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Transport and Connectivity to Global Value Chains

Illustrations from the Arab Region

Transport and Connectivity to Global Value Chains: Illustrations from the Arab Region

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Acknowledgments

Executive Summary

International production sharing agreements have become an important modality in shaping the structure of regional partnerships. They offer significant opportunities for developing economies, the fragmented production improving economic performance in terms of higher productivity, and greater sophistication and diversification of exported intermediates in participant countries.[1] The extent to which a country benefits depends on policies and structural factors.[2] Better integration in the world economy through higher connectivity to GVCs could result in adjustment costs,[3] which can be divided into economy-wide and sectoral effects. Economy-wide costs are usually associated with the increasing use of natural resources, such as pollution and deteriorating living conditions, while sectoral effects relate to the reallocation of resources from declining sectors as a result of greater specialization. Both theory and experience show progress in connecting to GVCs is beneficial to economies, provided it is accompanied by effective adjustment policies.[4]

Fragmentation of production networks has gathered pace on the back of advances in information and communication technologies (ICT) and reduced transport costs. This has facilitated the emergence of multifaceted international supply chains by allowing firms to coordinate activities across borders, standardize production stages, and move personnel, parts and components in a reliable, cost-effective and timely manner. Many production functions are now dispersed in remote regions. Today it is estimated that 80 per cent of global trade is made by GVCs coordinated through transnational companies.

This report explores the impact of transport infrastructure and service availability and efficiency on the connectivity – the state of being connected – of GVCs. It assesses whether the Arab region meets the necessary requirements of infrastructure, logistics and trade facilitation to be able to participate meaningfully in GVCs. Though we acknowledge the impact on employment equality and social issues, including gender specific aspects, this report focuses only on the role of transport infrastructure and policies.[5]

The ability of countries to integrate in such networks depends on a multitude of structural and policy factors; for example, proximity to suppliers and consumers has a direct bearing on a country's engagement in GVCs. Aside from widespread ICT, fast, cheap and reliable transport has a profound impact on trade, investment and economic activity in general. Transport services determine the ease with which firms reach producers in different parts of the world in a competitive manner. However, GVC participation is not an automatic process. Countries need to provide an enabling environment for domestic firms to take advantage of, or remedy, their endowments and structural factors – such as proximity to suppliers and final consumers – allowing them to compete globally. Infrastructure investment and upgrading, improved regulatory frameworks, liberalized trade and investment regimes, flexible labour markets, human capital

development and policy harmonization among participating countries greatly enhance the extent and nature of GVC engagement.

The report shows the performance of transport and logistics services is a key reason behind the relatively poor integration of the region in GVCs, along with the low level of trade facilitation. Most Arab countries fare poorly in efficiency and timeliness of services and infrastructure. Countries have generally poor links with global transport networks and must make substantial progress in implementing trade facilitation measures. The region maintains a high level of restrictions on transport sectors as shown by the OECD (Organisation for Economic Co-operation and Development) Service Trade Restrictiveness Index.[6] The sector is also the most restricted compared with other sectors.[7]

This is reflected in countries' low-level commitment to transport services at multilateral level as part of World Trade Organization (WTO) obligations. Individual countries differ widely; many have no commitments and the regional average is essentially maintained by Jordan, Oman, Saudi Arabia and Yemen. Great strides

could be made once countries engage in the WTO Trade Facilitation Agreement (TFA),[8] and promote and honour their commitments on transport.

With gaps in institutional quality and governance, Arab countries should adopt an integrated approach to their transport infrastructure and services. This will better boost GVC participation by facilitating the emergence of regional value chains (RVCs), that when integrated in GVCs could help movement up the value ladder.

Transport development and GVC integration need to be mainstreamed in country development plans, to ensure links with the local economy and to build a solid capability to better capture opportunities in international markets. It is imperative Arab countries engage in deeper trade accords, covering not only merchandise but also other domains, notably services, investment and intellectual property rights. Extending existing regional agreements in a way that would allow the emergence and expansion of regional value chains would also yield substantial benefits.

Contents

Contents (continued)

List of Boxes

Acronyms

DVA	domestic value added
EU	European Union
FDI	foreign direct investment
FVA	foreign value added
GATT	General Agreement on Tariffs and Trade
GDP	gross domestic product
GVC	global value chain
ICT	information and communications technology
IIA	International Investment Agreement
IPR	intellectual property rights
LPI	Logistics Performance Index
LSCI	liner shipping connectivity index
NAFTA	North American Free Trade Agreement
NTM	non-tariff measures
OECD	Organisation for Economic Co-operation and Development
OSA	Open Skies Agreement
PCFC	Ports, Customs and Free Zone Corporation
RVC	regional value chain
STRI	Services Trade Restrictiveness Index
TFA	Trade Facilitation Agreement
TiVA	Trade in Value Added
WEF	World Economic Forum
WTO	World Trade Organization

Introduction

GVCs are a salient feature of production in today's world. Participation leads to substantial benefits for all stakeholders and thus plays an important role in fostering development. More than 50 per cent of global trade in manufacturing goods consists of intermediate goods, and an increasing 70 per cent of trade in services involves intermediate services.[9] GVCs allow disadvantaged countries to become involved in production chains by specializing in certain components, parts or tasks. Such countries benefit from economies of scale and other advantages associated with partnering global conglomerates, notably greater interconnectedness among economies in a geographical region.[10]

The impact of GVC participation on economic development has been discussed extensively in literature.[11] An OECD study of five developing subregions in Africa and Asia, for example, underscored the link between fragmented production networks and improved economic performance.[12] The increasing importance of GVCs alters the traditional relationship between exchange rate movements and competitiveness. As imports of intermediate goods and components constitute a valuable input in global production networks, exchange rate interventions to boost exports become ineffective. Higher prices of imported inputs negate the favourable effects of exchange rate depreciation regarding price competitiveness. The effectiveness of such interventions, therefore, depends largely on the extent of an economy's GVC integration.[13]

Participation in GVC networks is not an automatic process. Countries should engage in strategic decision-making to achieve the desired nature of integration based on national endowments, such as geographical location (proximity to suppliers, markets) and natural resources. Several factors are identified as the main drivers of international production sharing, including the following:

- lower transport costs;
- ICT advances;
- improved telecommunication infrastructure;
- transport infrastructure;
- technological progress;
- workforce education and skills;
- competitive labour productivity;
- political, social and cultural environments;
- administrative capacity and ability to enforce contracts;
- proximity to supply sources and markets.

Central among these is transport connectivity, which determines the ability of countries to reach producers in different parts of the world without delay. Those less connected to global transport networks are severely disadvantaged in terms of costs and transfer time to production hubs.[14]

This report explores the impact of transport infrastructure and services availability and efficiency on GVC connectivity. It assesses whether the Arab region meets the necessary requirements to be able to participate meaningfully in GVCs. It is divided into

three chapters. This brief introductory chapter sets the scene, explaining why GVC connectivity is important, while chapter two provides an overview of the concept, and the implications of transport, logistics and trade facilitation measures for international product sharing, looking at where Arab countries stands in terms of these measures. Chapter three considers transport connectivity and services, and explores the relationship between the sector and GVC engagement in international comparison using the Trade in Value Added (TiVA) database,[15] which considers the value added by each country in the production of goods and services that are consumed worldwide.

The report does not cover all aspects of GVCs or transport per se, rather it focuses on the role of transport as far as international production sharing is concerned. It does not aim to provide exhaustive analysis of GVCs and their implications for the region.[16] With conflict an issue affecting several Arab countries, it does not deal specifically with any potential impact.[17] Neither does it consider the development of GVCs and transport services and their potential negative impacts on specific segments of labour (gender and skills) nor their associated environmental damages.

Such specific analysis of the impact of Arab connectivity to GVCs on labour markets[18] and the environment could be explored in the future. This report represents only a first step towards a better understanding of the components for boosting export performance and foreign direct investment (FDI) inflows.

1. GVC Engagement and its Impact on Trade Patterns

The term value chain refers to the processes involved in developing, designing, producing, marketing and distributing a product. It stretches from upstream activities (research and development, for example) to downstream ones (assembly, distribution, marketing and after-sales service). The distinction of a GVC is that these activities are spread across multiple countries, often in one geographical region but also in different parts of the world. Each firm joining a GVC specializes in a particular task, the leading firm bringing together the various processes, supplying headquarters services and coordinating inputs of goods and services to produce the final product and have it reach the consumer.[19] International fragmentation of production has helped shift participation in global markets from developed to developing countries, and among developing countries themselves. This has created a platform for countries to take part in the global economic operation through product specialization. Improvements in ICT have enabled producers to strengthen affiliation with major production operations anywhere in the world and to provide services as minor as data entry. It also facilitates the capacity of small and medium-sized enterprises to participate in operations previously limited to large and multinational ones.

The unbundling of manufacturing has allowed producers in developed and developing countries to lower costs by outsourcing tasks, parts and components. In addition, manufacturers can focus on core operations with high value added, allowing countries disadvantaged by size, location, and development and production capacity to find a small window through which they can tap into global markets.

Fragmenting production processes across national borders was made possible primarily by technological improvements in transport means, which enabled the exchange of production inputs and outputs and the movement of personnel, and also by advances in ICT which helped coordinate production. Sophisticated designs and the widespread use of software packages have promoted standardization, allowing for better, more flexible manipulation that further facilitates distance coordination. Functions and processes involving the flow of unfinished goods within the firm are now taking place through a two-way process of manufactured intermediates across borders.

The result is a new production and trade paradigm, integrating low-wage labour from developing countries with technology provided by more advanced ones. The novelty of the contemporary process of global production sharing is its wider and ever increasing product coverage, and its rapid spread from mature industrial countries to developing ones (broadly from the Global North to the Global South).[20]

After a modest start in the clothing and electronics industries in the late 1960s, the North-South exchange in international production networks has evolved, to industries such as sports footwear, automobiles, televisions and radio receivers, sewing machines, office equipment, electrical machinery, cameras, watches, light-emitting diodes, solar panels, and surgical and medical devices.

A. Evolution of GVCs

Transnational corporations or multinational enterprises play a pivotal role in supporting and consolidating GVCs. They have developed international production networks where trade in inputs and outputs takes place between affiliates and partners of firms involved. An estimated 80 per cent of the global trade associated with GVCs is conducted through transnational corporations,[21] which coordinate trade activities within their extended networks of affiliate partners and suppliers through governance schemes ranging from direct ownership of affiliates and contractual relationships, to arms-length dealings and supplier partners. Their investment in certain countries is pivotal in shaping the nature and degree of that country's participation in GVCs. As a result, countries with high FDI inflows relative to their economies tend to exhibit higher participation in GVCs and generate higher domestic value added from trade, which is corroborated by the strong correlation between FDI stocks and country GVC participation.[22]

Trade in intermediates has been increasing at global level, accounting for more than 60 per cent of the total increase in world manufacturing exports from 1990 to 2010.

The share of developing countries in total world network trade increased from 19 to 47 per cent over the same period, with Asia leading the way. These countries have continued to account for a larger share of component exports compared with that of final assembly, though the latter has increased at a faster rate in recent years.[23] Production sharing provides opportunities for countries to specialize in certain tasks in which they have a comparative advantage rather than trying to master the complete production process of a product. This deviates from the neoclassical trade theory, which stipulates that countries should specialize in sectors in which they have a comparative advantage, to the new trade theory that asserts firms with increasing returns to scale benefit from producing certain varieties within a sector.

International supply chains have evolved from simple arrangements to elaborate production networks. Initially production sharing involved relocating labour-intensive stages of manufacturing to low-wage geographic areas and reimporting the assembled components to be incorporated in the final product. Over time value chain networks expanded and included an increasing number of manufacturing stages involving many countries – and hence multiple border crossings – until reaching final assembly. With the consolidation of supply chains in certain industries mainly attributed to the transmission of technological know-how and new technologies, manufacturers are increasingly choosing to move final assembly stages to overseas locations to access low-wage labour, or final consumers. This was typically achieved through subsidiaries of multinational enterprises. Knowledge and technical skills were passed to nationally established capacities, encouraging subsidiaries to delegate parts of the production process to local firms.

B. Geographical distribution of global supply chains

Manufacturers tend to cluster in one location, depending on the balance between agglomeration and dispersion forces. Dispersion forces are related to two concepts: the first is vertical specialization, where firms produce most products themselves and through subsidiaries geographically dispersed, and the second horizontal specialization where most of their needs are sourced from others. Vertical specialization stems mainly from wage differences between the Global North and South, and results in jobs off-shored from developed to developing economies. Horizontal specialization results in dispersing tasks among developed and developing countries, related to variations in their specialization and associated economies of scale. Agglomeration forces, on the other hand, encourage geographical clustering of firms due to different spillover effects, which are mainly demand and/or supply driven. Demand-driven agglomeration forces apply in prospering economies where firms are located close to their customers; supply-driven are those linked to relatively reduced resource costs used as inputs in the production process.
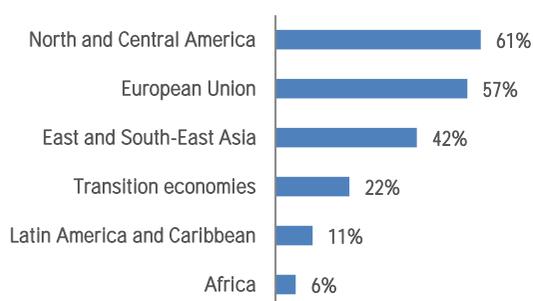
Production fragmentation tends to be characterized by a regional hub and spoke pattern rather than a homogeneously distributed production of intermediates at global level. This is illustrated by the emergence of the so-called headquarter and factory economies in different regions. Headquarter economies transcend regional boundaries and are characterized by a coordination role within a region, with exports of relatively low imported intermediates.[24] Factory economies are largely dependent on imports from headquarters economies, and use rather than export their value added.[25] In the case of North America for example, Canada and Mexico rely considerably on intermediate goods from the United States for their own exports, whereas the United States has little dependency on them for its own exports. The United States is therefore identified as the headquarter economy of North America, the other countries of the region as factory economies.

The regional dimension of international supply chains is further reinforced by the fact that, of the 3196 International Investment Agreements (IIAs) concluded until 2012, 2,857 were bilateral investment treaties. Of the 30 IIAs concluded in 2012, only 20 were regional.[26] This is reflected in the relatively high rate of part and component exchange intraregionally.

Distribution of value added along global or regional value chains is not uniform. Among the stages of a supply chain, from upstream product conception to manufacturing to midstream assembly, to downstream branding and marketing, the tasks associated with the highest value creation are concentrated in pre- and post-manufacturing stages. These are typically services-intensive. This pattern is represented graphically in a 'smiley' curve, with the initial and final stages of the production capturing most of the value added (figure 2).

Figure 1. Share of intraregional GVC flows in total GVC participation, 2010

North and Central America	61%
European Union	57%
East and South-East Asia	42%
Transition economies	22%
Latin America and Caribbean	11%
Africa	6%

Source: World Investment Report 2013, based on United Nations Conference on Trade and Development (UNCTAD)-EORA GVC database.

6

Manufacturing and assembly activities are associated with low value added per worker while the high added value remains in services sector jobs, such as research and development, marketing and product design.

An example is the iPhone supply chain, where tasks associated with high value added and high profits are made in California and the low-value assembly tasks, amounting to less than 5 per cent of the value of the product, are performed mainly in China.[27] Coinciding with the ICT revolution, the gaps in value added between the fabrication and assembly stages

and the service-oriented pre- and post-fabrication stages have been widening since the 1990s. This has led to a net displacement of low-wage jobs in the manufacturing and assembly fields from technologically advanced economies to low-technology, low-wage economies, with developed economies largely maintaining high-wage service sector jobs. The trend has led to concerns, particularly in advanced economies, which have experienced a waning role as global manufacturing hubs. Developing economies, meanwhile, have been occupied expanding their increased prevalence as providers of the manufacturing and assembly functions.

Figure 2. A conceptual representation of the smiley curve
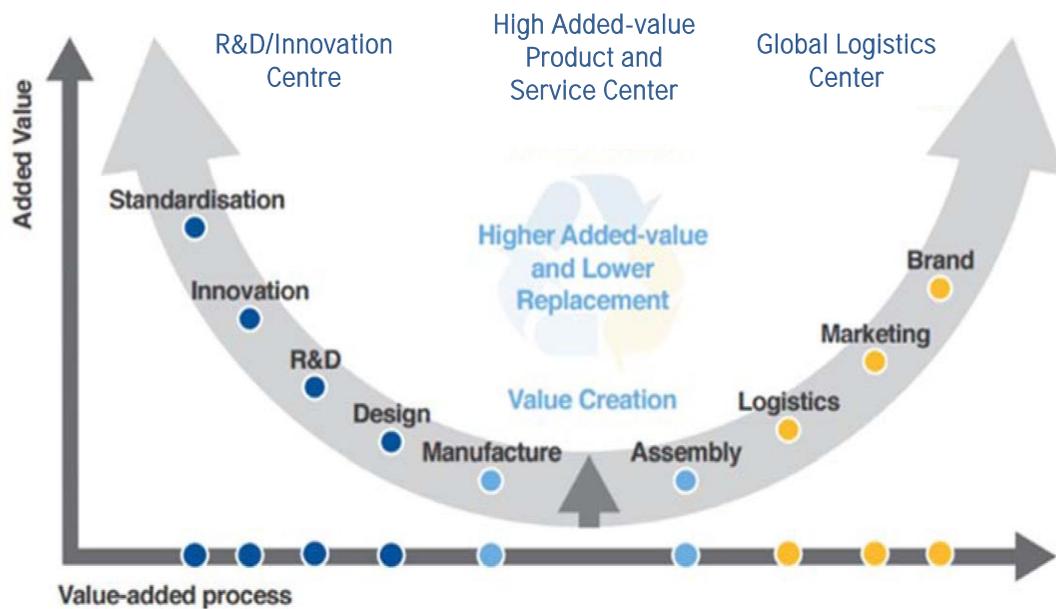
Figure 3. The case of GVC for the iPhone industry
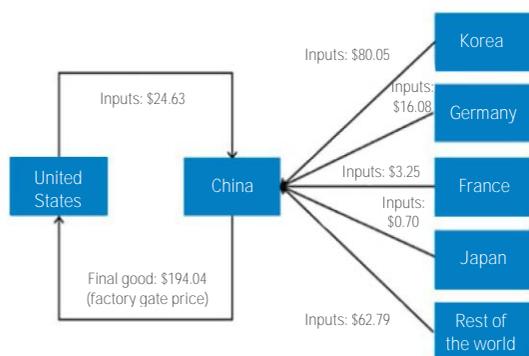
As a result, advanced economies are rethinking their competitiveness strategies and reconsidering industrial policy debates, given no credence since the late 1980s. On the other end of the spectrum, firms in developing countries are setting objectives aimed at shifting from manufacture and assembly into design, innovation, research and development, logistics, marketing and branding.

China is a case in point, remaining engaged broadly in products such as toys, Christmas decorations and low-quality textiles and garments. It is estimated that for every $1 worth of exports, only 6 cents are contributed and retained by China.[28] The trend is apparent in various industries and countries around the world. It is plausible (based on the smiley curve) that shifting away from the manufacturing and assembly stages of the production process to more sophisticated activities would capture a higher share of the value added generated in a value chain. But this may underestimate that the volume of the activity matters as much as the domestic share of the value of the product.[29] While assembly activities often represent a small share of the value of the final products, it is also true that substantial value can be generated from

specializing in assembly activities if the scale is large enough. For example, specialization in the assembly of electronic devices has served several firms in Asia well. They have become assemblers *par excellence*, and attracted leading clients such as Apple, Dell, Amazon, Nokia and Samsung. From their perspective, adding 5 per cent of the value of these firms' leading products adds up to a non-negligible sum. As an alternative business development strategy, these assemblers could have launched a mobile phone to rival the larger producers and entered the higher extremities of the smiley curve to capture larger shares of the value of the final product. But they would likely face tough competition. What is important, from a firm's viewpoint, is the value that is created from its economic activities, not the share it occupies in the value of the final product.

C. Implications of greater international product sharing for economic policy

Trade barriers raise specific concerns for GVC participation, imposing greater costs than the simple exchange of final goods and services. As imports constitute an essential input to exports, restrictions on the imports of parts and raw materials have an impact on exports when substantial production sharing is involved. As parts and components cross borders multiple times along a value chain, all trade costs, not just tariffs, are amplified.

The need for deeper trade agreements was brought to the fore as emerging economies with weaker domestic governance joined sophisticated international supply chains. In the absence of WTO provisions addressing issues created by multifaceted international supply chains, there has been a marked increase in regional trade agreements, bilateral investment treaties and unilateral reforms.

In the 1990s, regional trade agreements increasingly began to cover North-South trade, with South-South agreements gaining a foothold later in the decade. More than a third involve provisions not covered by the WTO rulebook, mainly addressing competition policy, movement of capital and intellectual property rights. Similarly, there has been a marked rise in the number of bilateral investment treaties to mitigate potential issues between private foreign investors and host governments, particularly between 1985 and 1995.

Countries themselves need to ensure the prerequisite policies are in place. In addition to vibrant, competitive industries and productive capacity, hard infrastructure (transport, logistics, telecommunication and energy) is required. Domestic regulatory reforms for trade and investment, including an open import regime with streamlined processes, flexible labour rules and an intellectual property rights regime can contribute to enhancing competitiveness, and in turn determine participation in GVCs. An open services sector, backed by strong, enforceable regulation (including financial services) is also crucial.

The policies and structural factors necessary to participate in GVCs differ from those required to scale up engagement and climb the value ladder. Over time, countries could engage in more sophisticated stages of manufacturing and claim a higher share of value added generated along GVCs. To follow such a trajectory requires policies that promote innovation, research and development and intellectual property protection, harmonize rules and standards with international norms, and are open to FDI and liberal trade policies.[30]

Moreover, boosting connectivity to GVCs in developing economies may generate adverse and different results depending on the country and the targeted sector of production. This is true with the labour market and gender equality in employment and wage levels. Here, it is necessary to underline the neoclassical theory, which supports a positive correlation between GVC connectivity and employment and wages. GVC connectivity, often embodied in expanded exports and stimulated growth, requires a greater workload. Given the law of supply and demand, this must be accompanied by an increase in real wages. (OECD 2014, Krueger 1985, Thabet and Chemingui 2011). But other studies put these outcomes in doubt by showing that increased trade openness through connectivity to GVCs especially in developing economies may have negative effects on both employment and real wages. More specifically, an export promotion policy, increasingly used in most developing countries, is more employment-friendly than an import substitution policy (Krueger 1985). Artecona and Cunningham (2002) confirm these assumptions. Their analysis of the impact of greater GVC participation on wages in Mexico's manufacturing sector showed it was associated with a higher gender wage gap. They explain their findings by the observed increase in the premium attached to men's higher skills and the fall in the discrimination component of wage differentials as result of increased international competition. Berik, Rodgers and Zveglich (2003) found the same results for the Republic of Korea and Taiwan Province of China, in the sense that increased international competitiveness between 1980 and 1999 in concentrated industries was associated with a wide gender wage gap. However, Hanson and Harrison (1999) show that for industries forced to become competitive in the face of international competition, the gender wage gap fell in a sample of developing economies. Becker (1971) had already pointed out competitive firms do not have the profits to wage discrimination.

Given that women experience more employment churning, that is frequent hiring, firing and relocation (Swamy, 2004), the impact of trade liberalization on the wage gap is another crucial dimension of this analysis. Levinsohn (1999) analysed employment patterns in Chile following substantial trade liberalization. He shows that firms tend to lay off a slightly higher proportion of female workers when business declines and to hire more women when business recovers. Ozler (2001) confirmed these results, through analysis in Turkey. She found that female employees had significantly higher job relocation rates.

GVC participation thus has an impact on gender inequality. Compared with men, women in developing countries, particularly the less skilled, profit less from the new economic opportunities, and with less time and mobility find it more difficult to adapt. Trade policies affect men and women differently due to inequalities in economic and social resources, and decision-making. Their impact is mediated by the different roles occupied by men and women within societies, in particular the gendered division of labour. GVC participation may be positive or negative for women and men, depending on their individual and social group characteristics. Economists agree that higher participation is likely to increase the employment opportunities for women, particularly in export-oriented sectors such as textiles, but it can also lead to higher unemployment in the form of adjustment costs. Such situations can more severely affect poor and marginalized groups of women than men. The flexible work necessary to respond to market fluctuations and higher competition can lead to more informal workers, mostly women.[31]

The effects of GVC participation on both sexes vary considerably depending on a country's diversification, the liberalization process, initial conditions in terms of policies and labour market regulations, and the available productive capacities. Accordingly, the impact on women and men, or even across industries within a country, should be made on a case-by-case basis.

D. The role of transport, logistics and trade facilitation in GVC integration

Services constitute an important output and input into GVC activity. Some are essential for enabling participants along the value chain to connect. The contribution of value added in services to the global gross domestic product (GDP) has increased steadily, from 58 per cent in 1995 to 69 per cent in 2014.[32] Transport is of particular significance for international trade, providing physical access to markets and production networks. The availability of transport services determines not only the ability of countries to take part in global trade but also the type of participation. For example, with some 40 per cent of world trade now moving by air,[33] countries with good air cargo can integrate with distant markets more easily than those depending on maritime transport.[34]

While maritime and air transport are vital for trade across regions, road and rail transport remains the most used between adjacent territories or countries. Transport choice is determined by factors such as the goods being transported, distance and time to the destination, available infrastructure and services, the technology involved and costs.

The emergence of GVCs is strongly tied to the development of transport services, containerization, increased vessel size and air cargo capacities, and falling transport costs, particularly air and road. Countries investing

heavily in transport infrastructure have outperformed competitors, and efficiency – of infrastructure and services – is gaining importance with fragmented production across countries, the expansion of GVCs, the 'just in time' methodology of manufacturing where goods are only received when they are needed, and increased global competition.

International trade requires efficient transport services. Trade within GVCs, especially for parts and components, is more time sensitive than that in final products and so connectivity and the reliability of transport services are fundamental to a country's ability to link to GVCs, the latter dependent on the composition of exports and country location.

1. Transport costs

With import tariffs falling rapidly following successive trade liberalization at global, regional and bilateral levels, other factors including transport costs and non-tariff measures (NTMs) now dominate trade costs. Transport costs have a significant impact on the structure of economic activities as well as international trade patterns. Evidence suggests that raising transport costs by 10 per cent reduces trade volumes by more than 20 per cent, and that infrastructure quality can account for half the variation in transport costs.[35] For the Arab region, ESCWA estimates that reducing transport costs by 5 per cent annually could lead to a 23 per cent growth in regional trade by 2020.[36]

Freight costs have about halved since the mid-1970s, driven by investment in infrastructure, better capacity use and technological progress. The major savings have been in road and air transport, with reform and falling trade barriers having a substantial impact. Air transport costs have decreased sharply compared with those of

maritime, increasing the use of air transport, especially across the Atlantic.

GVCs are characterized by speed and dynamism. As international trade has intensified over the past three decades, the demand for speed has increased too. For each day in ocean travel a country is distant from the importer, the probability of sourcing manufactured goods from that country is reduced by 1 per cent. Exporting firms are willing to pay 1 per cent of the value of the goods per day to avoid this time loss.[37] Competitive transport markets affect trade costs. There is strong evidence that a more competitive market through the Open Skies Agreement, or OSA (policy by which foreign air carriers are granted rights to transport between airports of other countries without restrictions), reduces costs by about 9 per cent and increases the share of imports arriving by air by 7 per cent within 3 years.[38] There is also evidence of a positive relationship between liberalization and the volume of air traffic. It is therefore essential to look at transport cost and its main determinants as the principal factor driving participation in GVCs. There is a significant body of literature addressing this issue, but attempts at establishing statistical significance are undermined by data deficiencies.[39]

2. Transport infrastructure

The role of transport goes beyond delivering the goods. It provides assurance against uncertainty, critical in GVC business. This allows manufacturers to stock fewer inventories, resulting in efficiency gains, or lean production.

Infrastructure is a major determinant of efficiency. Poor infrastructure accounts for 40 per cent of predicted transport costs for coastal countries, 60 per cent for landlocked countries.[40] When considering a location for outsourcing

parts and components, companies look at the availability of infrastructure and the quality and reliability of services. An OECD study found that a 10 per cent improvement in transport and trade-related infrastructure quality could increase agricultural exports of developing countries by 30 per cent.[41]

Trade in parts and components requires different transport arrangements than in the case of final goods. With parts and components feeding into other products, a delayed arrival implies a delay in production of the final product.

In the Arab region, infrastructure poses a real challenge to transport development. Many countries still lack an infrastructure that enables them to compete in international trade. According to the World Bank's Logistics Performance Index (LPI), only four Arab countries are featured in the top and third quintile of its transport infrastructure availability rankings, with four in the bottom quintile (table 1).

Box 1. A successful connectivity to GVCs: the case of Dubai

Dubai upgraded its GVC position by creating in 1985 the Jebel Ali Free Zone (Jafza) and investing in the most modern port infrastructure in the region. Its role as a transshipment hub was made possible by the upgrading of Jebel Ali Port, alongside measures taken to anticipate containerization.

Two thirds of Dubai's trade volume is re-exported, supported by tax-incentives for manufacturers and exporters. In a spillover benefit, many firms have chosen to relocate some tasks in their supply chains to the free zone area, such as in the construction, automotive parts and vehicles, electronics, textiles, and food and beverage industries. Typical offshore activities include assembling, labelling and repackaging goods manufactured in Asia and South-East Asia and destined for European and North American markets. As such, and having developed excellent transport infrastructure and logistics services, Dubai has managed to plug into GVCs.

This determination to capture the lion's share of the transport and logistics services supply chain in the region has resulted in major restructuring. The Ports, Customs and Free Zone Corporation (PCFC) was established in 2001 and includes the Dubai Ports Authority, Jafza, the Dubai Customs department and Dubai Ports World. The PCFC, which integrates private port operators and representatives of the relevant public authorities, provides an efficient administrative structure for firms, encouraging deeper integration in global service supply chains.

Table 1. LPI ranking and scores for Arab countries in 2016

Country	Rank	Score (out of 5)	% of highest performer (Germany)
United Arab Emirates	13	3.94	91.2
Qatar	30	3.6	80.6
Bahrain	44	3.31	71.7
Oman	48	3.23	69.3
Egypt	49	3.18	67.7
Saudi Arabia	52	3.16	66.8
Kuwait	53	3.15	66.7
Jordan	67	2.96	60.7
Lebanon	82	2.72	53.2
Morocco	86	2.67	51.6
Sudan	103	2.53	47.4
Tunisia	110	2.5	46.4
Libya	137	2.26	39.2
Iraq	149	2.15	35.6
Mauritania	157	1.87	26.8
Syrian Arab Republic	160	1.6	18.5

Source: Arvis and others, 2016.

3. Transport services

Transport infrastructure is necessary yet not sufficient for a well-functioning transport system. The availability of high-quality services is a key factor enabling competitiveness and connectivity to GVCs. Transport efficiency can be defined along several dimensions, including speed, accessibility and cost. Various elements including an intelligent system, fuel prices, competition and innovation are major determinants of efficiency.

The performance of Arab countries in transport differs greatly from one country to another, and from one sector to another. Based on available transport indicators, most lag behind the rest of the world. Given its strategic location and wealth of natural resources, the region's transport performance is less than impressive.

Table 2. Availability and quality of transport services in selected Arab countries, 2016[a]

Country	Rank (out of 136)	Score (1-7)
United Arab Emirates	13	5.57
Qatar	24	5.18
Bahrain	36	4.78
Saudi Arabia	47	4.49
Oman	50	4.44
Egypt	54	4.3
Jordan	55	4.29
Kuwait	65	4
Morocco	67	3.99
Tunisia	90	3.64
Lebanon	96	3.58
Yemen	126	3.04
Mauritania	135	2.62

Source: The WEF 2016-2017 Global Competitiveness Index.

[a] Data only available for some Arab countries in the index.

While calculating transport efficiency is difficult, the World Economic Forum (WEF) attempts to provide a measure from the perspective of transport-system users in its Global Competitiveness Index. Arab countries vary in their score in the availability and quality of transport services, but overall most countries performed modestly (table 2).

Transport policy is not only an important determinant of trade but also of the nature and extent of GVC participation. A well-functioning transport regime creates an environment for better services by enhancing competition and allowing foreign suppliers to serve the domestic market.

The open skies policy, for instance, has played a big role in lowering air cargo costs in countries where it has been adopted. One study estimated that air fares between the United States and the European Union (EU) decreased by at least 15 per cent after such an agreement. Similar gains are expected if the United States extends the agreement to other countries and regions.[42]

4. Connectivity to major transport networks

As participation in GVCs depends mainly on exports of parts and components that feed into other products, transporting them relies on fast and efficient transport. Air transport is, therefore, deemed an extremely important mode of transport, and a high-performing air transport services sector and GVC participation are closely associated. There is a positive relationship between exports of parts and components and their transport connectivity index. In other words, they represent a higher share of total exports in countries better connected to the international air transport network. It is also established that higher Air Connectivity Index scores are associated with a greater degree of air transport liberalization.

Maritime transport carries around 80 per cent of the world's traded goods, making it the most important mode of transport for trade. Connectivity to international networks is the goal for improving transport infrastructure. Countries that are connected to global transport networks are in a better position to participate in international trade, and in GVCs in particular.

A country's score in transport network indicators, particularly maritime, can measure connectivity. The liner shipping connectivity index (LSCI)[43] is the major indicator of connectivity to maritime networks. Despite its strategic location and high dependence on the trade of natural resources (most importantly oil), the Arab region's connectivity to global shipping networks remains moderate, as illustrated by the score of countries in the LSCI. Figure 4 shows that only five Arab counties are well connected to maritime transport networks.

Figure 4. Liner shipping connectivity index score of Arab countries in 2004 and 2016
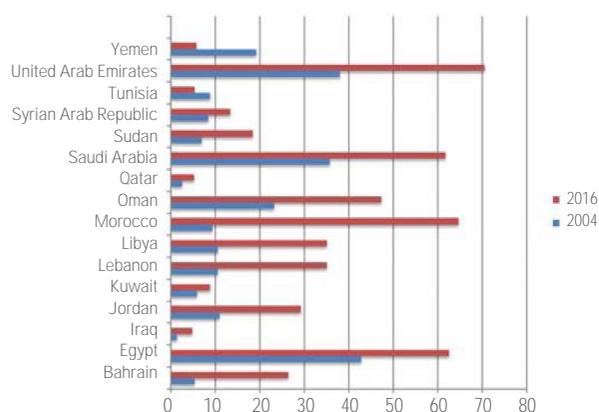
Source: United Nations Conference on Trade and Development, Liner shipping connectivity index, UNCTADstat. Available from http://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId =92 (accessed 15 February 2017).

Box 2. Morocco's maritime connectivity

With 15 commercial ports that generate 92.3 million tons annually in merchandise traffic, Morocco is solidifying its position as a commercial bridge between Europe and West Africa. Modern infrastructure in the form of world-class ports, airports and rail links are central to realizing this goal. Strategically located along the Strait of Gibraltar, just a seven-hour flight from New York and three hours from Paris, Morocco is increasingly seen as a regional hub in northwest Africa for transport and business.

Tanger Med port on the Atlantic coast in northern Morocco began operation in 2007 to serve five export free trade zones in the area and — taking advantage of its close location to an international shipping route — work as a transshipment hub. With huge investment in its handling capacity, port container traffic reached around 3 million twenty-foot equivalent units (teus) in 2015 and is expected to reach 8 million by 2018.

The port has made a massive difference in the country's connectivity to GVCs, helping attract companies in the automobile, aerospace and textile sectors, among others. The operation has enabled producers to send parts and components to manufacturers in Europe in just three days, to the Americas in fewer than 10. It will likely serve many African countries, providing transshipment to facilitate exports and thus enhance their connectivity to GVCs. Tanger Med has not just fostered Morocco's connectivity to GVCs but also enhanced its connectivity to shipping lines, as illustrated by its jump up the liner shipping connectivity index, from 9.4 in 2004 to 64.7 in 2016, the second-best performer in the Arab region.

Alongside this, significant efforts have been made on the trade facilitation front. Morocco has improved substantially and is ranked among the top performers in the world, implementing around 90 per cent of the measures set out in the WTO Trade Facilitation Agreement.

14

This low connectivity can be attributed to the region's low engagement in global trade, poor port infrastructure in most countries, dominance of port management by too few government agencies and lack of proper policies stimulating private investment. Major and successful port developments have been undertaken in the region in the past two decades, but this remains limited to a few countries.

5. Logistics

A key factor in determining competitiveness, logistics is an important trade enabler. In GVCs, logistics has two dimensions: first, the need for efficient movement of parts and components between multiple locations to allow for continued production; and second, the interdependence of producers requires reliable systems of delivery, of inputs and outputs. Research confirms that logistics performance matters more for trade within GVCs than for other types of trade. Using the proportion of parts and components in total exports as a proxy for manufacturing GVC participation, Saslavsky and Shepherd (2012) showed that countries with stronger logistics performance tend to specialize in GVC-related exports. The logistics performance of Arab countries, based on the LPI, is diverse. The index is a composite indicator, combining performance measures along various dimensions, such as customs, infrastructure, international shipments, logistics quality and competence, tracking and tracing, and timeliness. In terms of the overall LPI index, most Arab countries fare rather poorly, compared with other countries in the world. Five Arab countries were ranked in the lowest quintile out of 160 countries in the index, with the Syrian Arab Republic ranked the lowest. GCC countries the United Arab Emirates, Qatar, Bahrain and Saudi Arabia were ranked among the top performers in the region for 2016.

Table 3. 2016 LPI global rankings for Arab countries

Country	Overall LPI	Customs	Infrastructure	International shipments	Logistics quality and competence	Tracking and Tracing	Timeliness
Bahrain	3.31	3.14	3.1	3.33	3.38	3.32	3.58
Egypt	3.18	2.75	3.07	3.27	3.2	3.15	3.63
Iraq	2.15	2.01	1.87	2.33	1.97	1.98	2.66
Jordan	2.96	2.55	2.77	3.17	2.89	2.96	3.34
Kuwait	3.15	2.83	2.92	3.62	2.79	3.16	3.51
Lebanon	2.72	2.73	2.64	2.84	2.45	2.75	2.86
Libya	2.26	1.88	2.04	2.4	2.5	1.85	2.83
Mauritania	1.87	2.14	1.54	2	1.74	1.54	2.14
Morocco	2.67	2.22	2.46	3.09	2.59	2.34	3.2
Oman	3.23	2.76	3.44	3.35	3.26	3.09	3.5
Qatar	3.6	3.55	3.57	3.58	3.54	3.5	3.83
Saudi Arabia	3.16	2.69	3.24	3.23	3	3.25	3.53
Sudan	2.53	2.23	2.2	2.57	2.36	2.49	3.28
Syrian Arab Republic	1.6	1.11	1.24	1.36	1.39	2.1	2.4
Tunisia	2.5	1.96	2.44	2.33	2.59	2.67	3
United Arab Emirates	3.94	3.84	4.07	3.89	3.82	3.91	4.13

Source: The World Bank's 2016 Logistics Performance Index global rankings.
Note: 1 very poor, 5 excellent.

6.   Trade facilitation

Connectivity to global markets is influential in determining GVC participation. Sound infrastructure, well-performing institutions, a reliable transport system, efficient logistics, streamlined customs producers, modern information technology and effective communication services are important elements for connecting to value chains. Their availability and accessibility induce positive results on trade cost, which is essential for competitiveness. Poor infrastructure and/or logistical services can negatively impact a country's ability to integrate in GVCs by increasing trade costs, placing the country and its industries of parts and components in a disadvantaged position vis-à-vis other countries.

Global tariff barriers have declined substantially over the past 50 years but the benefits have not been fully realized. This is due in large part to the existence of non-tariff measures (NTMs), in the form of procedures and processes faced by importers and exporters. Additionally, various technical requirements and standards, licensing and the like, can form barriers to trade causing costs to increase.

Addressing NTMs has become a global goal in recent years to lower transaction costs that harm competitiveness. Facilitating the inflow and outflow of goods without jeopardizing the legitimate objectives for imposing them is the challenge facing policymakers.

The increased role of GVCs in international trade has not only changed the way companies do business but has also induced changes in policies, including trade policies. Countries facilitate imports as they do exports, because to remain competitive local industries must import parts and components to produce and export final goods. Tackling import barriers empowers local industries. It is therefore important in improving exports and increasing participation in GVCs.

Trade facilitation, defined as the simplification and harmonization of trade procedures, is a valuable tool to drive participation in GVCs. Recognizing this has increased the ability of countries to engage in GVCs due to the benefits it confers on manufacturers and exporters alike.

As GVCs are susceptible to shifts in transaction costs, policymakers should pay attention to both tariff and non-tariff measures. Reducing import tariffs is considered a catalyst for GVC engagement, allowing local producers to import components for products in a cost-effective manner. Similarly, removing invisible non-tariff measures that cause delay and increase transaction costs also enhances participation in GVCs. It could be argued that removing non-tariff measures is more important as they affect cost and also time, to which GVCs are sensitive.

Trade facilitation involves a range of procedures (including commercial, transport, regulatory and financial) to reduce transaction costs, thereby facilitating the smooth flow of international trade. With goods crossing more borders as a result of enhanced GVC activity, trade facilitation has become increasingly important. While less than 10 per cent of trade costs are related to tariffs, and 10 to 30 per cent to natural costs such as geographical and cultural factors,[44] the remaining 60 to 90 per cent are related to non-tariff policy measures, including indirect costs of trade procedures, maritime connectivity and services, business (regulatory) environment, currency fluctuations, and availability and use of ICT services.[45] The GVC business model is only feasible when companies can keep operating costs down.

Trade facilitation can provide the right environment for value chains to grow and prosper. It can support expansion of this business model to countries and sectors that have not traditionally been heavily involved. A positive correlation exists between a country's trade facilitation performance as measured by the LPI, and its share of parts and components in total manufactured goods (an indicator of value chain integration). The implication is clear. Trade facilitation must be a key element of any broader strategy to increase GVC integration.[46]

Box 3 GVCs and trade facilitation: the case of Tunisia

Tunisia has bolstered its GVC engagement in recent times. Over the period 1995-2011, domestic value added (DVA) sent to its consumer economy decreased from 63 to 49 per cent (DVA sent to Third World economies increased from 12 to 18 per cent). The foreign value added (FVA) content of exports grew more significantly, from 25 to 32 per cent. The top export industries were transport and storage, textiles and electrical machinery.

DVA accounted for the highest percentage in gross exports in transport and storage (81 per cent) followed by textiles (55 per cent). FVA accounted for a bigger share in gross exports of electrical machinery, at 54 per cent, with the DVA at 46 per cent. The top export destinations were France, Germany and Italy, with DVA accounting for between 65 and 70 per cent of total gross exports to each of these countries, while FVA accounted for between 30 and 35 per cent.

Tunisia participated in GVCs more through backward linkages (foreign value added in gross exports of a country) than it did through forward linkages (domestic value added exports of a country which go into exports of other countries). In 2011, its forward linkage participation was mostly in mining, transport and storage, and wholesale and retail trade, its backward linkage participation in electrical machinery, textiles, and transport and storage. The top foreign input providers were again France, Germany and Italy.

In terms of services value added content of exports, foreign services contributed more to exports of manufactures than domestic services, at 23 and 10 per cent, respectively. With total exports, domestic services (35 per cent) contributed more than foreign services (16 per cent). Wholesale and retail trade, transport and storage, and other business services contributed the most to exports of manufactures and total exports. France, Germany and Italy were the top foreign services providers to both.

Tunisia's trade facilitation figures for 2015 were positive. The cost to export and import at the border were $805 and $910, below the world averages of $1,841 and $2,084. Time to export and import was 16 days and 20 days, again below the world averages of 22 and 25 days. The number of documents required to export and import was four and six, against world averages of six and eight.

Source: William Mwanza, researcher, on the WTO's trade in value added and global value chains statistical profiles (tralac, 2016). Tralac develops trade-related capacity in east and southern Africa.

2. Transport Connectivity in the Arab Region

A. Transport services as a means to facilitate economic transactions

Transport services have important effects on economic, social and environmental outcomes. The availability – or lack – of high-quality transport services has consequences for firms' decisions on inputs, location and trade, as well for the structural transformation of economies in general.[48]

Greater availability of transport services reduces costs and boosts productivity, and in the process shift an economy to higher growth equilibrium, according to the Big Push theory formulated by Rosenstein-Rodan[49] and developed by Agénor.[50] There is evidence that transport infrastructure at the macroeconomic level has a significant positive impact on economic growth, a link documented by Calderón, Moral-Benito and Servén.[51] A sizable body of literature explores the channels through which the effects of transport infrastructure and services on economic activity materialize.

One such channel is trade. Reduced transport costs improve access to both factor (production or inputs in a production process) and product (the final goods) markets, which stimulates trade volumes and new industries. Hummels associates post-war trade growth with declines in transport costs. He finds that while the ad valorem impact of ocean shipping costs is no lower today than in the 1950s, those for air shipping have declined appreciably, leading to an increase in airborne trade and swifter product delivery.[52]

Efficient and high-quality transport and logistics services are of utmost importance for GVC integration. Conventional supply chains are characterized by production taking place in a given country. However, the production model has moved towards multiple-location and multiple-stage value addition across national borders. These segmented production chains locate production tasks including research and development, component manufacture, final assembly, marketing and distribution according to the availability of the most efficient resources. As a result, countries have gradually become specialists in certain stages of production rather than having to manufacture entire products. The phenomenon is referred to as international production sharing or international production networks, or global or regional value chains, depending on the geographical scale of operations.

Integration into international global or regional production networks requires predictable, timely transport and logistics services: the coordination of activities along the network and movement of products depend on such factors. In fact, trade facility measures such as high-quality services, efficient border management procedures and regulatory requirement play a larger role in the internationalization of production than traditional trade policy measures. Using a recent World Bank dataset on logistics performance, Arvis and others (2013) estimated that improving logistics performance would on average reduce trade costs 10 times more than an equivalent reduction in tariffs.

Increased fragmented production across borders also changes the nature of international competition. Competitiveness at the level of activity within an industry, rather than of the whole industry, matters more. Efficient and cost-effective transport and storage services are vital for attracting foreign firms to outsource parts of their production. If these services and the existing transport infrastructure do not allow firms to produce their outputs competitively, to import inputs or export their products in a reliable and cost-effective manner, taking part in GVCs and engaging in international production sharing would not be feasible.

With international production sharing, components and intermediate goods can cross national borders multiple times during the production process. Even nominal differences in transport and logistics costs translate into sizable sums and hence have a bearing on competitiveness comparable to the magnifying effects of tariff barriers in vertical production networks. The issue is severe for downstream firms incurring costs on their imported inputs as their products are processed along the value chain and on their exports of final goods. The compounded effect becomes greater depending on the number of production stages, or the length of the value chain. High transport and storage costs constitute an important barrier not only to foreign suppliers and international investors but also to domestic producers. They see their competitiveness undermined by higher input costs and constrained supply chains, weighing on demand and in turn production and investment at all stages of the GVC.

Transport and storage services can be an important determinant of competitiveness. In their absence it is necessary to maintain high inventory levels or opt for faster, reliable but more expensive modes of transport, which elevate production costs. Multistage production

networks often rely on 'just in time' inventory techniques to minimize inventory on-hand and in the pipeline. Using them, however, depends crucially on transport and storage services being available, as well as efficient customs clearance. Many countries fail to enter production networks because of their high costs or inability to deliver timely production and delivery requirements. These factors are particularly important for perishable agricultural products and certain upstream activities such as the manufacture of electronic components.[53]

Based on consumers' valuation of time embedded in United States imports data (which feature variation in the premium paid for air shipping and in time lags for ocean transit), Hummels and Schaur estimate that each day in transit is equivalent to an ad valorem tariff of 0.6 to 2.1 per cent. They find the most time-sensitive trade flows involve parts and components trade.[54] Similarly, Hummels estimates that a day of delay in exporting has a tariff equivalent of 1 per cent, more for time-sensitive products.[55]

B. Measuring integration in GVCs and the Arab region

Global trade and production patterns are increasingly governed by GVCs. Their emergence and spread is an important driver of efficiency and competitiveness, allowing firms to reap the benefits of greater international fragmentation of production. Although GVCs are often coordinated by multinational enterprises – which dominate cross-border trade of intermediate and final goods – domestic suppliers, notably small and medium-sized enterprises, play a growing role in producing goods and services that ultimately reach foreign consumers. As greater shares of income are generated through integrating GVCs in domestic economies, greater shares of total employment are sustained around the world.

OECD's Trade in Value Added (TiVA) database, developed jointly with the WTO, allows a more accurate picture of country integration into global and regional production networks by providing estimates of trade flows in value added terms. As opposed to trade flows in gross terms, it better captures the role of international trade in income and output creation in a world where products and components cross borders multiple times and activities take place in increasingly specialized domains.

The Arab region is in a favourable position to increase participation in GVCs due to its proximity to global production centres in Europe and Asia, location at the crossroads of international trade, diverse capabilities and endowments, and relatively low labour costs. Engagement however remains well below its potential, with few countries able to integrate meaningfully. Such a trend is apparent in Egypt, Morocco and Tunisia, individually. Some oil-rich countries, such as Saudi Arabia, are integrated in GVCs but mainly through oil products. Other countries with less developed industrial capabilities, Mauritania for example, are integrated in GVCs through the export of commodities such as iron ore, though with limited added value.

Box 4. Morocco and the textile supply chain

One of the first sectors to restructure on a global level, based on fragmented production processes and the dispersion of tasks across international borders, was the textile and garment industry. The example of Morocco and the EU is typical of this North-South outsourcing, which was motivated by the threat in the late-1950s from the growing Asian textile industry and its expansionary export strategy. Compared with the EU, Asian countries have lower wages and laxer employment regulations, and more recent investment in modernized equipment.

French manufacturers embarked on a strategy based on the complementarity between the garment-finishing workshops of Morocco and Tunisia and French spinning and weaving centres. The model was replicated in other European countries. High value added functions such as design, selection of suppliers, marketing and advertising were retained to preserve jobs in the capital-intensive textile sector while taking advantage of low wages in North Africa. European clients provide fabric and accessories that are assembled in Moroccan artisan workshops and re-exported to those who placed the orders. This was accompanied by agreements signed between the French and North African countries, notably Tunisia and Morocco, granting them privileged access to European markets. But by preserving the North African textile industry, the EU was also maintaining its own survival since most of the textile inputs were EU imports.

Implementing the outsourcing policy in the garment-manufacturing field resulted in the rapid growth of Morocco's textile industry, which today occupies a central role in the national economy, reflected in the share of exports (50 per cent in textile and garment manufacture) and labour employed (40 per cent of the labour force). Despite the limited upgrade of Morocco within textile value chains, the country has developed a strong industrial base to better accommodate world textile markets, and knowledge and skills centres supporting the sector, such as schools and study centres, technical institutes and professional associations.

Joining European textile supply chains also improved the transfer of technology, and Morocco's access to European markets, foreign investment and joint ventures. Since the late 1980s, production processes have undergone structural changes, encouraging further outsourcing of manufacturing and assembly stages by developed countries, leaving them able to focus on design and marketing. The objective is to deliver lean retail and fast fashion to avoid accumulating large stock volumes that are usually sold at discounted rates; not to reduce the price per unit sold but to avail more frequent orders with smaller volumes and shorter delivery times.

It is estimated that Morocco is set to perform well under this model, owing to its proximity to European markets and cost-effective transport modes. The challenge is to develop its capabilities in pulling through the finished garment, including organizing the required inputs without needing to revert to the original client.

Regional value chains have yet to emerge in a prominent manner, representing foregone opportunities to focus on higher value added products and develop productive capacities that would allow Arab countries to compete at the global level. Regional chains could play a major role in iron and steel production, and in food processing, textile and automobile sectors. A case in point is the four countries signing the 2001 Agadir agreement. Despite expressing an intention to set up their own free trade area, Egypt, Jordan, Morocco and Tunisia continue to export to the EU individually and, in some cases, compete against each other, as illustrated by the automobile industry in Morocco and Tunisia.

The lack of strong regional agricultural and food value chains reflects wider gaps in local and national development and regional economic integration. It highlights the virtual absence in many sectors of competitive regional advantage in production, processing or distribution through existing value chains. The result is lost opportunities, detracting from country efforts to raise income, create wealth and build capacities for growth and innovation. It also represents an untapped opportunity, given the significant role agricultural and food value chains could play in the region's development, especially for selected commodities such as cotton, sugar, olive oil, dates, livestock, fruits and vegetables, and staples such as wheat.

Poor infrastructure and transport capabilities, and high transport costs are some of the constraints facing value chain development in the region. The limited variety of services leads to an overreliance on one mode of transport – such as road – to exchange agriculture products between countries, which threatens the stability of production and supply when it becomes, for whatever reason, unusable. Closure of the Nasib border crossing between Jordan and the Syrian Arab Republic, for example, led to substantial losses for Syrian and Lebanese farmers, who were unable to find alternative means of transport to export products to Gulf Cooperation Council (GCC) countries.

Box 5. Impact of conflict on transport and trade in the Syrian Arab Republic

Conflict impacts internal and external trade by breaking the links between its main cities and regions. The physical infrastructure of national and local roads is negatively impacted, and the security of people and merchandise put in danger. This heightened risk, alongside other factors, increases the cost of transporting merchandise. Conflict in the Syrian Arab Republic, for example, led to a 10 to 15-fold increase in these costs between 2011 and 2013.

Conflict slows the speed at which goods are transported, internally and externally, due to closed and destroyed roads. On the Lebanon-Syria-Jordan axis in 2013, transport speed decreased to 2.5 km/hour compared with an average of 11.8 km/hour on all roads between Arab countries for the same period.

Conflict also makes transit between countries more difficult, leading to alternative routes being created. However, these might be at higher costs than before resulting in the goods being moved becoming less competitive. For example, Turkey officially closed its borders with the Syrian Arab Republic in July 2012, necessitating shipment to the Gulf countries via 'RoRo', roll-on/roll-off ships designed to carry wheeled cargo. Trucks are shipped by sea from Mersin port in Turkey to Port Said in Egypt then continue their journey by road. According to the Turkish Union of International Roads Shipping Companies, the cost of transporting a truck from Turkey to Saudi Arabia increased by almost 228 per cent due to the civil war (transit through the Syrian Arab Republic, $3,500; RoRo, $8,000).

Source: ESCWA, 2015.

C. Evolution of transport and storage services: evidence from the TiVA database

The extent to which transport services contribute to GVC integration across a heterogeneous set of countries is revealing, as well as how this has evolved over time. New insights afforded by the TiVA database allows tracking the transport and storage services (as opposed to transport services alone) content of total exports in both gross and value added terms in developed and several developing economies, including Morocco, Saudi Arabia and Tunisia, the three Arab countries for which data are available.

Transport and storage services cover passenger and freight transport, regardless of the mode (land transport by rail, road and pipeline, sea,

coastal water and inland water transport, and passenger air transport, freight air transport and space transport), postal and courier services, and warehousing and storage services, alongside transport support activities such as terminal and parking facilities (bus and train stations, harbours, airfields, car parks), infrastructure operations (rail networks, waterway locks, roads, bridges, tunnels, air traffic control), support services (towing, shunting, berthing, piloting), cargo handling and freight forwarding.[56]

In this chapter, analysis is based on a grouping into three categories of selected countries: developed economies, which include the EU15,[57] Japan and the United States; developing economies, which cover Brazil, China, India, Poland, Russian Federation, South Africa, Turkey and Viet Nam; and the three Arab countries.

Figure 5. The value added share of transport and storage services in selected economies
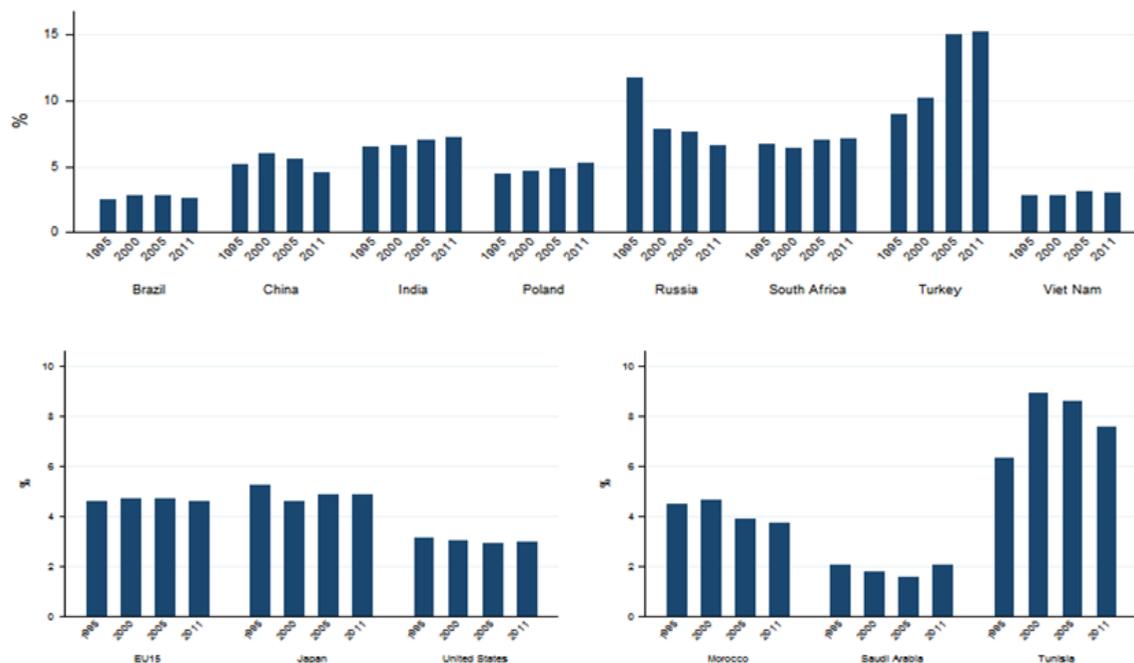

Source: ESCWA calculations based on data from the OECD-WTO TiVA database (accessed December 2016).

Transport and storage services contribute significantly to economic activity in developed and developing economies (figure 5). The sector's share tends to be higher in developing than developed economies, with some exceptions. Among developing economies, Turkey stands out with an exceptionally high share. The Russian Federation was another outlier in 1995 but the share has since come down to levels in line with the other selected developing countries.
In developed countries, the share has been stable and significantly lower than developing countries. Among Arab countries, Tunisia appears to be closer to selected developing economies compared with Morocco and Saudi Arabia.

1. The case of developed economies

In terms of both gross exports and the exports of the sector's value added, transport and storage services constitute a relatively small share of total domestic value added, evolving differently in the selected advanced economies over the period 1995-2011 (figure 6). The EU15 saw a steady increase from 1995. Japan, meanwhile, registered a surge between 2000 and 2005 and a small decline between 2005 and 2011. The shares declined in the United States between 1995 and 2005, before recovering between 2005 and 2011.

Figure 6. Exports of transport and storage services, selected developed economies
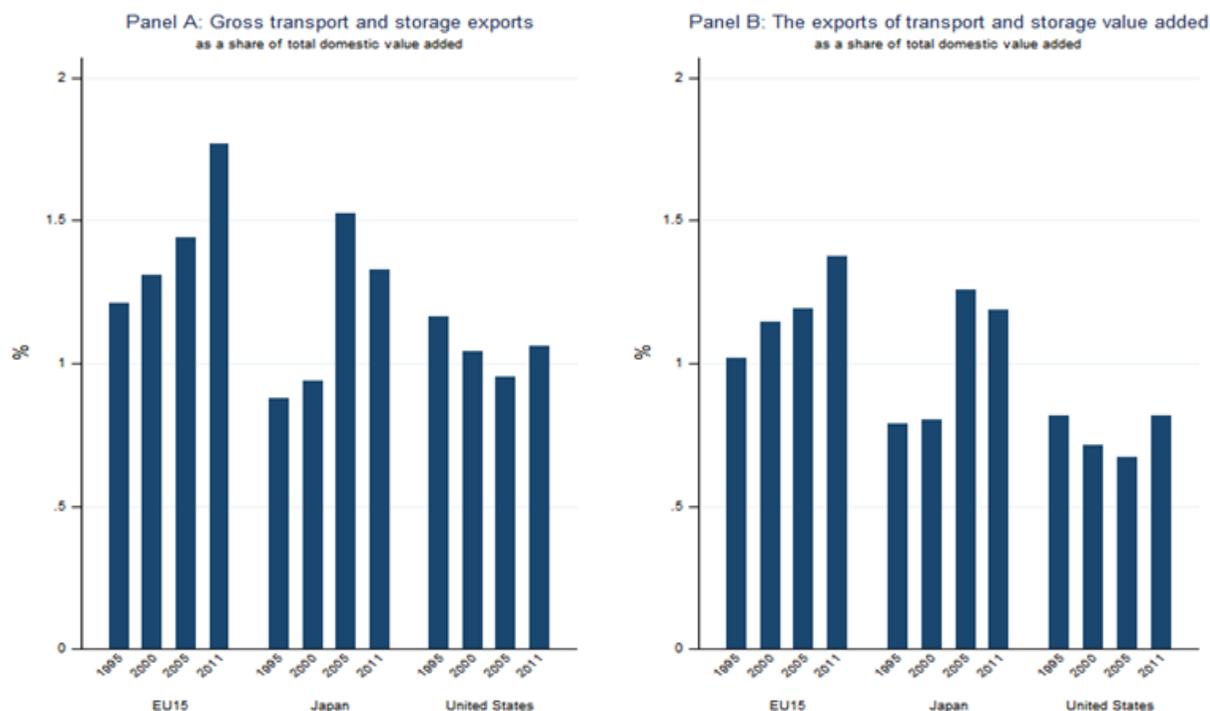
Source: ESCWA calculations based on data from the OECD-WTO TiVA database (accessed December 2016).

**Figure 7.** Transport and storage services value added content of exports, selected developed economies
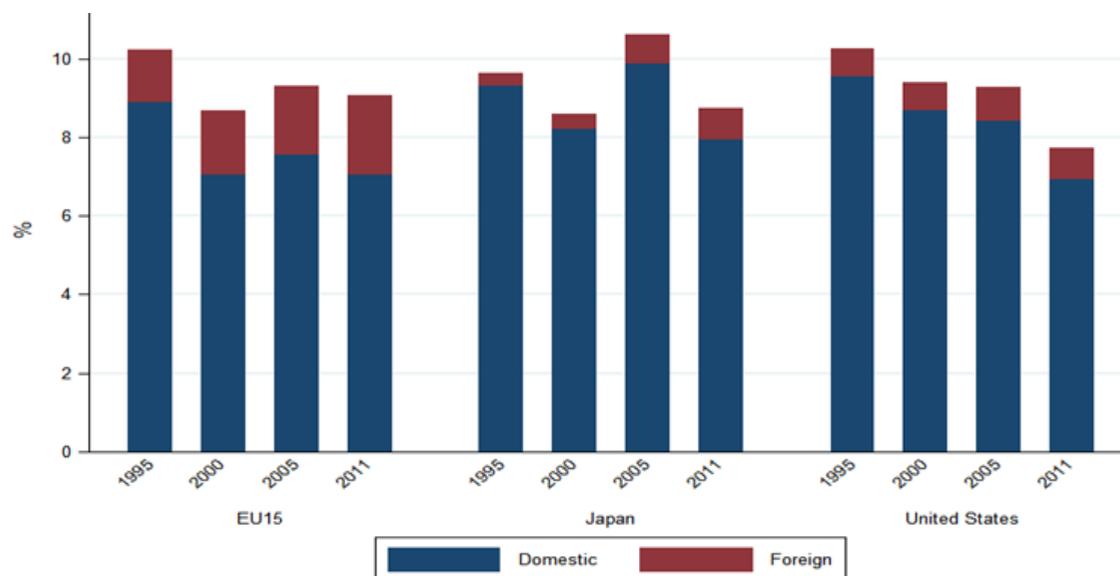
In terms of the level of transport and storage value added content of exports as a share of gross exports, the advanced economies are remarkably close, although the ratio evolved differently across the three (figure 7). The transport and storage value added content of exports declined steadily for the United States over the period 1995-2011. It zigzagged in the EU15 and Japan. After initial declines between 1995 and 2000, it increased from 2000 to 2005, and declined from 2005 to 2011, with fluctuations more pronounced for Japan. Although domestic transport and storage services dominate the exports of total transport and storage value added in all three selected economies, foreign services had a higher and increasing share in the EU15.

2. The case of developing economies

Commensurate with the diversity of the selected developing economies, the share of transport and storage services exports in gross and value added terms in total output exhibits pronounced heterogeneity (figure 8). For instance, in 2011 gross exports of transport and storage services as a share of total domestic value added amounted to less than a half per cent in Brazil while it reached 6 per cent in Viet Nam. With the exception of Brazil and China, the remaining developing economies appear to rely on transport and storage services to a great extent. The exports of transport and storage value added as a share of total output saw a steady increase in India, Poland, Turkey and Viet Nam between 1995 and 2011, and in South Africa between 1995 and 2005. In the Russian Federation, however, the ratio almost doubled between 2000 and 2011.

Figure 8. Exports of transport and storage services, selected developing economies
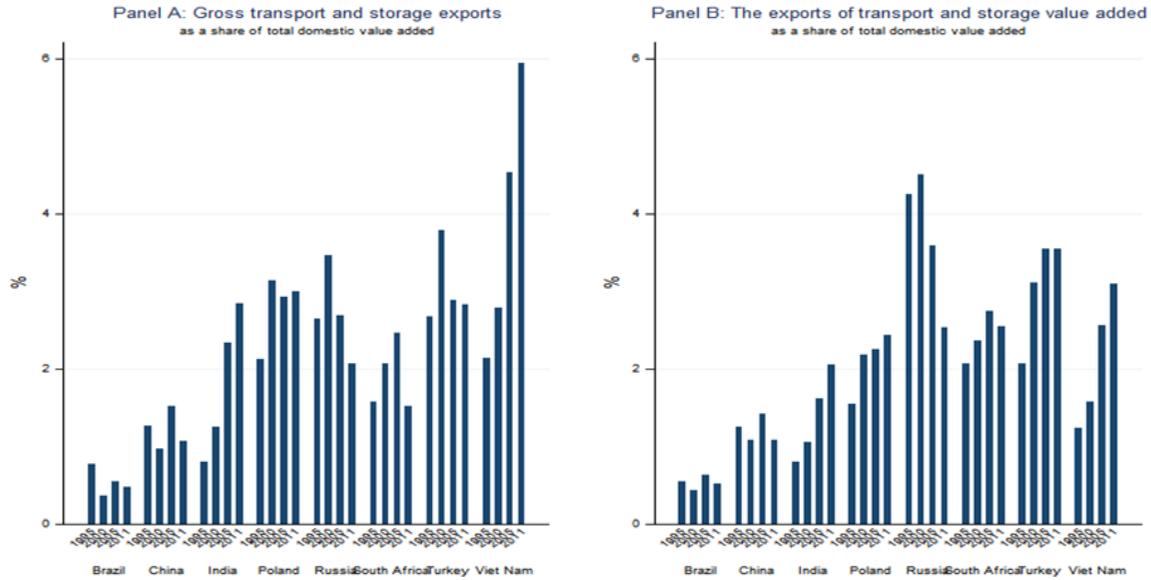
Panel A: Gross transport and storage exports
as a share of total domestic value added

Panel B: The exports of transport and storage value added
as a share of total domestic value added

Figure 9. Transport and storage services value added content of exports, selected developing economies

The transport and storage value added content of exports as a share of gross exports tended to be lower in the selected developing economies compared with the developed economies (figure 9). The share remained in excess of 10 per cent as of 2011 in India and Turkey, where it approached 20 per cent in 2000, and below 5 per cent in Brazil, China and South Africa. Most of the developing economies saw steady and/or sharp declines in the share of transport and storage value added content of gross exports. India and Viet Nam, for which foreign transport and storage services contribute significantly to the exports of the value added of such services, appear to register the greatest improvement over 1995-2011.

3. The case of three Arab countries

Arab countries included in the TiVA database display large differences in terms of exports of transport and storage services as a share of total value added (figure 10). Tunisia stands out among not only the three countries but also the previously considered developing economies, with the shares in gross and value added terms hovering around 6 per cent. Remarkably, the shares are fairly stable, particularly compared to other developing economies. The shares are also relatively high for Morocco.

Figure 10. Exports of transport and storage services, Arab countries
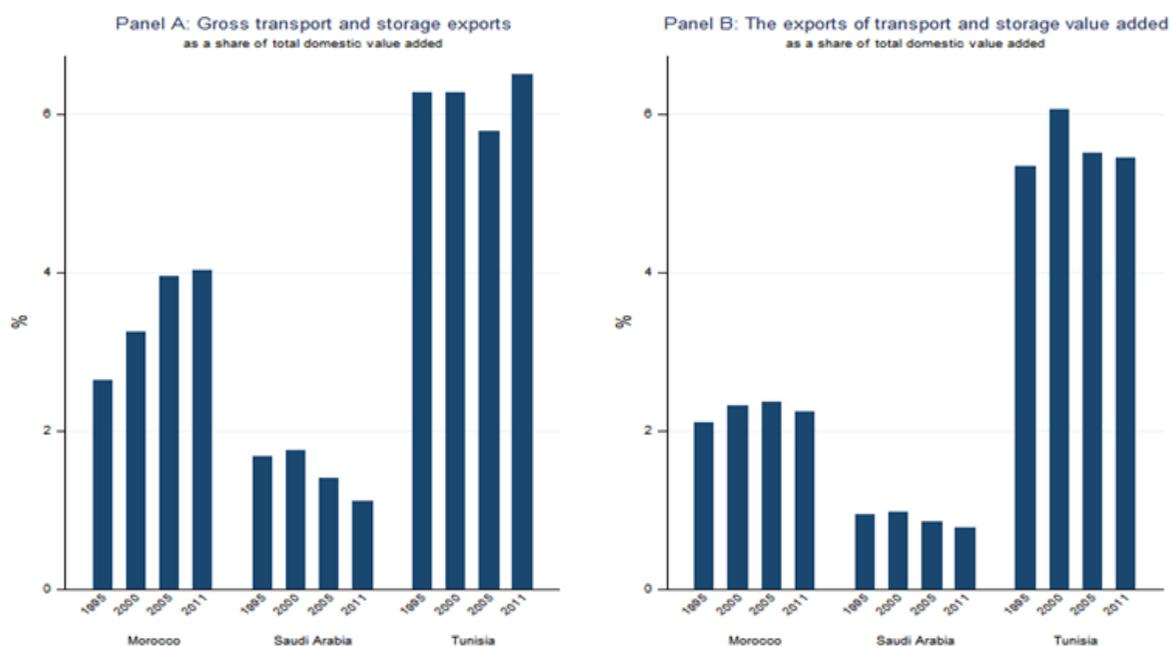
Source: ESCWA calculations based on data from the OECD-WTO TiVA database (accessed December 2016).

Figure 11. Transport and storage services value added content of exports, selected developing economies
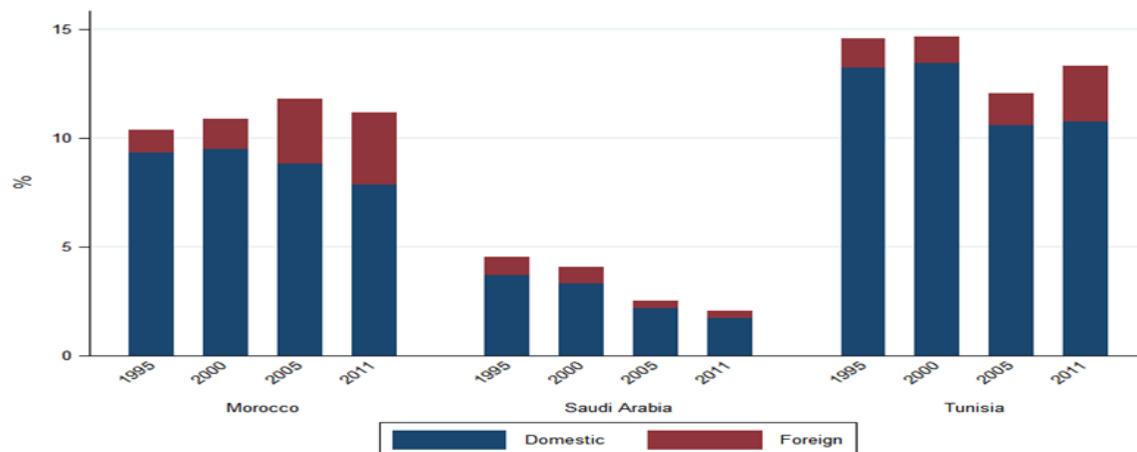

Source: ESCWA calculations based on data from the OECD-WTO TiVA database (accessed December 2016).

The transport and storage value added content of exports, as a share of gross exports, are high in Morocco and Tunisia, and fairly low in Saudi Arabia (figure 11). As of 2011, the share remained in excess of 10 per cent in Morocco and Tunisia, but below 2 per cent in Saudi Arabia. It is notable that foreign transport and storage services gained ground steadily in Morocco and made up a relatively high share of total transport and storage services. Foreign

services share increased in Tunisia but in Saudi Arabia the already low share of foreign transport and storage services shrunk.

4. Transport services and trade in goods

Using available indicators or by developing a relevant one, we will explore how transport services and trade in other sectors interact.

Figure 12. Transport and storage value added content of gross total exports, selected developed economies
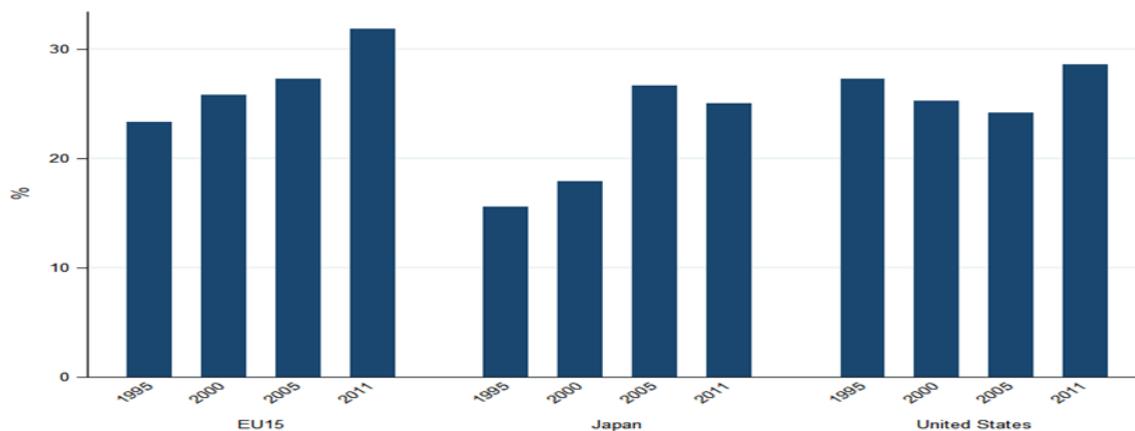
Source: ESCWA calculations based on data from the OECD-WTO TiVA database (accessed December 2016).

**Figure 13.** Transport and storage value added content of gross total exports, selected developing economies
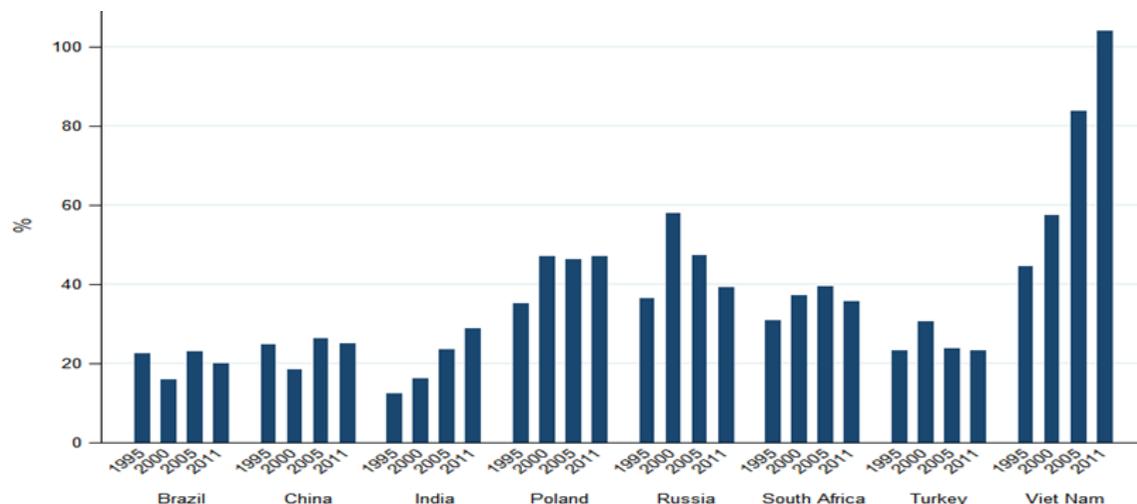
A sizable portion of transport and storage services is embodied in the exports of the selected developed economies (figure 12). The share was the highest in the EU15, and steadily increased, exceeding 30 per cent as of 2011. In Japan, the share increased considerably, reaching around 25 per cent as of 2005. After a steady decline between 1995 and 2005, the share in the United States approached 30 per cent, outstripping the 1995 level.

The selected developing countries differ widely in terms of the share of transport storage services embodied in their exports (figure 13). The share was quantitatively similar in Brazil, China, India and Turkey to those recorded in the developed economies. The case of Viet Nam is notable in that the share increased from around 40 per cent in 1995 to more than 100 per cent in 2011, reflecting greater integration in production networks, particularly in Asia. In the remaining countries, Poland, Russian Federation and South Africa, the share remained around 40 per cent.

The evolution of the share is also interesting. India and Viet Nam were the only countries that saw a steady increase over the period 1995-2011. The Russian Federation experienced a steady decline after 2000, following a sharp increase between 1995 and 2000. In Brazil, China, Poland, South Africa and Turkey, the share was relatively stable, and practically reverted back to levels observed in 1995.

Arab countries differ from developed and most developing economies in the share of transport storage services embodied in their exports (figure 14). The share was and remained rather high in Tunisia with respect to other considered countries, although it decreased substantially between 1995 and 2005. In Morocco, the share reached more than 60 per cent, comparatively high even among developing economies. The share was the lowest in Saudi Arabia among Arab countries for which data are available, although in absolute terms it remained high relative to the selected developing and developed economies.[58]

30

Figure 14. Transport and storage value added content of gross total exports, Arab economies
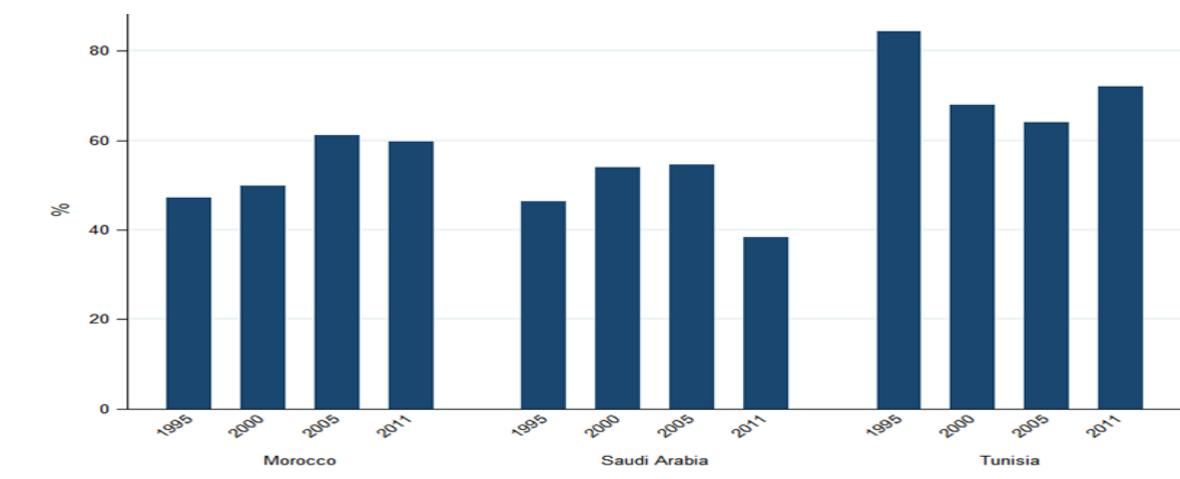
Source: ESCWA calculations based on data from the OECD-WTO TiVA database (accessed December 2016).

## D. GVC integration and transport and storage services

As discussed in the previous chapter, transport services and the extent and nature of GVC integration are closely related. Using TiVA data, it is possible to visually explore the relationship between transport and storage services exports, and backward and forward GVC participation. The backward participation index, as measured by the share of imported inputs in the overall exports of

a country, captures the extent of involvement in downstream activities along supply chains. The forward participation index measures the share of exported goods and services used as imported inputs to produce other economies' exports. Figure 15 suggests a strong, non-linear relationship between GVC participation and the exports of transport and storage services when the index is calculated for all countries with available data. The relationship seems to be particularly strong for forward participation.

Figure 15. Backward GVC participation and the exports of transport and storage services value added, 2011
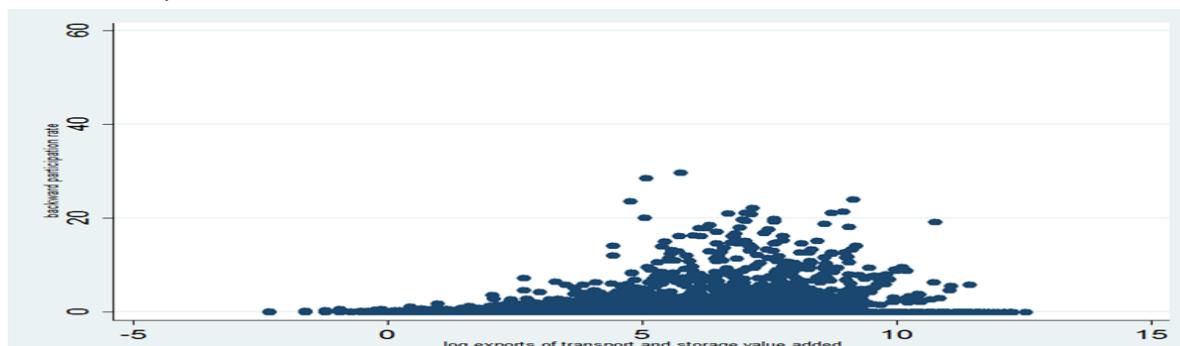
Source: ESCWA calculations based on data from the OECD-WTO TiVA database (accessed December 2016).

**Figure 16.** Forward GVC participation and the exports of transport and storage services value added, 2011
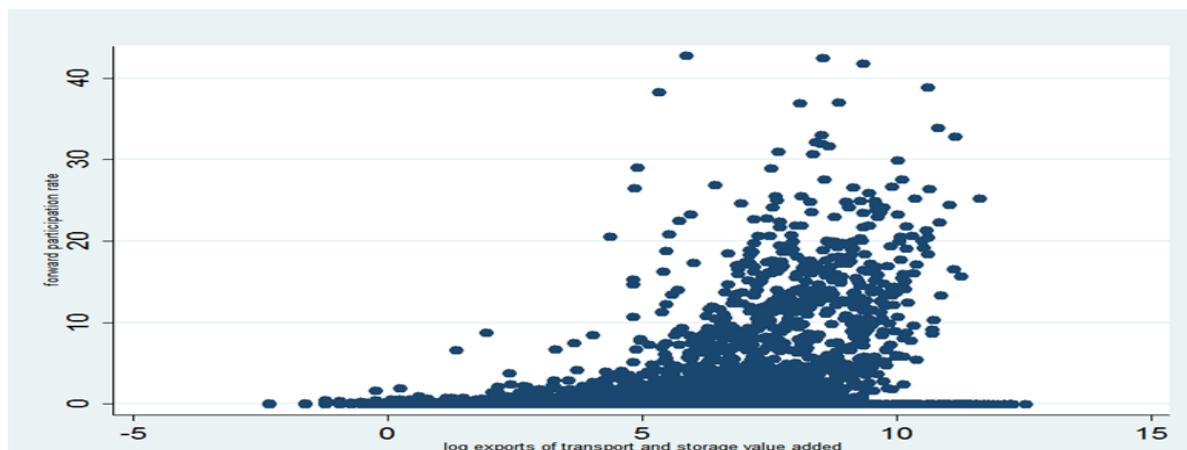
This section attempts to quantify how transport and storage services contribute to exports by a third country, to capture the impact of transport services in GVC engagement. To assess the importance of transport and storage value sector in GVC engagement, an indicator based on the TiVA data is considered. It captures the transport and storage value added embedded in the export of products that are further processed in a partner country to be exported to a third country. The measure is expressed as share of the transport and storage services value added content of the partner economy's exports originated in an economy, in total transport and storage services value added in that economy. It is also possible to trace how transport and storage services exports contribute to the exports of each sector, beyond total exports.

Figure 17. Transport and storage value added content originated in selected developed economies in the gross total exports of selected partner economies
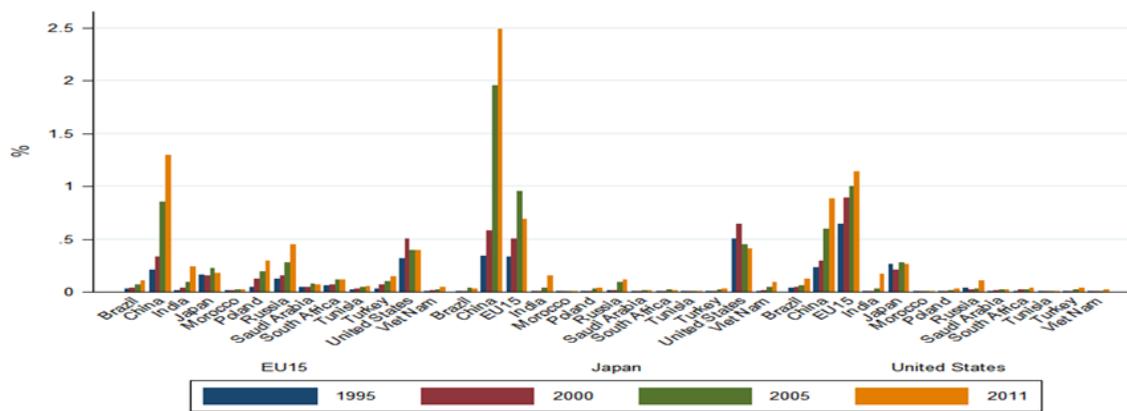
32

1. The case of developed economies

Based on this indicator, the contribution of the transport and storage sector in selected developed economies to the exports of partner economies has increased, though the share of the sector in the exports of individual partner countries remains limited (figure 17). China appears to have increasingly integrated with the selected developed economies. The increase is particularly stark in the case of Japanese transport and storage value added content of Chinese exports, which reached 2.5 per cent of Japanese transport and storage value added in 2011, up from around 0.3 per cent in 1995. The EU15, too, saw a drastic increase in the share, reflecting the greater extent of production sharing with China. The United States, meanwhile, appears to have been still more integrated with the EU15. China also figured as a prominent partner of the United States, its importance increasing steadily and sharply.

2. The case of developing economies

The selected developing economies by and large tend to display a greater contribution of transport storage services to their partners' exports as a share of the total domestic value added of the sector in the originating country, compared with the developed economies (figure 18). China and the EU15 invariably figure among the most important partners. Viet Nam, Japan and the United States were also important. Reflecting a high and increasing level of production sharing among Asian countries, China has become an important partner to Viet Nam, its share of transport and storage services in total domestic value added of the sector embodied in Chinese exports reaching almost 5 per cent by 2011. The relationship between Poland and the EU15 is similar, although production integration between the economies looks to have started much earlier.

Figure 18. Transport and storage value added content originated in selected developing economies in the gross total exports of selected partner economies
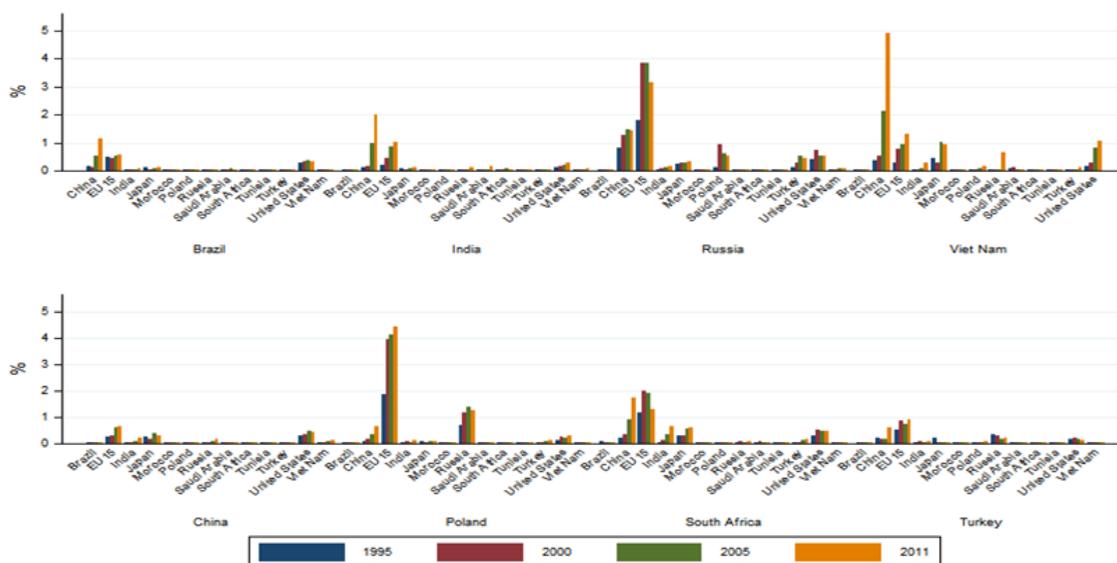
Figure 19. Transport and storage value added content originated in the three Arab economies in the gross total exports of selected partner economies
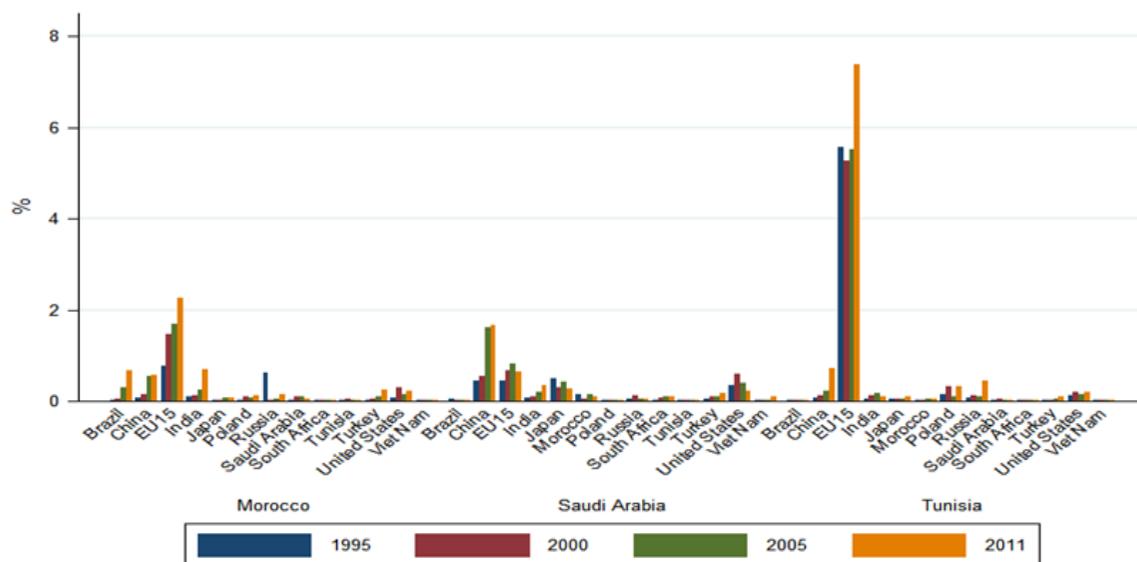
3. The case of Arab economies

The three Arab countries are heterogeneous in terms of how transport and storage services are embodied in their partners' exports, providing a measure of the extent of production sharing (figure 19). In line with strong trade links, the EU15 was the most important partner of Morocco and Tunisia, with varying degrees of absolute importance. Tunisia appeared closely integrated with the EU15, more so than any other pair of economies considered in the analysis in this chapter. Although Morocco's integration with the EU15 was significant and improving, other partners such as Brazil, China, India, Japan and the United States did gain ground. While Saudi Arabia's production sharing with its major trading partners, including China, the EU15 and Japan, was diffuse, China gained ground at the expense of Japan and the United States.

3. Conclusion and Policy Recommendations

The Arab region has a long way to go in upgrading the transport infrastructure and services that can promote GVC participation and bring about economic benefits such as increased exports and technological acquisitions, knowledge and skills – all contributors to sustainable social development. Just as developed countries in GVCs look to benefit from reduced costs induced by the potential of higher labour productivity in Arab countries, the latter should seek to import production technology from their more advanced partners to abridge the catch-up process.

This is certainly an incentive to upgrade transport capabilities and take part in international production networks. Despite some countries doing better, most need to revisit transport strategies and regulations to create an enabling environment, one that attracts investment in transport and logistics, and in other economic sectors including manufacturing and agriculture.

The reform of logistics and transport channels is a cornerstone and does not necessarily require huge investment. It is mostly a re-engineering of process and procedures but could make significant differences in the efficiency of services and logistics. This applies also to customs and other trade-related services, which could greatly benefit from a facilitation reform programme in light of the WTO Trade Facilitation Agreement.

Mainstreaming transport infrastructure in export promotion strategies is a prerequisite for any effective development strategy. Building regional transport networks is the second requirement, to promote exports, attract FDIs and create jobs. The EU transport policy, for example, helped develop an efficient, safe and sustainable transport sector based on competitive rules, while the 2014 transport infrastructure policy connects the continent from east to west, north to south. In the Arab region, regional and subregional organizations such as the Arab League, the GCC and the Arab Maghreb Union have a key role to play in designing and implementing a strategy to close the gaps between national transport networks and remove bottlenecks that still negatively affect the Greater Arab Free Trade Area. Moving towards the requirements of an Arab Customs Union is an opportunity for the region to reform transport policies for increased connectivity between member countries, and with the rest of the world.

GVC engagement should be complemented by policies that assure decent working conditions for men and women. Hours, remuneration and employment relationships need to reflect commitment to international human and workers' rights treaties. Governments must address gender bias currently faced in GVCs, through capacity building, training and support initiatives that target women working in participating firms. Just as with men, women must be recognized for their active and beneficial role in value chains. Gender-based segregation and constraints have to be dismantled through social upgrading policies to better ensure equality in the work environment. Enforcement of labour standards for both sexes,

and the provision of equal wages must be taken into account when setting up GVC in developing countries, and the Arab world in particular.[59]

A final area where governments can help promote the development of efficient transport infrastructures and services for better connectivity is through research in the formation, conduct and consequences of GVCs. ESCWA as a member of the OECD Initiative on Global Value Chains, Production Transformation and Development, launched in 2013, will continue supporting Member States, promoting knowledge-sharing and peer learning between developed and developing economies. Good practices will be identified, increasing policy impact and promoting the implementation of globally beneficial strategies, while at the same time fulfilling each country's priorities and development visions.

Research in this area is advanced, as demonstrated by the joint OECD-WTO TiVA initiative. Work to increase coverage of the database by Arab countries is planned, to improve timeliness and deepen industry detail in it. However, further analysis is required on other important areas directly linked to the Sustainable Development Goals, the universal set of goals, targets and indicators that UN Member States use to frame their agendas and political policies.

In particular, work is needed on the impact of higher GVCs connectivity on the number and gender of workers, including the sectorial, environmental and economic impacts. GVCs can help create jobs, but this potential remains limited if the country fails to capture a substantial share of the value added created in the chain. GVCs affect men and women in different ways, and the chain of GVC activities must all be taken into consideration, the working conditions, job security, health and occupational safety.[60]

Finally, GVC integration has myriad effects on a country's economic structure, its employment pattern, distributional characteristics and overall growth performance, and also on its environment. A full understanding of the impact on environmental life is beyond the scope of a single research project. But there is a need to identify conditions under which connectivity to GVCs is conducive to reducing pollution (water, air and soil) and enhancing growth, when and how its enforcement can be improved and how this impacts on its effectiveness.

These issues, as well as a focus on distributional effects of GVC connectivity and potential environmental damages, require a system-wide, general equilibrium perspective. In the complex interrelationship between the environmental, the production structure and trade, direct as well as indirect effects are important. By providing benchmarks and counterfactuals, they will allow prospective policies to be simulated, as in the case of a new trade agreement or a green tax policy, to better elucidate the consequences.[61]

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Endnotes

Executive Summary

1 Cheng and others, 2015.
2 Kummritz, Taglioni and Winkler, 2017.
3 OECD defines adjustment costs as the value of output that is foregone while transitioning to new long-run production patterns due to the time taken to reallocate factors from their pre- to their post-liberalization occupations.
4 OECD, World Trade Organization and the World Bank Group, 2014.
5 The report takes into consideration the emerging reality of GVCs in the region. It is not intended to advocate for increased participation in GVCs.
6 Service Trade Restrictiveness Index or STRI close to 0 shows an open trade regime while a figure close to 100 shows a closed trade regime.
7 World Bank, Services Trade Restrictions database. Available from http://iresearch.worldbank.org/servicetrade/.
8 OECD and World Bank Group, 2015.

Introduction

9 De Backer and Miroudot, 2013.
10 OECD, World Trade Organization and United Nations Conference on Trade and Development (UNCTAD), 2013.
11 Research on the impact of GVCs on trade, economic growth and development, job creation and value added distribution along GVCs has been completed by many international organizations, including the World Trade Organization, World Bank, UNCTAD and OECD.
12 Kowalski and others, 2015.
13 Cheng and others, 2015.
14 World Economic Forum, 2012.
15 The 2015 edition of the TiVA database provides indicators for 63 economies covering OECD, EU28, G20, most East and South-East Asian economies including the three Arab countries represented (Morocco, Saudi Arabia and Tunisia) and selected South American countries; 34 industrial sectors are represented, including 16 manufacturing and 14 services sectors, as well as related aggregates (such as total manufactures and total services).
16 Gereffi, 2014; Elms and Low, 2013.
17 ESCWA, 2015.
18 Kowalski and others, 2015.

Chapter 1

19 Shepherd, 2015.
20 Athukorala, 2017.
21 United Nations Conference on Trade and Development, 2013.
22 Ibid.
23 Athukorala and Nasir, 2012.
24 Baldwin and Lopez-Gonzalez, 2013.
25 World Economic Forum, 2012.
26 United Nations Conference on Trade and Development, 2013.
27 Baldwin, Ito and Sato, 2014.
28 World Economic Forum, 2012.
29 Kowalski and others, 2015.
30 United Nations Economic and Social Commission for Asia and the Pacific, 2015.
31 Randriamaro, 2006.
32 World Bank, national accounts data and OECD National Accounts data files. Available from https://data.worldbank.org/indicator/NY.GDP.MKTP.CD.
33 OECD, 2010.
34 Arvis and Shepherd, 2011.
35 Rodrigue, Comtois and Slack, 2017.
36 ESCWA, 2014.
37 World Bank, 2008.
38 Winston and Yan, 2015.
39 Pomfret and Sourdin, 2014.
40 Limão and Venables, 2001.
41 Shepherd, 2013.
42 Winston and Yan, 2015.
43 The index is computed based on five components of the maritime transport sector: number of ships; their total container-carrying capacity; maximum vessel

size; number of services; and number of companies that deploy container ships in a country's ports.

44   Hans Linnemann (1966) called this category of trade costs "psychic distance", meaning that familiarity with another country's laws, institutions, habits and languages is an important part of marketing.

45   United Nations Economic and Social Commission for Asia and the Pacific, 2014.

46   Inter-American Development Bank, 2015.

47   World Trade Organization, 2015.

Chapter 2

48   Berg and others, 2015.

49   Rosenstein-Rodan, 1943.

50   Pierre-Richard Agénor, 2010.

51   Calderón, Moral-Benito and Servén, 2015.

52   Hummels, 2007.

53   Alessandria, Kaboski and Midrigan, 2010.

54   Hummels and Schaur, 2013.

55   Hummels, 2007.

56   Transport and storage services statistics account for commercial transactions. Different to transport traffic volumes, transport services statistics exclude own account transport, such as a manufacturer collecting materials. Some activities, seemingly closely related to the sector, are not included in transport and storage services, such as repair of transport equipment (manufacturing sector), construction, maintenance and repair of transport networks or terminals (construction), and training (education).

57   The EU15 was the member countries in the European Union prior to the accession of 10 candidate countries on 1 May 2004. They were Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom. Available from https://stats.oecd.org/glossary/detail.asp?ID=6805.

58   Several policy and structural factors can determine the extent of storage and transport services embodied in a country's exports. This is analogous to the case of gross trade flows and GVC trade. The share theoretically depends on market size, proximity demand/production hubs, structure of the economy and development levels, among others. Considering policy and non-policy factors may exert significant influence on this indicator, a more robust comparison entails looking at how factors contribute to the observed level of the indicator.

Chapter 3

59   Bamber and Staritz, 2016.

60   African Development Bank Group, 2014.

61   Bussolo, Chemingui and O'Connor, 2003.

Global value chains (GVCs) have become a salient feature of production. Participation in GVCs leads to substantial benefits for all stakeholders and thus plays an important role in fostering development. In line with its mandate to support Arab countries to integrate in the regional and global economies, the Economic and Social Commission for Western Asia (ESCWA) focuses on fostering GVC participation of Arab countries. Extensive literature exists on the subject, however Arab countries are poorly covered. ESCWA is well placed to fill the gap in addressing how transport services and policies can be improved in the Arab region to ensure greater regional and global value chain engagement.

The present report explores the impact of transport infrastructure and service availability and efficiency on GVC connectivity. It reviews recent developments related to GVC engagement and connectivity in the Arab region, and sets out key recommendations on how to improve the role of transport services for greater GVC participation.