade logistics along the supply chain has thus been receiving increasing attention. Conclusion of the Trade Facilitation Agreement in the World Trade Organization (WTO) after 10 years of negotiations bodes well for trade logistics reform. National agendas for reform, however, need to go beyond that agreement to address country-specific issues.

The state of trade logistics varies greatly from one country to another in the Arab region. As a whole, the region is one of the poorest performers in the world according to the World Bank's Logistics Performance Index (LPI). Reform priorities include: streamlining customs; upgrading and developing infrastructure; and enhancing international shipping capabilities. Arab countries, according to the Liner Shipping Connectivity Index of the United Nations Conference on Trade and Development (UNCTAD) generally do not integrate well into liner shipping networks.

Trade logistics and facilitation indicators do not tell the whole story. Little information is available about the structure, performance and potential for improvement of the logistics chain. In an effort to identify issues facing different sectors, a survey of logistics chains in six Arab countries (Egypt, Jordan, Lebanon Morocco, Saudi Arabia and Tunisia) has provided insights into crucial qualitative aspects of trade logistics services, such as predictability, reliability and transparency.

The survey suggests that firms in those countries spend 15 per cent of turnover on logistics, compared to around 8 per cent in the European Union. The causes lie in the relative inefficiency of logistics chains and the fact that firms carry out most logistics tasks themselves. This prevents them from tapping into expertise and efficiency gains that specialized logistics firms could provide. Reliance on outdated software further increases the cost to companies of logistics operations.

The survey also reveals that the combined cost of warehousing and inventory management for firms is high, at 48 per cent of total logistics costs. The potential reduction in costs flowing from improved logistics is therefore significant. As logistics services become more efficient and reliable, firms can cut inventories without fearing delays in the delivery of raw materials, and intermediate and final goods. South Korea,

where trade facilitation reforms yielded the greatest benefits in warehousing and inventory, sets an example for the Arab region.

To illustrate gains from improved trade logistics systems, the case of Tunisia is explored within a computable general equilibrium framework. Tunisia's logistics system performs well, as measured by the World Bank's LPI and Trading Across Borders Indicators. It performs less favourably in terms of transport infrastructure. The Tunisian Government is attempting to address those deficiencies through various initiatives and the simulation exercise shows that gains made from investment in transport infrastructure far outweigh the costs.

The analysis in this report suggests that, whether financed domestically, externally or through additional taxation, public investment in transport infrastructure brings in benefits beyond its costs. Simulation exercises show that, in the Tunisian case, relying on external borrowing to finance infrastructure investment is the least distortive option with the greatest welfare gains, followed by financing through taxation. The outcome of the external borrowing scenario, however, depends on the credit terms. Financing through taxation leads to GDP gains comparable with those of the external financing scenario, but requires drastic changes in fiscal policy. Overall, there is room for Arab countries to diversify sources of funding for trade logistics reforms.

In conclusion, Arab countries need to address the bottlenecks and high cost factors causing total trade costs to increase. Mainstreaming trade into development plans, connecting to global supply chains and implementing trade facilitation measures can boost economic growth. More efficient trade logistics is a key to reducing the cost of imports and making exports more competitive. More research is needed to identify the specific trade logistics needs of each Arab country and to suggest ways and means to facilitate reform.

Introduction

Trade is an engine for growth and job creation. It is also an important channel for fostering integration into regional and global networks through foreign direct investment (FDI) and labour mobility. Building on their comparative and competitive advantages, many countries focus on ensuring their integration into the global economy with a view to sustaining higher economic and employment growth, more efficient utilization of available resources, competitive pressure on domestic firms, and greater access to new technologies and stability.

Trade logistics is a vast area, encompassing complicated interactions in various fields, such as infrastructure, governance, sustainable development, human resources, finance and regulations. Trade logistics comprises every task related to the physical transfer of a product from seller to buyer. For international trade, it involves, for instance, inland transport from the factory to the airport or maritime port, contact with the forwarding company or agent for customs procedures at the port of departure, cargo insurance, freight (by air or sea), customs clearance and administrative procedures at the arrival port (determining the correspondent rule of origin, the applied standards and required controls) and, finally, delivery of the merchandise to the recipient.

This study investigates the relationship between efficient trade logistics, and trade and economic performance, using a dynamic computable general equilibrium (CGE) model and taking Tunisia as a case study. The analysis focuses on the impact of additional investments in trade logistics capital stock on key macroeconomic indicators. A simulation scenario looks at the macroeconomic impacts on the Tunisian economy of catching up halfway to the rank of the top performing Arab country, the United Arab Emirates, as measured by LPI. The choice of the infrastructure rather than the efficiency component of trade logistics was determined by the weakest links identified among the Tunisian LPI subindices. One major contribution of this study is the modelling of the cost side of the desired change, rather than opting for a "free" technology improvement, as was typical in other studies. The study then examines ways to finance investment in infrastructure.

Chapter I assesses the trade logistics and facilitation performance of countries in the Arab region. Chapter II reviews key quantitative studies on the relationship between logistics and trade performance. Chapter III presents findings of a survey on trade logistics in selected Arab countries. Chapter IV presents a case study of the Tunisian economy, which identifies strengths and weaknesses in logistics services and considers the impact of new investments in transport infrastructures on trade costs using a CGE model. Chapter V provides policy recommendations.

I. AN OVERVIEW OF TRADE LOGISTICS AND FACILITATION

Trade logistics refers to activities that are essential to moving goods from producers to consumers, such as transport, warehousing, cargo consolidation, border clearance, insurance, and distribution and payments systems. The Council of Supply Chain Management Professionals defines logistics as "a part of the supply chain process for planning, implementation, and control of effective and productive two-way movement and storage of the materials, services and information flow … from the production point of the products up to the consumption point of end use in order to meet the requirements of customers".[1] Other tasks considered to be part of the logistical chain include the payment system, the distribution process (from distribution centres to wholesalers to retailers), and the use of information and communications technologies (ICT) at various stages of the trade operation. Trade logistics is therefore an umbrella term for a number of activities that influence export performance. Improvements in customs operations and communications services and the availability of trade finance can be just as important in efforts to increase a country's export capacities as improved efficiency of transport and other third party logistics services. Progress must thus be measured in terms of reducing not only physical obstacles, such as poor roads and congested ports, but also bureaucratic obstacles such as arbitrary and inefficient customs regulations and procedures.

A good logistics chain can facilitate higher economic growth, business competitiveness and infrastructure services in quality and quantity. Conversely, logistics inefficiencies undermine competitiveness through a direct negative effect on trade costs and time, especially for exporting firms. Persistently inefficient logistics can deter domestic and foreign investors, slowing down potential flows of FDI. Significant progress has been made on lowering tariff barriers in the past two decades and international institutions have shifted their focus to lessening the intensity of non-tariff barriers, including logistics costs. Behar and others (2011) say that a good example of non-tariff barriers is the cost of transporting products to foreign markets, in pecuniary terms (freight costs) and in terms of delays in moving goods.

Another strand of public policy, broadly called trade facilitation measures, has come to the fore in efforts to further lower trade costs. The World Trade Organization (WTO) and European Union define trade facilitation as the simplification and harmonization of international trade procedures, including import and export procedures, which refer to "the activities (practices and formalities) involved in collecting, presenting, communicating and processing the data required for movement of goods in international trade".[2] An extended definition includes trade finance. The United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT)[3] defines trade facilitation as the simplification, standardization and harmonization of procedures and associated information flows required to move goods from seller to buyer and to make payment.

The private sector provides most logistics services, but Governments are responsible for providing infrastructure and an enabling environment, such as roads, regulations and facilities, such as warehousing space in ports. Government policy on customs clearance and the liberalization of transport and financial services, which facilitate the participation of the private sector in the delivery of logistics services, also plays a key role.

Trade logistics are a key to trade efficiency, integration into global value chains and economic growth. Good logistics lower trade costs, boost competitiveness and improve export performance. Inefficient and insufficient trade logistics deprive domestic firms of their competitive advantages along the way between the factory and the buyer. Addressing the efficiency of logistics therefore is an integral part of export strategies and private sector development plans. Logistics have changed drastically over the past two decades. The "made in the world" notion of having parts of a product made in different countries and by different

[1] https://cscmp.org/about-us/supply-chain-management-definitions.

[2] http://ec.europa.eu/taxation_customs/customs/policy_issues/trade_falicitation/index_en.htm.

[3] UN/CEFACT makes international Electronic Data Interchange (EDI) standards for electronic trade documents in XML format.

producers in one country underlines the need to deliver raw materials, spare parts and final products to producers around the world in a timely manner. The rise of the just-on-time production model, where manufacturers keep low levels of inventories and depend to a large extent on timely delivery of supplies, has increased the importance of logistics.

The major benefits of efficient logistics operations include: (a) cost savings by centralizing inventory management and reducing the number of inventory holding locations, as well as the size and value of the inventory held; (b) faster order fulfilment by utilizing global transportation networks and logistics inventory management systems; (c) increased cash flow by using bonded warehouses for testing and storage, providing the option of deferring customs duties and taxes; and (d) the flexibility to change distribution patterns for new products efficiently, based on changing customer demands (Jamal, 2010).

Export success today requires efficient logistics for imports as well, in order to foster competitiveness generated by the global value chain (GVC). The smooth operation of supply chains requires efficient customs and port procedures, efficient transport, and predictable delivery to enable the maintenance of low inventory levels, a major cost factor.

Estimating the contribution of logistics-related costs to trade costs is feasible. According to Korinek and Sourdin (2011), customs procedures, tracking and tracing services, overall infrastructure and logistics competence have a stronger impact on trade flows than less policy-dependent trade determinants such as distance and transport costs. Every extra day needed to ready goods for export or import reduces trade volumes by around 4 per cent.

Countries with logistics systems that run smoothly incur minimal friction in trade and thereby support exporters through low transaction costs.

A. TRADE LOGISTICS IN THE ARAB REGION

Evidence suggests that trade-related problems facing Arab countries are due largely to poor logistics in terms of infrastructure and organization. The share of the Arab region in global trade was 4.3 per cent in 2010, unduly low given its potential and resources. There is a need to improve trade logistics in order to promote growth in non-oil exports and attract more export-oriented FDI. Hoekman and Zarrouk (2009), a study based on a survey of trading firms in nine member countries of the Greater Arab Free Trade Area (GAFTA), concluded that tariffs on intra-GAFTA trade and customs procedures were no longer the pressing problem they had been. Transport infrastructure and real trade costs were the most pressing problems. Other studies suggest that the magnitude of Arab trade flows is significantly lower than it could be because of high trade costs (Chauffour and Hoekman, 2013; and Zaki, 2010).

Arab countries need to tackle considerable trade logistics inefficiency. Wide-ranging economic reforms introduced over the past two decades have yet to work their way through all sectors of Arab economies.

The World Bank's LPI captures the efficiency of logistics services in several dimensions and covers a large panel of countries. The overall LPI score is based on the efficiency of customs clearance processes; quality of infrastructure; ease of arranging competitively priced shipments; quality of logistics services; ability to track and trace consignments; and frequency with which shipments reach the consignee on time. With a score of 2.5, the Middle East and North Africa (MENA) region is, in spite its income level, one of the worst performers in the world, close to sub-Saharan Africa (table 1). Streamlining customs procedure, upgrading and developing infrastructure, and enhancing international shipping capabilities are the priority tasks for the region.

TABLE 1. LPI BY REGION, 2014

Region	LPI Score	Customs	Infrastructure	International shipments	Logistics competence	Tracking and tracing	Timeliness
East Asia and Pacific	2.85	2.69	2.74	2.87	2.79	2.84	3.17
Europe and Central Asia	2.76	2.51	2.59	2.83	2.67	2.77	3.20
Latin America and Caribbean	2.74	2.57	2.52	2.79	2.70	2.76	3.08
South Asia	2.61	2.47	2.34	2.70	2.66	2.58	2.87
Middle East and North Africa	2.50	2.28	2.32	2.47	2.45	2.54	2.93
Sub-Saharan Africa	2.46	2.27	2.27	2.49	2.41	2.48	2.84

Source: World Bank, Logistics Performance Index database. Available from http://lpi.worldbank.org/international/scorecard/radar/254/C/DEU/2014/R/EAP/2014/R/ECA/2014/R/LAC/2014/R/MNA/2014/R/SAS/2014/R/SSA/2014?featured=17 (accessed March 2015).

The average scores mask a great deal of heterogeneity in the performance of individual countries (table 2). Three Arab countries are among the top 50 countries in 2014. The best performing country in the region is the United Arab Emirates, but its global ranking dropped from seventeenth in 2012 to twenty-seventh in 2014. Many countries in the region witnessed a drop in their LPI rankings, underlining the lack or sluggishness of progress relative to other parts of the world. Most Arab countries perform particularly poorly in the customs and international shipments components of LPI.

TABLE 2. ARAB COUNTRIES IN LPI

2012 score (*rank*)		2014 score (*rank*)						
Country	Overall LPI	Overall LPI	Customs	Infrastructure	International shipments	Logistics quality and competence	Tracking and tracing	Timeliness
United Arab Emirates	3.78 (17)	3.54 (27)	3.42 (25)	3.70 (21)	3.20 (43)	3.50 (31)	3.57 (24)	3.92 (32)
Qatar	3.32 (33)	3.52 (29)	3.21 (37)	3.44 (29)	3.55 (16)	3.55 (28)	3.47 (32)	3.87 (34)
Saudi Arabia	3.18 (37)	3.15 (49)	2.86 (56)	3.34 (34)	2.93 (70)	3.11 (48)	3.15 (54)	3.55 (47)
Bahrain	3.05 (48)	3.08 (52)	3.29 (30)	3.04 (49)	3.04 (58)	3.04 (51)	3.29 (42)	2.80 (119)
Kuwait	2.83 (70)	3.01 (56)	2.69 (68)	3.16 (43)	2.76 (89)	2.96 (59)	3.16 (50)	3.39 (60)
Oman	2.89 (62)	3.00 (59)	2.63 (74)	2.88 (57)	3.41 (31)	2.84 (73)	2.84 (80)	3.29 (67)
Egypt	2.98 (57)	2.97 (62)	2.85 (57)	2.86 (60)	2.87 (77)	2.99 (58)	3.23 (43)	2.99 (99)
Jordan	2.56 (102)	2.87 (68)	2.60 (78)	2.59 (76)	2.96 (65)	2.94 (60)	2.67 (96)	3.46 (58)
Lebanon	2.58 (96)	2.73 (85)	2.29 (124)	2.53 (89)	2.53 (118)	2.89 (67)	3.22 (44)	2.89 (108)
Algeria	2.41 (125)	2.65 (96)	2.71 (66)	2.54 (87)	2.54 (117)	2.54 (102)	2.54 (109)	3.04 (94)
Tunisia	3.17 (41)	2.55 (110)	2.02 (146)	2.30 (118)	2.91 (73)	2.42 (120)	2.42 (124)	3.16 (80)
Libya	2.28 (137)	2.50 (118)	2.41 (104)	2.29 (119)	2.29 (140)	2.29 (131)	2.85 (78)	2.85 (114)
Iraq	2.16 (145)	2.30 (141)	1.98 (149)	2.18 (131)	2.31 (139)	2.15 (147)	2.31 (136)	2.85 (116)
Mauritania	2.40 (127)	2.23 (148)	1.93 (152)	2.40 (103)	2.07 (155)	2.06 (157)	2.23 (142)	2.75 (130)
Yemen	2.89 (63)	2.18 (151)	1.63 (159)	1.87 (153)	2.35 (134)	2.21 (141)	2.21 (144)	2.78 (124)
Sudan	2.10 (148)	2.16 (153)	1.87 (155)	1.90 (152)	2.23 (144)	2.18 (144)	2.42 (125)	2.33 (156)
Djibouti	1.80 (154)	2.15 (154)	2.20 (134)	2.00 (150)	1.80 (158)	2.21 (140)	2.00 (155)	2.74 (132)
Syrian Arab Republic	2.60 (92)	2.09 (155)	2.07 (142)	2.08 (144)	2.15 (150)	1.82 (159)	1.90 (158)	2.53 (145)
Morocco	3.03 (50)	..	..	..	..	..	..	..

Source: World Bank, Logistics Performance Index database. Available from http://lpi.worldbank.org/international/global/2014 (accessed March 2015).

Note: Two dots (..) indicate that data are not available.

A similar picture emerges in the Trading Across Border Indicators of the World Bank, which to a large extent capture the degree of cross-border trade facilitation (table 3). The United Arab Emirates is the best performer in the region, ranked eighth globally, with one of the lowest numbers of documents needed for imports and exports and the fewest days needed to complete such processes in the world. The cost of transporting a container, for both imports and export, is also very low. Tunisia, ranked fiftieth globally, is another good performer in the region. Some countries in the region, however, rank low.

TABLE 3. PERFORMANCE OF ARAB COUNTRIES IN THE 2015 TRADING ACROSS BORDER INDICATORS

Country	Trading across border rank	No. of documents to export	Time to export (*days*)	Cost to export (*US$/container*)	No. of documents to import	Time to import (*days*)	Cost to import (*US$/container*)
Algeria	131	8	17	1,270	9	26	1,330
Bahrain	64	6	11	810	8	15	870
Djibouti	56	5	20	885	5	18	910
Egypt	99	8	12	625	10	15	790
Iraq	178	10	80	3,550	10	82	3,650
Jordan	54	5	12	825	7	15	1,235
Kuwait	117	7	15	1,085	10	20	1,250
Lebanon	97	4	22	1,080	7	30	1,365
Mauritania	151	8	31	1,640	8	38	1,523
Morocco	31	4	10	595	6	14	970
Oman	60	7	10	765	8	9	700
Qatar	61	5	15	927	7	16	1,050
Saudi Arabia	92	6	13	1,285	8	17	1,309
Sudan	162	7	32	2,630	7	46	3,400
Syrian Arab Republic	146	8	18	1,995	9	24	2,410
Tunisia	50	4	16	805	6	20	920
United Arab Emirates	8	3	7	665	5	7	625
West Bank and Gaza	130	6	23	1,750	6	38	1,425
Yemen	134	6	29	1,065	9	27	1,560

Source: World Bank, Trading Across Borders database. Available from http://www.doingbusiness.org/data/exploretopics/trading-across-borders (accessed March 2015).

Reducing the number of documents and days required to import or export is vital. There is also substantial scope for cutting the cost of transport, particularly for exports. Countries are investing heavily in transport to enable products to reach international markets in a more competitive fashion.

The Liner Shipping Connectivity Index (LSCI) of the United Nations Conference on Trade and Development (UNCTAD) is designed to measure a country's integration into global liner shipping networks. The index has five components: (a) number of ships; (b) total container-carrying capacity of those ships; (c) maximum vessel size; (d) number of services; and (e) number of companies deploying container ships or services to and from a country's ports. Arab countries do not integrate well into liner shipping networks (table 4).

TABLE 4. LINER SHIPPING CONNECTIVITY INDEX
(*Maximum value = 100*)

Country	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Algeria	10.0	9.7	8.7	7.9	7.8	8.4	31.5	31.1	7.8	6.9	6.9
Bahrain	5.4	4.3	4.4	6.0	5.8	8.0	7.8	9.8	17.9	17.9	27.0
Djibouti	6.8	7.6	7.4	10.5	10.4	18.0	19.6	21.0	16.6	20.3	20.2
Egypt	42.9	49.2	50.0	45.4	52.5	52.0	47.6	51.2	57.4	57.5	61.8
Iraq	1.4	1.6	4.1	2.6	1.2	5.1	4.2	4.2	7.1	5.7	5.2
Jordan	11.0	13.4	13.0	16.5	16.4	23.7	17.8	16.7	22.8	22.7	22.6
Kuwait	5.9	6.8	4.1	6.2	6.1	6.5	8.3	5.6	6.6	7.1	8.2
Lebanon	10.6	12.5	25.6	30.0	28.9	29.6	30.3	35.1	43.2	43.2	42.6
Libya	5.3	5.2	4.7	6.6	5.4	9.4	5.4	6.6	7.5	7.3	6.8
Mauritania	5.4	6.0	6.3	7.9	7.9	7.5	5.6	5.6	8.2	6.5	6.0
Morocco	9.4	8.7	8.5	9.0	29.8	38.4	49.4	55.1	55.1	55.5	64.3
Oman	23.3	23.6	20.3	29.0	30.4	45.3	48.5	49.3	47.3	48.5	49.9
Qatar	2.6	4.2	3.9	3.6	3.2	2.1	7.7	3.6	6.5	3.4	3.9
Saudi Arabia	35.8	36.2	40.7	45.0	47.4	47.3	50.4	60.0	60.4	59.7	61.2
Sudan	7.0	6.2	5.7	5.7	5.4	9.3	10.1	9.3			
Syrian Arab Republic	8.5	11.8	11.3	14.2	12.7	11.0	15.2	16.8	15.6	16.5	17.5
Tunisia	8.8	7.6	7.0	7.2	7.0	6.5	6.5	6.3	6.4	5.6	7.5
United Arab Emirates	38.1	39.2	46.7	48.2	48.8	60.5	63.4	62.5	61.1	67.0	66.5
Yemen	19.2	10.2	9.4	14.3	14.4	14.6	12.5	11.9	13.2	19.0	18.4

Source: UNCTADstat database. Available from http://unctadstat.unctad.org/EN/ (accessed March 2015).

B. TRADE FACILITATION

Trade-related complementary policies on transport and telecommunications services, customs procedures, port efficiency, standards and technical regulations, and flexibility of factor markets are increasingly seen as a key to enhancing a country's trade performance. Tariff reforms alone are insufficient (Dennis, 2006). Much attention has been given to reforming soft and hard infrastructure for trade. The trade facilitation agenda comes as a complementary measure to vast trade liberalization efforts around the world over the past half century, which have lowered tariff barriers significantly but left considerable non-tariff barriers in place.

Box 1. What is trade facilitation?

There is no standard definition of trade facilitation in public policy discourse. In a narrow sense, trade facilitation efforts simply address the logistics of moving goods through ports or more efficiently moving documentation associated with cross-border trade. In recent years, the definition has been broadened to include the environment in which trade transactions take place, to include transparency and professionalism of customs and regulatory environments, as well as harmonization of standards and conformity to international or regional regulations. These move the focus of trade facilitation efforts inside the border to "domestic" policies and institutional structures where capacity-building can play an important role. In addition, the rapid integration of networked information technology into trade means that modern definitions of trade facilitation need to encompass a technological concept as well.

Source: World Bank, 2003. Policy Research Working Paper 2988.

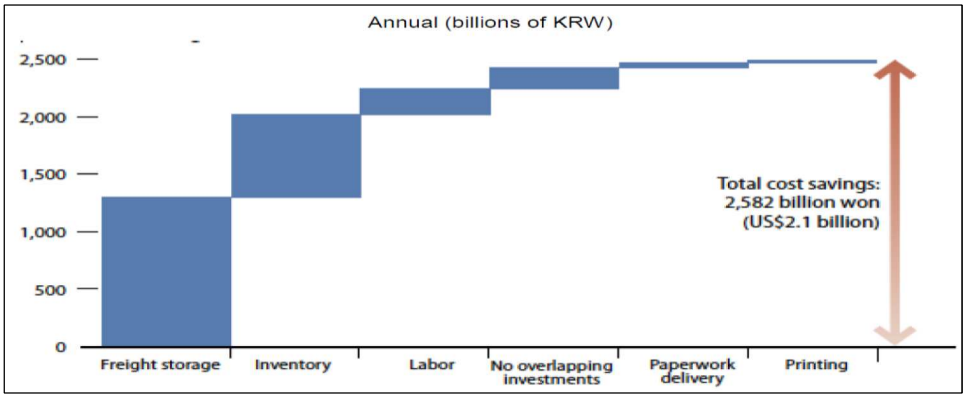
International trade is built on confidence between buyer and seller. Proper execution of the contract of sale is a key to sustaining a trade relationship. It guarantees the buyer receipt of shipment in good condition and the seller prompt payment. Efficiency is therefore of paramount importance throughout the international trade transaction process.

Developing countries that have successfully simplified and modernized their official trade procedures tend to have: (a) increased overall trade flows for exports and imports; (b) enjoyed higher revenue collection, due to increased trade volume and higher rates of fraud detection; (c) recouped initial capital costs involved in modernizing procedures; and (d) improved efficiency of customs administration. Box 2 shows the savings made by South Korea through trade facilitation reform. In most cases, infrastructure and hardware costs have been relatively limited and the key has been the re-engineering of management techniques coupled with better training. Portugal-Perez and Wilson (2010) confirm the importance of investment in physical infrastructure to improve export performance and emphasize the need for regulatory reform to improve the business environment.

Box 2. Cost savings in South Korea due to trade facilitation reform

Korea Customs Service has introduced a single window allowing traders and government agencies to exchange information and speed up export processes. The estimates of cost savings to South Korean firms stemming from trade facilitation reforms are presented below.

Cost saving to Korean firms due to trade facilitation reforms



Source: World Bank, *Doing Business Report 2010*.

Other benefits also stem from trade facilitation measures. Improved ease of trade leads not only to more trade but greater foreign investment as well. Studies suggest that trade procedures may represent 4-5 per cent of the overall cost of a trade transaction, which is roughly comparable with the contribution of tariffs on industrial goods from industrialized countries, at around 3.8 per cent. Halving the costs of trade procedures would result in a saving of US$325 billion a year worldwide. A disproportionate share of those costs is borne by small and medium enterprises (SMEs) and traders in developing countries.[4] Trade facilitation can enhance the participation of SMEs and women in international trade. SMEs have limited capacity to deal with cumbersome procedures, which are likely to discourage them from engaging in international trade. Self-employed women, who mostly depend on personal skills, especially in traditional handicrafts and home-based businesses, face difficulties in sending their products to markets when logistics are poor. Efficient logistics are likely to encourage more women to engage in production with a view to participating in international trade.

[4] "Trade facilitation: interest for developing countries", background information document available from http://ec.europa.eu/taxation_customs/customs/policy_issues/trade_falicitation/index_en.htm.

Financial resources for trade facilitation and private enterprises engaged in trade logistics have been under growing pressure since the global financial crisis. The banking and international transport sectors of many Arab countries have yet to be privatized and State-owned banks have not provided the financial resources needed by the private sector to expand.

1. *The WTO Trade Facilitation Agreement: Challenges and opportunities for the Arab region*

In December 2013, WTO members adopted a Trade Facilitation Agreement at the Bali Ministerial Conference, as part of a wider "Bali Package", after more than nine years of negotiations. The agreement concerns three issues: (a) the transit of goods; (b) fees and formalities (documentation and procedures); and (c) the transparency of laws and regulations. The agreement has two parts. The first includes 13 articles outlining the obligations of members and the second sets forth special and differential treatment for developing countries. It states that the agreement shall be implemented by developing and least developed countries (LDCs) to the extent of their capacity, and that assistance and support should be provided to them. It is underlined that implementation of specific provisions shall not be required of such countries until they have the requisite capacity.

Estimates by the Organisation for Economic Co-operation and Development (OECD) suggest that comprehensive implementation of the Trade Facilitation Agreement would reduce trade costs by 10 per cent in advanced economies and 13-15.5 per cent in developing countries. Reducing global trade costs by just 1 per cent would increase worldwide income by more than US$40 billion, most of which would accrue in developing countries (OECD, 2013).

Implementation of the Agreement presents Arab States with challenges: most lack the technological and human capital necessary for modernizing customs and trade logistic systems and bringing them into compliance with the Agreement. Identifying specific areas for reform and funding it are serious hurdles, particularly for countries with limited fiscal space. Implementing a trade facilitation agenda to enhance trade performance requires substantial resources, commitment and political will.

2. *Trade facilitation and aid for trade*

Trade facilitation has been on the agenda of donors for the past decade. Aid for trade facilitation has contributed most notably to the reform of border processes and improved transport through the purchase of equipment, the training of officials and other measures. Aid for trade facilitation was less affected than other types of aid by the global crisis of 2008. Donor support for simplifying and modernizing border procedures reached US$381 million in 2011, an increase of 365 per cent from the 2002-2005 average. The largest beneficiaries were African countries, which received US$200 million in 2011 (OECD, 2013). Arab countries received less than US$15 million of such aid in 2011, which is indicative of how little attention they give to trade facilitation and suggests that they are not taking advantage of opportunities that are unlikely to be available indefinitely.

C. SUMMARY

Most Arab countries have yet to accept that logistics is not the appropriate sector for generating monopoly profits or accommodating public sector inefficiencies, but is rather a means to promote trade through efficiency. Reforms in the transport and logistics sectors have been limited to reducing or eliminating some monopolies but have been insufficient to generate significant reductions in trade costs. Telecommunications reform has progressed significantly in many countries but remains too slow in others. For low-income countries, the largest gaps in trade logistics tend to be in infrastructure and border procedures. Middle-income countries need more competitive logistics services to meet growing demand for them. Assessments must be carried out in each of the Arab countries to identify bottlenecks that hamper trade, with a view to developing plans to reform logistics chains. Chapter IV presents the case of Tunisia, providing an example of such an assessment and the way forward to improve logistics.

II. THE PAYOFFS OF EFFICIENT TRADE LOGISTICS

Trade costs through the value chain can be significant but they are not always fully understood. One reason for this is that traditional approaches tend to focus on understanding *product* costs. Trade costs that are usually beyond the control of producers of goods are habitually ignored. Logistics costs vary by firm, industry and country of production or consumption. Estimates of the total cost of logistics as a percentage of gross domestic product (GDP) vary significantly and are usually available only for developed countries.

With the growth in regional economies and globalization, trade costs have become a key to bilateral trade, investment flows and geographical distribution of production. Anderson and van Wincoop (2003) estimate that such costs in developed countries might be as high as 170 per cent *ad valorem*, compared to around 5 per cent accounted for by tariffs. Trade costs in developing countries are often higher than in their developed counterparts.

A recent strand of the literature turns the gravity model on its head by inferring trade costs from observed patterns of trade and production across countries (Novy, 2013). Analyzing the different components of trade costs is essential in order to reveal to what extent policy can have an impact on them. Arvis and others (2013), using econometric methods to disaggregate trade costs, found that transport, trade facilitation and logistics, as measured by LPI and LSCI, have a greater impact on trade costs than geographical distance. Those factors tend to have a still greater impact on South-South trade relations. Nevertheless, it is difficult to measure trade facilitation with enough precision to inform policymaking. It needs to be borne in mind when adopting a modelling methodology that import and export trade flows hinge on trade facilitation efforts and that the impact of trade facilitation and logistics measures will depend on the trading patterns of the countries in question (Wilson and others, 2004).

The econometric approach is commonly taken to explore the impact of trade logistics and facilitation measures on trade flows. The standard or augmented gravity model is typically employed to establish a significant link between one or more sources of trade costs on bilateral trade flows. Computable general equilibrium (CGE) models are used to simulate the impact of improved trade logistics either by introducing a productivity effect or by inducing increased investment in logistics. In this chapter, prominent econometric studies that focus on the impact of trade logistics and facilitation on trade flows will be reviewed. Studies with the same focus but based on CGE models will then be discussed.

A. FINDINGS FROM ECONOMETRIC ANALYSIS

Studies of the impact of transport and other logistics costs on trade using gravity equations date at least to Tinbergen (1962). Extensive use of the gravity equation is mainly due to its versatility and power in explaining bilateral trade patterns, but much of the explanatory power comes from the two countries' GDP and the distance between them. Theory subsequently provided more grounds for the empirical success of the gravity model (Anderson, 1979; Bergstrand, 1985). The approach in a typical spatial gravity paper is to control for a range of factors, often related to geography and history, and then to add another source of trade costs to see whether it has a significant impact on bilateral trade. This approach suffers from two main problems: focusing on one source of trade costs rather than a comprehensive measure, and the possibility of omitted variable bias of alternative trade costs. Nevertheless, a growing body of the literature looks at a wide range of possible links between bilateral trade flows, and trade facilitation and logistics. Those factors include the performance of institutions, time to import or to export, logistics infrastructure stock, inventory levels and trade facilitation measures.

How institutions perform can have a significant impact on transaction costs, which in turn affect trade. De Groot and others (2003) considered institutional quality (accountability, political stability, effectiveness of government, regulatory quality, rule of law and control of corruption) in the context of a gravity model and concluded that improving the quality of institutions would significantly increase bilateral trade. Anderson and Marcouiller (2002) and others came to similar conclusions. Ranjan and Lee (2007) suggested

that contract enforcement affects the volume of trade in differentiated and homogenous goods, with a greater effect on differentiated goods. Estimating the effect of economic freedom on United States consumer exports and imports using a gravity model, Depken and Sonora (2005) revealed that better institutional quality in the partner country had a favourable impact on the volume of United States exports to that country. Rodrik and others (2004) suggested a more complex link between institutions, integration and growth, whereby institutions can promote integration and integration has a favourable impact on institutional quality. Differences in institutional quality were identified as a source of comparative advantage and important determinant of trade patterns by Levchenko (2004).

Trade facilitation boosts bilateral trade significantly. Wilson and others (2004) constructed a set of distinct trade facilitation indicators, measuring port efficiency, customs environment, regulatory environment and services sector infrastructure, before using them in a gravity model. They estimated that bringing below-average countries halfway to the average of all countries studied would boost overall trade among them by 9.7 percent. Improvement in service sector infrastructure accounted for around half of that growth. Clark and others (2004) showed that port efficiency heavily influences transport costs, which in turn have a significant impact on bilateral trade. Based on their analysis, improving port efficiency from the twenty-fifth to the seventy-fifth percentile reduces shipping costs by 12 per cent and thereby boosts bilateral trade flows by around 25 per cent.

OECD has developed 16 trade facilitation indicators (TFIs) to assess the impact of specific measures on the trade of developing countries. By its assessment, the provision of trade-related information, simplification and harmonization of documentation, streamlined procedures and use of automated processes have the greatest impact on trade volumes and costs. The combined effect of improvements in those areas is greater than the simple sum of the impact of individual measures, achieving a reduction of total trade costs for low- and middle-income countries of 13-16 per cent.

Transport time is also a distinct form of cost. Hummels (2001) took into account distance and shipping time expressed in days in a gravity model of imports to the United States from 200 countries by air or sea. It is estimated that each additional day spent in ocean transit between two given countries reduces the probability of trade between them by 1 per cent (1.5 per cent for manufactured goods). The largest manufacturing categories exhibit a willingness to pay for time savings equal to 0.8 per cent *ad valorem* per day, which is equivalent to a 16 per cent tariff for an average ocean trip of 20 days. Hausman and others (2005) highlighted the importance of reducing sources of friction in transport logistics.

Nordås and others (2006) focussed on the relation between time for exports and imports, logistics services and international trade and found that a 10 per cent increase in time for exports leads to a reduction in trade value between 5 per cent and 25 per cent, depending on the sector and export destination. Their estimates are higher than those of Hausman and others (2005) because they do not take into account zero trade flows. Djankov and others (2010) found that each additional day a product is delayed prior to being shipped reduces trade by more than 1 per cent and that delays are worse for exports of time-sensitive goods such as perishable agricultural products.

Subramanian and others (2005) measured the impact of long customs clearance on the total factor productivity (TFP) of firms in China and Brazil. Using an econometric technique, their results showed customs clearance delays and utility services interruptions, which dampen TFP. They found that reducing customs clearance by one day in China could increase TFP by 2-6 per cent.

A growing number of studies confirm the positive effect improved infrastructure can have on trade and output. Most of those studies look at developing countries, as returns on infrastructure investments are generally highest during the early stages of development.

Limão and Venables (2001) used a gravity model including transport costs, in addition to distance, to analyse bilateral trade flows. They found that the quality of infrastructure in origin and destination

countries had a significant effect on transport costs. Their estimations of the elasticity of trade flows with respect to transport costs are in the range of -2 to -3.5, suggesting that a 10 per cent increase in trade costs causes a reduction of trade volumes by more than 20 per cent. They estimated that poor infrastructure accounts for more than 40 per cent of predicted transport costs for coastal countries and up to 60 per cent for landlocked countries.

Calderón and Servén (2004) found a strong link between improved infrastructure and stronger long-term economic growth. If all Latin American countries were to catch up with the region's leader in terms of infrastructure, their long-term per capita annual growth gains would range between 1.1 and 4.8 per cent. Catching up with the East Asian median would bring gains of from 3.2 per cent to 6.3 per cent. Such catch-up scenarios, however, assume heavy investment in infrastructure.

The relationship between logistics infrastructure and the level of inventories is also crucial, given the cost of holding inventories. Businesses in developing countries tend to hold larger inventories than in developed economies, largely because of unreliable infrastructure and logistics. According to Guasch and Kogan (2001), United States businesses typically hold inventories equal to 15 per cent of GDP, while inventory levels in developing countries are often twice as large. If the private sector faces interest rates of 15 to 20 per cent to finance inventories in such countries, the cost to the economy of the additional inventories exceeds 2 per cent of GDP. The level of raw material inventories is generally two to five times higher in developing countries than in the United States. Poor infrastructure, ineffective regulation and deficiencies in market development, rather than interest rates and uncertainty, are largely to blame. Guasch and Kogan estimated that a one standard deviation improvement in infrastructure reduces raw material inventories by 27-47 per cent, with a consequent drop in costs, particularly when accompanied by effective regulation.

Behar and others (2011) took indicators relevant to international trade from the World Bank LPI to generate their International Logistics Index (ILI). They found that an increase in ILI leads to export growth, estimating that the elasticity of total exports with respect to a change in logistics for a country of average size is 0.74, compared with a typical (mean) elasticity of only 0.185. That is, a one standard deviation improvement in logistics translates into an 8 per cent increase in exports.

B. Findings from the CGE modelling framework

Comparatively few trade logistics studies rely on the CGE modelling framework, and most of those take a regional or global, rather than a country-specific, view of the gains associated with improvements in trade logistics and facilitation.

In 1999, Asia-Pacific Economic Cooperation (APEC) used a CGE model to measure the effect of trade liberalization and facilitation measures on trade and real income in APEC countries and found that such measures had contributed greatly to long-term growth in the region, with annual income gains of US$75 billion (0.4 per cent of regional GDP), more than half of which came from trade facilitation measures. Developing APEC countries, including those hit by crisis, generally enjoyed higher gains. Taking into account dynamic effects that cannot be captured by the CGE model, the gains would increase by 1.2 to 1.4 times, over the long term. The results showed that economies which liberalize the most gain the most.

Another APEC study (2002) showed that trade liberalization through a free trade area in the APEC region and reductions in trade costs through trade facilitation had benefitted the region's economy, boosting GDP growth, income and private consumption. Trade facilitation measures were found to have contributed more to those gains than trade liberalization. Moreover, it was found that the greater the share of intra-APEC trade in, and trade dependency of, any given economy in the region, the bigger its gains in terms of GDP growth from trade facilitation.

Hertel and others (2001) introduced time costs as a technical shift in the Armington import demand function and used a modified Global Trade Analysis Project (GTAP) model to analyse the improved transit time in context of the Japan-Singapore free trade agreement. The reduction of trade transaction costs as a consequence of a drop in waiting time ranged from 0.21 to 3.5 per cent by goods sector, translating to an annual income increase of about US$6.6 billion (0.16 per cent) for Japan and US$170 million (0.29 per cent) for Singapore. Ivanic and others (2006), using estimates on trade expansions, simulated the effect of trade facilitation within an applied general equilibrium model and found significant trade and welfare gains for developing countries.

Decreux and Fontagné (2009) introduced an iceberg cost in the CGE MIRAGE model and estimated that trade facilitation would add an annual US$99 billion to world GDP in the long term. Zaki (2010) extended the original MIRAGE to include more accurate *ad valorem* equivalents (AVEs) of red tape costs, computed from a gravity model. His analysis includes several stages. First, the transaction time to import and export, based on a variety of factors, is estimated. Secondly, the predicted time to trade is introduced in the gravity model to determine its effect on bilateral trade. The methodology used by Minor and Tsigas (2008) is used to estimate AVEs of non-tariff barriers. Results show that the Internet, bureaucracy, corruption and geographic variables significantly affect transaction time. If sectoral characteristics are taken into account, perishable (food and beverages), seasonal (apparel) and high-value added products appear more sensitive to transaction time than other products. AVEs for those goods are much higher than for other manufactured goods. Finally, the CGE model used by Decreux and Fontagné (2009) is extended to include the estimated AVEs in the form of an iceberg cost. Two simulations are performed. First, partial removal of administrative barriers is simulated by reducing the trade cost for all countries by 50 per cent. Then, in order to compare trade facilitation and trade liberalization effects, a similar shock is applied to tariffs. The results show that developing countries in Africa and Asia, especially sub-Saharan countries, the Middle East and North Africa, gain much more from trade facilitation than developed countries. At the sectoral level, vegetables, textiles and electronics witness greater expansion than other products because they are more time sensitive. The effects of trade facilitation are higher in the long run and more significant than those produced by reducing tariffs.

The study closest to the analysis of Tunisia described in Chapter IV is the one undertaken by Mirza in 2009. In it the author said that existing CGE models dealing with the impact of trade facilitation investments could not tell a complete story of why some countries invest more than others in trade-related facilities, because commonly used economic models primarily estimate the benefits of trade facilitation without accounting for the cost of investments. In particular, trade facilitation is simulated by including "exogenous" technological improvements that entail no initial cost. Mirza provided structure to the cost side of the story. Using a combination of partial and general equilibrium models, she created an approach to estimating the benefits of trade facilitation net of the opportunity costs of investment. Applying that approach to infrastructure investments in sub-Saharan Africa, she demonstrated why trade facilitation there had faltered. She extended the GTAP-based model and database by adding data on investments in trading facilities and maintained that modelling facilitation through the capital goods sector clearly illustrates costs. Capital goods are produced using limited resources that have competing uses, such as the production of consumables, and funds for investment are obtained by setting aside a portion of income as savings. Two funding scenarios for project development in sub-Saharan Africa are then explored: (a) private investments and aid from international institutions; and (b) funding from the national budget. Results indicate that returns in terms of trading capacity largely exceed costs in the long term, even in the case of self-funded projects. With a benefit-cost ratio of 3.9 per cent, in the case of internal funds, border reforms are largely profitable in terms of trade and economic growth opportunities. Nevertheless, the cost of reform is steep for such a region with low income and high poverty – for every US$100 invested in capital goods, the regional household must forego US$77 in direct consumption. This may not be feasible where much of the population lives near subsistence level. Thus, alternative funding schemes are needed.

ESCWA recently assessed the potential gains in Egypt from the liberalization of international air and sea transport of goods. The assessment was conducted in three phases: (1) measuring the trade

restrictiveness index for those two sectors; (2) measuring the tariff rate equivalent to that index; and (3) developing a dynamic general equilibrium model taking into account imperfect competition and the entry and exit of local and foreign sea and air transport companies. The model was used to assess two trade liberalization scenarios compared to the baseline scenario for 2012-2020: (a) total liberalization of trade in goods, not including services, with Arab countries; and (b) total liberalization of trade in goods with sea and air transport services. The results showed that GDP growth in Egypt would not be affected by the completion of GAFTA, compared to the baseline scenario. However, liberalization in sea and air transport would initially lift average economic growth by 0.6 per cent, and up to 6.6 per cent by 2020, contributing to a reduction in production and trade costs and thereby boosting Egyptian exports.

C. More efficient trade logistics is not enough to promote exports

Improved efficiency in trade logistics is required to promote trade, private sector development and economic growth, but such improvements alone are not enough. Individual firms must also integrate more into regional and global value chains. Improving trade logistics in parallel with a more diversified and competitive economy is not easy. After decades of operating under strong State control and/or oligopolies, the private sector in most Arab countries appears hesitant to give up its accommodation with the State bureaucracy. Family-owned businesses, moreover, are innately cautious and unwilling to seek external credit to underwrite major modernization or expansion to take advantage of the potentially liberalized environment. Such scruples are understandable, but for an export drive to yield lasting benefits, such investment is essential and would help to modernize major industries with significant potential for accelerating economic growth in many Arab countries.

Despite their strategic location between Europe and Africa, Arab industries face major hurdles in expanding their share in those markets. The internal and external logistical barriers restraining their competitiveness need to be identified and appropriate reforms undertaken with a clear understanding of the specific roles of government and private operators. The next chapter looks at the results of a survey carried out for this report regarding logistics in six Arab countries and sheds light on possible strategies for integrating Arab firms into global value chains.

III. TRADE LOGISTICS IN SELECTED ARAB COUNTRIES

Existing indicators, such as those included in the *Connecting to Compete* and *Doing Business* reports by the World Bank, provide a valuable benchmarking tool on the trade and transport "friendliness" of countries and logistics challenges and opportunities, but they leave important gaps. Little information is available about the structure, functioning, performance and potential for improvement of the logistics chain. Despite strong empirical evidence on the importance of logistics modernization and internationalization as drivers of productivity gains, logistics performance is still measured in terms of time and costs, without taking into account services predictability, reliability and transparency. Our survey analyses logistics chains in Egypt, Jordan, Lebanon, Morocco, Saudi Arabia and Tunisia, especially habits and behaviour that hold Arab countries back in the global competition process. Policy options for improving logistics chain management are also provided.

A questionnaire was sent to Arab companies operating in a variety of sectors to investigate the performance of their logistics activities. Three key sectors for Arab economies were selected: textiles and garments; processed food exports; and imported electronics. The survey analyses the organization and behaviour of firms, governance and the quality of institutions, and other elements specific to the Arab logistics chain. The results identify bottlenecks and compare country-level benchmarks in order to discern whether there are areas in which Arab countries can work together.

A. METHODOLOGICAL ASPECTS: COUNTRIES, SECTORS AND RESPONDENTS

The survey focuses on logistics operators and professionals. A country and sector protocol was developed and the sectors of focus cover those of the Arab region with high quality and significant involvement in international production networks. The criteria for sectors and countries selection are explained as follows, as well as the characteristics of the sample of respondent firms. The quality of the sample of firms is evaluated based on its consistence with other studies, and common knowledge about the overall structure of the selected sectors in Arab countries is then controlled.

1. *Country and sector selection rationale*

The three most relevant economic sectors were identified based on their contribution to non-oil trade (table 5). Where data is available, the share of sectors in total or industrial GDP and/or employment were also used as selection criteria. On the export side, textiles and garments and food processing sectors are crucial to many Arab countries. They each account for 10-20 per cent of exports from Arab countries, contribute about 30 per cent to manufacturing employment and account for 20-30 per cent of manufacturing value-added. On the import side, the analysis focuses on electronics as key manufacturing sector inputs that are crucial to the competitiveness of firms.

The selection of sectors influenced the choice of country for the study.[5] Three groups were identified. In the first group, including Egypt, Jordan, Morocco and Tunisia, the share of both sectors in total non-oil exports is high.[6] In the second group, from which Lebanon and Saudi Arabia were chosen, only the food processing sector makes a major contribution to total non-oil exports.

[5] The United Arab Emirates was dropped from the sample given the importance of re-exports, which distort comparisons with other Arab countries.

[6] Due to the current political and security situation, the Syrian Arab Republic was not considered further for this study.

TABLE 5. SECTORAL CONTRIBUTION TO TOTAL NON-OIL EXPORTS IN SELECTED ARAB COUNTRIES, 2010

Countries	Total exports (*US$ billion*)	Non-oil exports (*per cent*)	Textile and garment exports (*per cent*)	Food processing exports (*per cent*)
Bahrain	15.499	25.7	4.6	7.2
Egypt	25.298	70.2	14.5	24.5
Jordan	5.811	98.9	16.0	16.8
Lebanon	3.424	99.8	3.1	14.9
Libya	36.440	2.3	0.0	0.1
Morocco	17.589	98.9	19.2	19.2
Oman	31.569	22.2	0.2	11.2
Palestine	0.410	99.9	1.1	15.2
Qatar	72.800	23.6	0.0	0.1
Saudi Arabia	245.732	12.5	1.2	9.4
Syrian Arab Republic	1.353	50.1	18.6	41.9
Tunisia	16.425	85.8	25.0	9.0
Yemen	6.171	8.8	0.3	74.8

2. *Quality of the respondent sample*

The sectoral breakdown of surveyed firms in each country was reasonably balanced (table 6). Respondent firms are mostly private SMEs [7], three quarters of which have fewer than 100 employees and 90 per cent fewer than 200 (figure 1).[8] Their average turnover is US$9.3 million; three quarters of them record a turnover below US$11.7 million (figure 2). The survey findings suggest a salient positive relationship between turnover and export share.

TABLE 6. NUMBER OF RESPONDENT FIRMS, BY SECTOR

	Egypt	Jordan	Lebanon	Morocco	Saudi Arabia	Tunisia
Textile	35	32	35	48	32	41
Food processing	39	37	29	32	53	33
Electronics	26	32	35	20	16	26

Figure 1. Breakdown of firms by number of employees

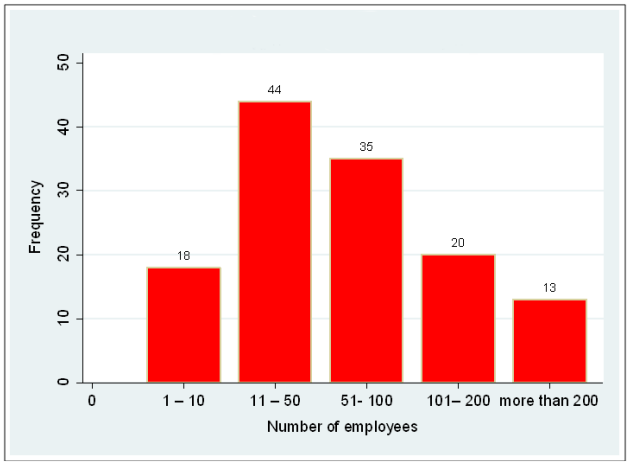
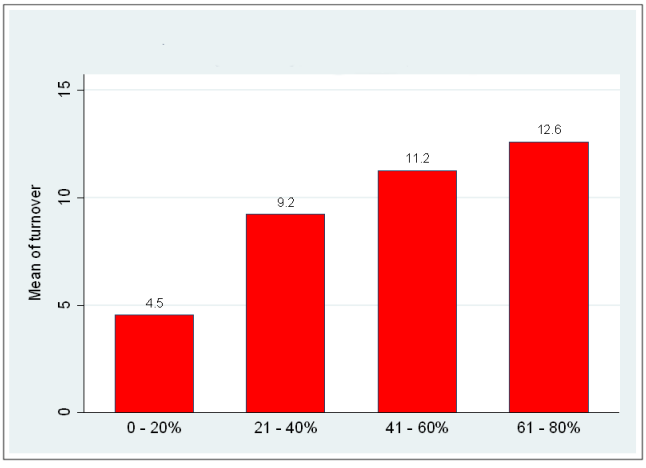


Figure 2. Relationship between mean turnover and share of exports



[7] Only 2.3 per cent of the respondents belong to the public sector.

[8] According to the definition of the European Commission, medium-sized enterprises have up to 250 employees. In some countries, such as Australia, the limit is set at 200. A 200-employee threshold is used in this survey.

3. *Methodology: survey content*

The questionnaire for this study was designed to gather quantitative and qualitative information about:

- The performance of the logistics chain from procurement activities, customs and technical control procedures, transportation and distribution, storage and warehousing (inputs/outputs), and supporting technology and finance.
- The perception of firms of the quality of logistics services provided by various suppliers.
- Company behaviour, practices and management of logistics related activities.

Response consistency was ensured by a random selection process and the homogeneity of the sample firms, but the findings and the degree to which they reflect the situation in each country and sector should be taken with caution.

B. PERFORMANCE ANALYSIS

This section analyses the behaviour and practices of firms, evaluates their performance and identifies challenges and opportunities along the logistics chain. It attempts to assess the intensity of the efforts required of Arab companies in order for them to compete and be significant players in global value chains. Logistical costs are a key to competitiveness in an environment where firms increasingly trade tasks and where goods cross frontiers multiple times.

1. *Main features of company logistics management*

Around the world, firms are increasingly outsourcing logistics services, which are regarded as a supporting activity more than a core function, but logistics is often still internalized in the Arab region; indeed, just over half of the respondents have a logistics department (see figure 3 for a breakdown of logistics outsourcing). This is partly due to the poor quality of logistics services supplied by third parties. Nevertheless, 51.6 per cent of respondents said that they were not satisfied with logistics services provided internally (figure 4). The responsibility that firms have for finding the best providers is underlined by the fact that those who are satisfied with their own logistics performances are also the 53 per cent that regularly conduct cost analysis (figure 5). Apart from customs clearance, which is generally handled by third parties, logistics activities are mainly conducted internally, sometimes in cooperation with a third party when the nature of the activity itself requires specific and costly capital investments, as in the case of inbound transport and distribution to customers. The degree of satisfaction of firms seems to depend largely on their own behaviour. There is thus ample room for improvement of logistics activities in Arab economies.

Figure 3. Extent of outsourcing of logistics functions

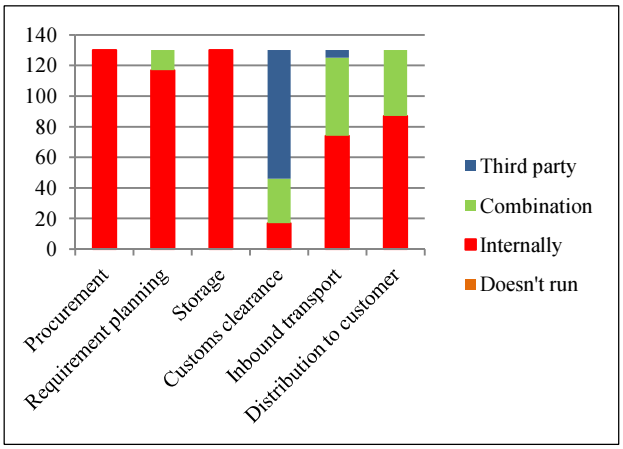


Figure 4. Assessment of company logistics functions

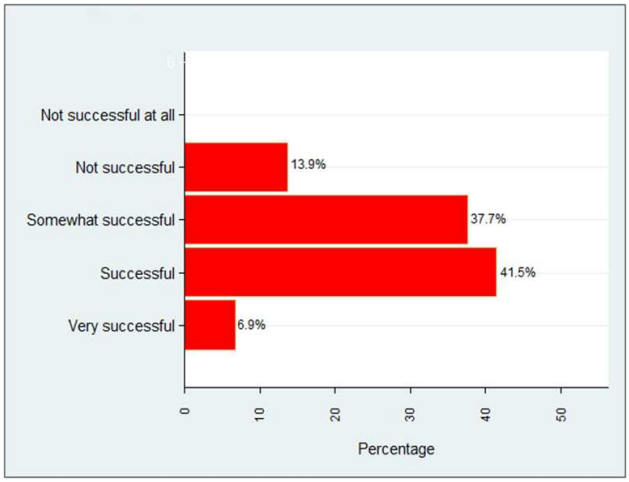
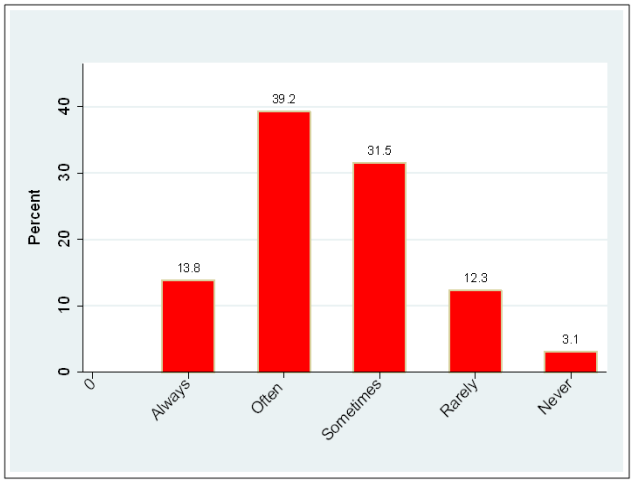


Figure 5. Frequency of systematic analysis of logistics costs



Considerable efforts have been made in Arab countries to improve infrastructure and reform customs procedures. Nonetheless, little impact has been made on the cost of logistics to firms. In 2012, those costs represented an *ad valorem* equivalent of 15 per cent compared with 16.7 per cent in 2005 (figure 6). More than half of the firms surveyed face logistics costs amounting to 13-18 per cent of their turnover (figure 7), compared with an average of 8 per cent for European firms.

Transportation, warehousing and inventory account for up to three quarters of the cost of logistics. According to Lafargue (2011), transportation alone accounts for 60 per cent of total logistics costs in Europe (figure 8). Several factors explain the differences in the cost structures between Arab and European firms. Subsidized energy prices in Arab countries should push down transportation costs and fuel comparative advantage in those countries, but because of poor logistics, firms tend to hold large stocks of raw materials to avoid shortages and disruptions to production, thereby pushing up warehousing and related costs and eroding their initial advantage.

Figure 6. Mean of trade logistics costs according to analysis by companies

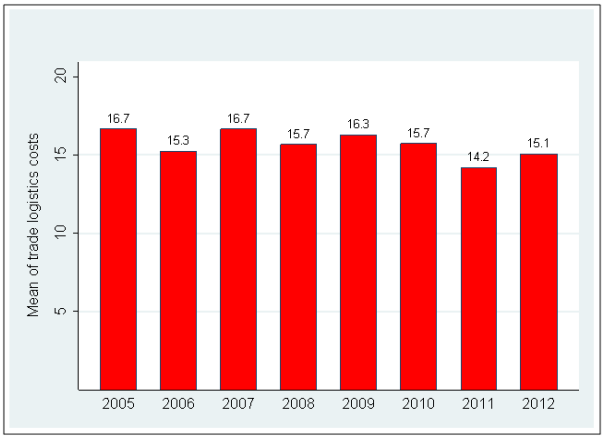


Figure 7. Company expenditure on logistics

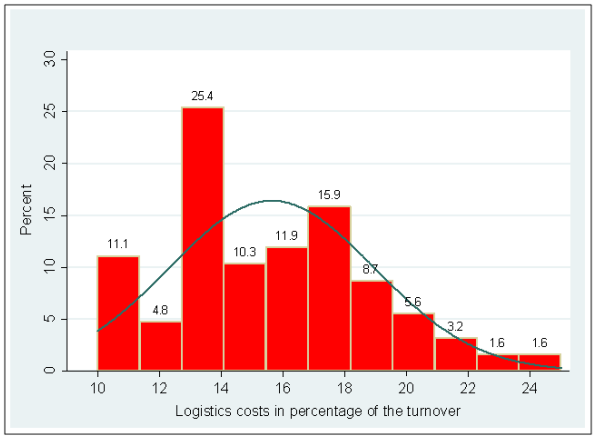
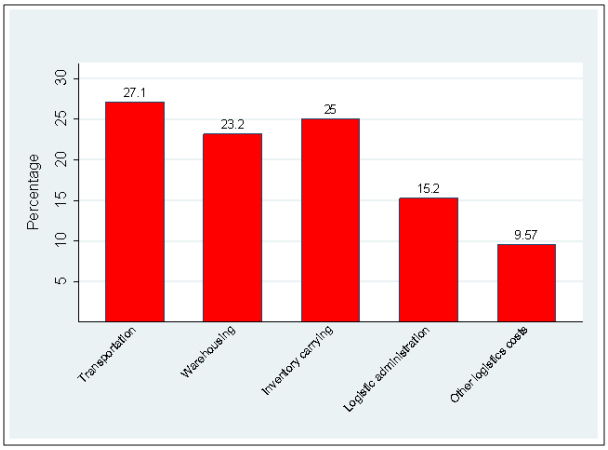


Figure 8. Breakdown of total logistics costs



2. *Performance in procurement activities*

On average, respondent firms place 210 purchase orders a year, two thirds to national suppliers and the remainder to international firms. Those shares vary substantially across sectors (appendix table A.1). Some 82 per cent of the orders are sent to suppliers using an immediate and traceable means of communication such as fax or email; the remaining are placed by phone or handed over (appendix figure A.1).

In general, the procurement process is not dynamic. More than half of the respondents declared that they did not look for new products and/or suppliers frequently (appendix figure A.2). Of the 34.6 per cent of surveyed firms actively seeking new opportunities, most find new suppliers at international exhibitions (53 per cent) or through market research (30 per cent) done internally or by a third party (appendix figure A.3). In the Arab region, the behaviour of procurement managers seems to prevent firms from seizing existing opportunities to reduce procurement costs, because they opt for the easiest and least costly investigation methods at the expense of more comprehensive and reliable ones. Moreover, those Arab procurement managers who attend international exhibitions mainly do so in Europe, further reducing chances of finding a partner in their own region.

The inefficiency of procurement is also reflected by the fact that only 34 per cent of respondents reported engaging in regular requirement planning but in an improvised manner (appendix figure A.4). Thus, 42 per cent of respondents encounter input shortages and disruptions in production.

Procurement managers in Arab countries fail to explore all options, narrowing them to those for which information is readily available. They cannot therefore fully benefit from the cost-reducing effect of a sufficiently competitive market. Their practices present limited opportunities for meeting and working with other Arab firms, with whom they share language and cultural ties. Disruptions to production due to input shortage can be seen as a cost of an underperforming procurement process.

3. *Performance of customs and technical control procedures*

With regard to customs clearance, the surveyed firms consider the performance of ports and border stations to be average (48 per cent and 43 per cent respectively) or inefficient (28 per cent and 43 per cent) (figure 9). Airports fare relatively well with a 44 per cent satisfaction level. Firms responded largely with median rankings; only five responded “very high” or “very low”.

The transparency and fairness of customs valuations are regarded as often satisfactory by more than half of respondents and sometimes satisfactory by 39 per cent. Only 7 per cent ranked the customs valuation process as rarely transparent and fair (figure 11). Customs clearance in Arab countries seems to work well except for cargo dwell time, which usually takes five days and can take up to 10 days (80 per cent

of respondents), which is high compared with the average of less than three days in most developed and emerging countries (figure 10). One of the main reasons is that, on average, half of shipments are physically inspected.

Figure 9. Efficiency of customs clearance (by sea port, airport and border station)

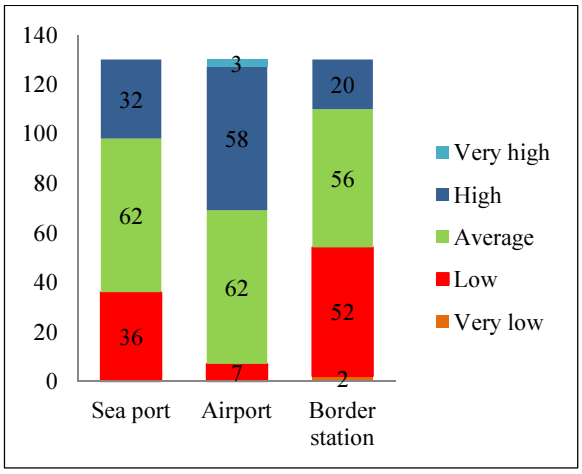


Figure 10. Cargo dwell time

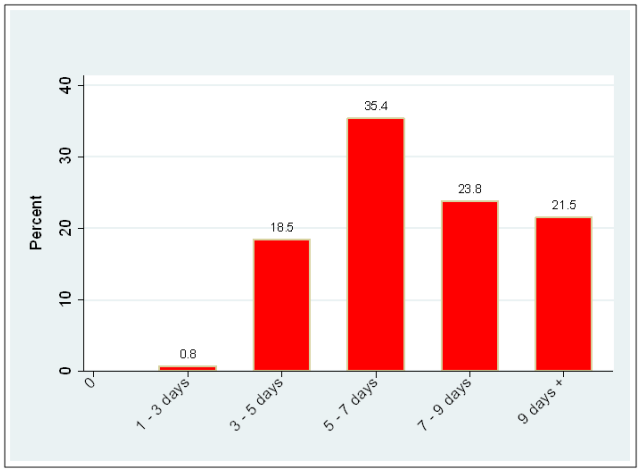
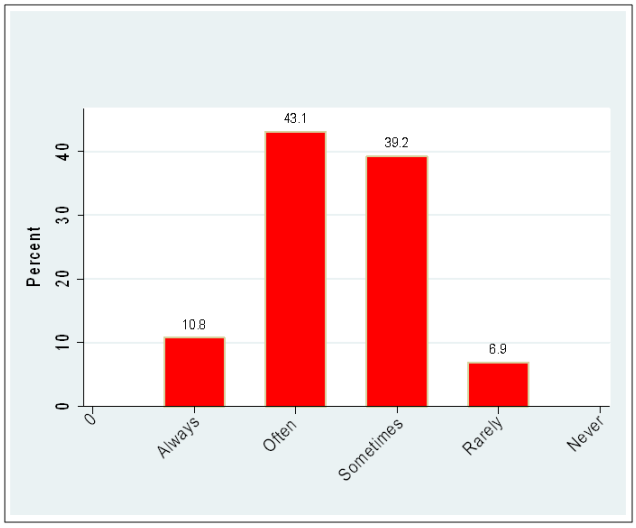


Figure 11. Assessment of the transparency and fairness of customs valuations

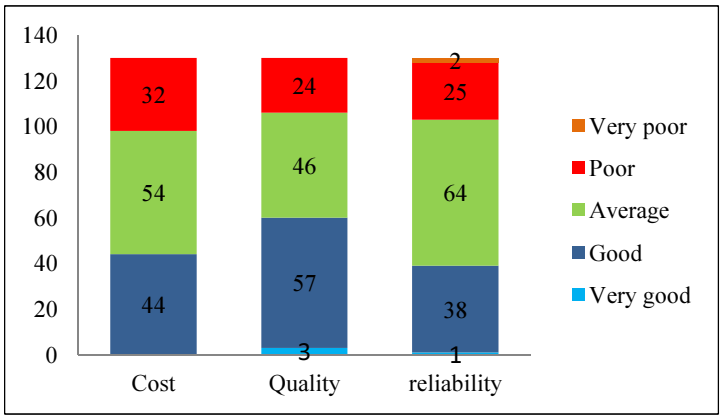


The high frequency of physical inspections is attributable to the nature of the sectors covered by the survey. Controls in the food processing sector are necessary to ensure compliance with sanitary and phytosanitary measures and other strict norms. The textile industry is highly sensitive for at least three countries in the sample (Egypt, Morocco and Tunisia), given the significant contribution it makes to exports and employment. Frequent inspections reflect a determination to ensure that goods do not come from countries where sale prices are below items' marginal cost – in other words, anti-dumping measures. Nonetheless, corruption and retaliatory measures taken in response to complaints, in the form of longer clearance processes that prolong cargo dwell time, represent the most vexatious burden in terms of time and costs for the bulk of respondents, especially in the food processing sector.

4. *Performance of transport and distribution activities*

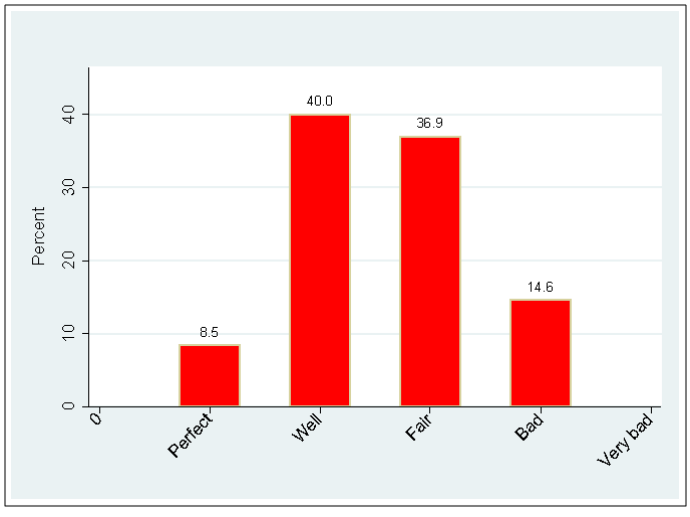
Around 65 per cent of survey respondents purchase materials from abroad on an ex-works or free-on-board (FOB) basis, meaning they arrange the freight themselves (appendix figure A.5). The freight forwarders selection process is competitive (appendix figure A.6). The quality of the investment made in IT solutions for tracking and tracing shipments is crucial to the satisfaction of firms. Although 57 per cent of respondents are satisfied with freight forwarders in terms of quality, their expectations are far from being met in terms of cost and reliability (figures 12 and 13).

Figure 12. Assessment of freight forwarders



The survey also reveals that transportation solutions are far from optimal. The average estimated value of transportation fleets is high at US$450,000 (appendix table A.2). Firms own on average 12 vehicles but disparities are large, with the size of transportation fleet ranging between 2 and 55 vehicles.[9] Vehicles tend to be old (10 to 15 years in 39 per cent of cases, see figure A.7 in the appendix) but goods delivery is subcontracted only 1 out of 10 times (appendix table A.2) and around 4,000 tons of goods are transported a year by firms themselves, as opposed to only 425 tons by third parties. Their annual fuel expenses are 7.5 times higher than the annual bill for third party transport and distribution services.[10]

Figure 13. Assessment of the reliability of deliveries to customers (time and location accuracy)



[9] Transport vehicles used to carry goods and merchandise. The sample includes manufacturing firms needing large fleets (food processing and textile sectors) and small retailers (electronic sector), explaining significant disparities among the respondents.

[10] Nevertheless, due to differences in the structure of the sectors, there are disparities among the pooled firms and within countries.

In addition to improving fleet quality and turnaround intensity or drivers' skills, Arab companies need to review cost management practices. By favouring higher quality services with lower prices, they could boost competition in the transport sector by accessing more transport options and lowering costs.

5. *Performance in storage and warehousing activities*

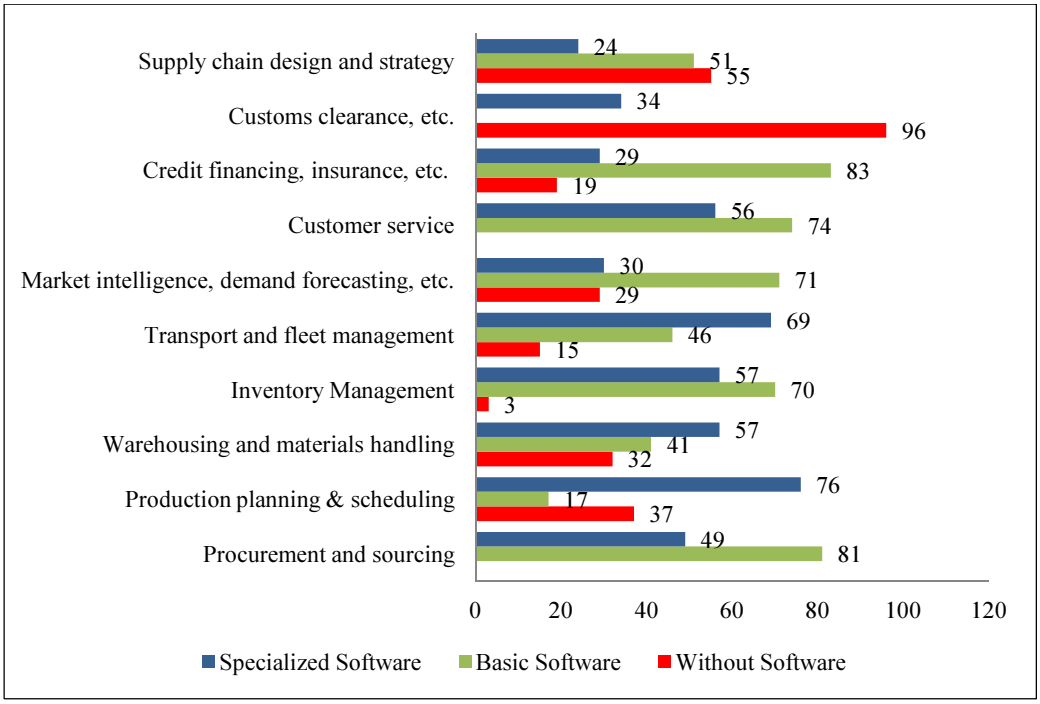
The questionnaire also provides quantitative and qualitative information on storage and warehousing activities (appendix table A.3). Companies own on average three storage facilities with an available surface of 4,000 square meters, valued at around US$1.2 million, with US$96,000 in storage equipment. Subcontracting activities are scarce and only around 468 square meters of storage space is rented for US $8,700 a year on average.

Firms are generally positive about equipment in storage facilities, with 94 per cent of respondents rating equipment satisfactory and 96 per cent ranking storage security as secure (appendix figures A.8, A.9 and A.10). Overall, the storage needs of firms seem to be met. IT solutions for inventory management, however, are still missing and more than half of respondents complain about time-consuming random searches.

6. *Performance in supporting technology and financial services*

Analysis of software usage (figure 14) shows that, apart from customs clearance, logistics-related tasks are largely handled using basic software. Dedicated applications are preferred for production planning and scheduling, warehousing and materials handling, or transport and fleet management.[11] The use of basic software for monitoring logistic activities weighs on the productivity of firms.

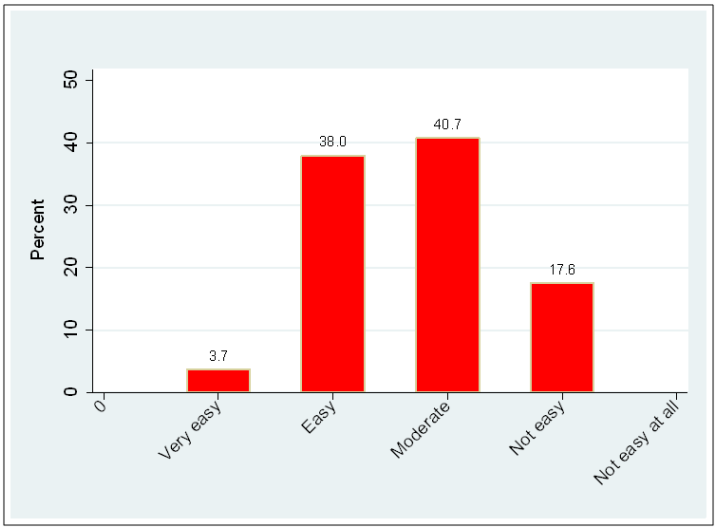
Figure 14. Use of logistics software



[11] Customs clearance usually requires a specific electronic interface connecting firms to the customs administration for declarations and duties evaluations. These activities are generally subcontracted, thus firms do not invest in dedicated software.

The survey confirms that difficulties in accessing credit impede the development, capacity for innovation and competitiveness of firms in the Arab region. Although 83 per cent of respondents are aware of lending opportunities in their home country, firms face obstacles in accessing services (figure 15). Credit appears to be especially hard to obtain for investing in intangible assets; the under-investment in software solutions mentioned above is a result. Financial institutions and Governments need to do more to promote the availability of credit to companies, especially the smallest ones, which face the greatest difficulties in this regard.

Figure 15. Ease of access to export lending options



C. COMPARATIVE AND BENCHMARKING ANALYSIS

This section provides an overview of outcomes from the survey of firms' logistics costs management, common difficulties and specific problems, using a cross-sectoral and benchmarking analysis. The analysis is then run on a country-by-country basis.

1. *Sectoral comparative and benchmarking analysis*

Before analyzing cross-sectoral logistics and assessing differences between respondent firms, an overview of their main characteristics is needed to disentangle sector-related patterns from behavioural differences.

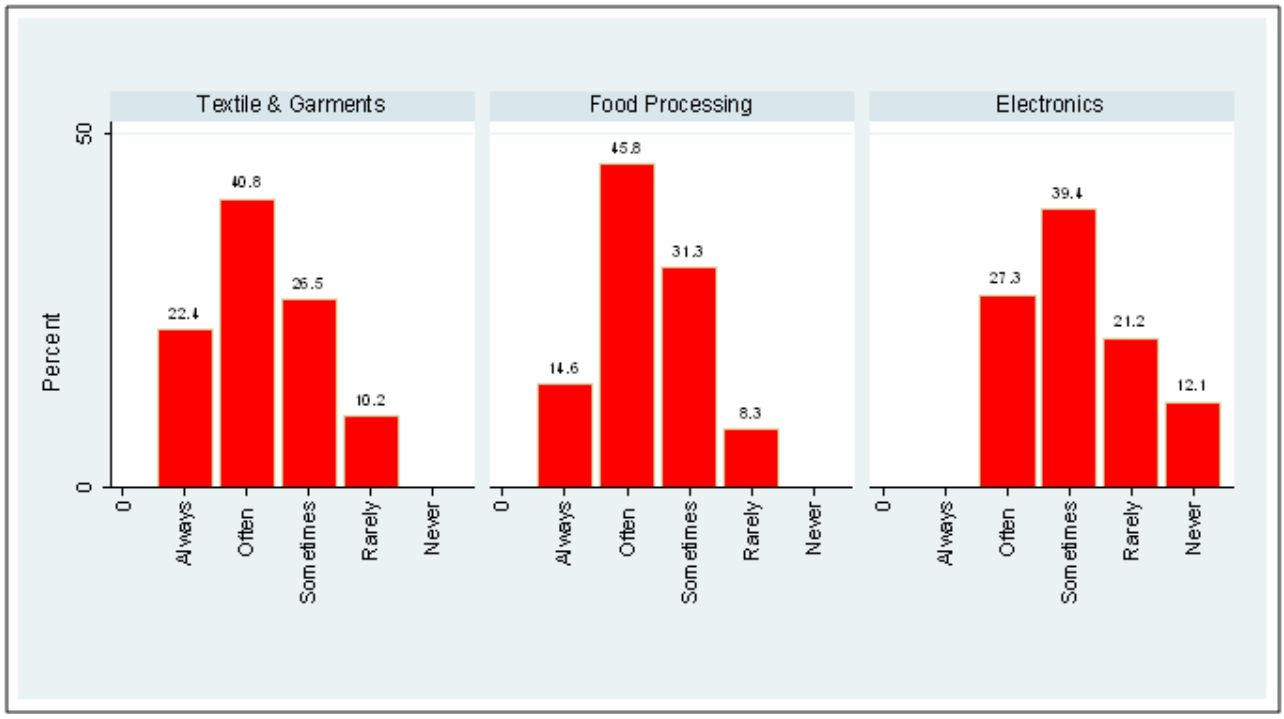
Firms from export-oriented manufacturing sectors are relatively larger and tend to monitor their own logistics activities carefully (figure 16). On average, their turnover and staff numbers are almost twice high as those of firms from the domestically-oriented electronics sector, half of which employ fewer than 10 workers (appendix table A.4).[12]

Although similar in some respects, export sectors show striking structural differences. Dominated by smaller firms employing 11 to 50 workers and often considered labour-intensive, the textile and garments sector seems to be relatively more capital intensive with gains in turnover outstripping employment growth. By contrast, firms with 51 to 100 employees make up the bulk of the food processing sector, in which turnover matches employment growth, reliance on blue-collar workers is considerable, and labour and capital are not as easily interchangeable.

[12] A two-group, mean-comparison test shows that the difference in turnover between the manufacturing sectors, on the one hand, and the retail electronics sector, on the other, is statistically significant at 1 per cent.

The survey shows that food processing companies place more purchase orders annually than firms from textile or electronics sectors. However, the textile and garment sector imports more raw materials from abroad, with 53 per cent of purchase orders placed with international suppliers, compared with 27.5 per cent and 32 per cent for the food processing and electronics sectors respectively. Export-oriented sectors hire more managers and employees for procurement than the electronics sector due to the breadth of input required for production and the volume of information and depth of analysis needed. The range of goods and arbitrage opportunities is narrower for companies purchasing electronics equipment, and they are thus less systematically involved in finding new suppliers.[13]

Figure 16. Frequency of systematic analysis of logistics costs, by sector



Food processing firms are subject to tight physical inspection. They also face higher freight costs compared to textile firms, due to the specific requirements for foodstuff transportation and lack of specialization of freight forwarders (appendix table A.5). Retail electronics companies, however, experience longer cargo dwell time than the other sectors. Although firms from all three sectors make similar choices in terms of transport and distribution subcontracting, and storage and warehousing, export-oriented firms largely internalize transport and distribution activities and have a more sophisticated transport fleet than domestically oriented firms, especially if the volume of their transactions with neighbouring countries is significant.

2. *Country-by-country comparative and benchmarking analysis*

The survey revealed that Saudi Arabia and, to some extent, Egypt enjoy the lowest logistics costs (figure 17).[14] Energy products in those countries are more heavily subsidized than elsewhere. In Egypt, those subsidies account for 20 per cent of the national budget and cost the Government US$17 billion

[13] Tests show that textile and food-processing companies look more actively than retail electronics companies for new suppliers. The test difference is statistically significant at 1 per cent. No statistical difference was detected between manufacturing industries. The same conclusions could be drawn for the variable "frequency of requirement planning".

[14] A statistically significant difference of 1 per cent with all the other countries in the sample was found.

a year.[15] Firms operating in Saudi Arabia also benefit from the fact that the country is an oil producer. As a consequence, the contribution of transportation and distribution items to logistics costs is low enough to make the total logistics costs the lowest in the sample. Figure 18 reveals great similarities in the distribution of such costs between Tunisia and Jordan and between Morocco and Lebanon. The same pattern holds for the share of transport costs in total logistics costs.

Figure 17. Distribution of logistics costs, by country

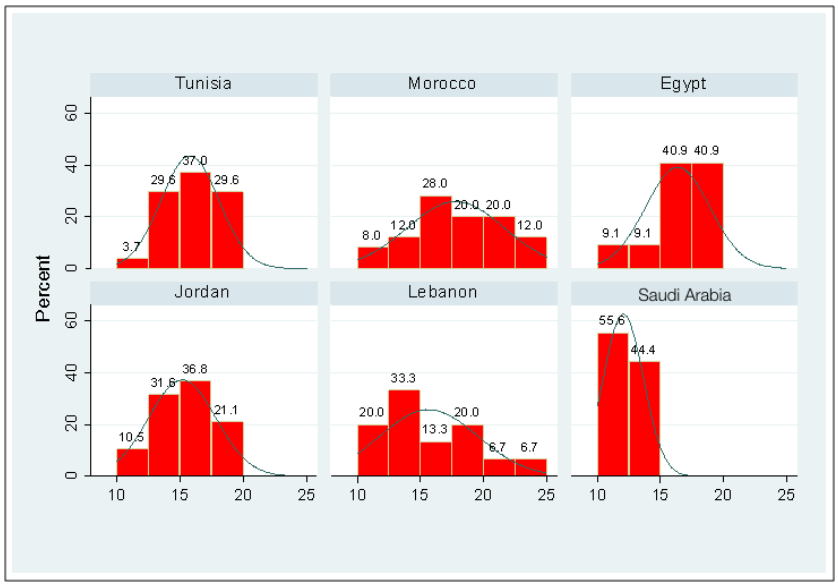
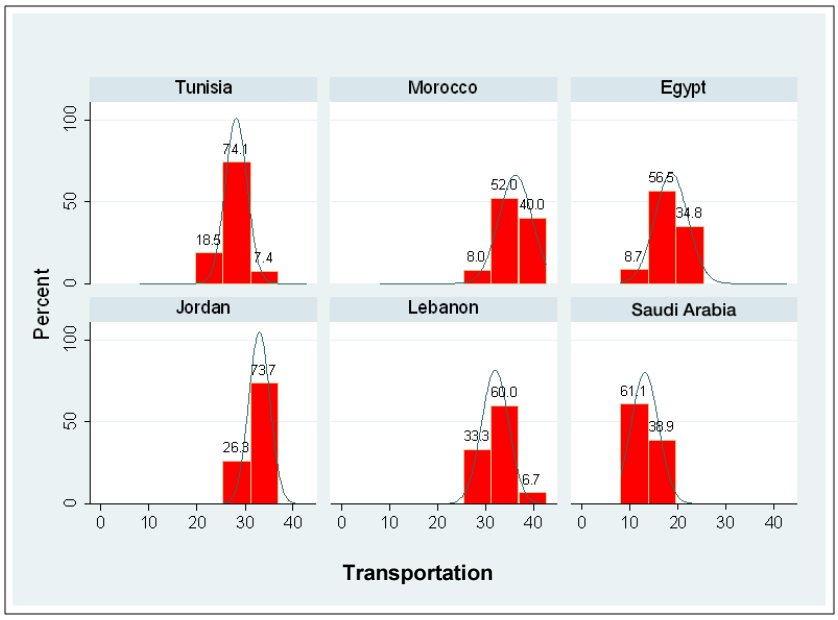


Figure 18. Share of transport costs in total logistics expenditure, by country

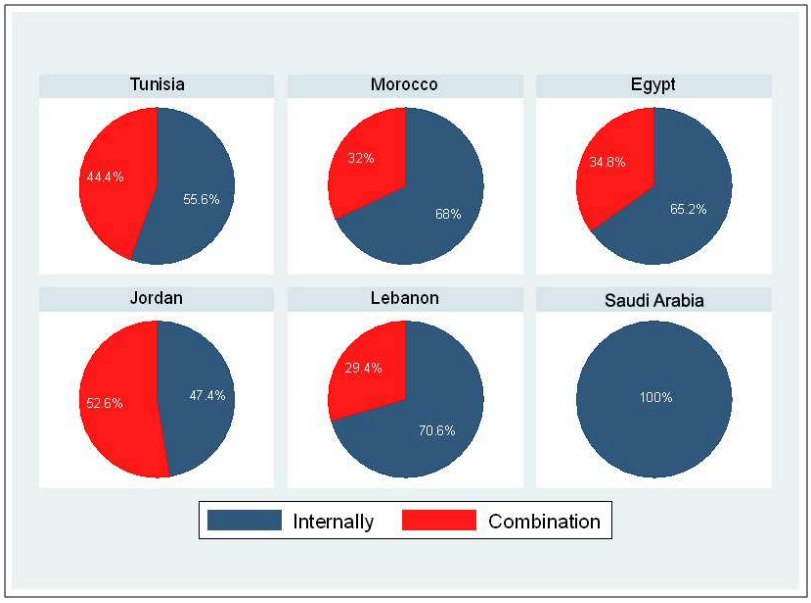


Countries differ markedly in terms of logistics outsourcing or subcontracting, ranging from Saudi Arabia, where distribution to customers was provided entirely internally, to Jordan, where this share is below 50 per cent (figure 19).[16]

[15] http://rebeleconomy.com/tag/egypt-energy-subsidies.

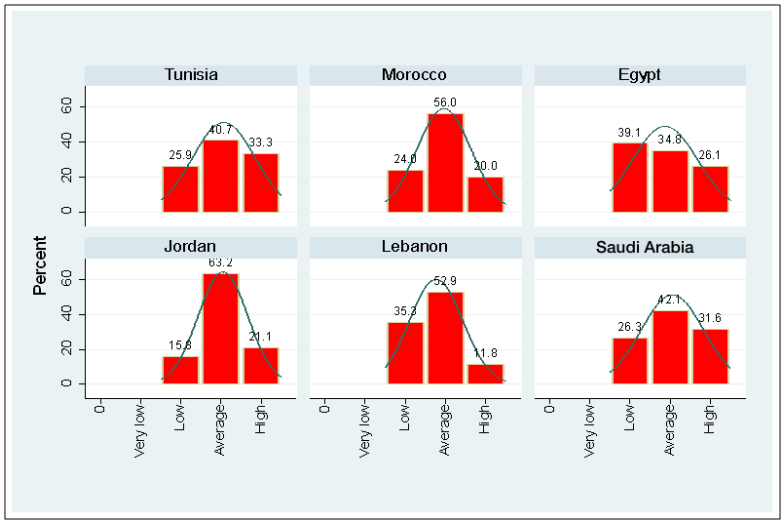
[16] The level of significance of the difference is at 1 per cent.

Figure 19. Extent of "distribution to customers" outsourcing, by country



Egypt appears to be the only country in which a majority of firms rate customs clearance efficiency in sea ports as below average. In the other countries, the majority of firms rated performance as average (figure 20). The findings on customs clearance at airports were similar.

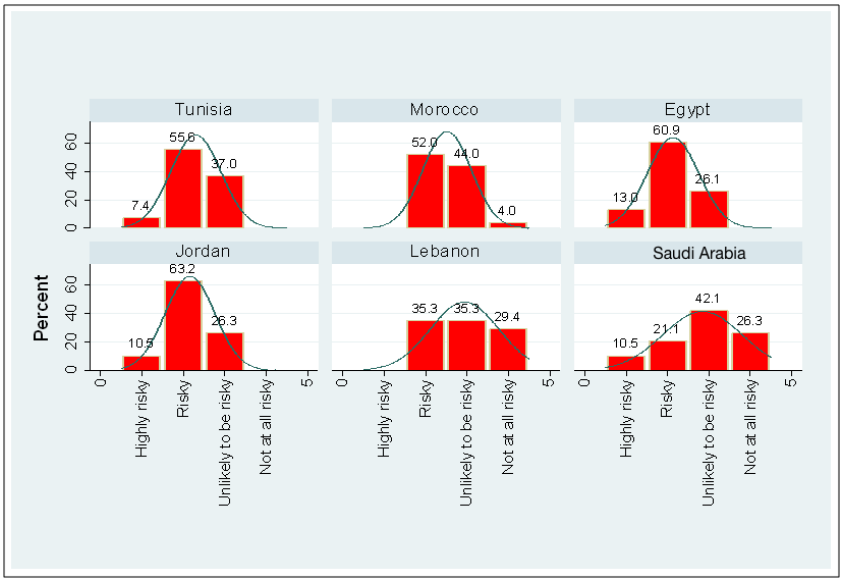
Figure 20. Assessment of customs clearance efficiency in sea ports, by country



Customs procedures and practices are similar throughout the Arab region and, accordingly, assessments by firms of those procedures are also largely similar from one country to the other. Negative consequences and potential retaliatory measures resulting from a complaint before the customs administration, however, do exhibit some variations. Around 30-35 per cent of firms in Lebanon and Saudi Arabia have to cope with such problems. Figures in the remaining four countries varie between 52 per cent in Morocco to almost 74 per cent in Egypt (figure 21). With a reportedly low frequency of bribe requests when clearing a product, Saudi Arabia seems to be the most transparent country in the sample (appendix figure A.12).[17]

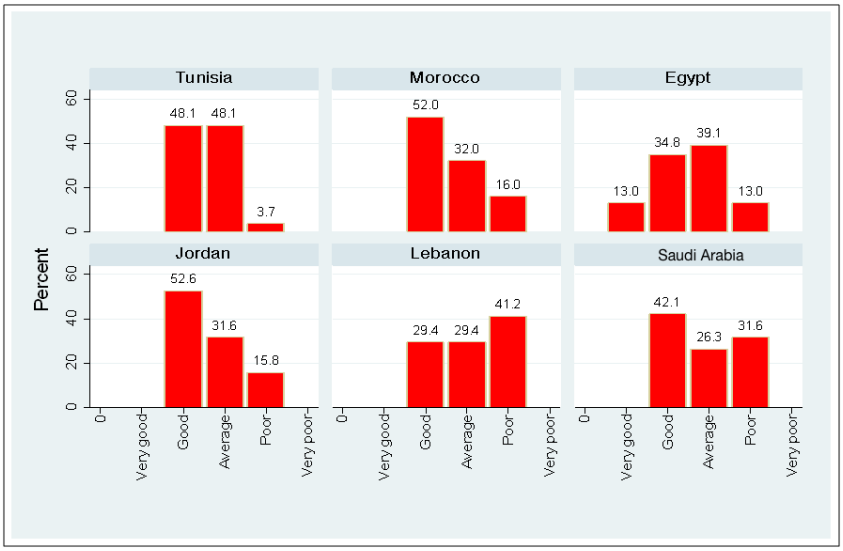
[17] The difference with all the other sample countries was significant at 1 per cent level.

Figure 21. Risk of retaliatory measures over complaints against customs agents, by country



Firms in Lebanon are the least satisfied with freight forwarders. Respondents in other countries mostly replied that services were good or average, with some lower-scoring outliers (figure 22).[18]

Figure 22. Assessment of freight forwarder service quality, by country

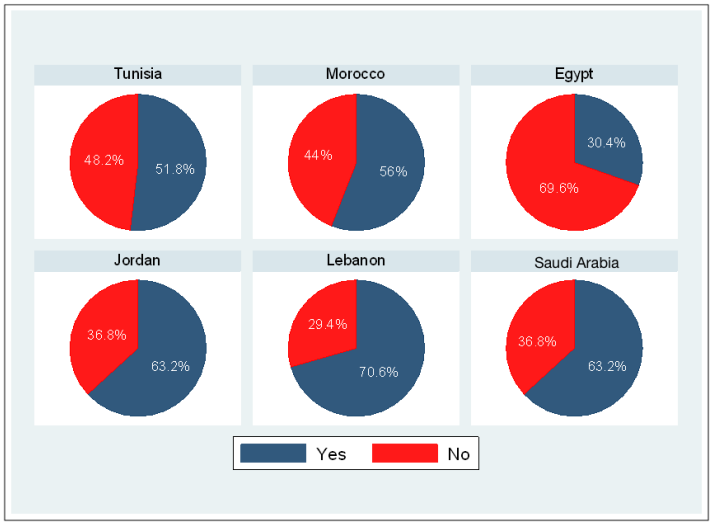


In five countries, a majority of firms answered in the affirmative regarding their use of IT solutions to track and trace shipments. However, in Egypt almost 70 per cent of companies do not have the necessary IT equipment (figure 23).[19]

[18] The difference with Tunisia and Egypt is significant at 5 per cent, and with Morocco and Jordan at 10 per cent.

[19] The difference is statistically significant at 5 per cent with Jordan, Lebanon and Saudi Arabia, significant at 10 per cent with Morocco, and not statistically significant with Tunisia.

Figure 23. Availability of IT solutions to track and trace shipments, by country



Survey results suggest that Saudi companies have the newest transport fleet in the sample, with an average vehicle age of about seven years. The average age ranges from 12 to 17 years in the other countries.[20] This could be in part explained by the relatively recent emergence of the textile industry in Saudi Arabia (appendix figure A.13).

No remarkable differences between countries were found regarding storage and warehousing activities or the availability of financing solutions to fund export transactions without applying for a mortgage. Such financial options are available in all the sampled countries and companies generally rate ease of access to such mechanisms similarly.

D. Conclusion

A breakdown of logistics costs shows that transportation, warehousing and inventory carrying each account for roughly a quarter of total costs. This is mainly explained by the high energy subsidies prevalent in Arab economies but also to low wages and social charges.

Responses by firms to the questionnaire show that externalization of logistics activities in the Arab region is limited, except in the case of transport and distribution activities and customs clearance. Companies with structured logistics departments are better placed to control logistics activities and rein in related costs. Nevertheless, the competitiveness of firms is impeded by an insufficiently proactive procurement process, especially in the case of those in export-oriented sectors with poor subcontracting habits. A downside of internalizing logistics is that it involves maintaining a large, old and costly transportation fleet and large storage capacities.

Customs clearance appears to be less problematic than in the past but much remains to be done, especially regarding timeliness. Responses revealed significant cargo dwell time, probably due to the high rate of physical inspections and inappropriate behaviour by customs agents. The survey shows that, too often, firms still rely on basic software to fulfil logistics functions, thereby generating a significant loss of time and efficiency. Firms also suffer from limited financial resources to cover export transactions.

Subcontracting a larger part of these logistics tasks would allow firms to optimize production costs and organization, based on each economic agent's comparative advantage. Such a restructuring would encourage firms to specialize along the logistics chain, reduce costs through economies of scale and knowledge accumulation, improve competitiveness and promote economic activity and job creation.

[20] The difference is statistically significant at 1 per cent.

IV. A STRATEGY FOR EFFICIENT INTERNATIONAL TRADE LOGISTICS: TUNISIA

After decades of strong performance, Tunisia's export sector is at a crossroads, facing numerous challenges. This case study looks at how improved logistics could help it to realize its trade ambitions.

From the 1990s until the political upheaval of recent years, Tunisia had been one of the fastest growing economies in the Arab region, with exports playing a key role in its economic and social development. In order to benefit from potential growth in output and employment that would flow from greater integration into the global economy, Tunisia needs to improve its export performance in the face of competition from new WTO members, such as China and India, and new members of the European Union. Tunisia also needs to revamp the structure of its exports. Most Tunisian firms serve as subcontractors for foreign companies, meaning they continue to produce garments and other simple goods that could easily be replaced with products from other countries with lower production costs. Moreover, export growth had been predominately in off-shore companies that produced mainly for export and that had few ties to on-shore industry. As a result, most onshore firms were ill-prepared for the international competition that began to affect the domestic market after the conclusion of various international and regional trade agreements.

Due to the low value-added operations of Tunisia's off-shore companies and the sluggish performance of European Union trading partners, Tunisian firms are no longer able to help the country to address challenges in job creation and poverty reduction.

Achieving solid export growth, particularly in high-value added activities, requires the development of productive capacities through private investment, but also the capacity to reinforce market shares in the European Union and penetrate new markets. It also requires the supply of new products to old and new markets. Tunisia must look not only at the production costs of companies but at the country's capacity of the country to connect to global value chains and regional value chains. The significance of transport and logistics for development is reflected by the fact that more than 80 per cent of partner country respondents to an OECD/WTO survey on Aid for Trade included transport and trade facilitation among their top three Aid for Trade priorities. All respondents indicated that national development strategies identified transport as a source of growth. No other sector has such unanimous recognition as a core lever for growth and development.

It is therefore imperative for Tunisia to address some key questions: How do trade logistics, especially transport, perform currently? If the role of exports in Tunisia's economic and social development strategy is to be boosted, by how much must transport logistics improve? What additional public spending would be needed to achieve that and what financing mechanisms would be feasible for Tunisia, given the existing macroeconomic constraints? What macroeconomic tradeoffs would the reduction of a trade costs-financing strategy trigger in the economy? And, to what extent will increased public spending operate as an effective counter-cyclical response to add to efforts by the Government to promote economic recovery?

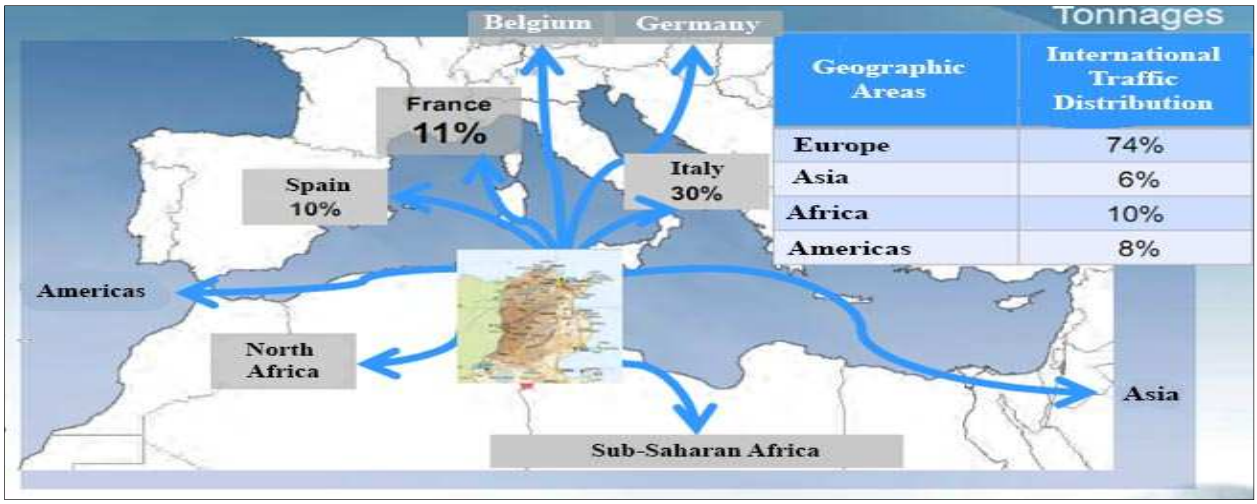
A. BACKGROUND ON TRANSPORT SECTORS

Tunisia's central position in North Africa gives it a natural comparative advantage in terms of proximity to the European market (mainly France, Italy and Spain) and the main Mediterranean shipping routes. Indeed, it is well placed to access markets in four continents (figure 24). Tunisia has made its strategic goal of integration into the global economy clear by signing various multilateral and bilateral trade agreements since the 1990s. The most important of them was the Association Agreement signed with the European Union in 1995, which came into force in January 1998. Accession to the General Agreement on Tariffs and Trade in 1990 marked a significant step towards globalization. Tunisia has since signed free trade agreements with Turkey, the European Free Trade Association, and most Arab countries in the framework of the Greater Arab Free Trade Area (GAFTA).

In order to benefit from those agreements through boosting exports, Tunisia has tried to improve the efficiency of logistical services by increasing public investment in trade infrastructure, encouraging public-private partnerships in selected trade-related activities and improving the efficiency of public services. However, much remains to be done in order to catch up with competitors.

This study focuses on the impact of improved logistics on trade, economic growth and public finances. It looks at the overall performance of Tunisia in terms of trade logistics, and in particular transport, using the findings of the World Bank's *Doing Business* and *Connecting to Compete* reports. Transport accounts for a major share of logistics costs. In Europe, it accounts for 52 per cent of total logistics costs, of which 27 per cent is related to sourcing transport and the remainder concerns distribution (Lafargue, 2011). A survey carried out among importers and exporters of selected commodities in a panel of Arab countries showed that transport accounted for a major share of trade costs; the rates were higher where energy subsidies were lower than in rich oil-producing countries.

Figure 24. Tunisia's position among regional trading partners



Source: Based on figures from Trade Map. Available from www.trademap.org (accessed March 2015).

1. *Maritime transport*

The maritime transport sector covers 92 per cent of Tunisia's international trade. Seven ports along 1300 km of coastline are open to international trade. Run by the Office de la Marine Marchande et des Ports (OMMP), they are more or less specialized in particular market segments.[21] Many worldwide shipping companies are present in Tunisia but they only ensure a feeder service because of a lack of deep-water ports. That limitation should be addressed by the planned Enfidha port, for which feasibility studies were launched in 2004. The Government plans to finance the US$2.5 billion project through public-private partnership, probably as a Build-Operate-Transfer contract, but little progress has been made to date.

Rades port occupies the leading position in the national maritime transport chain by virtue of its specialization in container traffic and rolling units, mainly trailer traffic. It accounts for 28 per cent of overall traffic, 88 per cent of the tonnage of containerized goods, 76 per cent of the tonnage of goods loaded in rolling units, 91 per cent of twenty-foot equivalent unit container traffic, 79 per cent of the traffic of rolling units and 24 per cent of the traffic of ships registered in all Tunisian commercial ports. In 2008, more than 350,000 containers were handled in Rades. Bizerte port serves industrial zones in the region. Goulette specializes in passenger transport and Sousse in cargo shipping. Sfax is a multipurpose port, mainly dealing

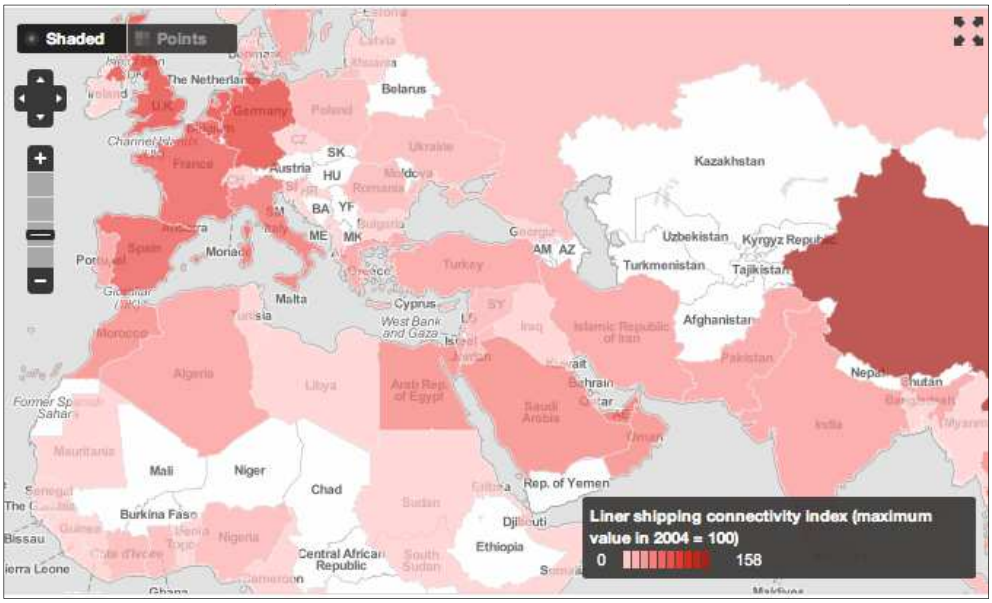
[21] The Merchant Marine and Ports Office (www.ommp.nat.tn).

in the solid bulk of phosphate and derivatives, salt and cereals. Gabes port is specialized in chemical imports and exports for local industry. Zarzis port serves the exportation of sea salt and crude petrol and the importation of refined petroleum products.

Rades port has several shortcomings: its draft does not exceed 10 meters, making it unsuitable for large-scale container traffic; and dock space, handling equipment, storage and logistics area are all inadequate. Development of the port has been limited since it began operations in the mid-1980s. Projects to build modern container terminals, extend the docks or create logistics areas have thus far come to naught. Moreover, nothing has been done to market the strategic location of the port, which was originally conceived for the transit of goods but not as a tool for economic development. By contrast, most European ports and the port of Tangiers in Morocco have ambitious business strategies. According to OMMP data, average annual growth of the weight of merchandise handled by Tunisian ports from 1990 to 2010 was 2.2 per cent.[22]

Tunisia has 400 maritime and port operators and more than 80 freight forwarders, most of which are also active in transport and logistics. The maritime transport sector consists of a public company (Compagnie Tunisienne de Navigation) and seven private companies. Short sea shipping (coastal trade) is provided by 23 shipping lines connecting Tunisia to the main Mediterranean ports. Marseille (France) and Genoa (Italy) are serviced daily. There are also connections with Barcelona (Spain) and Taranto (Italy). More than 20 per cent of merchandise unloaded at Rades is shipped from southern European ports, but much of it originates in other international ports and transits through Europe. This lack of direct connectivity with many countries leads to considerable additional costs for the Tunisian economy. Indeed, the regional UNCTAD LSCI (figure 25) shows that Tunisia ranks behind many western European countries, Algeria, Egypt, Greece, Lebanon, Morocco, Turkey and four Gulf countries in terms of connectivity.

Figure 25. Tunisia's Liner Shipping Connectivity Index, 2009-2013



Source: UNCTAD.

The Tunisian Ministry of Transport launched a five-year strategy in 2011 to improve the country's maritime connectivity.[23] As part of the strategy, Tunisia is working to improve traffic generated by foreign companies in Tunisia, by modernizing ports, organizing the maritime professions and establishing an

[22] In 2010, Tunisian ports handled 30.3 million tons of merchandise.

[23] See www.snt.com.tn.

integrated information network. In particular, the strategy is designed to enable the docking of vessels with drafts of up to 18 metres and, ultimately, with a capacity of up to 50,000 tons. According to the Ministry of Transport, this can be achieved by modernizing existing ports (in particular, by upgrading to specialized platforms), improving land connections between ports and developing logistics zones close to ports in order to optimize the transport chain and increase the competitiveness of Tunisian exports through the reduction of costs and delays.

2. *Road transport*

In 2008, the volume of goods transported by road in Tunisia totalled 28 billion ton-kilometres. The road transport sector is composed of two main segments. The first includes companies that possess their own vehicles. In 2005, firms had a fleet of 330,000 vehicles (8,000 tractors, 22,000 trucks and 300,000 vans), which accounted for nearly half of total road transport. The second segment involves transport companies that provide transport services "for hire" to other companies. In 2008, there were 578 such companies, of which only 60 were involved in international road transport (TIR), together with around 1,070 independent owner-drivers. The number of businesses in the informal sector is unknown but is likely to have risen since the revolution. Transport companies are small businesses and generally not subject to mergers or takeovers. On average, Tunisian operators engaged in TIR have 10 trucks, compared with the hundreds of vehicles held by their typical European counterparts.

Rules for access to professions in the road transport sector and the market are equivalent to those in Europe. The State-owned transportation business was privatized in 1995. Road transport comes under the supervision of the General Directorate of Land Transport (DGTT), which is responsible for regulation, tariff policy, relations with international organizations and the negotiation of bilateral agreements. Management and awarding of transport permits are the responsibility of the Technical Agency of Land Transport (ATTT).

Tunisian international transport companies hold only 8 per cent of the international transport market, with the remaining 92 per cent in the hands of foreign companies whose size, trade capacity and competitiveness are much greater. Tunisian TIR companies face operational problems, including differences in regulations and control procedures, and struggle to access European markets. As a result, they often act merely as local branches of international (mainly European) carriers.

The sector suffers from low productivity. In 2008, empty return was estimated at 60 per cent for vehicles with low tonnage and 46 per cent for those with high tonnage (Centre for Transportation Studies for the Western Mediterranean, 2010). Low productivity affects profitability and competitiveness, and causes environmental damage through unnecessary CO2 emissions. Service providers usually do not offer loading/unloading services, obliging customers to have their own workers perform these tasks or hire others. Use of pallets is not widespread and packaging tends be ad hoc to take full advantage of truck dimensions. Road services focus on dry cargo that does not require special conditions, as opposed to refrigerated transport. Most Tunisian road transport firms are unable to provide additional services that generate added value and have a poor record in terms of on-time delivery and product integrity. Additionally, prices are so low that transport companies face difficulty in developing further or supplying high quality services.

Tunisia has a road network of approximately 19,000 kilometres, 60 per cent of which are paved. The density of motorways is small compared to that of other countries. Three motorways totalling 364 km link Tunis and Sfax (A1), Tunis and Bizerte (A4), and Tunis and Oued-Zarga (A5). That works out to a density of 2 metres per square kilometre, compared with 20 metres in France and 22 metres in Italy.

3. *Air transport*

Air transport is supervised by the Tunisian Civil Aviation and Airports Authority (OACA), which operates under the Ministry of Transport. It manages seven international airports: Tunis-Carthage, Djerba, Tozeur, Sfax, Tabarka, Gafsa and Gabes. Management of the international airports of Monastir and Enfidha

is contracted out to the private sector. The nine airports are well distributed around the country (figure 26). However, Tunis-Carthage, Monastir and Djerba airports account for almost 95 per cent of air traffic. The new Enfidha airport is under-used due to high taxes on all services.

Tunisair, Tunisia's flag carrier, was formed in 1948 and operates mainly to destinations in Europe, Africa and the Middle East. Its main base is Tunis-Carthage International Airport. Tunisair has 32 aircraft with an average age of around 15 years. Tunisia began negotiations with the European Union on a bilateral open-skies agreement in 2011 but to date no agreement has been reached.

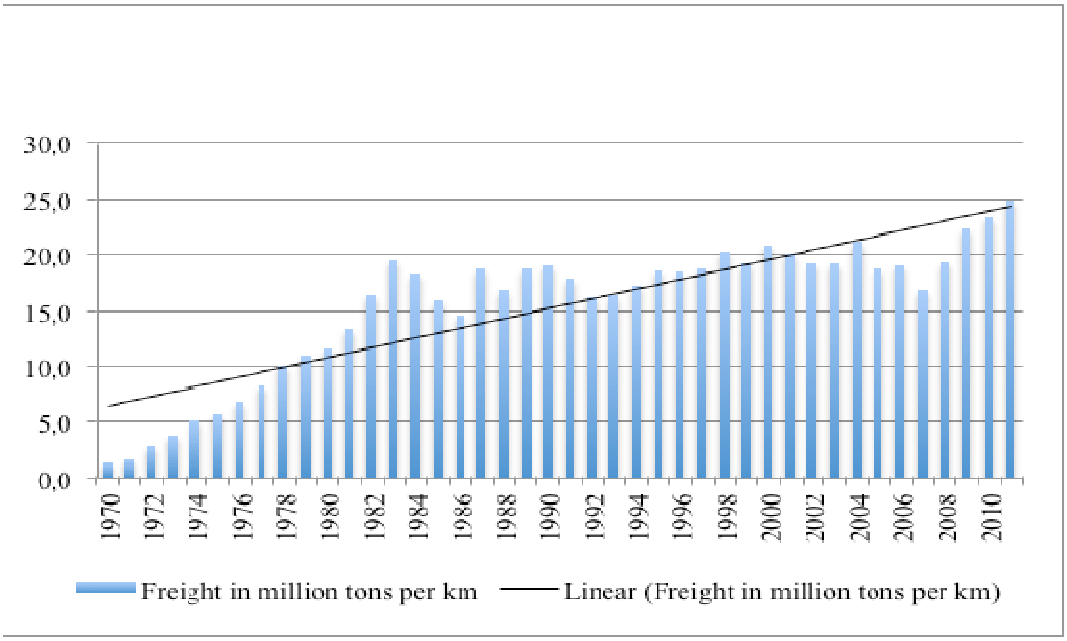
Between 1970 and 2006, average annual growth in international air freight was 14.6 per cent (figure 27). Nonetheless, the volume of air freight is small compared with countries that have followed a comprehensive strategy to develop their air transport sector. For example, the United Arab Emirates and Qatar started from an insignificant level of air freight in 1974 (2.2 million tons per km in both cases) to reach 6.171 billion tons per km and 1.162 billion tons per km, respectively, in 2007.

Figure 26. Tunisia's airports

Many constraints explain Tunisia's modest performance in air freight. Tunisair serves a limited number of destinations (44 cities in 28 countries, mainly in Europe and the Arab region). Companies wishing to export to "unusual" locations have the option only of a handful of foreign airlines, which can push up freight costs considerably. Tunisair has a poor record for on-time delivery. Ready-for-shipment merchandise is frequently held in Tunisair's warehouses longer than planned. There is potential for agricultural and processed food exports to African countries. However, Tunisair serves only three destinations in sub-Saharan Africa: Senegal, Côte d'Ivoire and Mali. The concentration of almost all air freight operations in three coastal airports creates obstacles (such as additional road transport costs) to the use of such services by firms located in the interior of the country.

Although air freight activity has been open to the private sector since 1993, there has been no private investment in this area. A new strategy is needed to promote such investment.

Figure 27. Tunisia's air transport (freight) in million tons per km



Source: Université Sherbrooke, "Perspective Monde" updated by the author from the website of the Ministry of Transport.

Note: Internationally used measure of the total weight of goods carried by all flights (all companies) as a function of the distance between the take-off and the landing points. For example, if an aircraft carries 10 tons of merchandise over a distance of 300 km, this is the equivalent of 3,000 tons per km.

B. THE PERFORMANCE OF TUNISIA'S TRADE LOGISTICS

Two main World Bank reports are often used to assess a country's trade logistics sector, the *Doing Business* report and the Logistic Performance *Index*. Since 2006, the annual *Doing Business* report has included indicators on "trading across borders" for many countries and information regarding trade facilitation. It measures the time and cost of exporting and importing a standard shipment of goods by sea. The indicators cover requirements, such as documentation, and procedures at ports, customs and other regulatory agencies. They also capture trade logistics, including the time and cost of inland transport to the largest business city. The ranking on the ease of trading across borders is the simple average of the rankings on its component indicators. According to the latest report (World Bank, 2014), exporting a standard container of goods from Tunisia requires four documents, takes 13 days and costs US$773, while importing a standard container of goods requires seven documents, takes 17 days and costs US$858. Tunisia was ranked thirtieth out of 185 economies covered in 2013, just behind France (twenty-seventh) and ahead of Spain (thirty-ninth). It fared much better than regional competitors like Morocco (forty-seventh) and Egypt (seventieth).

The number of required documents for exports and imports did not change between 2006 and 2013 (table 7). Some progress was made in reducing the average time required for finalizing an export operation, from 16 days in 2006 to 13 days in 2013 and, for an import operation, from 29 days in 2006 to 17 days in 2013. The average cost of importing a container rose between 2006 and 2010, and stagnated thereafter. The average cost of exporting a container was stable between 2009 and 2013.

Tunisia performs well on all indicators compared with the rest of the Arab region. It lags slightly behind the OECD average in terms of number of documents to import, but considerably in terms of the time required to finalize a trade operation. It performs better than the OECD average in terms of the average cost of a container for import and export. This "relative better performance" could be explained by two major

factors: The relatively short distance containers need to travel (Tunisia trades mostly with the European Union) and comparatively low wages in Tunisia, which are reflected in the cost of transport services.

TABLE 7. TREND IN TRADING ACROSS BORDERS INDICATORS FOR TUNISIA, 2006-2013

								2013		
Indicators	2006	2007	2008	2009	2010	2011	2012	Tunisia	MENA average	OECD average
Trading across borders (rank)	..	..	..	..	..	..	31	30	..	..
Documents to export (number)	4	4	4	4	4	4	4	4	6	4
Time to export (days)	16	16	15	15	13	13	13	13	19	10
Cost to export (US$ per container)	760	760	530	723	773	773	773	773	1,083	1,028
Documents to import (number)	7	7	7	7	7	7	7	7	8	5
Time to import (days)	29	29	22	23	21	17	17	17	22	10
Cost to import (US$ per container)	600	600	810	858	858	858	858	858	1,275	1,080

Source: World Bank *Doing Business* annual report, volumes from 2006 to 2013.

The *Doing Business* report has a major limitation. Its findings in terms of time, costs and number of documents required for trade operations are based on a specific basket of commodities that may not be representative of all tradable goods for all countries considered. To make the data comparable across countries, the report uses several assumptions: traded goods do not require refrigeration or any other special conditions other than to meet accepted international standards; are one of the economy's leading export or import products; and are transported in a dry-cargo, 20-foot full container load.

Researchers in the field of logistics therefore often refer to LPI, a more robust data set used to measure the quality of border logistics across countries. It uses surveys completed by international shipping companies and is available for 155 countries in the 2012 version. Previous LPI reports were released in 2007, 2010 and 2012. A review of the global ranking of a given country over time provides insight into changes in its overall logistics performance. A cross-country analysis for a given year is also highly informative.

According to those indicators, Tunisia moved from ranking among the top 10 lower middle-income performers in 2010 to ranking among the top 10 upper middle-income countries in 2012. Its overall rank improved from sixty-first to forty-first (table 8).

As measured by the LPI, Tunisia's overall performance is satisfactory. It ranks second in Africa after South Africa, fourth in the Arab region after the United Arab Emirates, Qatar and Saudi Arabia and first in North Africa. However, it could do better and policymakers should be motivated to catch up with the Gulf countries that outperformed Tunisia.

The LPI sub-index scores show that Tunisia's weakest points are international shipment and infrastructure. If those elements were disregarded, the country's LPI score would be 3.32 and its ranking thirty-third, equal to that of Qatar. Given the close connection between infrastructure and international shipment, logistics infrastructure will play a key role in Tunisia's catch-up.

TABLE 8. TUNISIA'S GLOBAL LPI RANKING:
2007, 2010 AND 2012

	2012			2010			2007		
	LPI rank	LPI score	Percentage of highest performer	LPI rank	LPI score	Percentage of highest performer	LPI rank	LPI score	Percentage of highest performer
South Africa	23	3.67	85.5	28	3.46	78.9	24	3.53	79.4
China	26	3.52	80.5	27	3.49	79.9	30	3.32	72.8
Turkey	27	3.51	80.3	39	3.22	71.4	34	3.15	67.5
Malaysia	29	3.49	79.8	29	3.44	78.4	27	3.48	77.7
Bulgaria	36	3.21	70.7	63	2.83	58.8	55	2.87	58.6
Thailand	38	3.18	69.6	35	3.29	73.6	31	3.31	72.5
Chile	39	3.17	69.5	49	3.09	67.3	32	3.25	70.5
Tunisia	41	3.17	69.4	61	2.84	58.9	60	2.76	55.3
Brazil	45	3.13	68.2	41	3.20	70.6	61	2.75	54.9
Mexico	47	3.06	66.0	50	3.05	65.7	56	2.87	58.6

Source: World Bank, *Connecting to Compete*, 2012.

In the rest of this chapter, a strategy will be identified and costed to improve performance in trade-related infrastructure with the goal of achieving the performance level of the United Arab Emirates. Financing options will be tested and the analysis will be based on a dynamic CGE model tailored to the Tunisian economy in general and its fiscal policy in particular.

C. MODELLING FRAMEWORK

Key questions include: How can trade-related transport performance be improved? How much additional public spending would be needed, and how could this be financed without triggering adverse macro-economic trade-offs? Any financing option would affect the economy. For example, foreign financing could have an impact on exchange rates, while financing through domestic taxes could reduce private consumption, among other things, and domestic borrowing could crowd out credit resources for private investment. Increased public spending could stimulate wage increases and rise unit costs throughout the economy, potentially discouraging exports and widening the external deficit. Productivity gains from improved trade logistics will take time to materialize. It is critical that short-run trade-offs do not offset potential economic and social gains in the long term.

A CGE model is best to address these questions. Econometrics techniques tend to neglect the potential indirect effects arising from alternative fiscal policies, such as increasing taxation or foreign borrowing, and positive external factors linked to increased public investment. By contrast, CGE models allow a comprehensive assessment of direct and indirect effects associated with the changes in economic policies, whether an individual instrument or a package of policies implemented simultaneously. Typically, CGE models include a disaggregated treatment of producers and consumers, making it possible to consider links between different sectors, between production and consumption, and between the macro and micro levels of the economy. Econometric regressions and gravity models provide a large picture of the consequences of an improvement in trade logistics and do not specify every aspect of the economy. Econometric studies also fail to capture how the impact of such reforms evolves over time and is distributed across different sectors of the economy.

The model used in this chapter builds on Chemingui and Sánchez (2011), which was employed for assessing the cost of alternative strategies for achieving the Millennium Development Goals in Tunisia. Of particular interest in the current context are the modelling of investment and financing options through

alternative closure rules. The investment block covers Government and private investment, including FDI, and their funding. It provides different determination of the service capital used to produce Government services and infrastructure capital that requires Government support services. The accumulation of service capital is the result of increases in investment demand and infrastructure capital. Investment demand is determined by the difference between the anticipated capital demand of the next year (assuming that production growth will be the same as the previous year and using a fixed capital-input coefficient), and the capital stock that would remain if no new investment took place. For infrastructure capital, Government investment demand is determined by the difference between an exogenous growth term multiplied by the infrastructure capital stock in a given period and the capital stock that would remain if no new investment was made. A non-negativity constraint is also imposed on Government investment.

The price of new capital stock by type of capital depends on investment and market prices. The resulting fixed Government investment value is financed by a combination of Government savings, sales of Government bonds, and foreign borrowing. Government bond sales are allocated across households on the basis of their savings shares. The choice of mechanism for clearing the budget - the Government closure rule - is an important part of the alternative simulations carried out in the present study. Accordingly, any changes in the direct tax variable adjust tax payments sufficiently to balance the budget. The other terms in the expressions for Government receipts and outlays are exogenous.

The model has been calibrated using a social accounting matrix (SAM) for the year 2005, initially constructed by Chemingui and Sánchez (2011) and has been further developed to match the specific purpose of this chapter. The SAM covers: 20 activities and their corresponding 20 commodities; three types of labour (disaggregated by skill level); six capital factors, one of which relates to private capital and the others concern Government capital; a household account; a Government account; five tax accounts; three savings investment accounts (household, Government and ROW (rest of the world)); a stock variation account; a foreign interest account; a domestic interest account; and an ROW account.

To measure the macroeconomic impact of additional public investment in trade-related transport sectors, the approach developed by Mirza (2009) has been adopted. It is based on the principle of bridging the gap of "free" technology improvement shocks, commonly used in trade logistics and trade facilitation analysis based on CGE models, by providing a structure to the cost of associated investments. To perform this type of analysis, three important and connected points need attention. First, it is important to obtain plausible estimates of the cost of the new additional investments. Secondly, the channel through which the additional investment in trade logistics infrastructure strengthens the trade performance of the country should be pinned down. Thirdly, alternative financing options to bridge investment gaps should be analyzed and trade-offs need to be clearly identified.

1. *The cost of additional investment in trade-related infrastructure*

Mirza (2009) undertook an interesting econometric exercise to estimate the impact of additional trade-related public capital to improve the quality of trade logistics at the border. She used the LPI as a proxy for border quality and a sample of 29 countries in which trade-related capital stock was evaluated at less than US$50 billion. After controlling for country size and income, the elasticity of the LPI with respect to logistics capital stock is estimated to be 0.063, which suggests that a 1 per cent increase in logistics capital stock increases the perceived quality of logistics at the border by 0.063 per cent.

Estimating the trade logistics capital stock of Tunisia is difficult. The only source in which some information is forthcoming is the study published by the Tunisian Quantitative Studies Institute on the capital stock of the Tunisian economy in 1961-81. Capital stock was disaggregated into private and public capital and the latter was further broken down into two subsets, economic and social infrastructure. Economic infrastructure is further split into "hydraulic infrastructure" and "road and ports infrastructure". Table 9 shows the evolution and structure of total capital stock in Tunisia over time.

TABLE 9. EVOLUTION AND STRUCTURE OF CAPITAL STOCK IN TUNISIA
(*1980 prices*)

Designations	1961	1971	1981
Hydraulic infrastructure (1)	143.9	512.2	784.2
Road and ports infrastructure (2)	55.6	148.1	396.9
Economic infrastructure (1) + (2) = (3)	199.5	660.3	1181.1
Social infrastructure (4)	193.0	621.7	1042.7
Total public infrastructure (3) + (4) = (5)	392.5	1282.0	2223.8
Total capital stock (6)	1916.8	4113.2	8566.8
Percentage of Road and ports infrastructure (3)/(6)	22.9	33.6	44.6

Source: Institut d'économie quantitative, 1985.

Based on the observed trends for the period 1961-1981, and after taking into account the implicit price deflator for GDP, the trend for the period 1982-2012 has been estimated using information on sectoral public investment extracted from the annual public finances. The results of this extrapolation suggest that Tunisian capital stock in trade logistics in 2012 amounts to 29.3 billion Tunisian dinars (TND), or 9.57 per cent of the total capital stock, which is estimated at TND 306 billion. This extrapolation relied on the perpetual inventory method with a depreciation rate of 5 per cent. Based on these findings, Tunisia needs to invest TND 45 billion, or 150 per cent of existing logistics capital stock, to catch up halfway with the United Arab Emirates.

2. *The operating channel*

In order to determine through which channel the new investment will have an impact on the economy, we have adopted the approach developed by Fox and others (2003). As a result of a better performing trade logistics sector, they opted for a trade-augmenting technical change through the modification of the imports and exports shift parameters in the trade equations. This change positively affects the volume of trade in both directions as a result of better logistics infrastructure. However, it entails specifying by how much trade will change following a better ranking in LPI and by how much import and export technical parameters should be modified to reflect the expected change in trade flows.

Regarding the quantitative impact of a change in the LPI on trade flows, we draw on the findings of a recent study (World Bank, 2007). It shows that the trade flow of a country that moves from the status of low-income to middle-income country in terms of LPI will rise by around 1.2 per cent. If Tunisia, an upper-middle income country, progressed halfway toward the position of the United Arab Emirates, a high-income country, it would be situated alongside Portugal and Poland as high-income countries according to *Connecting to Compete* (World Bank, 2012). Simulations using the developed CGE model show that an increase of 1.5 per cent in import and export technical parameters (shift parameters) would generate an increase in trade flows of between 8 per cent and 10 per cent.

3. *Extensions of the model*

Three main extensions have been made to the original model. First, the modelling of additional Government investment in logistics infrastructure has been made exogenous, making it possible to apply a positive shock that corresponds to such investment. Secondly, since the objective is to spread the additional public investment over a period of time, the same temporal spread has been adopted regarding the change in technical parameters that will reflect a positive impact on trade flows. Thirdly, the original model is modified to take into account the depreciation of debt. The original model assumes that the Government only makes interest payments, without repaying the principal, thereby failing to capture the welfare losses associated with repaying the principal that comes to maturity.

Data on Tunisian external debt was taken from the 2005 annual report of the Tunisian Central Bank. Interest payments on domestic and external debt for that year are based on the same source and integrated in the SAM 2005. The model allows for the evolution of domestic and external debt. The stock of external debt at the end of a given year (t) is determined by the external debt at the end of the year (t-1) and new external borrowing during the year (t). It is assumed that interest payments are made on time.[24] Another variable corresponding to the amount of the principal of external debt reimbursed during the year (t) is included in the law motion for the external debt.

4. *Improving trade-related infrastructure under alternative financing scenarios*

Different scenarios for funding increased public investment in trade logistics sectors by the amounts measured in the previous section are considered in order to determine which option will most benefit the Tunisian economy. This entails changes in some of the closure rules. In each scenario, one financing variable clears the Government budget, while the others remain fixed or change their value depending on a rule. Transfers from abroad (treated as grants) clear the Government budget in the baseline scenario. However, when the financing mechanism is domestic borrowing, domestic taxation or foreign borrowing, the clearing variable of the budget changes accordingly. Another change in these scenarios with respect to the baseline is that the model becomes savings-driven. That is, private investment adjusts endogenously to maintain balance between total savings and total investment.

Three approaches are explored: (a) increasing direct domestic taxes; (b) external borrowing; and (c) domestic borrowing. Simulations are carried out for the period 2005-2035, with the shocks introduced from 2013 on. The additional public investment in trade logistics takes place over a period of eight years from 2013, given that a rise of 153 per cent in trade logistics capital stock is sizable.

From the baseline scenario, the projections of Government investment in infrastructure during the simulation period have been determined assuming continuation of the trend observed over the period 2005-2012. The additional public investment has been introduced in the alternative simulations over the period 2013-2020 through an annual increase of 1/8 of the investment observed in the baseline scenario. The additional value of the new investment was converted to a quantity measure taking into account the price of "public infrastructure" capital in 2012. The increase in the import and export technical parameters has been spread over the same period evenly so that the change in the trade flows goes hand in hand with the effective investment in trade logistics infrastructure.

A long horizon is considered in the simulations to take into account the impact of reimbursement of the whole additional public debt used to finance investments. Moreover, for both types of borrowing, domestic and external, the repayment of the principal is assumed to occur over a period of 10 years, with a grace period of two years. Thus, for instance, the first payment towards the principal of the debt acquired in 2013 will be one tenth of the value of the original loan in 2015. The last payment towards the principal of the debt, domestic or external, will be in 2031. Four additional years have been added to the simulation period to allow full dynamic effects to appear in simulation results.

Table 10 provides a summary of the macroeconomic impacts, expressed in average annual growth rates, of the baseline and three alternative scenarios. In all cases, gains in GDP relative to the baseline are significant, although less so when infrastructure investment is financed through domestic public borrowing. Financing through taxation marginally outstrips the option of financing through external borrowing, with cumulative gains reaching around 0.5 per cent of GDP.

[24] The interest rate on foreign borrowing throughout the analysis is considered unchanged and equals the interest rate on foreign borrowing in the base year. This latter is defined on the basis of interest payments recorded in the SAM and base year foreign debt and borrowing data.

TABLE 10. MACRO INDICATORS BY SIMULATION
(*Percentage annual growth from base year to final year*)

	BASELINE	TLI-TAXE	TLI-FBOR	TLI-GBOR
Absorption	5.39	5.67	5.65	5.54
Private consumption	5.02	5.30	5.27	5.15
Government consumption	4.06	4.33	4.33	4.28
Private fixed investment	7.59	7.95	7.91	7.76
Government fixed investment	5.11	5.22	5.21	5.20
Exports	5.11	5.37	5.38	5.28
Imports	5.47	5.72	5.71	5.63
GDP at market prices	5.21	5.50	5.48	5.36
Net indirect taxes	5.15	5.42	5.40	5.30
Gross national savings	6.05	6.35	6.32	6.20

Source: Authors' calculations using results of the CGE model.

A uniform increase in all direct taxes, imposed on household incomes and company profits, in order to finance the public investment needed, will be less distorting than raising indirect taxes on goods and services. Table 11 shows the required changes in direct tax rates in selected years of the simulation period. The highest level of deviation compared to the baseline scenario is about 70 per cent. Substantial hikes are observed only during the investment period; thereafter, rates revert roughly to their baseline values.

TABLE 11. DIRECT TAX RATES IN PERCENTAGE OF TOTAL INCOMES AND PROFITS FOR HOUSEHOLDS AND FIRMS

2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
9.5	15.2	15.6	16.1	15.7	14.9	14.1	13.5	13.2	9.3

Source: Authors' calculations using the results of the CGE model.

TABLE 12. MACROECONOMIC IMPACTS OF THE TLI-TAXE SIMULATION
(*Nominal values in billions of TND*)

	2005	2015		2020		2025		2030		2035	
Absorption	37.6	59.6	-0.6	81.0	2.0	110.0	5.7	145.5	7.3	191.2	8.7
Private consumption	23.8	31.2	-13.4	44.4	-6.4	64.8	5.2	85.0	6.9	110.3	8.4
Government consumption	5.8	9.1	0.6	12.7	5.6	17.1	8.9	22.5	9.5	29.5	10.1
Private fixed investment	4.8	7.4	-18.7	11.7	-9.4	19.1	6.5	26.9	8.8	37.5	10.7
Government fixed investment	3.6	11.9	105.4	12.2	74.2	8.9	2.4	11.0	2.5	13.8	3.1
Exports	18.7	25.7	-7.4	35.2	-2.4	49.5	5.6	65.3	7.0	86.0	8.3
Imports	18.9	27.7	-6.6	38.4	-2.0	54.5	5.6	72.6	7.0	96.2	8.3
GDP at market prices	37.4	57.6	-0.8	77.7	2.0	105.0	5.8	138.2	7.3	181.0	8.7
Net indirect taxes	4.0	10.6	52.1	12.1	38.5	11.8	6.6	15.0	6.8	19.3	7.2
Gross national savings	7.7	18.6	31.0	22.9	21.0	26.7	5.3	36.0	7.1	48.6	8.9
Government deficit as percentage of GDP	5.9	3.3	0.0	3.3	0.0	3.3	0.0	3.3	0.0	3.3	0.0

Source: Authors' calculations using the results of the CGE model. Figures in the grey columns stand for percentage change from base.

Table 12 displays the results in terms of macroeconomic aggregates over five-year periods compared to the base year. By the end of the simulation period, GDP at market prices and absorption both grow by 8.7 per cent, and exports and imports expand by 8.3 per cent in nominal values. However, earlier in the simulation the picture is different. For instance, the column referring to 2015 gives some insights into the patterns of evolution of the main aggregates. Owing to the sizable public investment in trade logistics infrastructure, Government fixed investment climbs to 105.4 per cent as private investments decline by 18.7 per cent and private consumption falls by 13.4 per cent. This can largely be explained by the increase in direct taxes on consumption and private investment. Direct taxes climb from 9.7 per cent in 2015 in the baseline scenario to 16.1 per cent in the simulation exercise in which investment is financed through taxation. A significant drop in wages for all labour categories in the first year of the investment period is also recorded, further weighing on consumption. In 2013, real wages shrink by around 3.9 per cent compared to the previous year, before gradually picking up and reaching their peak growth rate in the aftermath of the final year of investment in trade logistics infrastructure in 2020. Real wage growth rates are 9.8 per cent for all labour factors (simple average of the three categories).

The results illustrate that Government investment initially weighs on private investment and consumption but, once improved logistics infrastructure is in place, private investment and consumption recover. In fact, better trade logistics stimulates investments and trade. Private fixed investment grows by 10.7 per cent in 2035 and private consumption by 8.4 per cent, compared to the baseline in 2035.

Another interesting result is the pickup in domestic savings, which stand at 8.9 per cent at the end of the simulation period. This increase can largely be accounted for by rising household income and the marginal propensity to save. Wages in 2035 are higher than in the baseline scenario; the difference amounts to 8 per cent in simple average of all labour types. The marginal propensity of households to save in the last year is 0.261 for the first simulation, compared with 0.256 in the baseline, representing an increase of about 2 per cent.

TABLE 13. GOVERNMENT RECEIPTS AND SPENDING OVER TIME – TLI-TAXE
(*Nominal values in billions of TND*)

	2005	2015		2020		2025		2030		2035	
Direct taxes	2.9	7.9	2.6	9.0	39.9	8.7	6.8	11.0	7.0	14.1	7.6
Import tariffs	0.5	0.8	0.8	1.1	2.0	1.4	5.8	1.9	7.3	2.4	8.7
Other indirect taxes	3.5	9.8	8.9	11.0	43.4	10.4	6.7	13.1	6.7	16.8	7.0
Private transfers	0.8	1.1	13.4	1.6	-6.4	2.3	5.2	3.0	6.9	3.9	8.4
Foreign transfers	0.3	0.5	0.8	0.6	2.0	0.8	5.8	1.1	7.3	1.4	8.7
Factor incomes	0.0	0.0	11.9	0.0	-6.8	0.1	4.9	0.1	7.9	0.1	10.3
Domestic borrowing	2.1	1.8	0.8	2.4	2.0	3.2	5.8	4.3	7.3	5.6	8.7
Foreign borrowing	0.1	0.1	0.8	0.1	2.0	0.2	5.8	0.2	7.3	0.3	8.7
Total receipts	10.3	21.9	8.9	25.9	29.4	27.1	6.4	34.8	6.9	44.7	7.7
Consumption	5.8	9.1	0.6	12.7	5.6	17.1	8.9	22.5	9.5	29.5	10.1
Fixed investment	3.6	11.9	5.4	12.2	74.2	8.9	2.4	11.0	2.5	13.8	3.1
Private transfers	0.1	0.1	0.8	0.2	2.0	0.3	5.8	0.3	7.3	0.4	8.7
Foreign transfers	0.0	0.0	0.8	0.0	-0.4	0.0	-0.2	0.0	0.2	0.0	0.7
Domestic interest payments	0.2	0.2	0.0	0.2	0.0	0.2	0.0	0.2	0.0	0.2	0.0
Foreign interest payments	0.6	0.6	0.8	0.6	-0.4	0.6	0.0	0.7	0.9	0.7	1.9
Total spending	10.3	21.9	8.9	25.9	29.4	27.1	6.4	34.8	6.9	44.7	7.7

Source: Authors' calculations using the results from the CGE model. Figures in grey columns stand for percentage change from base.

In terms of the impact on public finances, there are striking deviations from the baseline scenario in 2015 and 2020. The 105 per cent increase in Government fixed investment in 2015 is financed mainly by a

52.6 per cent increase in direct taxes along with a 59 per cent deviation in other indirect taxes, compared to the baseline scenario. The reallocation of public resources towards trade logistics investment leads to a contraction in economic activity during the investment period, resulting in smaller receipts from private transfers and factor incomes. The decrease in real wages and contraction of production drive the contraction in factor incomes, but the gains recorded after the investment period more than offset the effects of this contraction. From 2025 to 2035, deviations from the baseline grow steadily, reaching their highest level in 2035. All receipts are almost 8 per cent higher than the baseline scenario in 2035, although factor incomes are as much as 10 per cent higher compared to the baseline on the back of higher wages in 2035 and capital rents. The increase in Government revenues leads to higher public spending. In particular, Government consumption (10.1 per cent from the baseline), private transfers (8.7 per cent from the baseline) and fixed Government investment (3.1 per cent from the baseline) are boosted.

The second simulation, which explores financing the additional investment through external borrowing, is modelled through a change in the Government closure to set external borrowing as the clearing variable during the investment period. For the preceding and subsequent periods, the clearing variable is domestic taxes, as it is not possible to reduce the debt stock if foreign borrowing is the clearing variable in the period following the investment phase. In such a case, the Government will always borrow from abroad whenever a portion of the debt (principal) becomes due, leading to a vicious circle.

TABLE 14. MACROECONOMIC IMPACTS OF THE TLI-FBOR SIMULATION
(*Nominal values in billions of TND*)

	2005	2015		2020		2025		2030		2035	
Absorption	37.6	67.4	12.3	90.7	14.3	105.7	1.6	143.4	5.8	189.8	7.9
Private consumption	23.8	36.8	2.2	50.7	6.9	61.5	-0.2	83.6	5.1	109.5	7.6
Government consumption	5.8	9.4	3.7	13.3	11.0	17.4	10.7	22.5	9.6	29.4	9.8
Private fixed investment	4.8	9.4	2.7	14.0	8.7	17.7	-1.4	26.3	6.1	37.1	9.6
Government fixed investment	3.6	11.8	103.5	12.7	80.6	9.0	3.6	11.0	2.4	13.8	2.9
Exports	18.7	21.8	-21.3	32.3	-10.2	55.1	17.5	67.1	10.0	86.3	8.5
Imports	18.9	29.8	0.4	41.3	5.5	54.1	4.6	72.2	6.4	95.8	7.7
GDP at market prices	37.4	59.4	2.3	81.7	7.3	106.7	7.5	138.4	7.4	180.3	8.3
Net indirect taxes	4.0	7.1	2.3	9.3	7.3	15.6	40.7	16.3	15.9	19.6	9.0
Gross national savings	7.7	13.6	-4.1	17.6	-7.1	30.3	19.7	36.9	9.8	48.2	7.9
Government deficit as percentage of GDP	5.9	15.7	383.2	18.1	456.3	3.3	0.0	3.3	0.0	3.3	0.0

Source: Author's calculation. Figures in grey columns stand for percentage change from base.

Table 14 shows that the situation in 2035 is similar to what was observed in the case of financing through taxation, but some intermediate differences occur. In 2015, the 103.5 per cent increase in Government fixed investment was financed entirely by a sizable increase in foreign savings, following an important borrowing operation up to 2020. As resources for financing the new trade logistics investments come entirely from abroad, there is no pressure on private consumption and investment. This is revealed by their respective values in 2015 and 2020, which are higher in nominal terms than in the baseline scenario and much higher than in the taxation simulation. Moreover, during the investment period, exports drop more markedly than in the taxation simulation, which could be explained by the stronger appreciation of the local currency.

Under this scenario, the amount of interest payments made to ROW increases considerably. The interest payments on external borrowing start increasing in the beginning of the investment period and reach a peak in 2020, the last year of investment, before starting to fall due to the reimbursement of the principal.

Nevertheless, in 2035, the net interest income of ROW is 41 per cent higher than the level recorded in the baseline scenario, even after paying off the debt acquired for the investment. This could be explained by the fact that, when setting the foreign borrowing as the clearing variable during the investment period, the Government, in order to pay for debt due within that period, borrows more externally. Even amortizing exactly the amount needed to finance new trade logistics investments, the Government ends up with more foreign debt than in the baseline scenario because of the continuous recourse to foreign borrowing to meet debt repayment obligations during the investment period. This changes later due to modification of the clearing variable, but the burden of previous periods leads to more external debt in 2035 and higher interest payments. As a share of GDP, external debt stands at 61.5 per cent in 2035, compared to 50 per cent in the baseline scenario.

The outcome of the external borrowing scenario depends on the terms of external borrowing. For instance, a debt contracted over 20 years with a five-year grace period and a more competitive interest rate would lead to completely different results.

TABLE 15. MACROECONOMIC IMPACTS OF THE TLI-GBOR SIMULATION
(*Nominal values in billions of TND*)

	2005	2015		2020		2025		2030		2035	
Absorption	37.6	58.2	-3.1	70.3	-11.4	98.7	-5.1	137.9	1.7	183.4	4.3
Private consumption	23.8	35.2	-2.2	43.1	-9.2	54.7	-11.3	79.5	0.0	105.8	3.9
Government consumption	5.8	9.0	-1.4	11.1	-7.1	15.4	-2.0	21.4	3.9	28.4	5.8
Private fixed investments	4.8	2.8	-69.1	4.2	-67.7	19.8	10.0	26.1	5.3	35.5	4.9
Government fixed investments	3.6	11.1	92.5	11.9	69.7	8.9	1.9	11.0	1.9	13.7	2.4
Exports	18.7	26.2	-5.4	32.3	-10.4	44.5	-5.2	62.2	1.9	83.0	4.4
Imports	18.9	28.0	-5.7	34.6	-11.8	48.8	-5.5	69.1	1.8	92.7	4.4
GDP at market prices	37.4	56.4	-2.8	67.9	-10.8	94.3	-5.0	131.0	1.7	173.6	4.3
GDP at factor cost	33.4	49.7	-2.8	60.2	-10.8	80.2	-9.1	115.5	0.6	154.7	4.1
Gross national savings	7.7	13.3	-6.6	15.1	-20.1	27.3	7.9	35.2	4.5	46.6	4.4
Government deficit as a percentage of GDP	5.9	14.9	359.2	19.3	493.7	3.3	0.0	3.3	0.0	3.3	0.0

Source: Author's calculation. Figures in grey columns stand for percentage change from base.

Although there may be other forms of domestic borrowing, Governments generally borrow from households by selling bonds. In the end, interest will be paid and the principal must be reimbursed. Thus, the domestic borrowing simulation will be modelled similarly to the foreign borrowing option. In 2005, domestic debt in Tunisia amounts to TND 7.9 billion, compared to TND 14 billion in external debt, according to a report issued by the Tunisian Central Bank in 2005. As could be expected from the nature of the financing alternative, the increase of 92.5 per cent in trade logistics infrastructure stock is achieved at the expense of private investment, which falls by 69.1 per cent compared with the baseline scenario (table 15). This reflects the size of the investment and limited pool of savings to tap into. Macroeconomic performance starts to improve by the end of the simulation, although the improvement is more limited than in the cases of funding through taxation or external borrowing. For instance, GDP at market prices was 4.3 per cent higher than in the baseline scenario, but 4 per cent less than in TLI-TAXE and 3.7 per cent less than in TLI-FBOR. The same pattern holds for other macroeconomic aggregates.

Government spending and revenues exhibit changes in the expected direction in line with the simulated financing method (table 16). There is a spike in domestic borrowing in 2015 and 2020 and domestic interest payments shift up over the entire simulation period. Values recorded in 2035 show more growth overall than in the baseline scenario but less than in the other two simulations.

TABLE 16. GOVERNMENT RECEIPTS AND SPENDING OVER TIME – TLI-GBOR
(*Nominal values in billions of TND*)

	2005	2015		2020		2025		2030		2035	
Direct taxes	2.9	5.0	-2.8	5.8	-10.8	10.5	28.4	11.5	11.0	13.9	5.8
Import tariffs	0.5	0.8	-2.8	0.9	-10.8	1.3	-5.0	1.8	1.7	2.3	4.3
Other indirect taxes	3.5	6.0	-2.8	6.9	-10.8	12.9	32.3	13.8	11.9	16.6	5.7
Private transfers	0.8	1.3	-2.2	1.5	-9.2	2.0	-11.3	2.8	0.0	3.8	3.9
Foreign transfers	0.3	0.4	-2.8	0.5	-10.8	0.7	-5.0	1.0	1.7	1.4	4.3
Factor incomes	0.0	0.0	-6.1	0.0	-18.8	0.0	-15.0	0.1	-1.6	0.1	3.5
Domestic borrowing	2.1	8.3	364.5	13.0	452.8	2.9	-5.0	4.1	1.7	5.4	4.3
Foreign borrowing	0.1	0.1	-2.8	0.1	-10.8	0.2	-5.0	0.2	1.7	0.3	4.3
Total receipts	10.3	21.9	39.0	28.8	44.0	30.4	19.3	35.2	8.4	43.7	5.3
Consumption	5.8	9.0	-1.4	11.1	-7.1	15.4	-2.0	21.4	3.9	28.4	5.8
Fixed investment	3.6	11.1	92.5	11.9	69.7	8.9	1.9	11.0	1.9	13.7	2.4
Private transfers	0.1	0.1	-2.8	0.2	-10.8	0.2	-5.0	0.3	1.7	0.4	4.3
Foreign transfers	0.0	0.0	-0.4	0.0	-2.3	0.0	-2.7	0.0	-1.3	0.0	-0.4
Domestic interest payments	0.2	0.6	199.2	1.4	589.4	0.8	312.7	0.5	157.1	0.5	148.7
Foreign interest payments	0.6	0.6	-0.5	0.6	-2.6	0.6	-3.3	0.6	-1.7	0.7	-0.6
D.D Principal payments	0.0	0.5	n.a.	3.6	n.a.	4.5	n.a.	1.4	n.a.	0.0	n.a.
Total spending	10.3	21.9	39.0	28.8	44.0	30.4	19.3	35.2	8.4	43.7	5.3

Source: Author's calculations. Figures in grey columns stand for percentage change from base.

D. CONCLUSION

Results suggest that investment in improving trade logistics infrastructure would best be financed either by increasing taxes or resorting to external borrowing. When adopting a welfare measure, foreign borrowing appears to be the best approach. However, much depends on the conditions of the foreign loans (duration, interest rates and grace period).

In Tunisia, where national savings and total investment dropped respectively by 7 and 3 percentage points of GDP between 2010 and 2013, it is more efficient for the Government to contract a foreign loan than to raise domestic taxes for a relatively small period, in part also because of the cost associated with any fiscal change, which is not revealed by this model. Moreover, it is highly unlikely that a Government could almost double domestic taxes over a period of several years, no matter what the benefits might be. Social resistance could be considerable, leading domestic and foreign investors to shy away from what they might see as unfavourable climate because of lack of confidence in the Government.

New investments in trade-related infrastructure, estimated at around 153 per cent of the current capital stock in trade-related infrastructure, would have a positive impact on overall economic activity. Although gains would be modest at the outset, they would accrue, achieving maximum results by the end of the simulation period.

V. POLICY OPTIONS TO MAKE TRADE LOGISTICS WORK FOR EXPORT PROMOTION

Arab countries need to develop regional value chains and connect to global value chains for strategic commodities if they are to enhance their economic transformation and improve competitiveness. At present, they suffer from information gaps and weak coordination at the global, regional and national levels. Some Arab countries have invested in process improvement and information technology to support trade facilitation and information exchange, including single window and port community systems. Preliminary assessments show that those investments will support export growth with existing customers, but they also show that investment in basic infrastructure and capacity in various key sectors is needed in order to build competitiveness or establish capabilities in strategic and new sectors. It is crucial to identify the trade logistics needed to facilitate connection to global supply chains.

Most Arab firms face many challenges in their attempts to integrate into global markets. They must (a) identify the right target market, product segment and selling channel; (b) learn how to adapt their products for those markets to meet the price and quality standards demanded by the target market; (c) learn the logistical requirements for complete trade transaction; (d) understand who their competitors are; (e) launch marketing and selling campaigns; and (f) deliver the product on time and collect on sales (World Bank, 2004). Most firms lack know-how and resources to undertake these types of activities as they require significant investment, are information intensive and often require years of learning to understand the market. Moreover, firms have to cope with poor infrastructure, complicated regulations and procedural requirements, and limited access to credit.

Governments can play a role by helping firms to identify markets and buyers, improve productive capacities, diversify and compete. A key factor, however, will be the development of efficient trade logistics at the national and regional levels. Arab countries need to address several issues: the ability of firms to outsource trade logistics activities; customs clearing efficiencies; physical trade infrastructure; acquisition of the latest logistics software; and access to credit. Improvements in logistics will result in a more efficient use of resources, which will more than compensate for any costs of reform. Arab countries should use the WTO Trade Facilitation Agreement to enhance customs procedures and acquire an international seal of compliance, and to make use of Aid for Trade to help with implementing required reforms in their trade channels. Trade facilitation should be mainstreamed into development plans in order to ensure that trade logistics issues are addressed. Firms should be encouraged to form internal logistics departments. Where that is not feasible, Governments should encourage companies to externalize logistics activities by creating fiscal incentives, such as reductions in value-added tax. Standards on cargo dwell time must be imposed and a legal framework established to penalize delays. Although financing large-scale investment in logistics infrastructure is problematic, it is justifiable as a means of unlocking the region's potential for trade, which is a step towards greater sustainable economic development. The private sector could be involved, for example through public-private partnerships. At the same time, it is equally essential to invest in building human capacity.

Appendix

TABLES AND FIGURES

TABLE A.1. NUMBER OF PURCHASE ORDERS PLACED PER YEAR
(*National and international*)

	Mean	Std. Dev.	Min	Max
Number of purchase orders	210.0	113.2	50	860
National (per cent)	61.6	16.9	30	90
International (per cent)	38.4		10	70

Figure A.1. Means of communication of purchase orders

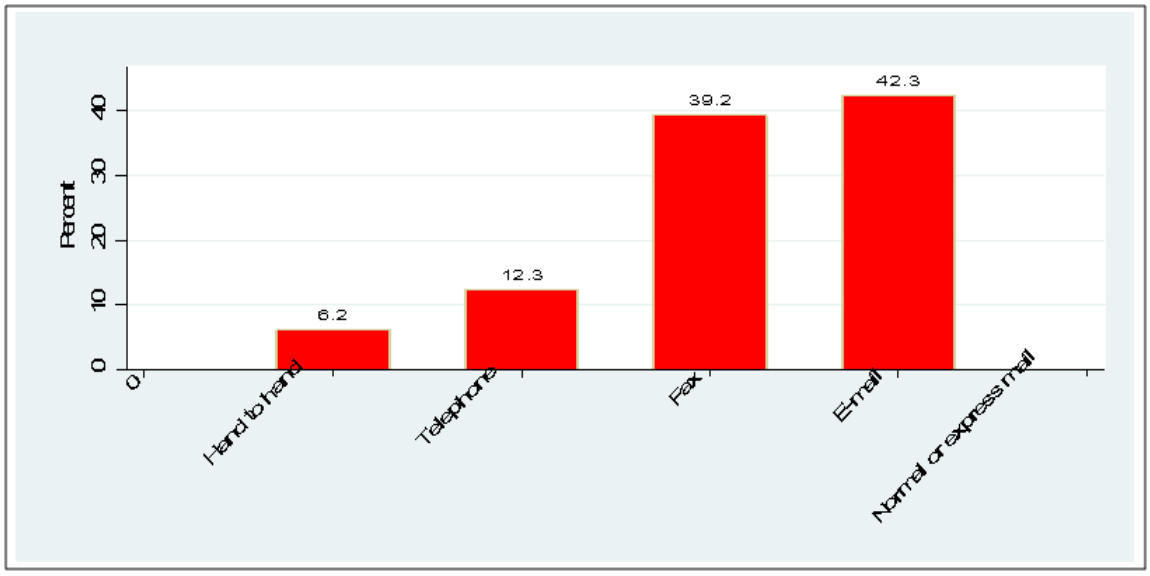


Figure A.2. Frequency of search of new suppliers

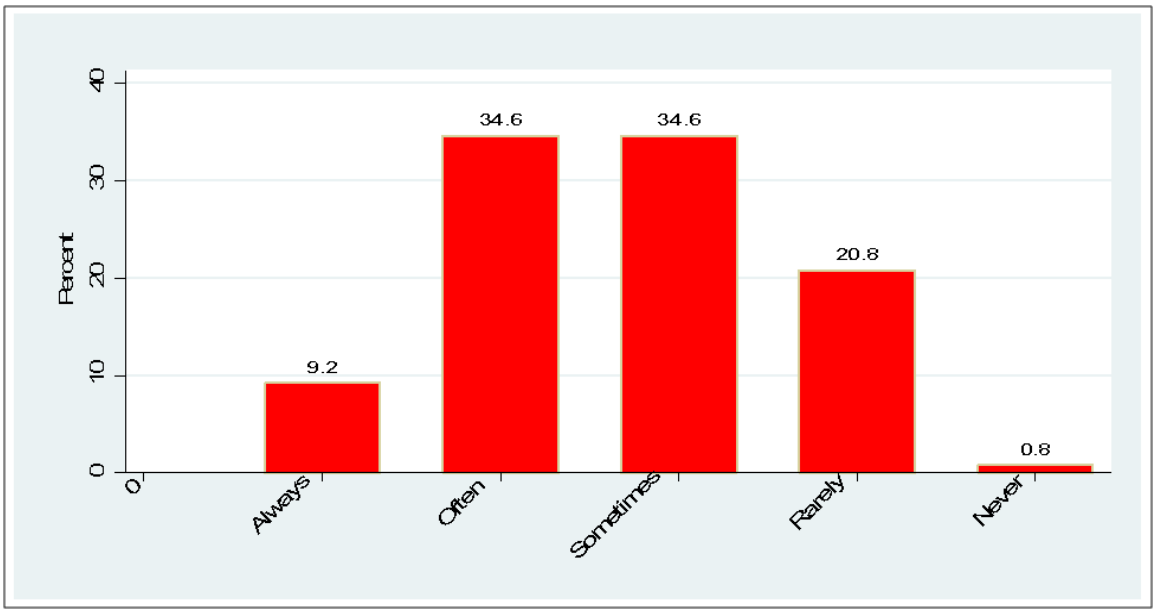


Figure A.3. Search strategies and methods for new suppliers

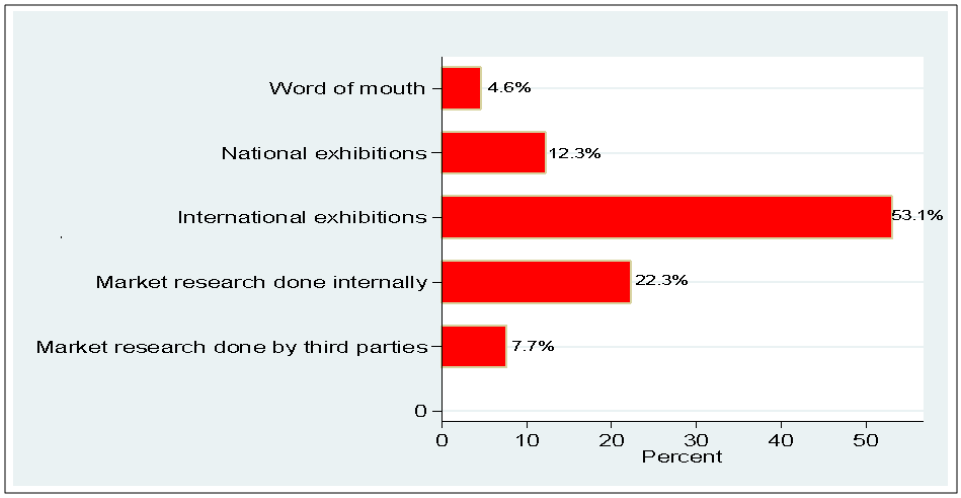


Figure A.4. Frequency of requirement planning

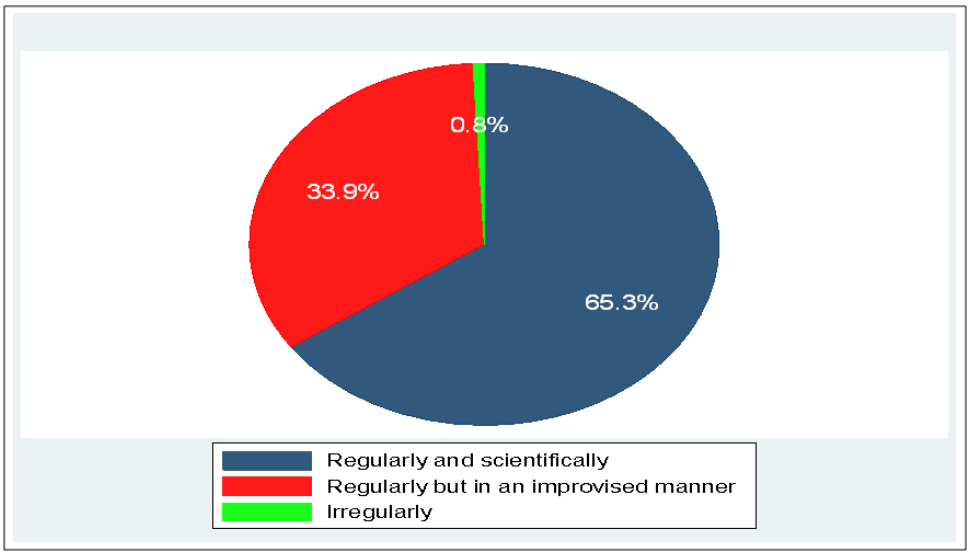


Figure A.5. Most used International Commercial Terms (INCOTERM)

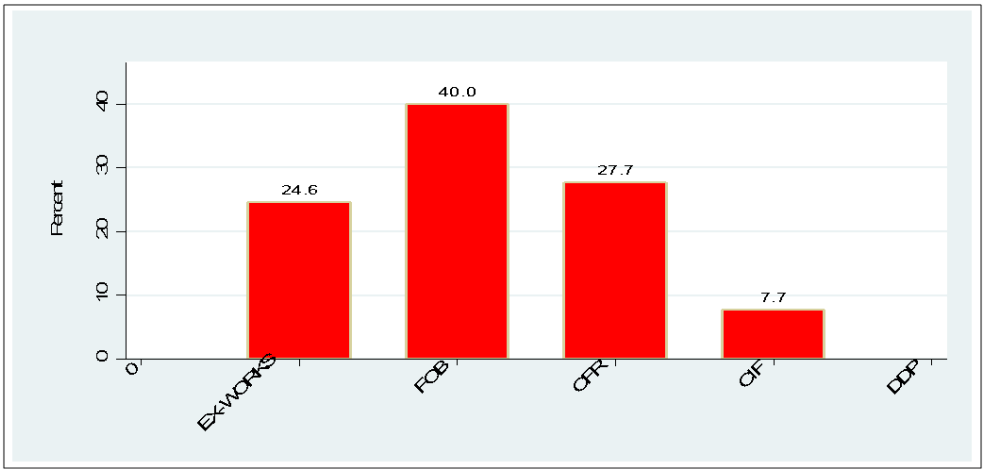


Figure A.6. Means of contracting freight forwarders

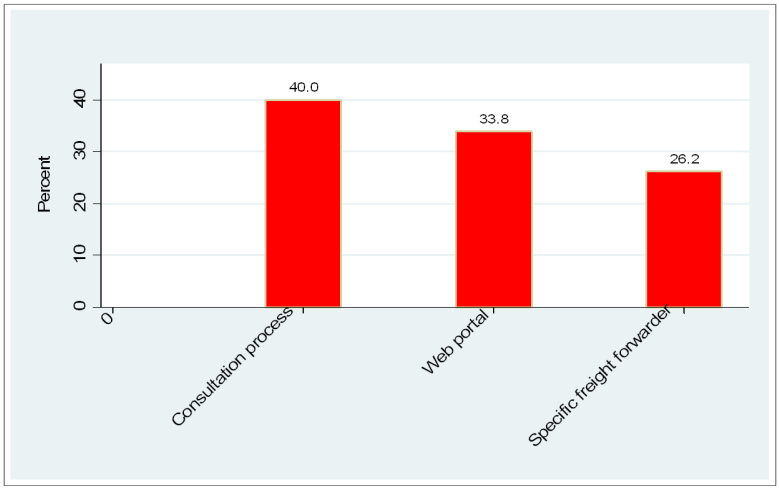


TABLE A.2. QUANTITATIVE INDICATORS ON TRANSPORT AND DISTRIBUTION ACTIVITIES

	Obs	Mean	Std. Dev.	Min	Max
Current commercial value of own transport equipment (in thousands of US dollars)	130	452.7	362.6	50.6	2453.8
Purchase value of transport software application (in thousands of US dollars)	130	5	7	0	33
Total number of vehicles in own transport fleet	130	12	9	2	55
Total load capacity of own transport fleet (in tons)	130	120	87	20	450
Total number of orders delivered to customers using own transport fleet	130	385	257	60	1,850
Total number of orders delivered to customers using third party carriers	130	43	74	0	370
Annual tonnage shipped using own transport fleet (in tons)	130	3,936	2,708	600	19,600
Annual tonnage shipped using third party carriers (in tons)	130	425	729	0	3,700
Total annual value paid for fuel for own transport fleet (in thousands of the US dollars)	130	18.6	19.9	0.5	118.0
Total annual value of expenses paid to third parties in transportation and distribution activities (in thousands of US dollars)	130	2.5	4.9	0.0	29.5

Figure A.7. Average age of own transport fleet

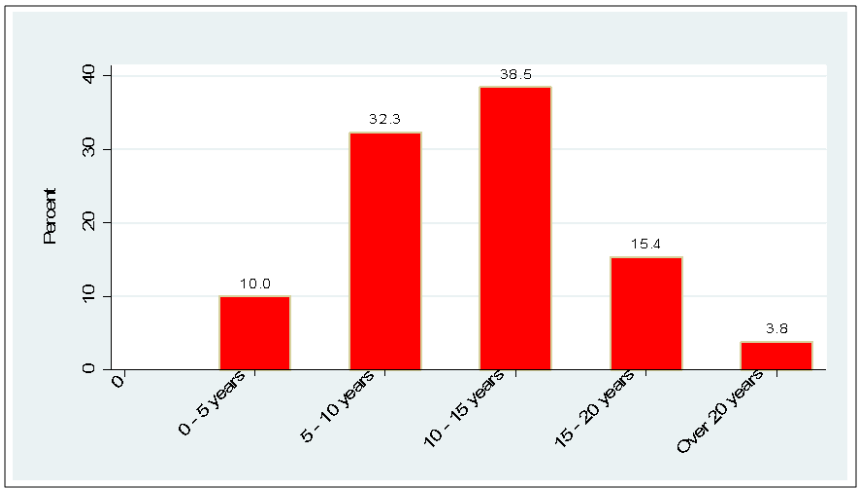


TABLE A.3. QUANTITATIVE INDICATORS ON STORAGE AND WAREHOUSING ACTIVITIES

	Obs	Mean	Std. Dev.	Min	Max
Current commercial value of own storage facilities (in thousands of US dollars)	130	1.182.6	841.0	0.0	4.930.8
Current commercial value of own storage equipment (in thousands of US dollars)	130	95.5	76.5	0.0	501.5
Purchase value of software applications for storage management (in thousands of US dollars)	130	1.5	2.0	0.0	8.7
Total space available in own storage facilities (in square metres)	130	4.076	3020	0	17,400
Total space available in third party (rented or outsourced) storage facilities (in square metres)	130	468	805	0	4.700
Number of own storage facilities in the country	130	2.7	2.1	0.0	12.0
Number of third party (rented or outsourced) storage facilities in the country	130	0.4	0.7	0.0	2.0
Total annual value paid for third party storage facilities (in thousands of US dollars)	130	8.7	14.8	0.0	66.4
Number of items held in stock in average	130	167.2	87.4	40	540

Figure A.8. Assessment of the suitability of current equipment in storage facilities

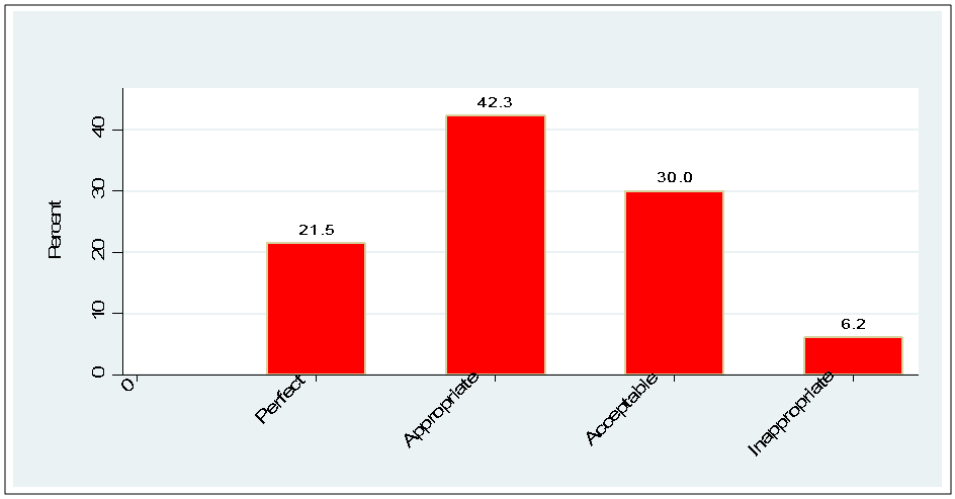


Figure A.9. Assessment of current storage facilities in terms of surface

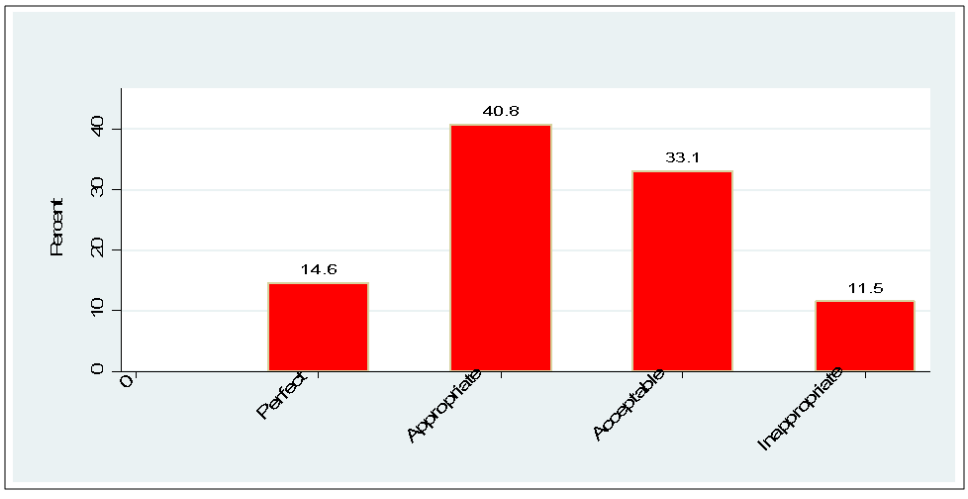


Figure A.10. Assessment of the security of current storage facilities

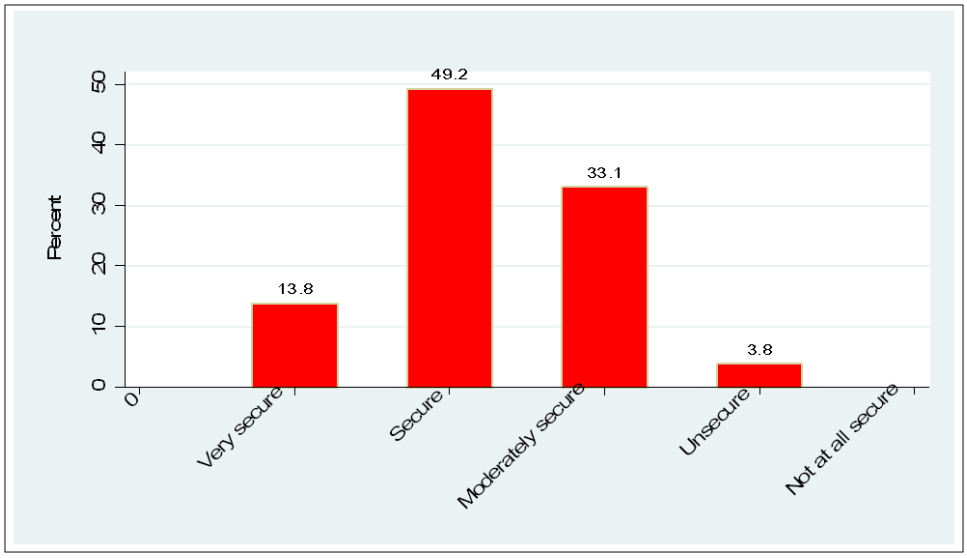


Figure A.11. Difference in number of employees across sectors

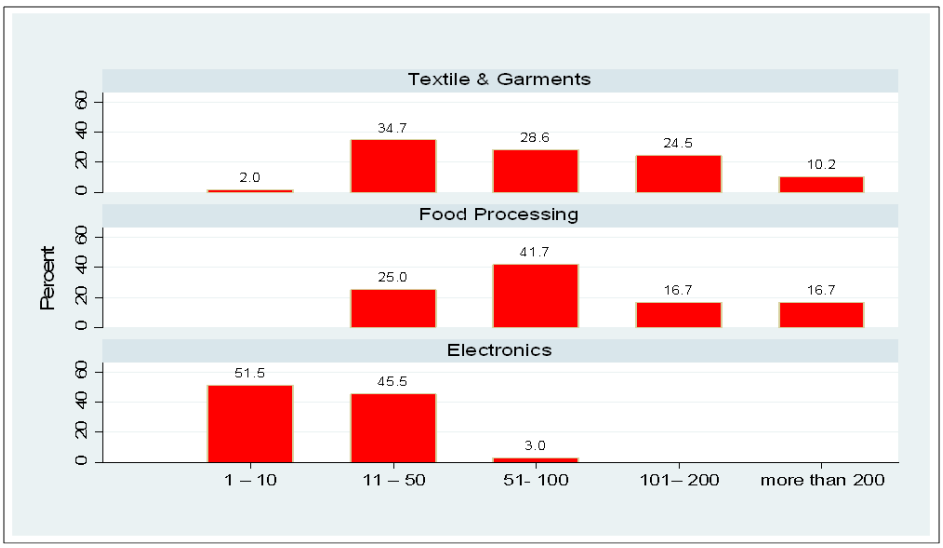


TABLE A.4. TURNOVER DIFFERENCE BETWEEN SECTORS

	Obs.	Mean	Std. Dev.	Min	Max
Textile and garments	49	11.1	6.4	1.6	39.0
Food processing	48	10.5	5.7	2.5	29.0
Retail electronics	33	5.0	2.9	1.3	12.3

TABLE A.5. TEST OF STATISTICAL DIFFERENCE OF MEANS BETWEEN THE TWO MANUFACTURING SECTORS WITH REGARD TO THE ASSESSMENT OF THEIR FREIGHT FORWARDERS' COST COMPONENT

Two-sample t test with equal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Textile	49	2.673469	.1026343	.7184403	2.467109	2.87983
Food Pro	48	3.083333	.1066633	.7389853	2.868754	3.297912
combined	97	2.876289	.0765136	.7535711	2.72441	3.028167
diff		-.4098639	.1479798		-.7036409	-.116087

diff = mean(Textile) - mean(Food Pro) t = -2.7697
Ho: diff = 0 degrees of freedom = 95

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = 0.0034 Pr(|T| > |t|) = 0.0067 Pr(T > t) = 0.9966

Figure A.12. Frequency of encountering irregular payments demands, by country

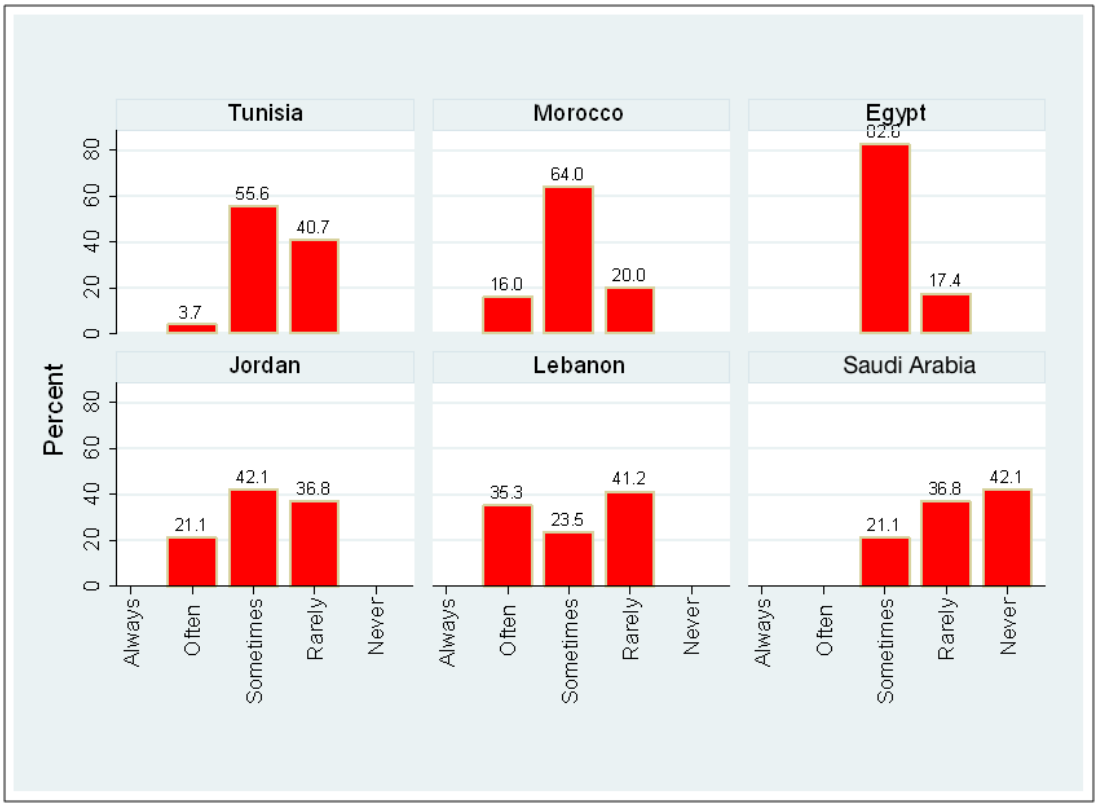
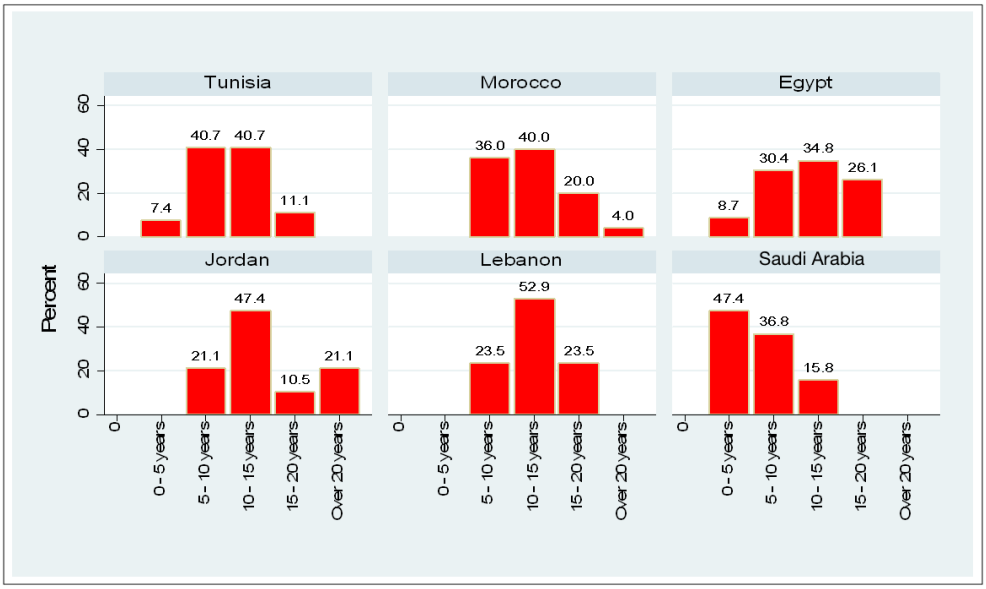


Figure A.13. Average age of transport fleet, by country



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Logistics is a multifaceted component of trade infrastructure and a key to competitiveness. Most Arab countries could provide cheap trade logistics but remain handicapped by inefficiencies at various stages of the logistics chain. This report looks at trade logistics at the company level in three industries in selected Arab countries. Results show that, due to poor services offered by third parties, companies typically use their own logistics services, which raises costs.

The report shows that, despite its reasonable performance in logistics, inefficient transport infrastructure hinders the overall trade performance of Tunisia. That example illustrates the degree to which the various elements of logistics must complement one another in order to improve a country's competitiveness. Given the difficulty of increasing investment in transport and trade-related infrastructure at a time when public finances are suffering from high deficits, public-private partnerships emerge as the optimal source of funding.

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