

Trade Logistics: Enhancing Supply Chain Efficiency

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14 August, 2014.

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Acknowledgement

This paper was originally prepared as a background paper for the Asia-Pacific Trade Facilitation Forum on 10–11 September 2013 in Beijing, People’s Republic of China. The authors appreciate the efficient research assistance provided by Asian Development Bank (ADB) consultant Aiken R. Tafgar. The authors appreciate valuable input from the following ADB staff: Fei Yu (EARD) and Pradeep Srivastava (CWRD). The paper benefited from comments and suggestions from the following ADB and United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) staff: Jeff Procak (EARD, ADB), Valeri D. Tian (EARD, ADB), Pradeep Srivastava (CWRD, ADB), Yann Duval (TID, UNESCAP), and Tengfai Wang (TID, UNESCAP). The views expressed in this paper are those of the authors and do not necessarily reflect the views and policies of ADB or UNESCAP.

Abstract

This paper examines the policy issues surrounding the development of the logistics sector in the Asia-Pacific. After a general discussion of measurement and performance issues, it identifies 10 challenges that policymakers face, covering areas such as infrastructure, cross-border cooperation and transit, policy barriers, internal connectivity, delays caused by criminal activities, and the emerging topic of “green logistics”. The paper then goes on to provide intra- and extra-regional examples of the ways in which those challenges have been overcome in particular contexts through concerted action by government and the private sector. Among the paper’s recommendations are: the need to develop private logistics services markets and build capacity; the ongoing desirability of international integration of logistics markets; the importance of cross-border cooperation; and the need to balance efficiency and environmental sustainability.

Blurb

This paper examines the policy issues surrounding the development of the logistics sector in the Asia-Pacific. After a general discussion of measurement and performance issues, it identifies 10 challenges that policymakers face. The paper then goes on to provide intra- and extra-regional examples of the ways in which those challenges have been overcome in particular contexts.

Keywords: Transport and Logistics. International Trade. Regional Cooperation. International Economic Integration.

JEL Codes: F15. L91.

1 Introduction

Trade logistics is the sector responsible for connecting people to markets and buyers to sellers. As such, it plays a key role in developing economic activity between countries and, incidentally, within them. This paper examines logistics performance from a supply chain efficiency perspective, noting some of the ways in which trade logistics can be part of the broader inclusive development agenda. It concludes with a series of questions that policymakers will need to address in order to maximize the gains from developing the sector over the medium-term.

Trade logistics refers to a cluster of related service activities that bring exporters in one country into contact with consumers (importers) in another. It is both a value chain in its own right and the system that makes other value chains and supply chains function. Internationalized business models, such as the consumer electronics value chains for which the Asia-Pacific has been widely recognized internationally, are simply not commercially viable without efficient trade logistics to support them. Like any sector, however, trade logistics is dependent on a number of inter-related factors for its smooth functioning: infrastructure, government services (e.g., border clearance), and service sector regulatory policies are particularly important. There is much that policymakers can do in these three areas to promote development of the sector and improve performance.

Trade logistics plays a critical role in promoting regional and international trade.¹ More efficient trade logistics decreases international trade costs (Arvis et al. 2013). There is also extensive evidence that better trade logistics tend to boost international trade performance, which can be the source of significant development gains (Saslavsky and Shepherd [forthcoming]). Indeed, Hoekman and Nicita (2011) find that trade facilitation and logistics has the strongest potential to boost trade of any of the policy measures considered in their analysis. These results form the basis of findings using computable general equilibrium models that improvements in trade facilitation—which includes trade logistics performance—can substantially boost both exports and national welfare, and that these effects are potentially larger than those coming from extensive tariff reductions on manufactured goods. For example, the World Economic Forum (2013) finds that reducing supply chain barriers half way to global best practices could increase world gross domestic product (GDP) by nearly 5%. Recent research shows that trade facilitation initiatives—which include various types of improvements to trade logistics processes—benefit all internationally linked firms, both small and large (Hoekman and Shepherd 2013). Saslavsky and Shepherd (forthcoming) show that countries with better logistics environments tend to specialize in the export of parts and components, which is one indicator of increased participation in international value chains. This finding reflects the fact that the value chain business model is unsustainable without a logistics sector that can reliably ensure on-time and low-cost delivery. Value chains provide developing countries with the opportunity to “move up” from low value-added assembly operations to higher value-added manufacturing and development operations. They represent an important new paradigm in the process of trade-led industrialization.

¹ There is overwhelming evidence that international trade can be a source of productivity growth at the firm level (Pavcnik 2002), which in turn drives sectoral and national productivity growth. Trade integration can, therefore, result in higher income levels, which are an important driver—under the appropriate policy settings—of inclusive development.

How can trade logistics be leveraged for inclusive development? One example is that better logistics decreases the price gap between small producers, such as farmers in developing countries, and consumers both at home and overseas. By reducing this price wedge, efficient trade logistics can help farmers receive a larger share of the final price of their goods (Porto et al. 2011) at the same time as lowering prices for consumers. As farmers in developing countries are often among the poorest members of society, trade logistics plays a crucial role in raising incomes, and thereby promoting development.

Against this background, the paper proceeds as follows. The next section provides an overall description of the sector. Section 3 provides a review of key data on the logistics sector, focusing on overall performance and the core processes that affect it. Section 4 discusses challenges facing countries eager to further develop the logistics sector. Section 5 discusses recent attempts in the Asia-Pacific to deal with some of those issues. Section 6 presents questions for discussion. Section 7 presents recommendations based on the findings of the paper and the results of the discussion. Finally, Section 8 summarizes the paper and concludes.

2 Description of the Sector

Trade logistics brings together a cluster of related service activities that help firms engage in international trade and which facilitate the development of international supply chains. At its broadest, the logistics sector includes transport, freight forwarding and express operations, warehousing, and retail and wholesale distribution. In a nutshell, it is the set of operations that bring producers in one country into contact with consumers in another; it is the “grease in the wheels” of international commerce that makes trade relations possible. Trade logistics therefore incorporates two main components: international and domestic logistics. The former set of activities focuses on the way in which goods move between countries, and the latter focuses on their movement within countries.

We refer to logistics as a cluster of activities because each area involves a range of different actors and services. For example, transport includes international shipping and air transport to move goods between countries, as well as rail and road links to move goods within countries (and sometimes between them as well). Freight forwarders and express operators—such as UPS, DHL, FedEx, and a range of smaller local operators—arrange shipping transactions between parties in different countries, as well as domestically. They organize transport nationally and internationally, and provide tracking and tracing services that help ensure the secure and timely delivery of merchandise. Warehousing activities are necessary at various points in the logistics supply chain, particularly at cargo entry points such as ports and airports. They allow shippers to temporarily store goods before moving them on to the next stage in the process; for example, storage at an international gateway port frequently occurs in developing countries due to the lag between completion of the international shipping leg and commencement of the goods’ domestic movements. Finally, retail and wholesale distributors move goods respectively to consumers and to smaller retail outlets that have direct contact with consumers. They include super- and hyper-market chains, as well as convenience stores and small local operations. They represent the final stage in the logistics supply chain, as they provide the purchase point for consumers of goods that have passed through the chain.

Although we take a broad view of logistics in this paper, the common use of the term limits it largely to a particular set of third-party operations, especially freight forwarders and express operators. However, from a policy standpoint, the broader view—a “whole of supply chain” approach—is important because it is necessary to take a holistic perspective to dealing with trade logistics. That perspective is necessarily multi-faceted. It facilitates a policy stance that reduces bottlenecks and chokepoints at all points in the chain, and thus facilitates trade transactions to the maximum possible extent.

Unfortunately, the breadth of the logistics sector means that it is not treated independently in commonly used industrial classifications. It is therefore difficult even to measure the size of the logistics sector in different countries, let alone the full extent of its impacts on the international economy. Shepherd (2011) uses approximate measures from national accounts data and input–output tables to provide some preliminary information on the total value added of third-party logistics operations in different countries, the only cross-country basis on which the approximate size of the sector can be gauged. On average, logistics accounts for between 5% and 17% of total value added in the economy, depending on whether a narrow or broad definition is used. Of course, a significant part of this total is accounted for by domestic logistics activities; the total contribution of international trade logistics is necessarily smaller. Nonetheless, logistics is clearly an important source of value added in the economy, including in developing countries. For example, logistics services in India account for between 6% and 19% of GDP, and in Viet Nam the corresponding figures are 2% and 13%.

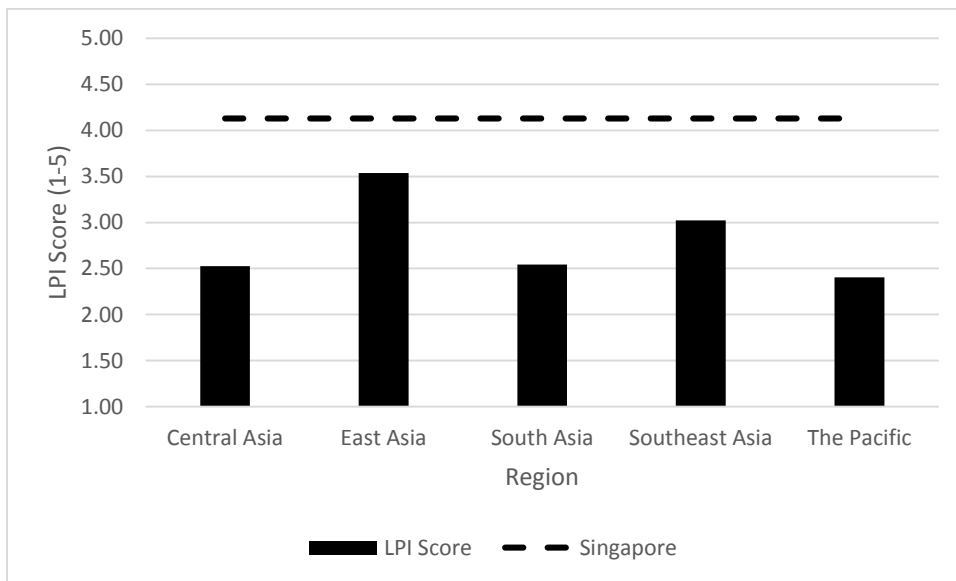
In addition to making its size difficult to measure, the breadth of trade logistics activities means that a wide variety of private and public actors are involved in each transaction. Thus far, we have focused on the private sector. However, all trade logistics transactions take place against a basis of “hard” (physical) and “soft” (regulatory) infrastructure. For instance, transport infrastructure, as well as sectoral regulations, affects the way in which national and international transport operators do business, thus influencing costs and efficiency throughout the supply chain. Similarly, trade-related regulations—such as border clearance formalities—affect the time, cost, and reliability associated with a variety of trade logistics activities that require goods to cross borders, which again influences costs and efficiency throughout the supply chain. There is thus an important relationship between private and public sector perspectives when it comes to developing trade logistics—neither half of the equation can act entirely independently from the other. Just as the private sector requires an efficient environment in which to operate—high quality infrastructure and economically rational regulations—so too the public sector depends on information flows from the private sector, as well as a relationship of trust and confidence with operators, to build a regulatory environment that achieves social goals at the same time as optimizing trade facilitation outcomes. The remainder of this paper will therefore discuss both private and public sector perspectives on improving trade logistics performance with a view to promoting inclusive development and supply chain efficiency.

3 Review of Current Status

The most commonly used set of indicators for measuring logistics efficiency across countries is the World Bank’s Logistics Performance Index database (LPI) (Arvis et al. 2012).² Based on a survey of around 1,000 logistics professionals, the International LPI is an index ranging between 1 and 5 summarizing performance in six key areas: efficiency of the clearance process; quality of trade and transport infrastructure; ease of arranging competitively priced shipments; competence and quality of logistics services; ability to track and trace consignments; and timeliness of shipments in reaching their destination. The second part of the LPI database, the Domestic LPI, measures a variety of qualitative and quantitative indicators on more detailed aspects of logistics performance, including time, cost, and reliability.

Figure 1 shows International LPI scores for Asian Development Bank (ADB) economies by region.³ Singapore, the world leader, is used as a point of comparison. Results show that on an overall basis—i.e., aggregating the six core dimensions of logistics performance referred to in the previous paragraph—East Asia is the leading region, followed at some distance by Southeast Asia. The other three ADB regions display similar levels of performance that are considerably lower. In all cases, however, the regional averages are well below the world technological frontier represented by Singapore. The implication of this finding is that there is considerable work for the public and private sectors to do in the Asia-Pacific to improve overall logistics performance.

Figure 1: Logistics Performance Index (LPI) Score by ADB Region



Note: LPI Index ranges from 1 to 5.

Source: LPI Database (2012) and authors’ calculations.

² Alternative data sources either focus on particular aspects, like red tape barriers (e.g., Doing Business), rather than multiple dimensions of logistics performance, are region-specific and not globally comparable, or aggregate existing data rather than collecting new information (such as the WEF’s Global Enabling Trade Index).

³ Data coverage is extremely limited for the Pacific, and results should be treated as indicative only. Data for East Asia include a number of developed economies, which makes comparison with developing regions potentially problematic.

The International LPI also provides information on six core areas of logistics performance (**Table 1**). The ordering of regions closely follows that of the overall index, as would be expected given the strong correlation among the various dimensions. Performance is strongest in all regions in the case of timeliness, which is a very positive sign given the importance that time plays as a determinant of supply chain efficiency. In all regions except Central Asia, the weakest performance dimension is border clearance, including—but not limited to—customs. Regulatory reform to improve the time and cost associated with procedures such as customs clearance, quarantine inspection, and quality inspection is therefore a priority area for most regions. In Central Asia, the most serious constraint is infrastructure. This finding perhaps reflects the fact that most Central Asian economies are landlocked—a constraint that is addressed in more detailed in Section 4. Notwithstanding these differences in performance across indicators and regions, a supply chain is only as strong as its weakest link (Arvis et al. 2012), and progress is necessary on each of these fronts if a country is to strengthen its general trade logistics environment.

Table 1: Core Areas of the International Logistics Performance Index (LPI) by ADB Region

	Central Asia	East Asia	South Asia	Southeast Asia	Pacific
Efficiency of Border Clearance Process	2.44	3.29	2.37	2.78	2.14
Quality of Infrastructure	2.41	3.59	2.38	2.82	2.15
Ease of Arranging Competitively Priced Shipments	2.48	3.44	2.48	3.02	2.40
Competence and Quality of Logistics Services	2.43	3.46	2.59	2.95	2.17
Ability to Track and Trace Consignments	2.49	3.55	2.51	3.11	2.46
Timeliness of Delivery	2.89	3.90	2.91	3.42	3.06

Note: LPI Index ranges from 1 to 5.

Source: LPI Database (2012) and authors' calculations.

The Domestic LPI database can be used to unpack these aggregate results and obtain more details on their drivers. One particularly important example is the identification of major sources of delay, which are a key determinant of timeliness. The data cover delays due to the following causes: compulsory warehousing and transloading, pre-shipment inspection, maritime transshipment, criminal activities (such as theft), and solicitation of informal payments in association with logistics activities. For each source of delay, the LPI database reports the percentage of survey respondents indicating that major delays are “nearly always” or “often” experienced for that reason.

Results are in **Table 2**. In line with the results on timeliness reported in Table 1, the data show that delays are generally much less prevalent in East Asia than elsewhere. In nearly all cases, delays are most prevalent in Central Asia, again probably due to the fact that most countries in this group are landlocked. The most significant sources of delay vary considerably across regions. In Central Asia and Southeast Asia it is pre-shipment inspection. In South Asia it is maritime transshipment, whereas in East Asia it is compulsory warehousing and transloading. These categories make clear that delays are usually due to the interaction between private and public agents and processes.

There is thus an important role for public policy as well as private sector development in reducing the prevalence of delays, and improving supply chain efficiency.

Table 2: Percentage of Logistics Performance Index (LPI) Survey Respondents Indicating They "Nearly Always" or "Often" Experience Major Delays Due to Listed Factors

	Central Asia	East Asia	South Asia	Southeast Asia	Pacific
Compulsory Warehousing and Transloading	55%	11%	30%	19%	NA
Pre-Shipment Inspection	63%	9%	23%	31%	NA
Maritime Transshipment	42%	4%	40%	13%	NA
Criminal Activities	1%	3%	6%	9%	NA
Informal Payments	34%	6%	25%	17%	NA

Source: LPI Database (2012) and authors' calculations.

4 Challenges

The six dimensions of logistics performance reviewed in Section 3 all relate to three key parameters: time, cost, and reliability. These factors are increasingly reflected at the policy level. For example, Asia-Pacific Economic Cooperation's (APEC) Supply Chain Connectivity Framework explicitly mentions them, and the interim progress assessment (APEC 2013) uses indicators including those described in the previous section to examine performance among APEC's 21 economies. Indeed, a focus on time, cost, and reliability from a supply chain point of view can be seen as a "new generation" trade facilitation initiative, which moves beyond traditional concerns such as streamlining border processes and lowering trade costs, to deal with factors that promote the development of global and regional value chains. Transport and logistics are important value chains in their own right, but they also make it possible for value chains to arise in other areas, such as electronic goods, and even agrifood sectors (Shepherd 2013).

In this section, we address 10 commercially important issues that affect logistics performance as measured in Section 3, and thus also impact supply chain efficiency more generally.

Challenge 1: Accurate Measurement of Logistics Performance

It is not easy to measure the real performance of the logistics sector. The widely used LPI is not without flaws. The LPI is partly a perception survey and hence is to some degree subjective. However, despite the fact that the International LPI is based on perception, the surveyed firms are logistics providers and are, therefore, able to represent the voices of the community of logistics providers regarding the actual status of the sector. Because the survey respondents are experts in the field, their answers to the survey questions are based on their actual experience to a degree. It is also important to realize that private sector perceptions do matter. Wrong perceptions would lead to the loss of business opportunities. Thus, when a government conducts reforms, it is critically important to disseminate such information properly so that past wrong impressions or misperceptions can be corrected.

The real challenge lies in the use of the LPI in policy making. The LPI can be used in policy making to paint the annual logistics performance of a country from a macro perspective, and to measure the status of improvements. On top of that, in the case of timeliness, a country can use the LPI database to identify causes of delays in shipments. It is wrong to over-rely on the LPI, however. Caution must be exercised in making cross-country comparisons using some sub-indicators of the LPI. For example, the supply chain reliability indicator, which reports the percentage of shipments that meet the internal criteria of surveyed firms, is very subjective. Internal criteria vary across firms within a country and all the more across countries. Therefore, comparing the reliability indicator across countries may give misleading results. For these reasons, cross-checking and complementing the LPI with other logistics indicators is important. There is no need to get frustrated if the LPI index does not improve even if the government conducts significant logistics reforms, as there can be many reasons—including sampling error and lack of awareness—behind such a result.

However, the available indicators are very general. National and regional policymaking, which design and institute logistics initiatives and reforms, need a more specific dataset that details the performance of logistics according to flow of trade (export or import) per sector, and volume and value of shipments, among others. In this way, governments will be able to capture the impact of timeliness, cost-effectiveness, and supply chain reliability in each sector and, in response, be able to design appropriate logistics initiatives and reforms.

We argue that these available aggregate logistics data are useful to approximate the logistics performance of countries. Country time series analysis of aggregate logistics performance helps policymakers keep track of general annual improvements in performance. And, cross-country analysis (so long as data are suitable for such analysis) helps policymakers keep track of a country's competitiveness relative to other countries.

Challenge 2: Scope of Commercially Meaningful Comprehensive Coverage of Logistics

As discussed in Section 2, the boundaries of logistics are ambiguous. Domestic and international industry classifications do not have an independent category dedicated to logistics. Trade in services statistics include the category of transportation services, but not logistics services. The W/120 classification, which is also used for services trade negotiations, has no independent category for logistics services. Logistics is embedded in cross-cutting items, ranging from transport to communications (e.g., courier services), which are sub-sectors of certain categories. Moreover, it should be noted that services provided by governments, such as customs, are also an important component of logistics. It is this cross-cutting nature of logistics that makes logistics critically important. Serious inefficiencies in one aspect of logistics may result in a malfunction of the entire supply chain. Therefore, in order to meet business needs and smoothen transactions, it is vital that reforms in logistics services comprehensively take into account the actual flow of goods, mapping specific sub-sectors involved in the chain of transactions.

During the Doha negotiations, there has been an effort to identify the commercially meaningful scope of logistics services. However, note that a service supplied in the exercise of governmental authority, such as customs, is excluded from its coverage. The logistics plurilateral negotiation

group was established in the Doha Round in line with the other twenty plurilateral negotiation groups. The World Trade Organization (WTO) logistics plurilateral group classifies logistics services into four categories: (i) core freight logistics services, (ii) freight transport services, (iii) other-related logistics services, and (iv) non-core freight logistics services. The coverage of the service categories that fall under each classification is provided in **Table 3**.

Table 3: Coverage of Logistics Services

Large Sector	Small Classification
(i) Core freight logistics services	<ul style="list-style-type: none"> - Cargo handling (e.g., container handling) - Storage and warehousing (e.g., distribution centers) - Transport agency (e.g., customs agency services) - Other auxiliary services (e.g., container leasing and rental)
(ii) Freight transport services	<ul style="list-style-type: none"> - Maritime transport services - Internal waterways transport services - Air transport services - Rail transport services - Road transport services
(iii) Other-related logistics services	<ul style="list-style-type: none"> - Business services (e.g., engineering services) - Postal and courier services - Distribution (e.g., commission agent services and wholesale services)
(iv) Non-core freight logistics services	<ul style="list-style-type: none"> - Computer and related services - Packaging - Management consultation

Note: The majority of air transport services are excluded from the General Agreement on Trade in Services (GATS) because they are dealt with through bilateral agreements.

Source: authors' compilation

One angle of disagreement, concerning the scope of logistics, argues the irrelevance of having a comprehensive definition of logistics services because some sub-sectors (e.g., computer and related services) have only very indirect implications for logistics. The other side may argue that the scope of the WTO services negotiations is too narrow, omitting government provided services crucial to logistics, such as customs.

What appears to be an important consideration in deciding the scope of any logistics project is the demand-side perspective. The government should carefully assess the commercial needs of logistics suppliers, without overlooking the standpoint of logistics users because the ultimate goal of logistics reform is to enhance the efficiency of delivery of goods through supply chains.

Challenge 3: Lack of Demand-Side Perspective

Understanding the demand-side perspective in logistics will aid policymakers in addressing the needs of logistics services users—both exporters and importers. Addressing the needs of logistics services users will enhance the interplay among key players: the government, which provides the enabling environment for the logistics sector; the logistics services suppliers and providers, which are involved in moving goods across the globe; and the logistics services users, which require services by both logistics services suppliers and providers and the government in order to finish an export or import transaction.

With respect to logistics services users' transactions with logistics services suppliers and providers, what appears to be important to users are the reputation of the logistics enterprise; cargo loss and damage; price; speedy and timely delivery; quality of customer service, including personalized and fast responses to customer complaints; geographic coverage; level of information technology utilization; and knowledge of the industry served.⁴

In addition, understanding the needs of logistics services users with respect to their transactions with the government amid fast-paced economic development is also necessary to deepen trade facilitation. The needs for transport and logistics are expected to change in future with the pace of economic development and the shift from export-oriented to consumption-led growth.⁵ In future, there will be (i) rapid expansion of reliable, economical short-haul transport services conducive to the development of industrial clusters; (ii) increasing use of multimodal transport that facilitates the linkage of upstream and downstream partners in a supply chain; (iii) growth in demand for seamless transport and logistics services that transcend administrative and modal barriers; (iv) need for trade logistics services to facilitate rapid clearance of goods used in or produced by advanced supply chains; (v) need for more environmentally friendly and energy-efficient forms of transport; and (vi) strong demand for convenient, reliable transport and logistics services to support advanced, high-technology manufacturing industries.

These considerations from the demand side of the logistics sector need more attention in the existing literature and policymaking agenda. Emphasis has always been placed on government provision of efficient customs services, infrastructure, and connectivity in order to address the needs of logistics suppliers and providers. There has been a lack of attention to the demand-side perspective, which caters to linking the needs of logistics services users to suppliers and providers.

Challenge 4: Difficulties Relating to Cross-Border Cooperation

The need for cross-border cooperation in the area of trade logistics stands out particularly strongly in the case of landlocked countries (see Challenge 6), which depend on infrastructure and transit arrangements with third countries in order to integrate with world markets. However, cross-border cooperation is also an issue more broadly for the logistics agenda, as many aspects of logistics processes—particularly transport and border clearance—depend to some extent on compatibility of rules and procedures, as well as the development of appropriate structures to facilitate international and regional trade. Concretely, cross-border cooperation in logistics (when appropriate) typically covers areas such as infrastructure, border procedures, and regulation.

In terms of infrastructure, the nature and extent of cross-border cooperation depends heavily on the geography of the sub-region under consideration. Where landlocked countries are involved, as in Central Asia or the Greater Mekong Subregion, there is a strong case to be made for a cross-country approach to infrastructure development (see Challenge 6). However, landlocked countries are not the only ones that can benefit from an international approach to infrastructure development. The construction and integration of major gateways in different countries so as to improve intra- and extra-regional connectivity is an important way of reducing trade costs (Arvis et al. 2013), thereby promoting regional and global trade. Connectivity is a key driving force behind the

⁴ Based on the PRC's Transport Planning and Research Institute Survey (ADB 2012a).

⁵ ADB (2012a).

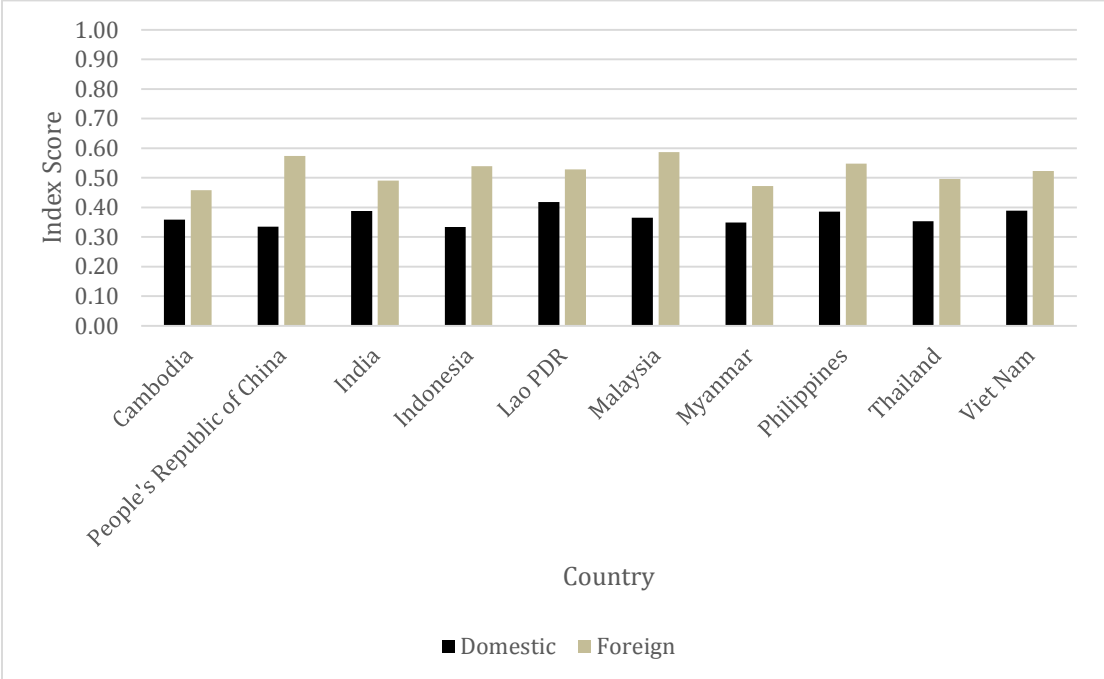
operation of logistics markets, and fostering the development of hub infrastructure services—like key ports and airports—can again take on a regional public good aspect. International cooperation in this area can therefore help ensure that there is an optimal level of investment. One example of the beginnings of such an approach is APEC’s Supply Chain Connectivity Framework Action Plan, which covers a range of connectivity-related issues that are complements to infrastructure development.

The simplification and harmonization of border clearance procedures on a regional or multilateral basis can also bring significant payoffs in terms of supply chain efficiency. Importantly, this is not just a customs agenda: empirical evidence suggests that in many countries, it is other government bodies involved in the clearance process—such as health, quarantine, and standards agencies—that represent the most significant burden for logistics operators (Arvis et al. 2012). A supply chain is only as strong as its weakest link, so it is important for cross-border cooperation on clearance procedures to involve all relevant agencies.

Challenge 5: Persistent Policy Barriers

The growth of value chains in the logistics sector has implied a certain degree of regional and global integration of trade logistics markets. However, significant policy barriers remain in many countries (Figure 2). Moreover, the fact that logistics is a cluster of service activities, rather than a single, well-defined, measurable sector, makes it difficult on a policy level to take the actions required for further integration.

Figure 2: Logistics Trade Restrictiveness Index in selected Asia-Pacific Developing Countries



Note: On the index from 0 to 1, a higher score indicates a more restrictive logistics services policy environment. The domestic index captures policy measures that apply to all logistics service providers, whereas the foreign index includes measures that affect foreign providers only.
 Source: Hollweg and Wong (2009).

As for any services sector, the key to promoting more integrated logistics markets lies in policies with two separate objectives: reducing explicit and implicit barriers to entry and lowering the cost of doing business. In terms of sequencing, it is important for countries to proceed with policies that reduce barriers to entry first to ensure a reasonably competitive marketplace in which subsequent reductions in the cost of doing business can be passed on to consumers, as well as to producers and exporters in other sectors.

What sort of policies will be on the integration agenda going forward? Openness to FDI is a crucial part of the process. Trade in logistics services often relies on the sales of foreign affiliates, which makes openness to FDI a particular priority. The importance of this step is reflected at a policy level in ongoing work to put into place an Association of Southeast Asian Nations (ASEAN) Economic Community: logistics is a priority sector for integration, with the first step being the relaxation of foreign equity limits, which act as explicit barriers to entry by foreign service providers. In addition to hampering foreign entry, limits on FDI directly inhibit the growth of value chains, and potentially hold back the productivity improvements that can come with that process. Reducing discrimination against foreign service providers, and discrimination in favor of incumbent operators against potential domestic entrants, is therefore likely to be a key element of the logistics integration agenda in the medium-term.

Policies that intentionally or unintentionally increase the costs of doing business for logistics service providers have negative effects on consumers (who pay more for the goods they consume), as well as producers and exporters (which have reduced ability to access markets at home and abroad). Reducing the cost of doing business is therefore a key step in the international integration agenda for logistics, as is the case for any service sector. Indeed, once a reasonably competitive market place has been constructed, empirical evidence shows that it is primarily the amendment of unnecessarily burdensome, but non-discriminatory, regulations that has the greatest potential to bring economic welfare gains for the reforming economy (Dee 2005).

Challenge 6: Disadvantages Faced by Landlocked Countries (Transit)

Logistics performance is generally weaker, and delays more prevalent and uncertain, in landlocked countries. Central Asian economies, as well as a small number of economies in South and Southeast Asia, are subject to this problem. The main difficulty for landlocked countries resides in their lack of access to major international transport lanes, due to the necessity to pass through a third country (transit) before connecting with world markets. This dynamic tends to drive trade costs up and at the same time reduce supply chain reliability. The difficulties of being landlocked are reflected in those countries' generally low level of international trade integration relative to GDP.

The lack of a regional or sub-regional approach to infrastructure investment can severely hamper the trade relations of landlocked countries. They are dependent on infrastructure availability in transit countries—their trade is a positive externality from infrastructure development in third countries, which means that underinvestment can easily occur. We discuss in Section 5 some attempts to remedy this problem in the context of regional integration in the Asia-Pacific region.

Transit regimes also represent a serious bottleneck for landlocked countries. Their goods must cross borders a number of times before arriving at their final destination. As a result, they are more subject than coastal countries' exports to cumulative delays in customs, and in other border clearance procedures. In addition, it is sometimes necessary to unload and reload goods traveling by road due to restrictive nationality regulations or differences in load limits. All these factors contribute to additional time, cost, and uncertainty for supply chains based in, or crossing, landlocked countries.

Challenge 7: Ensuring Consistency between Hard and Soft Infrastructure

As discussed in Section 2, trade logistics activities take place against a background of interactions between the public and private sectors. For example, private sector operators use infrastructure that is often funded, at least in part, by the public sector, and they must comply with public sector regulations, such as maximum load limits in trucking, as part of their everyday activities. For logistics activities to proceed as efficiently as possible, it is important that hard (physical) and soft (regulatory) infrastructure be well coordinated. To continue with the trucking example, if a major highway is significantly upgraded, it might be possible to raise the load limit for that section of road, as it will be better able to handle heavier traffic without undue deterioration.

More generally, it is important to ensure that improvements in hard and soft infrastructure keep pace with each other. Soft infrastructure governs the conditions under which trade logistics operators can access and use hard infrastructure, so it is generally appropriate to loosen those conditions as physical improvements take place. This approach ensures that the improved physical infrastructure is used to the maximum possible extent, which has flow-on benefits for the time, cost, and reliability of supply chain operations.

Challenge 8: Poor Internal Logistics and Domestic Logistics Capacity

This paper has largely focused on international trade logistics; that is, the set of processes that move goods from exporters in one country to importers in another. However, internal connectivity is also a challenge for some countries in the Asia-Pacific region, particularly those that are geographically large and diverse, and those that are archipelagic. For instance, the People's Republic of China (PRC) is a strong overall performer in the LPI, but its score primarily reflects the state of play at its major international gateways. Ensuring connectivity between those gateways and the hinterland is widely believed to be considerably more challenging. Internal connectivity is also challenging for Indonesia, where restrictive maritime cabotage practices and infrastructure problems result in it sometimes costing less to ship goods internationally (e.g., to Singapore) than to another part of Indonesia. From a supply chain efficiency point of view, remedying these disparities in logistics performance is clearly an important priority.

An additional aspect of internal logistics performance relates to the development of private sector capacity, including through improvements in human resources. Due to the variety of activities involved in logistics, as well as a historically restrictive approach to the regulation of some of them, developing countries frequently find that logistics markets are highly fragmented, with a preponderance of small, relatively inefficient suppliers. Integrating logistics markets both nationally and internationally can help mitigate this problem, as it provides an incentive for

consolidation among firms, particularly when openness to foreign direct investment (FDI) is part of the overall approach. Entry by large, foreign firms not only encourages integration of markets, it tends to promote human capital upgrading as these firms train local employees to meet international quality standards. Clearly, the need for consolidation and openness to large investors needs to be balanced by the need to ensure an adequate degree of competition in the market. Openness on a non-discriminatory basis is therefore to be preferred.

Challenge 9: Delays Caused by Criminal Activities

The LPI data reviewed in Subsection 3.1 showed that delays due to criminal activities, particularly the making of informal payments such as “speed money,” are an important impediment to trade logistics performance in the Asia-Pacific region. Indeed, such delays not only affect timeliness, they also add to the direct and indirect costs borne by logistics operators. There is also an element of uncertainty—a lack of reliability—involved in speed money payments, because there is an aspect of negotiation involved in each payment. Delays due to criminal activities of this type therefore affect supply chain performance in its three key dimensions of time, cost, and reliability.

Which issues need to be addressed in the context of dealing with criminal activities, particularly the payment of speed money? Putting in place effective enforcement mechanisms to discourage such practices is only one part of the equation. It is also necessary to look at the broader logistics environment and the extent to which it creates incentives for operators and officials to engage in corrupt activity. Olken and Barron (2009) show that in the trucking sector in Indonesia, for example, corrupt payments are usually solicited at points of exogenous delay in the supply chain, such as police roadblocks or weigh stations. It is therefore necessary to examine the regulatory and enforcement environment surrounding trade logistics in general in order to find ways to reduce the incidence of such blockages, and thereby decrease the opportunities for hold up problems—where corrupt payments are frequently sought—to occur. Shepherd (2009) has shown that the same logic applies to border clearance regimes: longer official delays make it more likely that operators pay speed money in order to circumvent them. Trade facilitation initiatives that aim to improve the trade logistics environment by reducing red tape delays can therefore also have the added benefit of reducing incentives to pay speed money.

Challenge 10: An Emerging Issue: “Green” Logistics

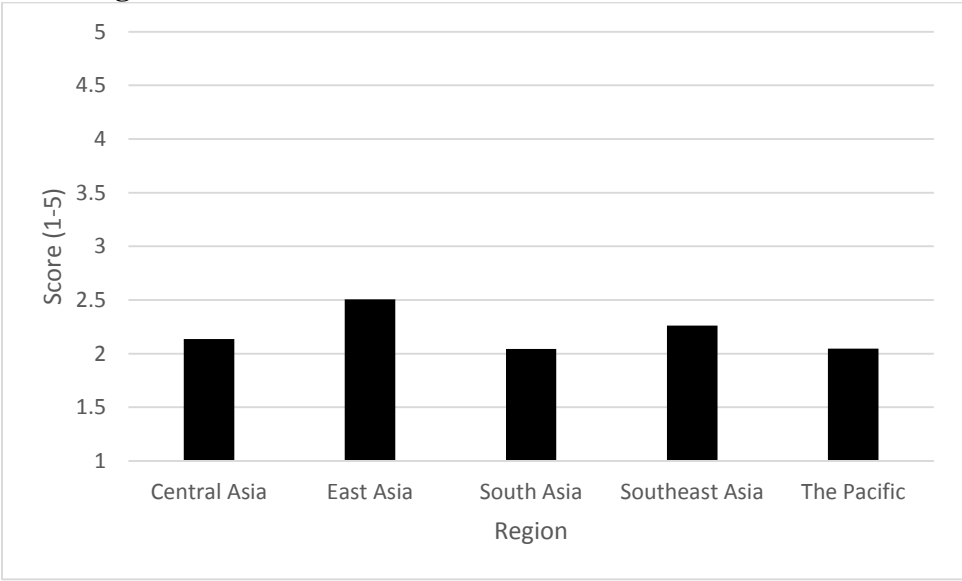
The environment is an important element of the inclusive development agenda. Logistics service providers are increasingly taking account of the environmental consequences of their industry’s activities. Transport, for example, produces emissions of carbon dioxide and other polluting gases. Disposal of packaging material also has environmental implications. Efforts are underway within the industry to limit its environmental footprint, particularly in high income countries. Developing countries are also seeing moves toward “greener” logistics, which are often driven by large, lead firms in transport and logistics value chains, as well as demand from shippers.

The 2012 International LPI survey asked respondents to indicate how often shippers ask for environmentally friendly options. A response of 1 indicates “hardly ever” and a response of 5 means “nearly always.” **Figure 3** shows that shipper behavior is clearly changing in the Asia-Pacific region. Demand for environmentally friendly options is strongest in the East Asia sub-

region, no doubt because of the prevalence of developed economies in that group. It is weakest in South Asia. However, the spread of scores is relatively modest compared with other LPI indicators, which indicates that the prevalence of green logistics in the Asia-Pacific may be somewhat more homogeneous than other factors, such as infrastructure or service sector development.

To put these results in perspective, even the world leader in logistics, Singapore, only records a score of 2.8 (“sometimes”) on this measure. The global trend toward environmentally friendlier logistics practices is therefore spreading to the developing countries of the Asia-Pacific, and is an issue that shippers, service providers, and policymakers alike will need to deal with in the coming years.

Figure 3: Frequency with which Shippers Ask for Environmentally Friendly Options by ADB Region



Note: On a scale ranging from 1 (“hardly ever”) to 5 (“nearly always”).
 Source: LPI database (2012) and authors’ calculations.

5 Examples of Overcoming Challenges

Most countries in the Asia-Pacific region are increasingly placing a high priority on logistics-related reforms with the aim of improving supply chain efficiency. Just as performance varies from country to country, so too does the nature of the problems to be addressed. In some cases, it is primarily physical infrastructure. In others, it is regulatory reform and red tape. In others still, it is cross-border cooperation, particularly in the area of border procedures and transit arrangements. This section presents selected examples of recent attempts to deal with significant logistics-related issues in the Asia-Pacific context, as well as international cases that can potentially inform action in the Asia-Pacific. Each of the sets of policies engaged in these examples can be seen as forming part of the trade facilitation agenda of a country or region, using that term in the broad sense of any policy action that is designed to reduce trade costs. As previously noted, lower trade costs translate into better supply chain performance, with consequent economic benefits for consumers and producers, including exporters.

5.1. CAREC Corridor Performance Monitoring Measure: Challenge 1

The Corridor Performance Measurement and Monitoring (CPMM) indicators designed for monitoring the CAREC Transport and Trade Facilitation Strategy (TTFS) can be a model for a logistics data structure that is suitable for design of policies and reforms, particularly in corridor logistics system. The CPMM indicators are not based on a perception survey but on actual time and costs of logistics activities at each border crossing point (BCP).

Since the CPMM database is very detailed (**Table 4**), it is a good monitoring tool for trade facilitation project management.

- The CPMM indicators can be drawn for every commodity group and logistics activity at each BCP, thereby allowing policymakers to design policies and reforms specific to the needs of each border, or commodity group, or logistics activity. Table 4 is an example from the CPMM database.
- It is possible for policymakers to examine the progress of trade facilitation reform in a timely manner. Commodity groups covered in published quarterly and annual reports are agriculture, machinery, base metals, textiles, industrial materials, wood, manufactured items, beverages, chemicals, vehicles, animals, minerals, shoes, mixed cargoes, plastics, hides and skins, pulp and paper, animal fats, and instruments.
- The published average and median time (based on the number of hours of transit plus hours spent on BCP activities) and cost (based on vehicle operating cost and activities costs) for each of the 16 BCP activities (see scope of CPMM in Table 3) allow policymakers to identify activities that delay time and are costly.
- The analysis on speed without delay and speed with delay in km/hour, which can be drawn for different modes of transport for domestic or cross-border transactions—road, rail, and multimodal—is useful for assessing the transport efficiency component of logistics.
- The CPMM data can also be aggregated for general analysis of the entire logistics sector. For the development effectiveness review for the CAREC Transport and Trade Facilitation Strategy, ADB aggregates four operational trade facilitation indicators: time taken to cross a BCP (hours), costs incurred in border crossing (US\$); cost incurred to travel a 500km corridor section carrying 20 tons, and average speed along corridors (SWOD, SWD).

Table 4: Summary Worksheet from the CPMM Database

File ID	1	2	3	4	5
Route	Kuldzha–Moskow	Korgas–Troitsk	Bakhty–Tashkent	Dortmund–Shymkent	Stambul–Bishkek
Commodity	Footwear	Equipment	Consumer goods	Rubber discs	Home appliances
Commodity Classification	CC12 Shoes	CC16 machineries	CC20 manufactured items	CC7 Plastics	CC16 machineries
Perishable	No	No	No	No	No
Cargo weight (tons)	20	20	22	19	15
Container?	No	No	No	No	No
TIR?	Yes	Yes	Yes	Yes	Yes
Date of Questionnaire completion	10 Jan 2013	10 Jan 2013	11 Jan 2013	11 Jan 2013	11 Jan 2013

Distance (km)	2,485	2,451	1,765	2,106	2,458
Transit time (hrs.)	43.78	38.47	29.95	33.08	38.12
Activities time (hrs.)	86.25	78.18	46.33	27.5	35.83
Total time (hrs.)	130.03	116.65	76.28	60.58	73.95
Vehicle operating cost (US\$)	1,441.3	7,132.41	2,389.81	2,232.36	
Activities cost (US\$)	402.01	98.17	137.34	82.01	4,936.9
Total Trip Cost (US\$)	1,843.31	7,230.58	2,527.14	2,314.37	139.35
Speed without delay (SWOD) in km/hr	56.76	63.72	58.93	63.66	64.49
Speed with delay (SWD) in km/hr	19.11	21.01	23.14	34.76	33.24

Note: The CPMM improved on UNESCAP's time-cost distance (TCD) methodology. However, compared to UNESCAP's TCD, the CPMM has a bigger sample size (300/month). While TCD focuses on a one-time analysis of transport efficiency based on border crossing activities reported at the discretion of freight forwarders, the CPMM covers 16 standardized sets of BCP activities (see scope of CPMM in Table 3).

Source: CPMM Presentation material by Max Ee (International Consultant).

While the LPI and Doing Business datasets give us a macro perspective of the logistics sector across countries over time, the CPMM focuses on the detailed information necessary for designing and implementing appropriate logistics policies and reforms at the corridor, national, and regional levels. **Table 5** summarizes the differences between the CPMM and other logistics data.

Table 5: Difference between CPMM and other Logistics Datasets

	CPMM	LPI	DB
Source of Data	Ground operators from transport and logistics sector	Logistics providers (multinational freight forwarders, main express carriers)	In-country entities with knowledge of business regulations
Concept	Detailed time-cost study per border	Logistics performance outcomes per country	Time, cost and documents to import and export per country
Frequency	Monthly, quarterly, annual since 2010. Annual data are available for 2009	Every 2–3 years since 2007	Yearly since 2003
Significance	Four operational trade facilitation indicators (time taken to cross a border crossing point, cost incurred in border crossing, cost incurred to travel a 500km corridor section carrying 20 tons, average speed along corridors)	International and domestic logistics performance	Time and cost to export or import; number of documents to export or import
Countries	10 countries, 14 partner associations	155	183
Scope	Detailed time and cost for every border and for 16 BCP activities: border security and control, customs clearance, health and quarantine, phyto-	International LPI: customs, infrastructure, international shipments, logistics quality and competence, tracking and tracing, and timeliness	Breakdown of time and cost data for port and terminal handling, customs and border agencies, inland transport, and document preparation

	sanitary inspection, veterinary inspection, Visa and immigration, traffic inspection, police checkpoint, transport inspection, weight and standard inspection, vehicle registration, emergency repair, escort and convoy, loading and unloading, road toll, and waiting and queue	Domestic LPI: level of fees and charges, quality of infrastructure, quality and competence of services, efficiency of processes, sources of major delays, changes in the logistics environment since 2009, export time and cost (port or airport supply chain, and land supply chain)	
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Source: CPMM resources available at <http://cfefa.net/cpmm/>; Presentation material of Professor Mark Goh at the CPMM International Workshop in Almaty, Kazakhstan on 1 March 2013, and World Bank LPI and DB databases

5.2. ASEAN’s Regional Integration in the Logistics Sector: Challenge 2 (scope), Challenge 5 (policy barriers), and Challenge 8 (internal logistics)

In November 2004 in Vientiane, Lao PDR, the ASEAN Framework Agreement for the Integration of Priority Sectors was forged to advance efforts at liberalizing priority sectors. The Vientiane Action Plan (VAP) listed 11 priority sectors, of which four are services sectors (air transport, tourism, E-ASEAN, and healthcare). Meanwhile, in August 2007 in Cebu, Philippines, the ASEAN Sectoral Integration Protocol for the Logistics Services Sector was agreed to, with the logistics sector added as the fifth priority services sector.

The ASEAN logistics integration scheme covers all core-logistics services included in the WTO logistics negotiations (Section 4). Except for a few sub-sectors, most sub-sectors under freight transport services are also included. Some sub-sectors in other related logistics services and non-core freight logistics services are also covered by the ASEAN scheme, with the notable exceptions of business services (e.g., engineering services), distribution, computer and related services, and management consultation services (Hamanaka et al. 2010).

Moreover, ASEAN’s logistics integration project goes far beyond the services negotiations at the WTO. It is not strictly exclusive to logistics services. Since customs clearance services, which are beyond the scope of the General Agreement on Trade in Services (GATS), are linked with governmental authority, they are covered in the ASEAN logistics integration program. Moreover, the ASEAN Logistics Protocol includes four major components, beyond services liberalization:

- customs and transportation facilitation, with its main component being the adoption of international standards established by organizations such as the WTO and the World Custom Organization (WCO);
- assistance to logistics service providers in ASEAN, including the support of small- and medium-sized logistics enterprises and the establishment of networks among logistics service providers in the region;
- human resource development for customs officials and the private sector; and
- infrastructure and investment, with the development of the ASEAN transport logistics corridor as its principal focus.

ASEAN's priority integration of logistics is a good example of setting a commercially meaningful scope for logistics, covering both logistics services and customs related issues (Challenge 1). Since ASEAN will fully integrate its logistics sector as a priority sector, policy barriers to the supply of international logistics services within ASEAN were set to be eliminated by the end of 2013 as stipulated in the Logistics Protocol (Challenge 5), although implementation on the ground remains a serious issue in some countries. It is important to note that capacity building in logistics for SMEs is also covered by this project (Challenge 8).

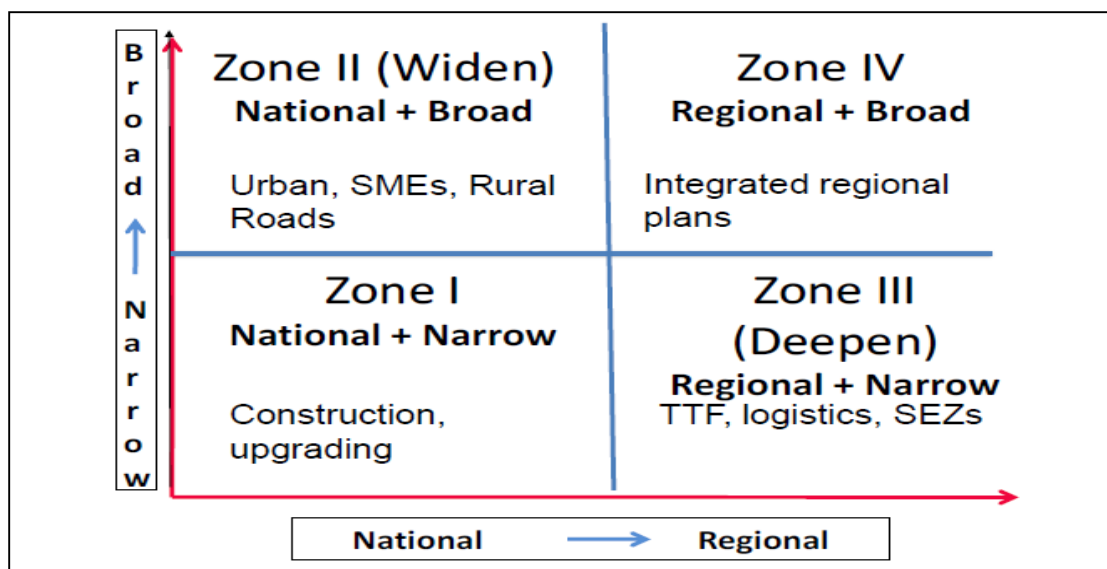
5.3 Greater Mekong Subregion (GMS) Logistics Corridor Development: Challenge 4 (cross-border cooperation), Challenge 7 (hard and soft infrastructure), and Challenge 8 (internal and domestic logistics capacity)

There are two approaches for GMS corridor development that were presented at the Fourth Economic Corridor Forum on June 2012. Both approaches address the many issues on logistics such as cross-border cooperation; physical connectivity, including internal and domestic infrastructure; and complementarities between soft and hard infrastructure.

The first approach involves four stages of development (Banomyong 2008). The first stage is the transport corridor that physically links an area or region. The second stage is the multimodal corridor that physically links an area or region through integration of various modes of transport. The third stage is the logistics corridor, which not only physically links the area or region but also harmonizes the corridor institutional framework to facilitate the efficient movement and storage of freight, people, and related information. The last stage is economic corridor development, which requires physical linkages and logistics facilitation to first be in place. The economic corridor attracts investments and generates economic activities.

The second approach is a zonal stage framework (**Figure 4**), featuring four zones, which are somewhat similar to the four stages of corridor development above. Zone 1 equates to a transport corridor described in Banomyong (2008). Zones II and III are proposed priority zones in order to achieve Zone IV maturity. Zone II is the widening process focused on extending potential catchment areas to generate additional traffic to support the corridor. Zone III refers to the deepening process, whereby soft infrastructure issues are addressed in order to remove potential constraints to corridor performance. In Zone III, soft infrastructure aspects of logistics come into play to complement physical connectivity and border infrastructure developed in Zones 1 and II. Zone IV is consistent with the economic corridor stage in Banomyong (2008) in the sense that both require physical connectivity and trade facilitation measures to be in place.

Figure 4: Proposed Framework for Corridor Development



Source: ADB (2012b).

The only difference between the two approaches is that the proposed zonal development framework sets a roadmap for the intermediate stages of the transformation from transport into economic corridors with implementation of Zone II widening and Zone III deepening activities. According to ADB (2012b), an integrated approach is to undertake zonal development stages concurrently rather than consecutively.

According to ADB (2012b), the status of GMS corridors at present stands in Zone I; physical connectivity across corridors is largely complete and the focus to date has been on basic corridor infrastructure. Zone II projects include road improvements in Myanmar: Kawkaik–Thaton Road, Thaton–Payagyi Road, Thilawa–East Dagon Road, and East Dagon–NR1 Road. Projects in Cambodia include improvement of Phnom Penh–Sihanoukville Highway Corridor and Sihanoukville Port Access Road, and Phnom Penh Outer Ring Road Investment Project. In Lao PDR, there is Thanaleng Border Crossing Infrastructure Improvement Project. Under Zone III, projects include the Cross Border Transport Agreement (CBTA).

Trade Facilitation in the GMS: Challenge 4 (cooperation), Challenge 6 (landlocked) and Challenge 7 (infrastructure)⁶

The GMS also provides an example of an integrated approach to trade facilitation in Asia, which has already improved outcomes for logistics operators. Connectivity in that region is particularly important for two reasons. First, it facilitates linkages with the PRC, a regional giant. Second, it has the potential to significantly promote intraregional trade, as well as international trade more broadly. That point is particularly true for landlocked Lao PDR, which depends on transit arrangements with other countries to bring its goods to international markets and to have access to important imports, such as capital goods and intermediate inputs, as well as human development products such as medicines and vaccines. The GMS is a good example of the fact that logistics is by its very nature a cross-border activity in much of the Asia-Pacific, which means that

⁶ This subsection is based on OECD and WTO (2013).

governments need to cooperate in adopting an integrated approach covering both “hard” (infrastructure) and “soft” (regulations and procedures) aspects.

The crucial mode of transport for links within the GMS is roads. With that in mind, the governments of Lao PDR, Thailand, and Vietnam decided to boost regional connectivity by improving their respective road networks. In addition to improving internal links, those countries—assisted by ADB—identified crucial links for international trade relations and worked on expanding them by building additional roads and bridges. This approach is a good example of cross-border cooperation to improve hard infrastructure, which addresses two of the challenges identified in Section 4.

All parties to the GMS’ development realized, however, that building hard infrastructure is not enough on its own to facilitate trade and boost logistics performance. As identified in Section 4, there needs to be coordination between hard and soft infrastructure projects. It needs to be accompanied by regulatory reforms that improve transit arrangements and reduce the costs of doing business for international logistics operators. The participating governments therefore agreed on a Cross Border Transport Agreement covering areas such as customs inspections, transit traffic, and road and bridge design. It was envisaged as one important way of facilitating both goods and services trade within the region. Most recently, the agreement has allowed 500 operators to run trucks along the GMS transport corridor without paying transshipment fees. This measure reduces the cost of doing business and has the potential to improve supply chain performance.

In line with expectations, the GMS program has had some success in boosting trade, although due to the simultaneity of reforms and the number of programs in operation, causal attribution is a serious issue. Between 1999-2000 and 2006-2007, trade values increased by over 50%. Part of this success is arguably due to the improvements in logistics performance that the program brought about. For example, average travel times were cut by 50%, border crossing times fell by 30%–50%, and the average number of vehicle crossings per day increased markedly. There is also evidence that the GMS program benefited agricultural producers by bringing them closer to important markets.

Although implementation on the ground has not been without its problems, and there are notable ways in which the program could be improved, the GMS program is a good example of international cooperation in the Asia-Pacific region that has borne fruit in terms of better logistics performance and, as a consequence, increased trade. It highlights the importance of moving forward on hard and soft infrastructure simultaneously. It also brings out the fact that the regional nature of trade among countries sharing land borders—and particularly for landlocked countries—means that logistics operations also have an important regional dimension. Taking account of this dimension makes it possible to ensure an adequate level of investment in regional public goods that are strongly trade promoting.

5.5. Africa’s Logistics Corridor (Maputo Corridor Logistics Initiative): Challenge 3 (demand-side perspective), Challenge 4 (cross-border cooperation), and Challenge 8 (poor internal logistics)⁷

⁷ This subsection is based on www.mcli.co.za.

Involving participants from Mozambique, South Africa, and Swaziland, the Maputo Corridor Logistics Initiative (MCLI) provides an interesting point of comparison for regional logistics sector integration projects in the Asia-Pacific. It groups together countries of vastly different market size and development level, and includes one landlocked country. The MCLI takes a broad-based approach to logistics, covering infrastructure and service sector development. Importantly, it serves as a forum for stakeholders to convene and exchange views—a process which importantly includes logistics users. Although the primary activities of the MCLI necessarily focus on the supply side, the demand-side perspective (Challenge 3) is also integrated.

Development of the Maputo Corridor relies heavily on cross-border cooperation to develop and where necessary rehabilitate the necessary hard infrastructure. The main concern is with road connections between the main cities linked by the corridor. Because it involves both a core route between the main economic hub of Johannesburg in South Africa and the port of Maputo in Mozambique, and a series of feeder roads to smaller cities, the MCLI is not just about improving cross border cooperation in the logistics sector (Challenge 4). It also plays a significant part in developing domestic logistics by improving internal connectivity (Challenge 8).

One notable feature of the MCLI from which the Asia-Pacific could potentially draw inspiration is its private sector focus. Initiatives such as the ASEAN Economic Community Blueprint focus on reducing public sector barriers to the international integration of logistics markets, on the assumption that private operators will then take advantage of the newly created commercial opportunities to increase trade and investment. The MCLI itself is, however, a private organization. Its focus is twofold. The first aspect relates to channeling the views of private sector actors to the governments involved, so that government action can fully integrate the emergence of new business models and evolving trade patterns. Second, the MCLI facilitates information exchanges within the private sector, ensuring that improvements are brought to the attention of private sector users (and potential users) of the corridor. As seen in the context of Challenge 1, private sector perceptions matter, both for the concrete reality of supply chain performance and for the issue of measurement using tools like the World Bank's LPI.

5.6. Upgrade of Port Facility Infrastructure and Customs Reforms in Indonesia: Challenge 7 (infrastructure) and Challenge 8 (internal logistics)⁸

Following what was perceived as a disappointing score and ranking in the 2007 LPI, Indonesia's authorities embarked on a program of reforms designed to improve trade facilitation performance. Indonesia is one of relatively few countries to have a national logistics strategy. (Malaysia is another such country in the Asia-Pacific region.) However, as an archipelagic state consisting of over 10,000 islands, it faces particular problems of internal and external connectivity.

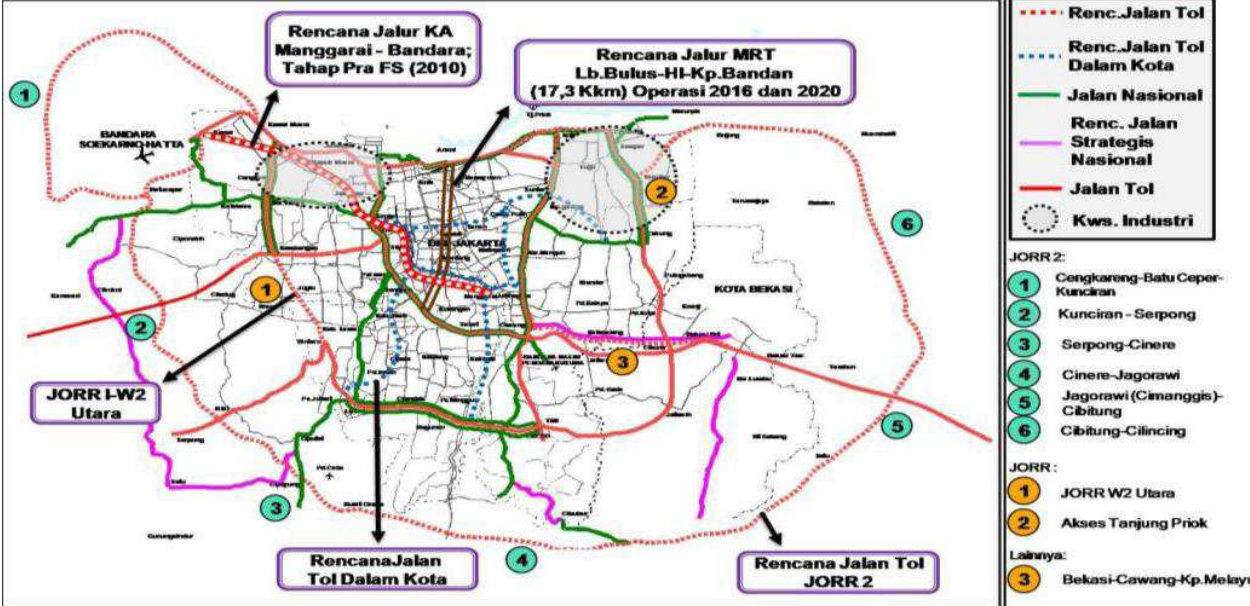
A core part of Indonesia's reform program related to the country's busiest port, Tanjung Priok. The country took a dual approach, focusing on physical infrastructure and customs reforms working in tandem to improve logistics performance. This approach is directly aimed at overcoming Challenge 7 (coordination between hard and soft infrastructure), but given that Indonesia is made up of a very large number of islands that require maritime connections, it is also important for improving internal connectivity (Challenge 8).

⁸ This subsection is based on Arvis et al. (2012).

In consultation with the World Bank, the government identified dwell time as a significant obstacle to improved logistics performance at Tanjung Priok port. (Dwell time is the average time it takes containers to clear the port.) Increased dwell times contribute to direct and indirect logistics costs, and to the extent that long dwell times tend to be unpredictable, they also reduce supply chain reliability. Dwell times were seen as a significant obstacle to Indonesia’s competitiveness vis-à-vis its Southeast Asian neighbors. Indonesia’s figure of 6 days was longer than Thailand’s (5 days) and Malaysia’s (4 days), and far in excess of that of regional hub Singapore (1 day).

In terms of physical infrastructure, the Indonesian government and its development partners have put together a plan for a major expansion of the port that is expected to double its capacity by 2017. To ensure the maximum payoff from this infrastructure investment, it will be necessary to ensure that port investments are coordinated with investments in connecting roads so that goods can make it to and from the gateway efficiently. Together, these steps will not only ensure coordination of infrastructure investments (Challenge 7), but also increase internal connectivity (Challenge 8). As **Figure 5** illustrates, when the facility of the sea and/or airports are increased, enhanced road access to them is critically important.

Figure 5: Road Access to Tanjung Priok and Soetta Airport



Source: Presentation by Lukita Dinarsyah Tuwo, Vice Minister of National Development Planning of the Republic of Indonesia at World Export Development Forum in Jakarta on 15 October 2012.

Infrastructure investments of this magnitude necessarily take time to implement. It is therefore important to concentrate in the short-term on simpler reforms, particular those relating to regulations and procedures: they can be designed and implemented relatively quickly based on administrative decisions, and they do not require extensive construction projects or a large amount of external financing. Again, these questions primarily relate to soft infrastructure and are an example of coordinating reforms in the two dimensions of this area (Challenge 7).

Indonesia has therefore made a number of improvements to port functioning with the aim of reducing costs for logistics operators. The main issues appear to be (i) cumbersome pre-customs clearance procedures and (ii) late filing of documents by shippers and importers. The government is working in cooperation with development partners and the private sector to try and resolve these problems. In addition, the port operator has increased storage fees, with the aim of reducing shippers' incentive to leave containers in storage for long periods. It has also introduced a new system for monitoring and directing port traffic, based on the more extensive use of information and communication technologies.

The Indonesian example demonstrates that informed action on a number of fronts simultaneously can have significant impacts on logistics performance. The country's overall LPI ranking improved from 75th to 59th between 2010 and 2012. Although rankings are subject to sampling error and cannot be interpreted too literally, this result indicates that a combined approach—focusing on infrastructure and procedures—can improve port performance, with consequent benefits for logistics operators and supply chain efficiency. Much remains to be done, particularly in terms of the planned medium-term expansion of the port, but the government and its partners have made an encouraging start to the reform process.

5.7. Border Clearance Reforms and Transport Infrastructure Improvements in Senegal: Challenge 7 and Challenge 8⁹

In the late 1990s and early 2000s, Senegal adopted a National Single Window. At the same time, it automated its border clearance processes. The combination of these two steps means that logistics operators can now submit a single set of electronic documentation to comply with a wide range of border clearance processes. The time required to clear customs, for example, was cut from 4 days to only half a day, and even less in some cases. Senegal's approach has become a model for the region, even though adaptations are of course necessary to meet with particularities in national procedures. Elements of Senegal's broader program to upgrade logistics performance have also influenced similar measures as far afield as the Kyrgyz Republic. Low and middle income Asia-Pacific countries can clearly benefit from South–South knowledge exchanges in the area of improving logistics performance, in addition to having the advantage of the presence within the region of a world leader like Singapore.

Reforming customs and border procedures is an important soft infrastructure reform. By reducing the time and cost associated with trade formalities, it increases supply chain efficiency. Moreover, Senegal also found that increased trade volumes and better collection performance resulting from the changes meant that the measures had a positive impact on government revenue.

However, as noted in Section 4, it is important to coordinate improvements in hard and soft infrastructure. A related point is that better international gateway performance will only have limited economic impacts in the absence of improved internal connectivity. Road upgrading therefore remains a major priority of the Senegalese government, supported by international donors such as the World Bank. Many of Senegal's roads are in poor condition. However, the government intends to upgrade them over the medium-term. This program requires significant upfront investment costs, as well as the setting aside of funds for maintenance in future budget

⁹ This section is based on Diagne (2010) and World Bank (2011).

cycles. The potential for these measures—in combination with improvements to soft infrastructure such as the implementation of a National Single Window—to improve internal and external logistics performance is significant.

5.8. The PRC's Logistics System Development for Agricultural Products: Challenge 3, Challenge 7, and Challenge 8

Logistics inefficiencies in the agricultural sector are among the main factors causing low returns to farmers, high and volatile food prices, and degraded quality of food supplies, which have negative implications on poverty reduction. ADB's Technical Assistance for the PRC's Logistics System Development for Agricultural Products assessed the current state of agricultural logistics, encompassing both the suppliers and users of logistics and those aspects concerning government provision, and revealed a number of areas of weaknesses and challenges. Based on the assessment results, the TA has the potential to identify and address policy issues surrounding logistics demand side based on progress in the agriculture production and supply chain, internal and domestic connectivity, and complementarity between hard and soft infrastructure.

The project's initial results reveal the mismatch between supply and demand for logistics in agricultural products. Agricultural logistics supply is highly fragmented, consisting of small businesses. A large number of self-run businesses operate in trading, wholesaling, and retail markets. For example, 82% of agricultural brokers operate individually and 97% of meat and vegetables businesses in wholesale markets are individual businesses. However, the demand (the needs of end-users like farmers and middlemen) for agricultural logistics is becoming large scale as the sector's supply chain integration and concentration continue to intensify with the ongoing cooperation and mergers and acquisitions. This scheme reduces the number of stops a product makes through the supply chain and tightens distribution channels, thereby reducing logistics costs and sales prices. Therefore, logistics suppliers need to operate on a large scale to accommodate the demand brought about by development in the agricultural production and supply chain.

Logistics aspects requiring government provision and services, concerning infrastructure, especially internal and domestic connectivity, and synergies between soft and hard infrastructure, also need to be in place to support efficient transactions between logistics suppliers and users. The assessment under ADB's TA notes that the development of the PRC's hard logistics infrastructure (e.g., roads) has been in full swing, leading in turn to development of the agricultural logistics system. The consistent improvement in road grade levels, especially for highways, has laid the foundation for the cross-regional transport of farm produce. Domestic connectivity is, therefore, continually improving. However, there are huge constraints concerning supposedly complementary soft infrastructure, which includes standards for agricultural products, logistics governance and logistics policies. First, standards on agricultural products are inadequate (especially in the area of grading and testing, market transactions, technical operations of cold chain logistics, health, and environment and pesticides residues). There are overlaps and inconsistencies among technical requirements and provisions, a lack of fundamental research and qualified professionals for standards-setting, and a lengthy process of standardization. Second, the dual management system of agricultural logistics (central and local administration) with overlapping functions fragments supply chain management and stunts synergies among policies. Third, there is no governance framework of laws and technical regulations, while there is a lack of

attention to circulation and software capabilities, inadequate government support on the establishment of a fair and transparent institutional environment, and a disintegrated system.

6. Policy Discussion

The previous sections clearly show that policymakers have a variety of issues to confront in improving trade logistics performance for more efficient supply chains within the framework of the broader inclusive development agenda. This section of the paper raises a series of questions for policy-level discussion in the context of the 2013 Asia-Pacific Trade Facilitation Forum. The questions are designed to cover a variety of areas within trade logistics, although comprehensive coverage is of course not possible due to space constraints. The objective of this section is to identify a selection of the most important discussion points going forward, present their background, and briefly discuss the options open to decision makers.

6.1. Developing Internal Logistics Capacity: What Can be Done to Support Private Sector Development in the Trade Logistics Sector?

Historically, governments have been directly involved at a number of points in the trade logistics value chain. For example, ports and airports have often been both constructed and operated by state-controlled entities. However, the many disadvantages of that approach have led to a sustained shift toward increased private sector involvement through arrangements such as concessions or franchising (i.e., granting a limited-period monopoly following a competitive bidding process). Similarly, aspects of the logistics value chain where competition is feasible have increasingly seen the entry of private operators. Express delivery is an example, with traditional postal services now sharing the market with private operators like FedEx, DHL, and UPS.

The importance of the private sector means that a key question for government is: what can be done to support private sector development in the trade logistics sector? This question is important because it determines in part a country's ability to develop its domestic logistics capacity so as to be well placed in the international market. Clearly, the answer on a policy level is many faceted. In terms of the challenges set out in Section 4, it is necessary to address a variety of constraints to doing business in the sector, such as deficient hard and soft infrastructure. In addition, it is important to address persistent policy barriers (Challenge 5), in particular those that constrain international trade and FDI in logistics services. Two detailed questions for governments to address are therefore:

- What sort of hard and soft infrastructure environment is best suited to promoting the development of domestic logistics capacity?
- How can policy barriers, including those to services trade and FDI, be loosened so as to support the development of domestic logistics capacity?

6.2. Supporting Cross-Border Cooperation: What Can be Done to Support Increased Cross-Border Cooperation in Relation to Trade Logistics?

Challenges 4 and 6 in Section 4 relate to the need for international coordination of policies and investments in logistics-related areas. The need for cross-border cooperation stands out

particularly in the case of landlocked countries, which depend on infrastructure and transit arrangements with third countries in order to integrate with world markets. A second important question for logistics policymakers is: what can be done to support increased cross-border cooperation in relation to trade logistics? More concretely still, the questions for governments can be posed in the following terms:

- To what extent, and in which areas, is cross-border cooperation desirable in relation to hard and soft infrastructure?
- What types of national policies are most supportive of cross-border cooperation, including through liberal approaches to trade and investment in logistics services?

Clearly, the policy agenda for cross-border cooperation on trade logistics has a number of dimensions. Firstly, in terms of infrastructure, the nature and extent of cross-border cooperation depends heavily on the geography of the sub-region under consideration. Where landlocked countries are involved, as in Central Asia or the GMS, there is a strong case to be made for a cross-country approach to infrastructure development. If each country develops its trade and transport infrastructure independently of the others, there is a serious risk of underinvestment in regional public goods. However, landlocked countries are not the only ones that can benefit from an international approach to infrastructure development. The construction and integration of major gateways in different countries so as to improve intra- and extra-regional connectivity is an important way of reducing trade costs (Arvis et al. 2013), thereby promoting regional and global trade.

Secondly, it is important for governments to cooperate on soft infrastructure as well. For example, the development of National Single Windows can do much to speed up border clearance processes. However, to the extent that different information requirements and formats are in place in different countries, the impact of such measures is reduced. The ASEAN Single Window—currently under development—is one prominent example of an attempt to deal with these problems. Cooperation can reduce unnecessary paperwork burdens, and make it easier for logistics companies to operate across national borders in a way that is necessary for the development of global and regional value chains in the manufacturing sector.

6.3. Sustaining Integration of Trade Logistics Markets: How to Sustain the Ongoing International Integration of Trade Logistics Markets?

Related to the issue of cross-border cooperation discussed in the previous section is the question of how can countries make progress toward the increased international integration of logistics markets (i.e., the removal of policy barriers to trade and investment discussed in Challenge 5). Concretely, the question for policymakers is:

- What is the right mix of unilateral reform, regional or bilateral agreements, and multilateral negotiations to maximize the international integration of logistics markets and thereby enhance supply chain efficiency?

From an economic welfare point of view, unilateral and multilateral reforms are generally believed to be preferable to regional action because they do not result in welfare-reducing discrimination

(trade diversion). In fact, as with most trade policy reforms, the bulk of the economic gains from regulatory reforms that open markets accrue to the reforming market itself, not its trading partners. The need for reciprocity is therefore not generally an economic imperative, even if it is a political one.

Multilateral negotiations on services under the WTO and the GATS are part of the broader Doha Round of trade negotiations. Those negotiations currently appear to be blocked in all but a few areas, although trade facilitation—closely linked to logistics—is one of the more hopeful issues. However, there has generally been little progress on services generally. This political reality, combined with the perceived desirability of reciprocity, makes regional integration an attractive option. ASEAN has already taken significant steps in this direction. Although regional integration of any sector, including logistics, generally carries with it the risk of costly trade diversion, the evidence for services tends to suggest that such effects are relatively minor (Miroudot and Shepherd 2012). If so, then regional integration presents policymakers in the Asia-Pacific with a potentially powerful tool for supporting the ongoing integration of logistics markets. Regional initiatives such as the ASEAN Economic Community and the Trans-Pacific Partnership can potentially do much to contribute to the aim of greater integration of logistics markets, with corresponding benefits for consumers and producers alike.

6.4.Green Logistics: How to Balance the Desire for Enhanced Supply Chain Efficiency with Increased Demand for Environmentally Friendly Shipping Options?

This paper has focused on supply chain efficiency and the attendant benefits it can bring. However, Challenge 10 noted that there is increased demand in the Asia-Pacific, as in other regions, for green logistics. At the moment, much of the dynamic relating to green logistics is taking place on a private basis; that is, without the imposition of a wide range of public sector standards. However, that position might change in the future in light of the increasing public and economic importance of issues such as climate change and pollution in developing countries. A key policy question is therefore:

- To what extent should the public sector become involved in setting environmental standards for the logistics industry, and what instruments should be used?

There is no easy answer to this question because each country's environmental and technological characteristics—as well as the nature of shipper demand—are different. However, two dynamics are likely to be important. The first is that green logistics is, at present, largely being driven by the large, developed economies, which with only a small number of exceptions are outside the Asia-Pacific region. Regional policy specialists and leaders therefore need to consider the extent to which public involvement might be necessary to adapt this largely North–South dynamic to deal with the particularities of the region.

Second, there is possible tension between green logistics on the one hand and other aims such as supply chain efficiency and international integration of logistics markets on the other. To the extent that environmentally sustainable options are increasingly a subject of demand-side interest, it may be that there is only a relatively small role for public policy to play in promoting them. Logistics operators, through market pressure, will upgrade and broaden the range of services they offer to

achieve the best balance between the type of processes requested by shippers and supply chain efficiency. However, the risk for tension to develop between these aims increases as the public sector becomes more heavily involved. For instance, different environmental standards in different countries can create barriers to the international integration of logistics markets, which in turn tend to reduce—albeit unintentionally—supply chain efficiency.

7. Possible Solutions

The challenges and discussion points covered in the paper are suggestive of a number of areas in which policymakers in the Asia-Pacific can assist the private sector in developing national and regional logistics capacity.

First, logistics is an important value chain in its own right, not just a crucial input into other value chains, such as electronics and machinery. As such, the policy environment needs to be supportive of the fact that firms need to develop forward and backward linkages, including across borders. Efforts to integrate logistics markets on a regional and international basis should therefore be intensified going forward. This approach necessarily entails increased openness to trade in services, including through GATS Mode 3 (sales of foreign affiliates): that is, openness to trade should also imply openness to FDI and the benefits it can bring. Integrating international logistics markets is not an end in itself, of course: it is an important way of promoting domestic capacity upgrading, improvements in physical and human capital, and the transfer of technology, including organizational capacity and management practices. Given the presence in the Asia-Pacific region of world leaders in the provision of logistics services, there is strong potential for knowledge exchange and development of the sector in developing countries where performance currently lags.

Second, initiatives for cross-border cooperation should be strengthened, particularly in the case of landlocked countries. It is important for such programs to cover infrastructure investment, as it has many characteristics of a regional public good. As a result, it tends to be underprovided in the absence of cooperation. Regional and international development partners, including the ADB, can play an important role in promoting and financing cross-border infrastructure projects. However, it is not enough to invest in physical (hard) infrastructure. It is also important to get the regulatory environment (soft infrastructure) right. One aspect relates to customs and border procedures: the payoff from infrastructure improvements will be highest when they are accompanied by improvements to procedures that make it simpler, quicker, and less expensive to move goods across borders. In addition, the regulatory environment governing transport sectors also needs to be addressed. Reforms that reduce entry barriers and lower the cost of doing business will be welcomed by the private sector, and will result in higher utilization rates of infrastructure, and thus significant trade gains.

Third, policymakers need to include both the supply and demand sides in their assessments of appropriate actions going forward. The demand side includes users of logistics services, such as manufacturers and exporters in other sectors, as well as, ultimately, consumers. The aim of reforms to integrate markets and increase international cooperation is not just to improve supply chain efficiency as such, but to ensure that those gains are passed on to end-users and consumers. A competitive environment in logistics will help ensure that such transfers indeed take place. But in designing policy interventions in logistics, it is important for policymakers to ensure that the needs

of users and consumers are accounted for in the process through the introduction of an appropriate degree of transparency as part of the reform procedure. Similarly, changes in demand patterns, such as the rise of green logistics, need to be carefully monitored by policymakers to ensure that regulations are not holding back the development of new systems and business models that would benefit both producers and users. It may, in some cases, prove necessary to alter regulations to ensure that such models can emerge, but this process must be decided on a case-by-case basis. The regulator's touch should generally be applied in a light way and only if there is clear evidence of a market failure that needs to be corrected.

8. Conclusion

This background paper has provided an overview of the trade logistics sector in the Asia-Pacific from the twin standpoints of supply chain efficiency and inclusive development. Based on a review of internationally comparable data, it has shown that performance within the region varies substantially: some countries are world leaders in the sector, whereas the logistics environment is extremely challenging in others, particularly landlocked countries. It has also highlighted that international indicators tend to focus on performance at key international gateways, and thus do not take full account of the difficulties of internal logistics processes, particularly in very large or archipelagic countries. In most countries, there is much that policymakers can do to improve the logistics environment, both in terms of internal and external connectivity, to bring performance closer to the world technological frontier.

A number of important issues need to be considered by policymakers going forward. We have identified 10 particular challenges that regional policymakers face in supporting development of the logistics sector. We have also identified a number of questions—not an exhaustive list—that merit policy level discussion within the region. We believe these issues will be key determinants of sectoral and regional performance in the medium-term. There is great potential at the present time for policymakers to act decisively to put in place a firm basis for moving forward on logistics-related topics. Indeed, the Asia-Pacific contains many successful examples of responding to logistics sector challenges in positive and creative ways, and the paper has reviewed a number of such case studies and related them back to the 10 challenges we have identified.

Trade logistics is by its very nature an international issue. It involves goods and services crossing borders, sometimes repeatedly. It is closely linked to other important issues on the trade and development agendas, such as the growth of regional and global value chains. As such, many aspects of the effort to improve logistics performance require a collaborative mindset. The key issue policymakers confront today is how best to leverage international cooperation in areas such as physical infrastructure development, regulation, project finance, and private sector development so as to promote more efficient logistics processes and enhanced supply chain efficiency. Developing strategies based around this question will help policymakers develop an environment that is supportive of the continued development of private sector logistics activities, not just as an end in itself, but as a way of ensuring flow-on benefits to manufacturers and consumers. As the grease in the wheels of international trade, the logistics sector has major potential to act as a lever for growth and inclusive development over the medium- to long-term.

References

APEC. 2013. *The 2013 Interim Assessment for Supply Chain Connectivity Framework Action Plan*. Singapore: APEC Secretariat.

J.-F. Arvis, Y. Duval, B. Shepherd, and C. Utoktham. 2013. Trade Costs in the Developing World: 1995–2010. *World Bank Policy Research Working Paper*. No. 6309. Washington, DC: World Bank

Available at <http://elibrary.worldbank.org/docserver/download/6309.pdf?expires=1362524462&id=id&accname=guest&checksum=BA24508BAB2A0FF543AEE4C9BA3F90B9>.

J.-F. Arvis, M. Mustra, L. Ojala, B. Shepherd, and D. Saslavsky. 2010. *Connecting to Compete: Trade Logistics in the Global Economy*. Washington, D.C.: World Bank.

Asian Development Bank (ADB). 2012a. *Transport Efficiency through Logistics Development: Policy Study*. Manila: ADB.

_____. 2012b. *Technical Assistance Consultant's Report: Support for Implementing Action Plan for Transport and Trade Facilitation in the GMS (Subproject 1) Transport and Logistics Assessment Follow-up Study*. Manila: ADB.

R. Banomyong. 2008. Benchmarking Economic Corridors Logistics Performance: A GMS Border Crossing Observation. *World Customs Journal*. 4 (1).

I. Daigne. 2010. Developing a Single Window to Facilitate Trade in Senegal. *Investment Climate in Practice*. No. 59835. Washington, DC: World Bank.

P. Dee. 2005. A Compendium of Barriers to Services Trade. *World Bank Working Paper*. Washington, DC: World Bank.

Available at <http://siteresources.worldbank.org/INTRANETTRADE/Resources/Topics/Services/Report.pdf>

S. Hamanaka, A. Tafgar, and D. Lazaro. 2010. Trade Facilitation Measures under Free Trade Agreements: Are They Discriminatory against Non-Members? *Working Paper Series on Regional Economic Integration*. No. 55. Manila: ADB.

B. Hoekmann and A. Nicita. 2011. Trade Policy, Trade Costs, and Developing Country Trade. *World Development*. 39 (12). Pp. 2069–79.

B. Hoekman and B. Shepherd. 2013. Who Benefits from Trade Facilitation Initiatives? *CEPR Discussion Paper*. No. 9490. London. Centre for Economic Policy Research (CEPR).

C. Hollweg and M.-H. Wong. 2009. Measuring Regulatory Restrictions in Logistics Services. *ERIA Discussion Paper*. No. 2009-14. Jakarta: Economic Research Institute for ASEAN and East Asia (ERIA).

Available at <http://www.eria.org/ERIA-DP-2009-14.pdf>

S. Miroudot and B. Shepherd. 2012. The Paradox of Preferences: Regional Trade Agreements and Trade Costs in Services. *MPRA Working Paper*. Munich: MPRA.

Available at http://mpra.ub.uni-muenchen.de/41090/1/MPRA_paper_41090.pdf

Organisation for Economic Cooperation and Development (OECD) and World Trade Organization (WTO). 2013. *Aid for Trade in Action*. Paris: OECD.

B. Olken and P. Barron. 2009. The Simple Economics of Extortion: Evidence from Trucking in Aceh. *Journal of Political Economy*. 117 (3). Pp. 417–52.

N. Pavcnik. 2002. Trade Liberalization, Exit, and Productivity Improvement: Evidence from Chilean Plants. *Review of Economic Studies*. 69 (1). Pp. 245–76.

G. Porto, N. Depetris Chauvin, and M. Olarreaga. 2011. *Supply Chains in Export Agriculture, Competition, and Poverty in Sub-Saharan Africa*. Washington, DC: World Bank.

D. Saslavsky and B. Shepherd. Forthcoming. Facilitating International Production Networks: The Role of Trade Logistics. *Journal of International Trade and Economic Development*.

B. Shepherd. 2011. Logistics Costs and Competitiveness: Measurement and Trade Policy Applications. *Transport Research Support Working Paper*. Washington, DC: World Bank.

B. Shepherd. 2013. *Connecting to Value Chains: The Role of Transport and Logistics*. Paper prepared for the OECD and the WTO.

World Bank. 2011. *IDA Program Document for a Proposed Fifth Poverty Reduction Support Credit to the Republic of Senegal*. World Bank Report No. 60373-SN.

World Economic Forum. 2013. *Global Enabling Trade Report 2013: Valuing Growth Opportunities*. Geneva: World Economic Forum.