

Enabling Trade Valuing Growth Opportunities

In collaboration with Bain & Company and the World Bank



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Foreword



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In our hyperconnected world, increasing global trade is at the heart of igniting job growth, creating efficient and competitive markets and putting the global economy on a path of stable growth.

As an industry, express carriers and supply chain providers have a unique perspective into trade's positive impact on growth and prosperity. Lowering tariffs does stimulate trade, but it pales in comparison to the economic growth seen when supply chain barriers to trade are reduced or eliminated. This study shows decreasing these barriers could increase world GDP six times more than merely eliminating tariffs.

To reduce barriers to trade, the global business community needs to be innovative and put forth best practices that can be coordinated among small and medium-sized businesses, as well as large multinationals throughout many industries. In tandem, governments need to prioritize investments and ensure collaboration across countries, benefitting consumers through lower costs and more efficient global supply chains.

Reducing these trade barriers, such as customs clearance delays, lack of standardized procedures and poor infrastructure, will not be easy to achieve. However, by recognizing that we are now a global market and focusing on the "whole of the supply chain", we can collectively create a more stable global economy.

Trade, and in particular, breaking down barriers to trade, provides the type of positive stimulus that will benefit generations to come and serves as a path for further regional and multilateral economic cooperation.

Executive Summary

This report examines supply chain barriers to international trade and concludes that they are far more significant impediments to trade than tariffs. In fact, reducing supply chain barriers could increase world GDP over six times more than removing all tariffs.

The report combines empirical macroeconomic analysis with a series of in-depth case studies on individual companies and industries. This ground-level understanding informs a general set of lessons relevant to governments and companies as they attempt to promote trade and economic growth. The authors of the report offer specific policy recommendations with the lessons in mind.

Reducing supply chain barriers to trade could increase GDP up to six times more than removing tariffs. They have been under managed by both countries and companies

Reducing supply chain barriers to trade could increase GDP by nearly 5% and trade by 15%

If every country improved just two key supply chain barriers – border administration and transport and communications infrastructure and related services – even halfway to the world's best practices, global GDP could increase by US\$ 2.6 trillion (4.7%) and exports by US\$ 1.6 trillion (14.5%). For comparison, completely eliminating tariffs could increase global GDP by US\$ 0.4 trillion (0.7%) and exports by US\$ 1.1 trillion (10.1%). The estimates of the impact of barrier reduction are conservative; they reflect improvements in only two of four major supply chain categories.

Why is lowering barriers so effective? The reason is that it eliminates resource waste, whereas abolishing tariffs mainly reallocates resources. Moreover, the gains from reducing barriers are more evenly distributed among nations than the gains from eliminating tariffs.

Of course, reducing supply chain barriers requires investment, while tariff reductions require only the stroke of a pen. However, many barriers can be traced to regulation. Detailed analysis can enable policy-makers to prioritize the investments that are most critical and cost-efficient.

Reducing barriers benefits households by lowering prices and improving employment prospects

The welfare gains from a trade increase would be substantial, though not every individual or company would benefit. Reducing supply chain barriers lowers costs and hence lowers prices, both to consumers and to firms that import production inputs. Consumers gain access to a wider variety of goods. Workers benefit as well, as the boost to GDP is likely to stimulate employment growth. In the long run, trade facilitation promotes a shift in resources to more productive industries and firms, thereby increasing productivity and wages.

Trade increases from reducing supply chain barriers can be achieved only if specific “tipping points” are reached

The effects of reducing barriers are not gradual; changes occur when tipping points are reached

Most macroeconomic trade models assume that the relationship between removing a supply chain barrier and the resultant effect on trade is a continuous function. But the case studies in this report suggest that removing barriers has an effect only when the effort reaches a tipping point. Companies conduct rigorous analyses to determine profitable geographies for production and sale of their goods. These analyses are generally binary: the company either chooses to produce and/or sell in a specific market or does not. Incremental reductions in trade barriers thus may have no impact until a certain “set” of barriers is removed. For example, Brazil adopted an electronic freight system but failed to invest sufficiently in supporting information and communications technology (ICT) infrastructure. Agriculture Co., a global agribusiness, experiences multiple delays each week when government servers crash. The company estimates that unreliable ICT systems and processes cut its truck fleet's operating efficiencies by some 4%.

However, once barrier reductions reach a tipping point, the impact on trade and foreign direct investment can be immense. For example, by addressing the different barriers and the complexity faced by small Internet merchants, the number of merchants selling internationally can increase significantly.

A barrier's consequences vary by industry

The effect of supply chain barriers on companies differs from one industry to another; it depends on product characteristics such as time sensitivity,

exposure to regulation, and value-to-bulk ratios, as well as supply chain complexity. Companies commonly respond to delays and unreliability by holding additional inventory. For example, a company highlighted in this report active in rubber products holds 120 days of inventory instead of 30 as a result of supply chain barriers. Individual companies must balance the cost of higher inventory levels against the opportunity costs of lost revenue or reputational damage if barriers leave them under stocked.

Barriers are harder to overcome for smaller businesses

Supply chain barriers make it particularly difficult for smaller businesses to enter foreign markets. Despite being integral parts of most national economies, small- and medium-sized enterprises (SMEs) have been largely excluded from export markets. Overcoming supply chain barriers often requires significant upfront investment – for example, understanding varying country regulatory requirements – and SMEs may find it difficult to generate enough revenue to compensate for these fixed costs. SMEs are also unable to realize the economies of scale associated with international shipping. For example, a survey of eBay's small German merchants shows that one-third of the significant barriers to exporting outside the European Union have to do with the number of regulatory regimes or with difficulties in international shipping.

Clear regulations and better coordination among agencies are needed

One key element of supply chain barriers is heterogeneity in country policies, and even among agencies within any one country. A lack of uniform customs rules, for example, makes it significantly more costly for a company to operate in multiple foreign markets. The variation requires companies to invest in understanding many different regulations, and to complete far more paperwork than would be required under uniform standards. In extreme cases, companies must alter product specifications or reorganize their supply chain to deal with conflicting requirements. Coordination can also be lacking within nations, particularly when an industry falls under the jurisdiction of multiple government agencies. For example, when importing chemical products into the US, Chemical Co. must, on average, comply with regulations from five different agencies that often fail to coordinate and communicate effectively with one another. The company's shipments of acetyl products, for example, are delayed a staggering 30% of the time.

Recommendation to countries and companies – the devil is in the details

Main country lesson: Governments need to remove the sets of barriers relevant to their industries

Given the heterogeneity in supply chain barriers, governments must understand their existing industries and potential future industries, and prioritize which barriers are most costly to those industries. Governments can then develop tailored strategies to address them, with an emphasis on reaching the tipping points that will unlock trade and investment. Singapore provides a good example: its strategic initiatives to reduce barriers have made it one of the most open economies in the world, placing it at the top of the Enabling Trade Index.

Some companies have a vested interest in preserving barriers

In engaging with stakeholders, governments should recognize that some may have a vested interest in preserving barriers. Some companies will be local firms seeking protection from import competition. The remainder may include firms whose added value exists because of barriers, firms that have already made significant investments to address barriers, and firms that perceive the status quo as inevitable. Governments should also realize that some of the stakeholders might not exist yet or might not have voice.

Main company lesson: Companies may not recognize costs where they should

In dealing with a global supply chain, companies must account for costs beyond traditional factor costs – for example, the costs associated with greater inventory or an increased risk of theft. When making decisions on which markets to produce and sell in, companies should recognize that costs associated with supply chain barriers may offset more obvious savings, such as lower labour costs. Many companies, after making large investments, have been surprised to find that supply chain barriers completely eliminate the cost advantages on which the investments were based.

Policy implication: Think Supply Chain!

Given the significance of supply chain barriers, the international community should actively manage supply chain costs, particularly since tariff discussions have stalled. Governments need tailored strategies to address these barriers, but certain general policy recommendations should inform their strategies:

- 1. Create a national mechanism to set policy priorities for improving supply chain efficiency based on objective performance data and feedback loops between government and firms.*
Governments must work with businesses and analysts to determine the policies and procedures that will help reach key tipping points. A central component of this effort should be the creation of mechanisms to collect data on factors affecting supply chain operations. This data can then be used to identify clusters of policies that jointly determine key supply chain barriers, identify priorities for action, and assess progress.
- 2. Create a focal point within government with a mandate to coordinate and oversee all regulation that directly affects supply chain efficiency.*
Given the importance of tipping points, governments need to design policy with an economy-wide vision and the recognition that industry-specific supply chains are affected by different clusters of policies. Improving supply chain performance requires coherence and coordination across many government agencies and collaboration with industry. Governments should create a high-level body to oversee all regulation directly affecting the supply chain.
- 3. Ensure that SME interests are represented in the policy prioritization process and that solutions are designed to address specific constraints that impact SMEs disproportionately.*
Because SMEs face proportionally more barriers, governments should pay special attention to the needs of smaller businesses.
For example, one relatively straightforward policy would be to raise de minimis provisions to facilitate small-business engagement in international markets; another is to ensure that initiatives to reduce regulatory compliance costs such as trusted trader programmes are open to smaller firms and are complemented by programmes to help them address regulatory complexity and lower their costs.
- 4. Whether through multilateral or regional agreements, governments should agree to pursue a whole of the supply chain approach to negotiating barrier removal.*
Greater coherence of domestic policies is important, but a key insight derived from the case studies is that coordination across countries matters as well. Joint action will increase the

overall gains from lower supply chain barriers. International trade negotiations usually take a silo approach, addressing policy areas in isolation. Lowering supply chain barriers requires a more holistic approach that spans key sectors that impact trade logistics, including services such as transport and distribution, as well as policy areas that jointly determine supply chain performance – in particular those related to border protection and management, product health and safety, foreign investment, and the movement of business people and service providers. A whole of the supply chain approach can be pursued through both multilateral and regional trade agreements.

- 5. Launch a global effort to pursue conversion of manual and paper-based documentation to electronic systems, using globally agreed data formats.*
Many of the inefficiencies in supply chain operations reflect a lack of reliability due to delays and uncertainty stemming from manual paper-based documentation, redundancy in data requirements and the absence of pre-arrival clearance and risk management-based policy implementation. A global effort to adopt common documentary and electronic data/information standards would reduce administrative costs, errors, and time associated with moving goods across borders.

Summary of company case examples

Detailed case descriptions can be found in the report

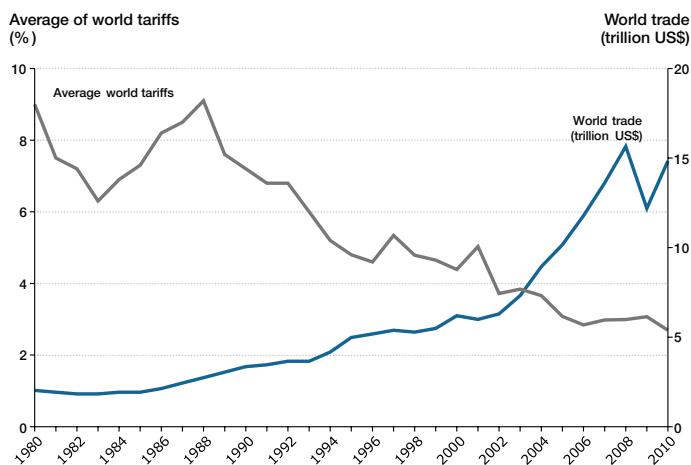
Name	Description	Summary
1 Agriculture Co.	Agriculture commodities in Brazil	<ul style="list-style-type: none"> Internal transport and communications infrastructure in Brazil, coupled with customs procedures barriers, affect agriculture commodity supply chains that start in remote locations Lack of infrastructure creates delays and potentially demurrage costs of ~US\$ 25,000 per vessel per day Lack of information and communication technology reduces operating efficiencies of truck fleet by 4% Managing customs paperwork takes some 12 times longer in Brazil than in the European Union (full day vs a couple of hours)
2 Rubber Products	Rubber monopoly in South-East Asia	<ul style="list-style-type: none"> Substandard infrastructure, poor quality control and a corrupt business environment in the South-East Asian rubber market make the supply chain for finished goods unreliable Eliminating such barriers could reduce carried inventories by 90 days, representing a 10% reduction in landed cost
3 Healthcare Co.	Trusted trader programmes in Canada and China	<ul style="list-style-type: none"> Trusted trader programmes are one way in which countries try to overcome customs barriers to trade, but specifics of the programme itself can enable trade in varying degrees The company's trusted status in Canada is through an account-based system, requiring low minimal periodic inspections from government, which adds only 0.07% to costs per shipment In China, trusted status decreases volume of inspections, which are still carried out for every transaction, and adds 0.64% to costs per shipment
4 Chemical Co.	Importing chemicals into US and Brazil	<ul style="list-style-type: none"> Chemical industry faces high market access restrictions through licenses, import procedures and lack of government agency coordination Delays in chemical products are sensitive because of storage problems, demurrage charges, and potential confiscation of products Obtaining licenses and lack of coordination of five agencies in the US leads to delays in up to 30% of acetyl product shipments – with potential demurrage charges of US\$60,000 per day Inefficiencies and uncertainty in Brazil force company to choose a privately owned zone – they pay US\$30,000 fee per shipment vs US\$10,000 using the customs zone
5 Mexican Chemical Co.	Market access and business environment effect in Mexican industry	<ul style="list-style-type: none"> A Mexican chemical company is hampered by registration regulations in the European Union requiring redundant local lab testing, which delays delivery several weeks Deteriorating business environment increases inspection rates of chemical products into Mexico eightfold as a response to the rise of illegal drug trafficking, which adds US\$ 750 to US\$ 1,800 per shipment
6 eBay	Unlocking SME trade	<ul style="list-style-type: none"> Complex regulations, poor international shipping services, and high fixed costs of international trade discourage SMEs, who often enter markets only with reliable shipping and transparent or few regulations Using preliminary eBay and outside data, the authors estimate that removing such barriers could trigger between 60% and 80% increase in cross-border SME sales
7 IATA	e-Freight: global air cargo	<ul style="list-style-type: none"> Complexity of handling physical paperwork along the global cargo chain is a major cause of delays and hidden costs Adopting electronic documentation for the air cargo industry could yield US\$ 12 billion in annual savings and prevent 70-80% of paperwork-related delays
8 Pharmaceuticals	Pharmaceutical industry in South-East Asia	<ul style="list-style-type: none"> Local investment regulations, import quotas, and inconsistent standards in South-East Asia and other developing markets obstruct pharmaceutical companies – they will release fewer new products in such markets, delaying people's access to advanced medicine Local clinical trials imposed by some countries may delay market entrance of new medicines by as much as five years
9 Apparel Co.	Apparel manufacturer in Madagascar	<ul style="list-style-type: none"> Supply chain barriers in Madagascar – shipping services and border administration – threaten to erode the country's labour cost-competitive advantage Supply chain barriers account for about 4% of total revenues through higher freight costs, increased inventories and customs charges Country faces high opportunity cost – for every 1% gain in fast fashion segment, some US\$ 54 million is generated for the economy

Name	Description	Summary
10 Global Co.	Hidden costs of producing in Mexico	<ul style="list-style-type: none"> Based on Bain & Company's experience, the impacts of supply chain barriers are addressed through a hypothetical study of Global Co., and what considerations it must make when setting up a manufacturing facility in Mexico for the North American region Consideration of a country's hidden supply chain costs includes transportation, infrastructure and security barriers While Mexico might have a 25% cost advantage, more than half of that advantage could be eliminated by supply chain friction costs
11 CPG Co. (consumer packaged goods)	Risk and business environment in Africa	<ul style="list-style-type: none"> Political and social instability, economic mismanagement, corruption, and security increase company costs and financing ability in Africa; they drive company investment decisions Poor quality of infrastructure in roads, ports and services creates inefficiencies that translate into higher prices. Input raw material costs may even increase almost up to 200% in certain countries
12 Semiconductor Co	High-tech industry barriers in Brazil, Russia, India and China (BRIC)	<ul style="list-style-type: none"> Vague regulations and complexity in customs processes within China and Russia create bottlenecks in a semiconductor company's supply chain, making it difficult to manage inventory levels and the shipment of finished goods Operating in uncertain and unsafe business environments in Brazil, Argentina and India hampers operations and increases business costs
13 Tech Co.	Preferential market access in India	<ul style="list-style-type: none"> Preferential Market Access regulation, which provides preference for locally produced products in government procurement, could increase costs by 10% over imports. If extended to cover sales to private companies, this would have adverse effects on the competitiveness of foreign producers
14 Handset Distribution Co.	Market access in Brazil and overall African business environment	<ul style="list-style-type: none"> Complexity in tax and tariff regimes, and excessive customs requirements create significant costs in Brazil that are transferred to consumers Handsets imported to Brazil will face 83% tax vs 32% for locally produced, and customs delays of up to a month will add 5% to cost of product Fees and tariffs, corruption, and inadequate infrastructure in Africa lead companies to base operations elsewhere, and sometimes even not to enter specific markets Lower barriers and greater connectivity in Dubai make it a better location for operation, even if that means adding ~5% cost to end product
15 PC Co.	Technology market access in the Middle East	<ul style="list-style-type: none"> A wide range of supply chain barriers to trade in the Middle East, in the form of local content requirements, rules-of-origin restrictions and pilferage at border crossings, stretch out customer delivery times and increase costs by 6% to 9%
16 Computer Co.	Computer market access in Russia	<ul style="list-style-type: none"> Product testing and licensing lead to large administrative costs and delay time-to-market anywhere from 10 days to eight weeks depending on specific product type Price uplifts – the price-setting of shipment imposed by customs on imports – cause higher value-added tax (VAT) that increases costs in some instances up to 30% of invoice price
17 Express Delivery Services Co.	Customs barriers in global express delivery	<ul style="list-style-type: none"> Delays arising from customs clearance bottlenecks and border administration inefficiencies are the major barriers express delivery companies encounter Lack of risk analysis methods, limited customs operating hours, and lack of process standardization and coordination cause delays that may amount to 25% of the shipping cost company pays per package
18 Shipping Co.	Cabotage in US and China	<ul style="list-style-type: none"> Cabotage is a politically sensitive restriction to the movement of goods within country borders; while based on sound national security concerns, the inefficiencies it creates affect entire supply chains. Relaxing cabotage restrictions reduces yearly costs by about US\$ 200 million if the US trans-ships international containers instead of transporting via land In China, relaxing relay regulations may reduce costs by some US\$ 500 to US\$ 700 million, and may reduce some US\$ 1 billion in inventory by trans-shipping instead of rerouting

1. Introduction

The distributional impacts of international trade often generate heated debate, but the overall benefits of greater trade in supporting increases in global welfare are widely acknowledged. Historically, negotiations to expand trade have focused on removing tariffs and non-tariff measures – with considerable success. But more recent trade-widening talks, like the stalled Doha Round, have foundered.

Figure 1: Tariff removal has been successful in increasing trade



Source: Tariffs adapted from Coatsworth and Williamson, 2002 and Mitchel, 1992; referenced in Nenci, 2009; World Bank, World Trade from World Trade Organization report, 2012.

The last 30 years have seen a large reduction in tariffs. Today, the biggest deterrents to trade are physical, administrative and informal obstructions to the movement of goods. Regulations that impinge on the smooth functioning of a product's global supply chain interfere with trade more than traditional barriers do. New efforts to make global supply chains function more smoothly have won industry advocacy and have begun to be embraced in recent regional trade talks, like the Trans Pacific Partnership.

The World Economic Forum has been a leader in fostering this new understanding of how to broaden and deepen global trade by unshackling supply chains. Its annual *Global Enabling Trade Report* (GETR) identifies market access, border administration, telecommunications and transportation infrastructure, and business environment as the four main issue areas affecting supply chains before, at and after the border. This analysis also builds on more detailed data compiled by the World Bank, in particular the *Doing Business* reports and the *Logistics Performance Index*.

Building on the insights provided by these indicators, the World Economic Forum launched the Enabling Trade: Valuing Growth Opportunities project under its Supply Chain & Transport Industry programme at its Annual Meeting 2012 in Davos-Klosters in January. Conceptualized by the Forum's Global Agenda Councils on Trade and Logistics & Supply Chain, the project aims to improve the understanding of the policies that result in supply chain inefficiencies and to identify new approaches that can be taken to reduce supply chain barriers, including through trade negotiations and cooperation.

This report quantifies the barriers highlighted by the *Global Enabling Trade Report* and describes how they actually play out on the ground through the examination of 18 case examples drawn from many industries and geographies. It attempts to answer several questions: How do companies deal with barriers? What costs do barriers impose? What impact do they have on supply chain delays? Some cases focus on a single company, others on a collection of companies or an association.

The major lessons and recommendations drawn from these examples can be found in the body of this report. Detailed descriptions of the cases studies can be found under section 6. The authors are grateful for the cooperation of the many companies and executives who generously shared their time and perspective.

2. Approach

Definition

This report focuses on supply chain barriers to trade. These barriers are more extensive than those that are traditionally considered, as they include what happens both before and after goods cross the border.

The barriers described here are based on the definition used by the *Global Enabling Trade Report* published annually by the World Economic Forum. The definition includes barriers related to the following four areas:

1. *Market access*: The extent to which a country's policy framework welcomes foreign goods into the country's economy and enables access to foreign markets for its exports
2. *Border administration*: The extent to which border administration facilitates the entry and exit of goods
3. *Transport and communications infrastructure*: The extent to which a country has the transport and communications infrastructure necessary to facilitate the movement of goods within the economy and across the border
4. *Business environment*: The quality of a country's government, including the regulatory and security environment affecting the business of importers and exporters active in the country.

Though tariffs affect market access, they are not the main focus of this report and the case studies.

The barriers considered could be solved with appropriate policies. This does not mean that the solutions would be simple, easy or cheap. For example, removing infrastructure barriers could mean creating a policy that facilitates extensive investment in infrastructure.

Scope

The report tries to understand how barriers affect the different stakeholders in international trade from a supply chain perspective. Since trade barriers are a broad subject, the report is necessarily limited in scope.

First, the report considers a country's business environment and infrastructure only as they affect international trade. Their effects on the domestic economy are outside the scope of the study.

Second, even though trade between countries includes goods, services and factors of production, this report focuses on goods. (Manufactured) goods make up the majority of global exports and are most relevant to international supply chains. The economic modelling in this report includes all non-fuel trade.

Third, governments propose many arguments in favour of tariffs, quotas and non-tariff barriers, for example for goods that have strategic value. The report does not try to evaluate these arguments.

Approach

The report combines a quantitative study of the macro effects of barriers with a view of their effects on the ground. It aims to generate insights and recommendations that policy-makers, trade representatives and companies can use.

The report draws on the Forum's network, Bain's analytical capabilities and the World Bank's expertise in trade and macroeconomics. The team also received input through a series of high-level Enabling Trade workshops around the world (including in Washington DC, Geneva, Puerto Vallarta, Tianjin, Hong Kong SAR, New Delhi and Dubai) which engaged senior government and international organization representatives, business leaders and academics.

The authors started with a review of the academic literature. There have been many reports on the macroeconomic impact of barriers. However, most do not lend themselves to action. While these reports identify various impacts, they lack insight into how companies actually think about their supply chains and how they make decisions.

So the authors of this report decided to approach the subject from two sides. First, they assessed the macroeconomic effects, working with Michael Ferrantino and his team.¹ Team members drew on the gravity model developed at the World Economic Forum, along with a survey conducted specifically for this report. They based their assessment on the *Enabling Trade Index* (ETI) as published in the Forum's *Global Enabling Trade Report* (GETR).

Next, the authors looked at the effect of barriers on companies. They reached out to nearly 90 companies,² and received input in varying degrees from 35 companies. Twenty-one participated in building 18 case studies representative of major industries, barriers and supply chain steps. The companies are all multinationals, each has operations in over ten countries and all geographies are covered. Their combined revenue exceeds US\$ 800 billion. As many were worried about confidentiality and political repercussions, most are not named.

A comprehensive bottom-up study of all supply chain barriers to trade is obviously unachievable. The report's authors needed to work with companies that were willing to cooperate and provide data within a limited timeframe. This skews the company sample in a few ways:

- Western companies are proportionally overrepresented because they were easier to approach, and as a group they were more willing to participate
- Most of the case examples describe the experience of large multinationals; these companies have usually invested heavily in their supply chains, so they don't necessarily face the highest barriers
- Smaller companies are underrepresented, an issue addressed later in the report.

For the case studies, companies were asked about the biggest supply chain barriers they face and which regions and products are most problematic. Each case study was then framed based on company responses wherever possible. The authors tried to understand the implications of these barriers and what an ideal scenario would be. They also tried to understand how the companies dealt with the barriers. Cases typically involved several interviews, data provided by the company, and external research. Sometimes, the companies came with their own analysis. Other times, a model a company had already built was adjusted.

Because the report is based on case studies of specific companies and products, the examples are detailed and colourful. Though all companies agreed to the publication of their case, the case studies are only as valid as the information provided.

Finally, based on the case examples collected and the interviews and discussions with the task force, the report lays out the main insights. Based on consideration of these insights, the World Bank offers recommendations for policy-makers and trade negotiations.

3. Description of Supply Chain Barriers to Trade

Consistent with the categories used by the *Enabling Trade Index* (ETI), this report organizes supply chain barriers to trade into four main categories and the nine specific pillars they embrace. This section briefly describes each of the barriers, presents some illustrative case examples, examines how barriers interact across categories, and describes the consequences they have on companies' operations.

Figure 2: Supply chain barriers to trade

Definition: The lack of infrastructure, institutions, policies and services facilitating the free flow of goods over borders

Market access	Border administration	Telecom and transport infrastructure	Business environment
1. Domestic and foreign market access - Quotas - Import fees – not tariffs (e.g. tax schemes) - Local content requirements - Rules of origin - Technical, sanitary and phytosanitary measures or other requirements - Import/export licenses	2. Efficiency of customs administration 3. Efficiency of import-export procedures (e.g. coordination between border agencies; administration burden of complying with standards) 4. Transparency of border administration (e.g. facilitation payments)	5. Availability and quality of transport infrastructure 6. Availability and quality of transport services 7. Availability and use of information and communication technologies (e.g. tracking, electronic-tolls, communication)	8. Regulatory environment - Investment policy - Hiring foreign workers - Other regulatory environment issues (including trade finance) 9. Physical security

Note: The Global Enabling Trade Report identifies 9 pillars, this is an extended list including several sub-pillars as tested in a separate survey for this study.

Supply Chain Barriers to Trade

A. Market access

Market access encompasses both domestic and foreign market access.

1. Domestic and foreign market access

Frequently cited by companies as a primary concern, market access includes tariffs as well as non-tariff measures that disadvantage foreign firms, which are a major focus of this report. Many of these measures primarily serve other purposes, and usually fulfil valid policy goals. However, when they are sometimes abused or not standardized when possible, they become barriers. Market access barriers include safety and sanitary requirements, technical standards, local content requirements and other regulations that make importing into the country more difficult. Like tariffs, these restrictions give the domestic industry a price advantage over foreign competitors.

The case studies in this report include numerous instances of market access barriers. For example, PC Co. faces burdensome local content requirements and rules-of-origin restrictions when serving the Middle East and Indonesian markets from its manufacturing base. In Vietnam, many pharmaceuticals importers are required to conduct local clinical trials, even for drugs that the US Food and Drug Administration (FDA) or the European Union's European Medicines Agency (EMA) had previously approved. In the US, the Jones Merchant Marine Act of 1920 restricts the movement of merchandise between US ports to ships that are US-owned, US-crewed, and US-built, reducing competitive forces and raising the costs and environmental impact of transport. The case studies on Chemical Co., Mexican Chemical Co., Technology Co., Handset Distribution Co., and Computer Co. provide further examples of market access barriers.

B. Border administration

The second category of barrier is border administration, which includes three pillars: efficiency of customs administration, efficiency of import-export procedures, and transparency of border administration.

2. Efficiency of customs administration

Efficiency of customs administration refers to the speed and ease with which imports and exports can clear customs and the quality and range of services national customs authorities provide. Inefficiency usually reflects an insufficient allocation of resources to customs agencies or a failure to adopt best practices in customs procedures. These barriers can include frequent inspections and long wait times.

As a global express delivery company, Express Delivery Services Co. is highly sensitive to the efficiency of customs processes around the world and particularly in developing countries where investments to improve customs processing have lagged. Customs authorities in many developing countries do not employ risk analysis tools to target physical inspections, requiring them to inspect far more shipments. Also, in China, India and other emerging markets, customs agencies do not operate around the clock, seven days a week, resulting in long delays. Other examples illustrating how customs efficiency affects trade can be found in the Healthcare Co. and Semiconductors Co. case studies.

3. Efficiency of import-export procedures

Border delays and burdensome requirements can extend beyond a customs administration to include a lack of coordination between border agencies and compliance with import-export standards.

These barriers weigh especially heavily on industries like chemicals that are regulated by multiple agencies. For example, when Chemical Co. exports into the US, its products can fall under the jurisdiction of up to 12 regulators, including the FDA, the Drug Enforcement Agency (DEA), the Department of Commerce Bureau of Industry and Security (BIS) and the Department of Homeland Security. These agencies operate independently and often lack effective coordination of communications, which results in the imposition of additional rules and regulations and increased delays.

4. Transparency of border administration

Transparency of border administration reflects barriers associated with corruption, which could include the direct costs of making “facilitation payments” (bribes) or the added delays that result if a bribe is refused or not forthcoming. CPG Co., a global consumer goods company, refuses to pay bribes as a matter of policy and faces severe delays at customs and ports in Africa, where its shipments are queued behind those of companies that do pay off officials (see sidebar, “The corrosive effects of corruption”).

C. Telecom and transport infrastructure

Telecom and transport infrastructure, the third category of barrier, includes availability and quality of transport infrastructure, availability and quality of transport services, and availability and use of information and communication technologies.

5. Availability and quality of transport infrastructure

Inadequate road, rail, sea or air transportation networks can be a huge burden, especially when moving goods across a large territory from inland facilities to coastal ports. The availability of quality transport infrastructure reflects the number of airports, the quality of roads and the amount of congestion at ports and other transport facilities.

The case study on Agriculture Co., an agricultural products and food company with significant operations in Brazil, illustrates the types of barriers firms can face in transport infrastructure. Poorly maintained roadways reduce truck weight capacity and speed, and increase maintenance and repairs. A poor rail network forces Agriculture Co. to rely on trucks for longer-haul cargoes where rail would be more efficient. Additionally, inadequate port infrastructure creates choke points when cargo is unloaded. The case studies of CPG Co., Apparel Co. and Express Delivery Services Co. provide further examples of how poor transport infrastructure impedes trade.

6. Availability and quality of transport services

Closely related to transport infrastructure are barriers related to transport services, which may include a dearth of companies picking up or delivering goods to a country and a lack of a capable local logistics industry. In Madagascar, for example, Apparel Co., an apparel company that has manufacturing facilities in the country, struggles to compete with Asian rivals because Madagascar’s low trade volume accommodates only one ship sailing per week.

7. Availability and use of information and communication technologies (ICT)

Unreliable communications and technology infrastructure add uncertainty to a company’s supply chain by, for example, making it difficult to track containers at ports or forcing shippers to rely on paper documentation instead of electronic customs processing.

Agriculture Co., an agriculture company with operations in Brazil, cannot rely on Brazil’s limited electronic freight invoice system to handle all transactions. The company also estimates that it encounters five- to six-hour delays about twice a week when government computer servers crash. The IATA and PC Co. case studies describe other barriers stemming from inadequate ICT.

D. Business environment

Business environment encompasses broad issues related to a country’s general business conditions, but two aspects – its regulatory environment and physical security – are especially salient.

8. Regulatory environment

Barriers arising from a country’s regulatory environment that increase costs and risks may reflect an unstable or poorly functioning government, difficulties in hiring foreign workers and a lack of available trade finance. The costs and risks that an uncertain regulatory environment creates can be steep. In Nigeria, for example, CPG Co. was forced to cease operations temporarily because of internal social and political conflicts. In Zambia, CPG Co. and many other foreign companies saw their businesses adversely affected by economic and political mismanagement. The case studies on Rubber Products, Handset Distribution Co., Express Delivery Services Co. and Chemical Co. provide other examples of how regulatory barriers handicap supply chains.

9. Physical security

High crime rates and frequent thefts along the supply chain drive up operating costs and are major factors companies weigh when deciding whether they will enter a market. Semiconductors Co. points to security breaches at customs warehouses in India. PC Co. has been forced to cease transporting its goods between Middle Eastern countries during holiday periods because of the spike in thefts that occurs from the backlog of deliveries that build while customs offices are shut down. Other examples of the impact of poor security can be found in the case study on Global Co.

Although it is useful to separate barriers into distinct categories, in reality the lines between them are blurry. For example, it may not be obvious whether a rule enforced at customs is a market access barrier or a border administration barrier. In other cases, one set of barriers can activate or magnify a second set. For instance, many regulations provide more opportunities for corruption of agents at the border. One company interviewed for this study reported that border agents will exploit any vagueness in customs rules to extract “fines” (bribes). As described in the PC Co. example, frequent border delays during holiday periods led to higher rates theft. Barriers also interact to increase the costs companies must bear. Delays are a serious problem in their own right, but their effects are worsened when poor ICT means the company cannot track the shipment. And the cost of the initial delay is magnified further when business regulations limit a company’s ability to return its shipment.

Consequences of Barriers to Trade

Figure 3: Direct consequences of barriers are costs, delays, volume and risk

Illustrative

Consequence	Costs		Delay		Volume	Risk
	Increased operational costs	Increased investment/working capital	Increased average delay	Increased variable delay (unpredictability)	Decreased volume	Increased (political) risk (unpredictability)
Domestic and foreign market access	●	-	●			
Efficiency of customs administration	-		●	●		
Efficiency of import- export procedures	-		●	●		
Transparency of border administration	-		●	●	-	●
Availability and quality of transport infrastructure	●	●	●	-		
Availability and quality of transport services	●	●	-	-		
Availability and use of ICTs	-	●	-	-		
Regulatory environment	●	●	●	-	-	●
Physical security	●	-				

● most likely
- potentially

Potential implications

- Increased buffer stock
- Increased stock in transit
- High depreciation/scrap rate
- Customer satisfaction/ opportunity costs/ lawsuits
- Increased FX risk
- Increased theft/breakage
- Incurred risk or insurance costs (i.e. hedging or spreading risk)
- Higher return on investments required (lowers volume)

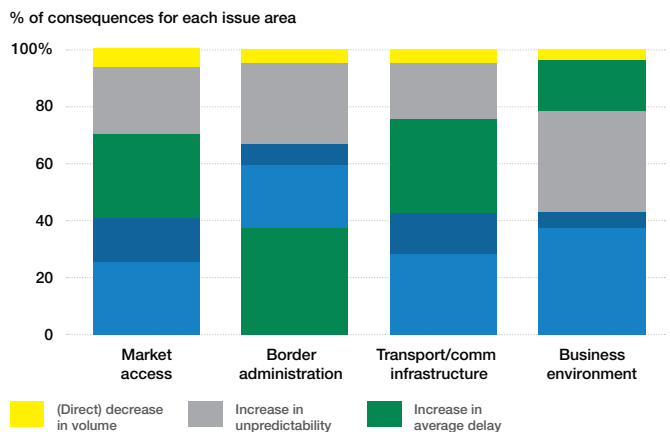
Supply chain barriers weigh on a business in four direct ways:

1. Add to costs, both in terms of higher operating costs and increased capital expenditures
2. Worsen the delays the business faces by making them less predictable or longer.
3. Reduce volume of trade activity
4. Increase risk

A company's experiences will vary by the specific barrier it encounters and the actions, if any, it takes in response. For example, a company that must contend with frequent truck breakdowns resulting from badly maintained roads (poor transportation infrastructure) might simply accept a higher average delay in shipments, or it could purchase additional trucks, thereby increasing capital expenditures.

How an individual company responds will depend on its operational priorities or characteristics specific to its industry. For instance, transportation delays will be more harmful to a company that sells fresh fish than to one that sells canned tuna. Likewise, a company that differentiates itself as the industry's most reliable provider may absorb higher costs – by maintaining a buffer stock of inventory, say – for the sake of fewer, more predictable delays. Finally, while it may be possible to classify a supply chain barrier's direct impact into one of the four categories, the lines may ultimately blur. A company that incurs additional costs because of a barrier may eventually discover that there is no longer a business case to be in that market and will reduce its volume. Or a company that suffers reduced volume – as the result of a quota, for example – could see its production costs rise if it is no longer able to capture economies of scale.

Figure 4: Each trade barrier can disrupt a company's supply chain and lead to higher costs



Note: Includes manufacturing, retail and logistics, N=108
Source: World Economic Forum survey.

The corrosive effects of corruption

Perhaps the most sensitive and difficult trade barrier for companies to discuss is corruption. Because no company likes to admit paying illegal bribes, corruption's full scope is hard to quantify. Multinational corporations like those interviewed for this report are highly unlikely to acquiesce to paying bribes, and as a consequence are the most likely to be harmed by corruption. Although the size of a bribe may be relatively insignificant, the consequences of not paying can be quite large. One company featured in the study reported that in Russia, some businesses pay bribes to avoid tariffs, leaving those that refuse to engage with corrupt officials at a significant competitive disadvantage. In extreme cases of pervasive corruption, some companies may be forced to exit a market altogether rather than try to compete on unequal terms. Since local firms may be better able to deal with corrupt officials, either because of relationships with officials or more knowledge of workarounds, foreign firms are more likely to withdraw from a market because of widespread corruption.

4. Main Lessons

A. Reducing supply chain barriers to trade could increase GDP up to six times more than removing tariffs. They have been under-managed by both countries and companies

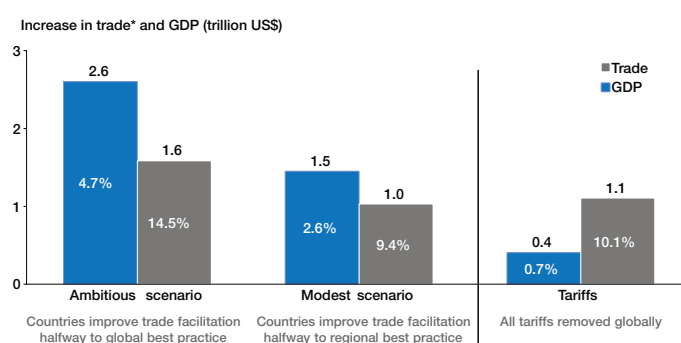
1. Reducing supply chain barriers to trade could increase global GDP by nearly 5% and trade by 15%³

The benefits of improved global trade facilitation far exceed those available from further tariff reduction. Estimates suggest that an ambitious (but still incomplete) improvement in two key components of supply chain barriers, border administration and transport and communications infrastructure, with all countries raising their performance halfway to global best practice, would lead to an increase of approximately US\$ 2.6 trillion (4.7%) in global GDP and US\$ 1.6 trillion (14.5%) in global exports.⁴ By contrast, the gains available from complete worldwide tariff elimination amount to no more than US\$ 400 billion (0.7%) in global GDP and US\$ 1.1 trillion (10.1%) in global exports.⁵

Even a more modest improvement in trade facilitation, in which all countries raised their performance halfway to regional best practice, would lead to increases of US\$ 1.5 trillion (2.6%) in global GDP and US\$ 1.0 trillion (9.4%) in global exports. This is considered a more modest scenario for two reasons. First, it may be difficult for countries to achieve the improvements in border administration and infrastructure envisioned in the ambitious scenario, so it is of interest to show the gains that may be achievable with a less ambitious effort. Second, the improvements in a regional best practice scenario are uneven, since the best practice is different in every region. Thus, the modest scenario reflects a case in which some countries' efforts in trade facilitation lag behind their neighbours more than would be expected given their current performance.

These estimates are illustrative rather than precise and are meant to provide only a broad indication of the potential impact of the policies being modelled.

Figure 5: Reducing supply chain barriers has a larger effect than removing tariffs



The GDP effect of reducing supply chain barriers is much higher than for tariffs

³Based on export value; includes only the effect of "Border Administration" and "Telecommunication and Transport Infrastructure".

Source: Ferrantino, Geiger and Tsigas, The Benefits of Trade Facilitation - A Modelling Exercise. Based on 2007 baseline.

While the increases in trade from tariff elimination are similar in magnitude to those associated with trade facilitation, the increases in GDP are many times greater. The reason is that the kinds of efficiencies brought about by improved trade facilitation are more powerful than those associated with tariff reduction. Reductions in supply chain barriers improve the efficiency of the movement of goods, in a manner analogous to an increase in transportation productivity, thereby recovering resources that are otherwise wasted. In contrast, tariff reductions primarily represent a reallocation of resources within an economy, while capturing only the more modest inefficiency created by the tax.⁶

Gains in GDP associated with trade facilitation would take place in all regions, though they would be concentrated in those with the greatest improvements. In the more ambitious scenario, these would include sub-Saharan Africa, South Asia, and parts of Central and West Asia (labelled "Rest of Asia" in figures below), as well as other developing regions. Economic gains from barrier reductions are more evenly distributed across countries than the gains associated with tariff elimination, which disproportionately accrue to specific countries, such as Russia and China.

Figure 6: Impact per region varies under the ambitious scenario

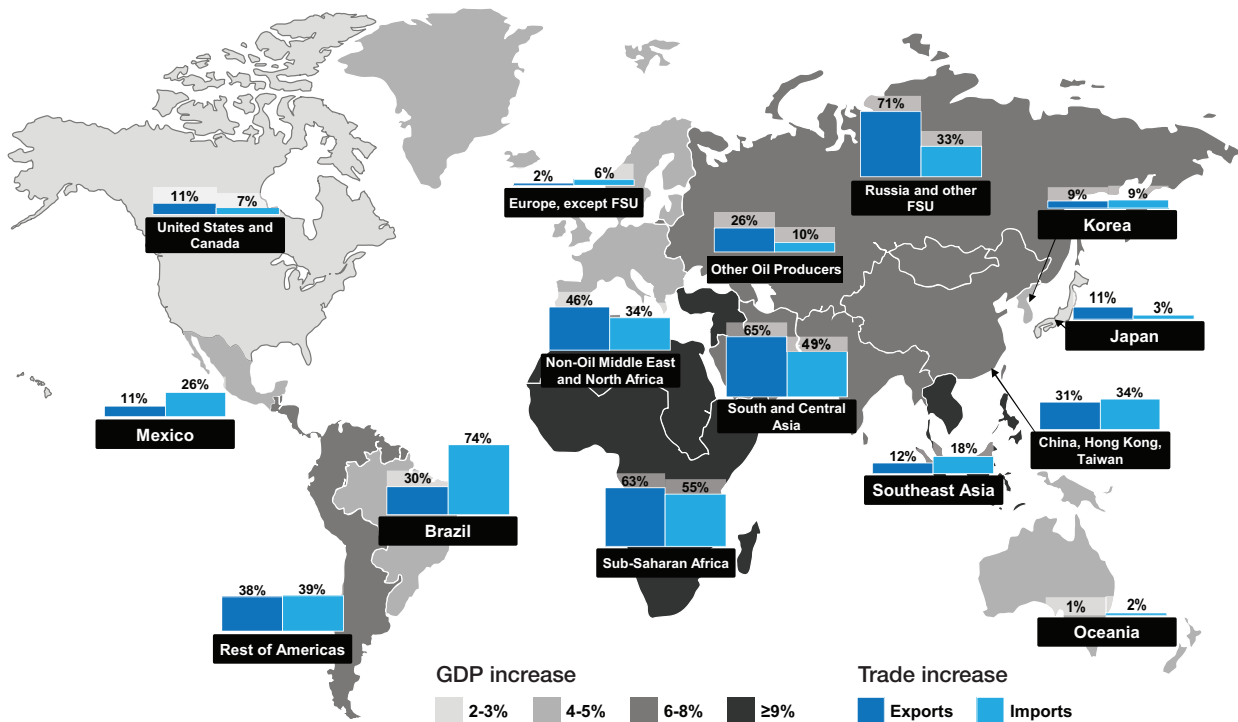


Table 1: Ambitious scenario

Ambitious scenario (Countries raising their performance halfway to global best practice)			
	Increase in GDP (%)	Increase in exports (%)	Increase in imports (%)
Total	4.7	14.5	14.9
Oceania	4.3	0.5	2.2
China, Hong Kong SAR, Taiwan	7.6	30.6	33.8
Japan	2	10.9	2.9
Korea	4.9	8.8	8.9
South-East Asia	9.3	12.1	18.4
South and Central Asia	8	65.2	49.3
US and Canada	2.8	11.3	6.7
Mexico	4.4	11.2	26.3
Brazil	3.6	29.7	73.9
Rest of Americas	7.5	37.9	39.1
Europe, except FSU*	4.5	1.7	6.1
Russia, other FSU	7.4	71	33
Non-oil Middle East and North Africa	8.5	45.9	33.8
Sub-Saharan Africa	12	63.1	55.3
Other oil producers	6.8	25.9	9.9

*FSU = Former Soviet Union

Source: Ferrantino, Geiger and Tsigas, *The Benefits of Trade Facilitations – A modelling Exercise*. Based on 2007 baseline. See text and online Appendix for details.

Trade facilitation leads to expansion of trade in a broader range of sectors than tariff elimination, so global exports would increase for most categories of goods.⁷ The trade-creating effects of tariff elimination are focused on products such as agriculture, processed foods, and textiles and apparel, which currently have tariff peaks. By contrast, a modest amount of trade facilitation would lead to trade expansion in a wider variety of manufactured goods, while ambitious trade facilitation is particularly helpful for trade expansion in technologically complex goods with long supply chains, such as transport equipment, machinery and electronics.

Further gains are available if countries improve market access and the business environment. While these gains are not included in the above estimates, they are likely to be substantial. Improvements in market access – which includes not only tariffs, but non-tariff measures, SPS/TBT⁸ requirements, quotas, licenses, rules of origin and other issues – and improvements in the business environment, including the regulatory environment, investment policy, security and related issues, are important complements to improved trade facilitation. A change in market access and the business environment comparable to those modelled above could increase the overall economic gains by about 70%.⁹

Of course, reducing certain supply chain barriers – particularly those related to infrastructure – requires upfront investments, whereas tariffs can be eliminated with the stroke of a pen. The magnitude of the required investments will depend on the specific situation in a given country or region. While it is important to recognize that gains will depend on prior investments and that the estimates of real income increases are gross and not net gains, it is also important to note that many of the barriers that are modelled in the analysis are a reflection of policy – or the absence of policy – and will not give rise to significant implementation costs. This is the case in particular for border administration improvements, but also to some extent transport and communication infrastructure as the latter includes transport and communications services. As shown in this report, detailed analysis can enable policy-makers to prioritize investments that are most critical and cost-efficient.

Overview of barrier quantification in literature

There is a rich existing literature on supply chain barriers to trade. Much of this literature focuses on a selected set of barriers or a particular geographic region and applies a top-down approach to quantification. Previous work has generally been limited to estimating the effects of barrier reductions on trade volume, but not on GDP. This report augments the existing body of research by combining an empirical macroeconomic model with an analysis of individual case studies at the company and industry level, as well as an empirical estimate of the global effects of supply chain barrier reductions on both trade volume and GDP. Below is a table summarizing the scope and results of key papers. The online appendix contains a more detailed review.

Table 2: Literature overview: Impact of change in metric on trade flows, except where specified differently

Article	Port efficiency	Customs environment	Services/ infrastructure/ transport	Regulatory environment/ corruption/ transparency	eCommerce/ ICT	Enabling Trade Index	Denominator explanation	Geographic focus
Wilson, Mann, Otsuki (2003)	9,7%	1,8%		7,3%	2,3%		Bringing below-average Asia-Pacific Economic Cooperation (APEC) countries halfway to average	APEC
Wilson, Mann, Otsuki (2005)	2,8%	0,8%	4,0%	2,1%			Bringing below-average world countries halfway to average	World
Abe, Wilson (2008)				9,7%			Bringing underperforming APEC countries up to average	APEC
Freund, Rocha (2010)			7,0%				1 day reduction in inland transport time, impact on exports (equivalent to 1.5% decrease in tariffs)	Africa
Djankov, Freund, Pham (2010)			1,3%				1 day decrease in transport time across 98 countries, impact on trade	World
Portugal-Perez, Wilson (2012)	2,5%		5,0%	19,0%	15,0%		Bringing exporter's indicators halfway to the top performer in the region, across 101 countries, impact on exports	World
Portugal-Perez, Wilson (2009)	7,5%						Bringing African exporter's indicators halfway to the top performer in the region, illustrative figure provided (7.5%) is for Ethiopia	Africa
Korinek, Sourdin (2009)	4,5%						5% decrease (1 day) in time in transit	World
Korinek, Sourdin (2011)						36,0%	10% increase in Enabling Trade Index	World
World Economic Forum, Global Enabling Trade Report (2009)						4,0%	1% increase in Enabling Trade Index impact on country-pair trade flow	World
Otsuki, Wilson, Sewadeh (2001)		11,0%					10% decrease in restrictiveness of aflatoxin standards, impact on trade volume	EU/ Africa
Limao, Venables (2001)			28,0%				Reducing infrastructure from median to 75th percentile, reduction in trade	World
Freund, Weinhold (2004)					0,2%		10% increase in Web volume, impact on exports	World
Anderson, Marcouiller (2002)				34,0%			Aligning Latin American institutions with European Union standards	Latin America
Behar, Manners, Nelson (2012)			36,0%				1 standard deviation increase in logistics index (incl. affordability/ speed of shipments, IT and other metrics), impact on exports	World
Helble, Shepherd, Wilson (2007)				7,5%			Bringing APEC nations with transparency measures below average to the regional average	APEC

Table 3: Literature overview: Additional quantification of trade barriers

Article	Relevant empirical result	Geographic focus
Kee, Orlarreaga, Nicita (2006)	Average ad valorem equivalent (AVE) tariff of current in-place restrictions is 10.7%	World
Hummels, Skiba (2004)	Doubling trade flow leads to a 12% reduction in shipping costs	Latin America
Cadot, de Melo (2007)	10% decrease in the % of unit cost required to be from a rules of origin (RoO) country leads to 2-5% increase in use (decrease in effective tariff)	North America/ Africa
Arvis, Duval, Shepherd, Utoktham (2012)	Effect on trade costs of a one-standard deviation increase in logistics index 10x greater than a one-standard deviation decrease in tariffs	World
Hoekman, Nicita (2011)	Convergence of logistics in low-income countries to average of middle-income countries is associated with 15% increase in exports; comparable convergence of tariffs associated with 10.6% increase in exports	World
Adler, Brunel, Hufbauer, Schott (2009)	Implementation of Doha trade facilitation negotiations (freedom of transit, limited border fees, transparent trade regulations) could increase GDP by US\$ 385 billion	World
Decreux, Fontagne (2009)	50% reduction in import/export clearance times by countries above world median increases GDP by US\$ 99 billion	World

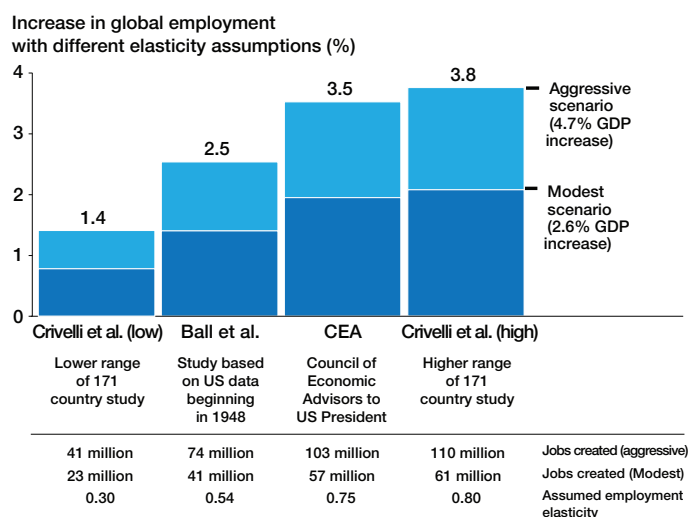
2. Reducing barriers benefits households by lowering prices and improving employment prospects

The most direct benefit of eliminating supply chain barriers is a reduction in cost to trading firms and thus lower prices for consumers and for businesses that import materials used in their production activities. Although both supply chain barriers and tariffs increase the cost of trade, barriers create greater inefficiencies than tariffs because they often represent a pure waste of resources rather than simply a transfer payment to the government.¹⁰ Therefore, as discussed in the previous section, the net gain to aggregate welfare (GDP) from removing supply chain barriers is greater than the gain from lowering tariffs. Even the modest scenario of supply chain barrier reduction yields a global increase in GDP of 2.6%. This increase in income is equivalent to creating over 76 million jobs worldwide, based on global GDP per employed person (a GDP increase of 4.7%, as in the ambitious scenario, is equivalent to creating 137 million jobs).¹¹

Of course, GDP increases can manifest itself in multiple ways, and the actual impacts of lowering trade costs are highly dependent on the specific circumstances in a country or region. Supply chain barrier reductions will improve living standards by reducing social waste and lowering prices. It is also reasonable to expect that increases in aggregate income of the order of magnitude suggested by the analysis would stimulate demand for labour in countries with significant unemployment, creating additional jobs and reducing short-term unemployment.¹² Indeed, the relationship between unemployment and output has been a consistent fixture in macroeconomics since the 1960s.

Precise estimates of the employment impact are complex and beyond the scope of this report. But an illustrative calculation may be useful. A recent study of the statistical relationship between GDP and employment found that, for a majority of the 167 countries studied, estimated employment elasticities were between 0.3 and 0.8. In other words, a 1% increase in GDP is associated with a 0.3% to 0.8% increase in employment.¹³ By applying the lower bound of the range to a modest scenario of a 2.6% increase in GDP, global employment would increase by 0.8%, or approximately 23 million jobs. By applying the range's upper bound to the ambitious scenario of a 4.7% GDP increase, there would be a global increase in employment of 3.8%, or approximately 110 million jobs. These figures should not be viewed as precise forecasts, but rather as illustrative calculations of potential impacts. Any employment gains, of course, would not occur instantaneously, but would be realized over time.

Figure 7: Growth in global income can also stimulate employment



Source: Council of Economic Advisors to US President (2009); Ball et al., 2012; Crivelli et al., 2012.

In the long run, the primary employment benefit of a reduction in supply chain barriers is better, higher paying jobs. By facilitating trade, a reduction in barriers promotes a productivity-enhancing reallocation of workers and capital within the economy. There is substantial empirical evidence in the literature, for example, that freer trade increases competition, which weeds out inefficient firms and shifts resources (labour and capital) to those that are most productive.¹⁴ Studies have shown that exporting firms tend to pay higher wages than non-exporters.¹⁵ The shift of resources from less to more productive industries and from less to more productive firms improves aggregate productivity across countries, further increasing wages, long-run GDP and overall welfare.¹⁶

Citizens also gain in ways that may be difficult to incorporate into GDP. For example, a reduction in trade barriers supports economies of scale, which in turn enable greater product differentiation and variety.¹⁷ Although the welfare gains of variety are more difficult to measure than productivity gains, they can be substantial.¹⁸ The pharmaceutical industry offers a clear illustration. The development of a new drug requires enormous upfront costs, which a firm will incur only if it can realize substantial profits after launch. In smaller countries, a particular disease may not be common enough to sustain such an investment. Patients with this disease would benefit greatly if the drug could be imported from abroad. However, the case studies here indicate that many countries impose barriers to drug imports – such as requiring local clinical trials – that sometimes cause pharmaceutical companies to neglect or underserve that market altogether. These policies may benefit domestic pharmaceutical companies, but at a tremendous cost to the patients who are left without access to the best available treatment.

Why, if trade increases overall income and consumer welfare, do countries not do more to dismantle barriers? The reason reflects the distribution of gains and losses among stakeholders. A key tenet of modern trade theory is that not every worker, firm or community will necessarily benefit.¹⁹ For example, a reduction in tariffs may harm a domestic or established multinational firm that produces a certain product and now faces greater competition from importers, even while it benefits a domestic firm in another industry that uses the product as an input. Consumers as a whole, of course, consistently benefit from access to a greater variety of goods at cheaper prices. The complication is that the benefits of trade are less direct, less immediate, and more widely spread across the population, whereas the costs of trade liberalization are concentrated on a visible (and vocal) few.²⁰

A key dimension of the supply chain barriers that are the focus of this report is that the gains from reforms that reduce supply chain inefficiencies are much larger than the gains from lowering tariffs and are much more widely spread: almost everyone benefits from lower transaction costs. How much different groups in society benefit from lowering supply chain barriers will depend on the degree of competition that prevails on the markets for the goods that are affected by supply chain costs. In cases where competition is constrained or firms have market power, the benefits may be captured disproportionately by certain groups. For the gains to accrue primarily to households, it is necessary that markets be contestable so that the prices of goods and services reflect the costs of production.

B. Trade increases from reducing supply chain barriers can be achieved only if specific tipping points are reached

1. The effects of reducing barriers are not gradual; changes occur when tipping points are reached

Macroeconomic models typically assume a continuous function showing the impact of supply chain barrier reductions on trade volume and investment. However, the case studies in this report indicate that countries make progress in discrete steps: small incremental changes may have minimal effects until a tipping point is reached. So while macroeconomic models provide useful information on average effects, the consequences of any given set of changes will vary based on the specific country, industry and shipping lane.

The chief reason for this is that company decisions on where to locate production and which markets to serve are often binary. One location is either the best place to site production, or else some other location is a better choice. It is either profitable to serve a particular market or it is unprofitable.

Perhaps the best illustration of the importance of tipping points is in companies' decisions about investments. When Global Co. faces the choice of manufacturing in the United States or in Mexico, it needs to analyse a host of factors to determine what makes financial sense. There are obvious advantages to producing in Mexico, such as lower labour costs. But there are also mitigating supply chain considerations; for example, until 2011, goods sent to the US required different trucks and drivers on each side of the border, a situation which is only partially solved today. Also, less automation and lower labour productivity in Mexico would necessitate a larger labour force. Ultimately, Global Co. would need to perform a discounted cash flow analysis to determine which country would make the most profitable production centre.

There is a similarly complex decision process in investments made by Semiconductors Co. In fact, in deciding where to locate production, Semiconductors Co. creates a model that assigns a dollar value to all the relevant factors, including the types of supply chain barriers discussed in this report. As with Global Co., the decision is binary: whether to produce in that country or not. Moreover, by monetizing the factors, Semiconductors Co. can compare each one directly. Thus there is no single combination of factors that leads to success.

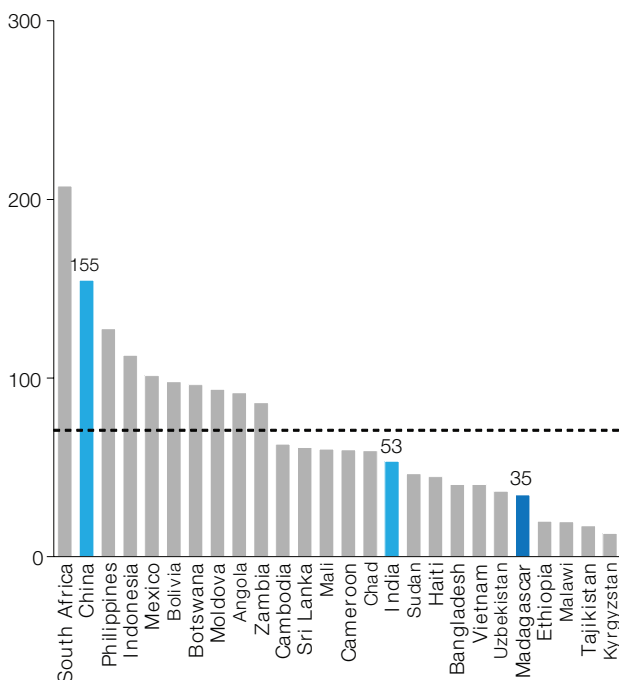
Multi-factor analyses also help companies decide where to hold inventory and sell products. For instance, in deciding where to operate in Africa, CPG Co. considers a host of factors, including the political environment, security, corruption and currency risk. Depending on the perceived riskiness of a country, the company establishes hurdles that must be met in order to justify investment. Until recently, for instance, CPG Co. did not even consider a southern African country for major trade or inventory. It was only after a period of relative stability that the company began to consider the business case for investment there.

Merchants working with eBay further illustrate the importance of tipping points. They can either choose to sell internationally or not. Based on estimates derived with preliminary pilot results, through different enabling initiatives, cross-border sales could increase by 60%-80%. This effect underscores the fact that if barriers can be reduced to a tipping point, the result is a flood of increased trade activity, particularly from small businesses.

Figure 8: Madagascar has labour-cost and free-trade advantages, but supply chain barriers erode competitiveness

Madagascar's labour costs and lack of tariff give it a competitive advantage

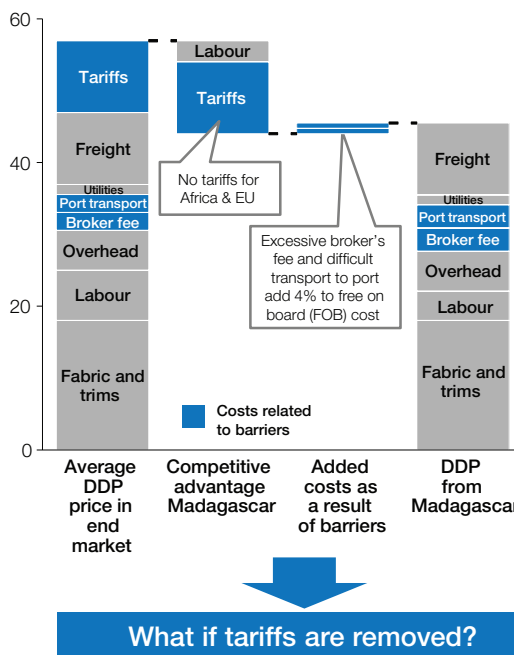
Minimum wage (US\$/month)



Source: Euromonitor 2011 data for labour costs; Bain analysis; company interview.

...but barriers add costs that can tip the balance to the next low-cost country

Average delivered duty paid (DDP) price of apparel item (US\$)



As these case studies demonstrate, incremental improvements will have little impact on trade and investment until a country reaches a tipping point that fundamentally alters the equation. Apparel Co., an apparel manufacturer in Madagascar, offers perhaps the clearest illustration of this reality. Apparel production occurs in a specially designated free zone instituted by Madagascar to facilitate trade. Exports from this zone are subject to fast-track export procedures. In addition, Madagascar has adopted electronic export and import declarations. And yet, notwithstanding its low labour costs and these reductions to supply chain barriers, Apparel Co. continues to suffer relative to competitors in Asia because of poor local infrastructure (see figure 8). Moreover, although the border administration process is electronic, the government has not made sufficient investments in facilities, resulting in long queues and waiting times. A similar phenomenon occurred in Brazil, where the government adopted an electronic freight invoice system. Because of insufficient investment in the supporting infrastructure, servers failed regularly. Agriculture Co. estimates that the unreliability of Brazil's information and communication technology (ICT) systems and processes cut the annual operating efficiencies of its truck fleet by some 4%. In both cases, incremental investments were not sufficient to reach a tipping point that fundamentally altered the environment for trade.

The cases also show that countries are in constant competition with one another. In addition to using its monetization model to make investment decisions, Semiconductors Co. uses the output to negotiate incentives from governments by pricing the difference in attractiveness between two locations.

Handset Distribution Co. is another company that constantly re-evaluates its supply chain decisions based on changing conditions. For example, in the past the company has produced phones in Mexico for export to Colombia. However, if Colombia joins the Mercosur common market, the tariffs on imports from Brazil will likely fall to zero (compared with a 5% tariff on Mexican imports), and Handset Distribution Co. will most likely start sourcing from Brazil. This intensity of competition, combined with the importance of tipping points, requires governments to carefully analyse their unique situations. To realize substantive results, policy-makers must understand where the tipping points lie for particular industries and lanes and pull the appropriate levers. As is so often the case, the devil is the details.

2. Barrier's consequences vary by industry

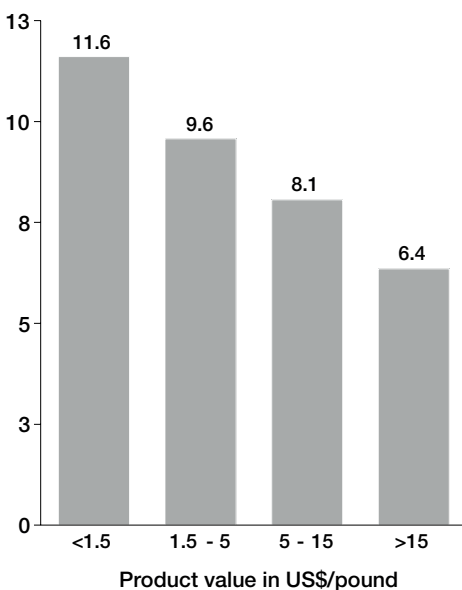
How much a company is hurt by a barrier depends largely on its cost structure and on industry characteristics such as time sensitivity and value

Different cost factors determine the impact of supply chain barriers on an industry. In general, the higher the logistics costs, the more the industry is likely to be affected. Lower value products typically have higher relative logistics costs and so are hit hardest by barriers. Also, different industries have different inventory needs, which in turn determine inventory costs. All logistics costs depend on the value of the product, on time sensitivity, and on the sophistication of the supply chain. A highly sophisticated supply chain, for example, magnifies barriers: primary inputs themselves face the barriers and then are used in secondary or tertiary inputs, which face the barriers again. These factors also determine the necessary speed of the supply chain, and thereby affect how much a company might be willing to invest.

Figure 9: Barrier impact will depend on product value and industry characteristics

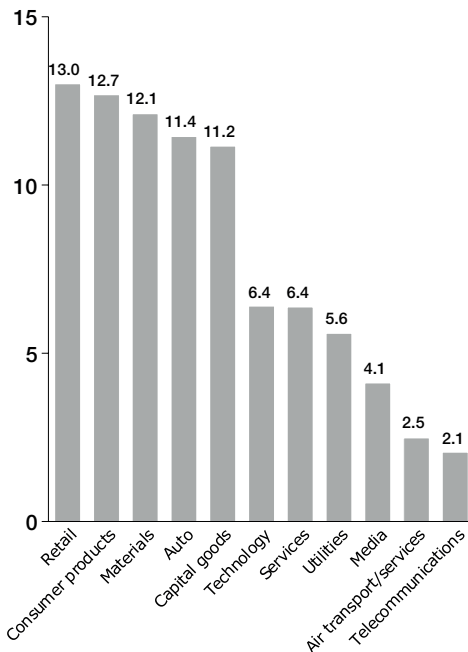
Logistics cost structure depends on product value

Logistics costs as % of sales (2009-US)



Different industries have different logistics and inventory needs

Inventory as % of revenue (2004)



Source: Establish, Inc., 2009. Logistics Cost and Service 2009, page 14. CompuStat 2006; Bain analysis. Note: Latest year is 2004.

The implications of barrier-related delays vary by industry

The most common response to the problem of delays across a supply chain is to increase inventory. For example, Rubber Products Co. mentions a lead time of up to 5 months to obtain rubber gloves for its European distribution centre. Shipping requires only two weeks of this time; the rest is attributable to barriers. The delay means that the company must maintain an average of 120 days of inventory, a level that could be reduced to only 30 days if the supply chain were more reliable and faster. Several other companies take the same approach, with the increased inventory adding to their warehousing costs, working capital requirements, and even demurrage costs. Chemical Co., a chemical manufacturer, deals in bulk shipments. These shipments face severe demurrage costs, amounting to some US\$ 60,000 per day, as a result of delays in loading and unloading at ports. Every hidden cost resulting from delays negatively affects returns and makes investments less attractive.

Even though most companies and industries have to build stock to address barriers, the specific effects depend on industry characteristics. Durable, time-sensitive goods may face rapid depreciation. Fashionable apparel items depreciate quickly if they are not supplied within specific timelines and the item then goes out of style. On average, apparel manufacturers lose ~9% of revenues due to cancellations or returns of late shipments. Non-durable, time-sensitive goods face spoilage if stored for long periods of time. This is particularly problematic for the pharmaceutical industry: large stocks delayed at borders with minimal infrastructure and high temperatures may spoil the products. Pharmaceuticals, for example, must conduct further testing to ensure product integrity, and must dispose of any spoiled medications. High-value products such as high-tech items pose a risk of theft. Handset Distribution Co. sometimes faces issues at its warehouses. In countries such as Brazil and Mexico, where truck raids are frequent, Handset Distribution Co. assigns an escort for shipments worth more than US\$ 1 million. Theft may also occur in government warehouses at the border. Semiconductors Co., for instance, must deal regularly with theft of chips at Indian warehouses monitored by customs. Such differences shape the costs faced by different industries and affect each industry's stance toward barriers.

A slow and inefficient supply chain has other indirect implications as well. A company that runs out of stock faces significant opportunity costs. CPG Co., for instance, struggles constantly to find the right balance between over- and under-stocking in Africa. If a given product is popular, the company may run out of stock, losing significant revenue. If the product does not sell, it might be left with worthless inventory. Then, too, delays may interrupt production. With the advent of just-in-time manufacturing in the high-tech industry, Semiconductors Co. customers try to minimize inventories. But an unexpected delay may then stop production completely. In general, delays and unreliability generate uncertainty in forecasting, leading to poor planning. This might unintentionally lead to grey markets, in which companies sell unsold stock (particularly high-tech products) in other markets. Delays may also lead to lawsuits, and they may generate financial risk from changing foreign exchange rates. All such effects have an impact on industries, though they are sometimes ignored.

At a still broader level, delays may restrict the development of time-sensitive industries or restrict innovation in business models that rely on supply chain speed. For example, the "fast fashion" industry can exist only with reliable, fast supply chains. Zara launches a new fashion line approximately every month by tracking in real time what sells and what does not and then telling manufacturers what to produce. The company must get designs into production quickly, and must receive shipments in three days rather than three weeks. Countries that are unable to meet such expectations will miss out on an entire industry. Apparel Co., an apparel manufacturer, enjoys labour cost and tariff advantages, but the lack of shipping services in Madagascar can generate delays of about a week, which is unacceptable by fast-fashion industry standards.

Companies react very differently to the risk and unreliability associated with barriers

In general, barriers generate risk. Companies can handle this risk either by incurring it themselves or by insuring against it. A company can insure itself by spreading the risk among suppliers and by manufacturing in different centres worldwide. This might be less efficient than a single manufacturing plant, but it mitigates risks. However, companies will closely evaluate risks before taking either path. They will expect higher returns to justify the risk, and may forgo some projects entirely. In countries with high risk profiles, for instance, CPG Co. factors risk into its expected cash flow. This negatively affects the business case for investments, and may lead to investments in other markets instead. In other instances, Global Co. and Handset Distribution Co. consider risk in other financial parameters, such as weighted average cost of capital, return on investment, or internal rate of return, all of which may affect investment decisions.

3. Barriers are harder to overcome for smaller businesses

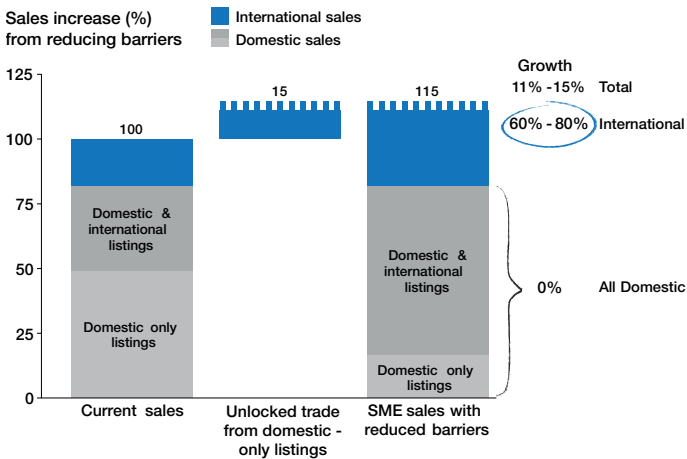
The supply chain barriers discussed in this report are particularly debilitating for small- and medium-sized enterprises (SMEs). Case studies and data analyses conducted across multiple regions have found that SMEs everywhere face similar supply chain hurdles when exporting. In its 2012 Annual Report to Ministers, the Asia-Pacific Economic Cooperation's Committee on Trade and Investment (APEC-CTI) listed delays in customs clearance and problems related to differing legal, regulatory and technical requirements as two important barriers to exporting by SMEs.²¹ An analysis by the OECD concluded that SMEs are particularly vulnerable to the impact of customs procedures and domestic regulations.²² And surveys conducted by the US International Trade Commission (USITC) found that representatives of SMEs cited both the administrative burdens of compliance and a lack of standardized regulations from one country to the next as particular problems for small businesses.

Supply chain barriers particularly hinder the trade of smaller firms because dealing with the barriers requires significant upfront investments. Few SMEs operate on a scale that would make such investments economical.²³ For example, one barrier is simply the time and personnel required to understand the idiosyncrasies of a given country's policies and procedures. Testimony to the USITC indicated that small firms cannot easily absorb the cost of hiring personnel dedicated to navigating the market and regulatory requirements of export markets, whereas larger firms can do so.²⁴ The eBay case study also indicates that these barriers are relevant to a small firm's decision not to export. Those merchants that do choose to sell internationally typically limit sales to countries where the regulations are easiest to navigate.

If such barriers could be sufficiently mitigated, the potential for international trade by SMEs would be immense. In twelve countries identified as target markets by the EU, including China, Japan, Russia, India and Brazil, more than 50% of the € 261.6 billion (US\$ 347.7 billion) in European exports come from SME-dominated sectors. Yet only 13% of EU small businesses are internationally active outside of the EU.²⁵ In the United States as of 2010, 59% of SMEs that currently export recorded sales in only one foreign market. In contrast, 55% of large US exporters recorded sales in five or more countries.²⁶ While SMEs account for half of economic activity in the US, they account for only 31% of total export value.²⁷

Removing the barriers would likely boost trade substantially, as preliminary results from various short-term, highly targeted eBay pilot programmes show. Under these pilot programmes, eBay worked with some of its pre-selected small business users to make the small business listings visible to a global customer base (whereas the listings had previously been visible only to a domestic audience). It then undertook to eliminate the barriers for international buyers and sellers by providing transparency on fully landed costs and delivery dates, facilitating communication between people who might speak different languages, and handling shipping. Estimates here show that that addressing barriers such as these can result in expanded cross-border activity by small business sellers by 60% to 80%. As this result shows, the Internet can be a powerful tool to unlock SME export potential. The finding is further supported by a study in Europe showing that, after controlling for other effects, the possibility of selling online is positively correlated with activity in export or import markets. The study concluded that the Internet makes it easier for all sorts of SMEs to overcome barriers to international trade.²⁸ For example, SMEs can far more easily identify potential markets and customers through the Internet than previously.

Figure 10: Based on pilots, this analysis estimates a 60%-80% increase in cross-border sales by reducing barriers



Note: Assumes same average revenue per listing in domestic and international markets; author calculations based on US eBay pilot studies preliminary results.

Source: Company data; interviews; based on preliminary, targeted US pilot results; authors' calculations.

By definition, SMEs are a fragmented group of small players. Although they are an integral part of most countries' economies and generate a significant share of overall employment, they may find it difficult to mount a united effort to enact the changes and reach the tipping points that enable significant expansion into international trade. If they could, however, the benefit to consumers would be substantial. The small merchants that do business through eBay, for instance, enable customers to enjoy niche products and experience the best of many cultures.

4. Clear regulations and better coordination among agencies are needed

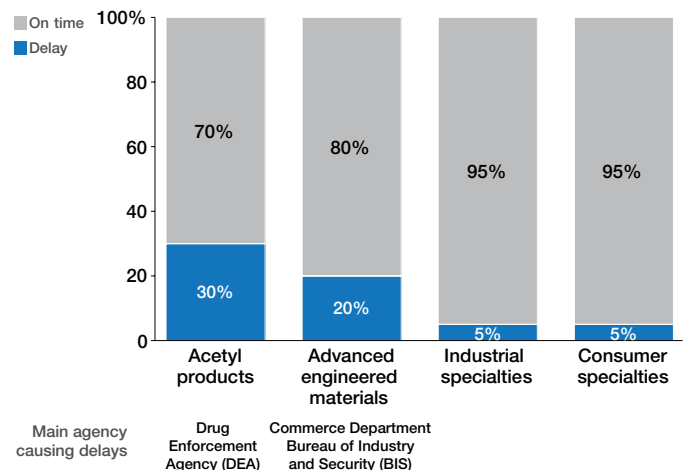
Regulatory factors are a key barrier to efficient cross-border trading. At times, even policies specifically designed to reduce barriers either create new problems or fail to have an impact because of poor implementation.

One barrier facing exporting companies is the lack of standardization in regulatory requirements across countries. Standardizing the requirements would reduce the costs of operating in multiple markets. The case studies in this report illustrate a number of areas where differences in regulatory practices add to the direct and indirect costs of exporting products to multiple regions. In Europe, for instance, chemicals regulations require lab tests at certified European laboratories before chemical products can be registered. This policy forces foreign companies like Mexican Chemical Co. to incur the additional costs of rerunning trials and creates delays in introducing products into the European market. In Mexico, certain chemicals are restricted from import because of concerns that they may be used to produce drugs. However, many of these products have legitimate uses and are allowed in other major markets. Mexico's unilateral bans create conflicts for products designed and synthesized in a global supply chain. Such problems are not limited to the chemical industry. PC Co. faces rules of origin and local content restrictions that vary from market to market, creating a costly administrative burden as the company tries to understand and comply with a diverse set of rules and documentation requirements.

Companies must deal at times with multiple regulatory regimes within a single country. Such conflicts are particularly likely when several agencies have jurisdiction over imports and fail to communicate or coordinate with one another. When exporting into the US, Chemical Co. may have to comply with regulations issued by the Food and Drug Administration (FDA), the Drug Enforcement Agency (DEA), the Office of Homeland Security, and others – five different agencies on average. Unfortunately, these agencies coordinate ineffectively, causing extensive delays and increased costs. For example, the company's shipments of acetyl products, approval of which requires coordination by the DEA and Customs and Border Protection, are delayed a staggering 30% of the time.

Figure 11: Acetyl products and advanced engineered material run into serious Delayed in US imports

Chemical Co. US import delay by product



Source: Company interview

Even when there is a single set of regulations, the rules and procedures may be vague, with little guidance provided by the regulatory body. Under these circumstances, companies must devise their own interpretations of the rules, with no guarantee that the government will ultimately agree. Semiconductors Co., for instance, is required by Chinese regulations to ensure that bonded assets remain under customs control; however, the government offers no guidance on how these items should be tracked or exactly which items are covered by the rule. Uncertainty about how to interpret and implement the regulatory requirements requires Semiconductors Co. to create its own guidelines, which may or may not be consistent with the government's intent. Yet Semiconductors Co. cannot get an answer as to whether its interpretations are correct.

The example of bonded zones in China, discussed elsewhere, also provides an example of how government policies intended to encourage trade can sometimes introduce a new set of even costlier barriers. China introduced bonded zones to provide tax benefits and other incentives to increase trade. The case study of Semiconductors Co. indicates that, as more of its finished products produced in China are ultimately sold domestically rather than exported to other markets, the bonded zones have become a burden. The reason is that customs compliance requirements when moving products between bonded zones are particularly onerous. In fact, it is often faster to first export a product to Hong Kong and then import it back into China than to transfer the good from one bonded zone to another.

Some government policies designed to reduce supply chain barriers to trade, while theoretically beneficial, are poorly implemented. One example of such a programme is the Customs-Trade Partnership Against Terrorism (C-TPAT). The principle behind C-TPAT is to give companies that implement certain security measures access to a faster customs process when importing into the US. In practice, however, companies such as Chemical Co. stated that the requirements are quite costly, while the purported benefits of faster customs times are minimally realized.

Other government programmes to reduce barriers have been successful. Canada was able to institute a trusted trader programme that is widely viewed as a success. Canada's programme is based on account-based clearances, which require customs authorities to assess and inspect only a small portion of the total shipments a company imports.

Meanwhile, efforts to make regulations more sensible often founder because there are few effective communication channels between industry and government. Indeed, many companies the authors spoke to believe some governments actively discourage feedback or criticism. Many companies discussed in this report would not agree to be named for fear of government reprisals. However, as discussed extensively in this report, governments should be striving to minimize regulatory barriers to trade. Effective improvement will come only with clear and honest communication between stakeholders, especially government agencies and companies.

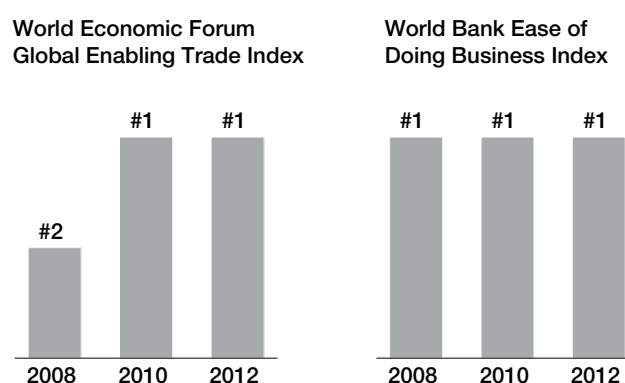
C. Recommendation to countries and companies – the devil is in the details

1. Main country lesson: Governments need to remove the relevant set of barriers for their industries

In *The Competitive Advantage of Nations*, Michael Porter argues that countries should build up and sustain competitive advantage in a cluster of industries that fit naturally with the country's economic structure, institutions and culture. No nation, he says, "can or will be competitive in every or even most industries".²⁹

Some of the most successful competitive clusters in the world have been built up by tapping foreign expertise and by opening up the borders to foreign competition. Singapore is one such country. It has successfully leveraged overseas expertise to foster its industries' competitive advantage. It has also removed barriers to foreign investment and trade. At this time, it is the number one country in the Enabling Trade Index (ETI), and it has been consistently ranked as one of the most business-friendly countries in the world.³⁰

Figure 12: Singapore is consistently recognized as one of the most business-friendly countries globally

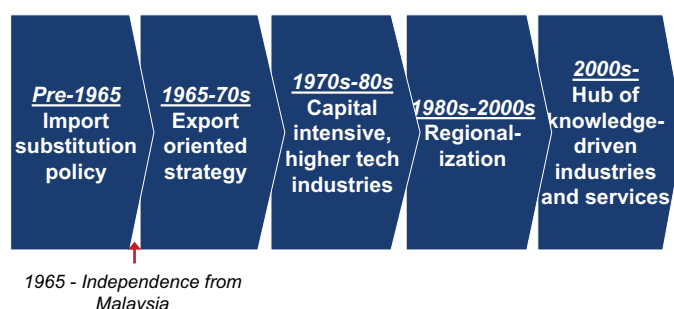


Source: World Economic Forum, *Global Enabling Trade Report*, 2008, 2010, 2012. World Bank, *Ease of Doing Business Report*, 2012. "Singapore Tops World Bank Survey", Bloomberg, 2010.

Singapore's story

Ever since it gained independence from Malaysia in 1965, Singapore has adopted the stance that its development is highly dependent on resources beyond its borders, and that the government should therefore reduce barriers to foreign investment and trade.

Figure 13: Phases in Singapore's growth



From 1965 to 1970, for example – unlike other developing countries that adopted an import-substitution policy – Singapore quickly transitioned to an export-oriented strategy. This shift was encouraged by the loss of the Malaysian hinterland, with its significant base of consumers, and by Britain’s decision to pull its troops out of Singapore.³¹

Believing that Singapore lacked the skills and capital to develop strong domestic enterprises, the government looked to attract foreign investment, implementing a set of measures to improve the investment climate and reduce barriers:

- **Border administration** – The government took a firm stand against corruption, establishing an independent body, the Corrupt Practices Investigation Bureau, that reports directly to the Prime Minister. The government made examples of prominent officials, prosecuting and imprisoning some for corruption.³²
- **Business environment** – Singapore reduced tax rates for certain industries from 40% to 4% for up to 15 years. The government passed legislation to control the nation’s trade unions, which had been prone to strikes. These laws also gave employers greater discretion in hiring and firing.

By 1969, major electronics multinationals such as National Semiconductor and Texas Instruments had located factories in Singapore, making components to ship back to parent companies in the US. Singapore’s manufacturing and net exports grew from 15% to 25% and 12% to 20% of GDP, respectively.³³

In the 1970s and 1980s, increasing land and labour costs started to affect the competitiveness of Singapore’s labour-intensive exports. With its changing comparative advantage, it shifted to attracting foreign investments in higher value-adding industries, such as electronics and chemicals.³⁴ The government also promoted investment possibilities to multinational oil companies looking to develop oil deposits in Indonesia. It accompanied these moves with a set of macroeconomic policies and regulations that further reduced the barriers to foreign investment and trade:

- **Market access** – The government opened nearly all economic sectors other than basic services such as power and telecommunications to foreign investment. It progressively reduced tariffs from 1983 on.³⁵
- **Business environment** – The government increased the number of work permits for foreign workers. Unskilled foreign workers increased from 3% of the labour force in 1970 to 13% in 1973. The government removed foreign exchange controls and eliminated restrictions on capital repatriation and remittance of funds.³⁶

During this time, oil companies such as Shell and Esso established refineries in Singapore, and the nation became the third-largest oil refining centre in the world.³⁷

From the 1980s through the 2000s, as its cost advantage continued to decline, Singapore expanded its presence overseas, joining Malaysia and Indonesia to develop manufacturing sites in those countries. Malaysia and Indonesia would provide the land and labour, Singapore the infrastructure and administrative skills. These ventures allowed Singaporean firms to capture contracts beyond the country’s borders.³⁸ Meanwhile, the focus at home was on improving linkages between Singapore and the rest of the world by investing in air and sea infrastructure.

- **Market access** – Singapore was the first country in Asia to enter into an Open Skies Agreement with the US in 1997.
- **Infrastructure** – Changi Airport opened in 1981, and just seven years later Business Traveller (UK) recognized it as the world’s best airport. Today, it is the seventh busiest airport globally by international passenger traffic.³⁹ The Port of Singapore made similar advances through heavy investment in technological innovations.

Growth of the Singapore economy started to slow in the late 1990s, partly because of external shocks such as the 1997 Asian financial crisis. In response, the government formed an Economic Review Committee in 2001 to review economic restructuring and maintain Singapore’s competitiveness. In 2000, the government began to promote biomedical science and technology in hopes of turning Singapore into an Asian hub for the sector.⁴⁰ The government also believed that Singapore should become a regional services hub to meet the needs of the growing markets of China and India. Among the actions the government took were the following:

- **Market access** – Foreign investors in biomed gained tax relief on profits for up to 15 years. A Fortune 100 biopharmaceutical company that expanded its manufacturing operations to Singapore estimates the incentives would reduce the company’s overall tax rates from approximately 40% to nearly 30%.⁴¹
- **Business environment** – Singapore built a state-of-the-art biomedical park. Housing and recreation facilities were designed to attract foreign scientists to Singapore. It also liberalized its financial sector and opened it to foreign bank participation, granting full licenses to six foreign banks between 1999 and 2001.⁴²

Leading multinational pharmaceutical companies set up R&D centres in Singapore in 2002⁴³ and announced plans to expand their activities; the biomedical sector in general experienced rapid growth. The financial sector contributed about 13% to Singapore’s GDP in 2008 and registered a growth rate of 7.3% despite a general slowdown of financial services in other parts of the world.⁴⁴

Key success factors and potential lessons for other governments

Singapore focused on barriers that were critical to key industries at different points in time. For instance, from 1965 through the 1970s, it wanted to attract the wave of foreign investment required to jump-start an export-oriented strategy in manufacturing. So it concentrated on providing tax and financial incentives while greatly reducing corruption. It also ensured a stable labour force to meet the needs of labour-intensive manufacturing. In the 2000s and beyond, to build Singapore into a knowledge-based manufacturing and services hub, the government has focused on creating the necessary business environment via a supporting ecosystem of professional, financial and legal services.

Market access and border administration barriers were eliminated early on. Singapore used a technocratic approach to common barriers and the government's credible commitment to eliminating corruption helped it avoid the Achilles heel of many other South-East Asian countries. Making examples of prominent civil servants showed that no one was above the law. (The most recent prosecutions occurred in 2012.) The temptation for corruption of civil servants was further reduced by competitive compensation pegged to the private sector.

Singapore not only eliminated infrastructure and business environment barriers, it turned these areas into sources of competitive advantage. It didn't just provide a functional port and airport, it built world-class systems. It didn't just provide a clear regulatory framework and a crime-free environment, it built a supporting ecosystem of services to encourage foreign multinationals to set up a base in Singapore.

Today, most countries show varying performance across the different types of barriers. Governments must understand what industries they have and could develop and address the most relevant barriers. Singapore has done just that.

Some companies have a vested interest in preserving barriers

It would not be entirely surprising to find that certain stakeholders may resist efforts to lower supply chain barriers. What may be less obvious is that many of these companies are not local businesses enjoying protection from foreign competitors. In fact, the authors have identified four other categories of companies resistant to such efforts: (1) companies whose added value depends on the supply chain barrier; (2) those that have already incurred sunk costs in response to the supply chain barrier; (3) those that perceive the status quo as inevitable; and (4) those that fail to act because of a "coordination problem". Each category is considered in detail below:

- 1. Companies that depend on supply-chain barriers** – A key component of some companies' added value is mitigating supply chain barriers. In air cargo transportation, for example, freight forwarders act as intermediaries between shippers and carriers. Some of the freight forwarders differentiate themselves by handling the complex paperwork pervasive in the air cargo industry – a valuable service. Although proposed e-freight initiatives would substantially improve efficiency in the industry and produce substantial cost savings, some freight forwarders might lose their differentiation and a portion of their contribution to the value chain. It would therefore be unsurprising if some would resist electronic shipping documentation.
- 2. Companies that have incurred sunk costs** – As addressed previously in this report, overcoming supply chain barriers to trade can require substantial upfront investments. Some companies have decided to make these investments, and for them the expenditures represent a large and potentially unrecoverable fixed cost. Such upfront costs can act as a barrier to entry, providing incumbent firms with a competitive advantage.⁴⁵ Once a company incurs the cost, it has an interest in seeing the supply chain barriers maintained; if the barriers are removed, the investment will have been a waste. This point of view was heard many times in the course of company interviews. One large CPG manufacturer, for example, built a factory in an African country to bypass supply chain barriers in selling to the local market. Having made the investment, this company enjoyed a strong local competitive advantage and explicitly opposed a reduction in supply chain barriers. Such cases illustrate the need for gradual and transparent reductions in barriers, as uncertainty about the future could impede investment decisions.

3. Companies that simply accept the status quo – In the course of the research, the authors found that many companies are so accustomed to adverse conditions that they fail to fully appreciate potential improvements. In discussing India's poor *Enabling Trade Index* score with companies in the region, for instance, it was found that businesses leaders did not perceive it as a particularly pressing problem. Similarly, firms that do substantial business in Brazil do not view security issues as important, whereas companies that are unaccustomed to the poor security environment there would surely view security as a first-order problem. This passivity towards barriers that are accepted as inevitable is reinforced when they affect all competitors more or less equally, so that much of the added cost is transferred to the customers. What was seen in the study was that companies seem to underweight the importance of barriers, such as infrastructure, that affect all companies doing business. They overweight barriers, such as market access, that bestow a competitive advantage on some companies relative to others.

4. Companies that fail to act because of lack of coordination – Finally, the authors found that the interdependencies between different stakeholders' decisions can also impede action. These problems are best viewed through the lens of game theory, which studies how actors interact when making strategic decisions.⁴⁶ In the example of air cargo transportation, a coordination problem was seen, in that the returns to an investment in e-freight initiatives are realized only if all other actors in the shipping process also make the required investment. If even one part of the paperwork process remains manual, an electronic system in the other parts of the process makes little sense. This coordination problem is exacerbated when the party likely to benefit most from a reduction in supply chain barriers is not best positioned to influence its implementation. Shippers, for instance, would realize substantial gains from implementation of e-freight, but freight forwarders and carriers are in a better position to spearhead the initiative.

One general takeaway from these observations is that initiatives to reduce supply chain barriers must account for the individual actions required for success, and for each party's incentives to contribute to those actions. This task is made particularly challenging by the fact that the relevant parties may be difficult to identify, and that some stakeholders – for instance, firms that do not as yet have a presence in the country – may be inaccessible. An implication for policy is that governments, business and civil society should establish mechanisms to identify potential gains from actions to improve supply chain efficiency and to analyse the distributional impacts of policies and policy reforms.

2. Main company lesson: Companies may not recognize costs where they should

Companies must look beyond factor costs such as labour and raw materials when assessing investment and operational decisions. The reason is that supply chain trade barriers create additional direct costs and add to risks. Understanding these barriers will give companies a more complete view of the real costs of a global operation; proper risk assessment will lead to better investment decisions. For example, delays in the supply chain require increased buffer inventory, which adds to direct costs such as warehousing. Delays may also generate risks such as depreciation, spoilage, theft, opportunity costs, or even production bottlenecks.

Most companies pay close attention to labour costs. On a closer look, however, supply chain barriers may offset a given country's labour cost advantage. When Global Co. looks into locating production for the North American market, the obvious choice would seem to be Mexico. Its labour costs are about 20% of those in the United States, and its capital costs are about 10% lower. Examining the hidden costs resulting from supply chain barriers, however, Global Co. would realize that the decision is not as clear-cut as it might seem. Until 2011, Mexican truck drivers were not allowed into the US, and so the company needed to switch truckers at the border. An inadequate infrastructure compared to Canada or US would mean slower movement, raising transport costs significantly. And security issues in Mexico would mean that armed guards would have to ride along with the trucks. All these effects limit Mexico's competitive advantage by reducing the cost advantage by over half.

In general, companies must take into account supply chain impacts from each of the main barriers when making investment and operational decisions:

- **Market access** issues and regulations constrain any company's supply chain and may force inefficiencies. For example, chemical products imported to the European market must comply with Registration, Evaluation, Authorization and Restriction of Chemical Substances (REACH) regulations and be tested in European labs. Mexican Chemical Co. has to rerun all laboratory tests in certified European labs in order to register products in the European Union. Companies can sometimes work around these non-tariff barriers, but the resulting inefficiencies lead to decreased competitiveness.
- **Transport infrastructure** and services always affect a supply chain. For example, Brazil moved towards an electronic freight invoicing system that would theoretically speed the supply chain for Agriculture Co., an agribusiness company. But Brazil suffers from poor ICT infrastructure and the government's systems were unable to handle the volume of electronic documents, crashing frequently. This ended up causing more delays than the old system.⁴⁷
- Companies must factor **border administration** barriers into their cost analyses. Customs hours of operation and the degree of adherence to the World Customs Organization's (WCO) best practices will affect physical inspections, caged shipments and dwell times. Express Delivery Co. has estimated that inspection rates on its shipments vary from about 2% in the Netherlands to roughly 10% in Mexico. Some countries still carry out physical inspections of all shipments. In a 2009 study by the Global Express Association, 18 out of 114 countries surveyed physically inspected 100% of shipments.
- Finally, the **business environment** is a factor companies must consider. The business environment includes many different socio-political aspects, but will mostly be reflected in security issues and risk. A poor business environment not only adds to direct operating cost, it may also limit what companies offer within a country. For example CPG Co., like other companies in its industry, limits its product lines in the African continent.

Figure 14: Companies should take a more comprehensive approach to supply chain decisions

	Consequence	Costs	Delay		Volume	Risk
		Increased operational costs	Increased investment/ working capital	Increased average delay	Increased variable delay (unpredictability)	Decreased volume
Factor costs	Domestic and foreign market access	●	-	●		
Barrier costs	Efficiency of customs administration	-		●	●	
	Efficiency of import- export procedures	-		●	●	
	Transparency of border administration	-		●	●	-
Compare alternatives	Availability and quality of transport infrastructure	●	●	●	-	
	Availability and quality of transport services	●	●	-	-	
Strategic implications	Availability and use of ICTs	-	●	-	-	
	Regulatory environment	●	●	●	-	-
	Physical security	●	-			●

● most likely
- potentially

5. Policy Implication: Think Supply Chain!

As the case studies in this report show, companies are increasingly organizing production of goods and services through global supply chains. Products are processed – and value is added – in many different countries. A company's ability to participate in these supply chains depends greatly on their government's policy choices: the extent of restrictions on market access; the efficiency of border management; information technology capabilities; transport and logistics services infrastructure; and the business environment. Even if tariffs on their exported goods are zero, firms that confront high and uncertain border costs and inefficient and unpredictable logistics will not be able to compete with firms in countries that provide a more efficient economic environment.

A key problem highlighted by the case studies is that many different policies and administrative procedures can artificially “break” the supply chain by introducing discontinuity and affecting reliability. Supply chain efficiency is not simply about greater trade in parts and components and trade facilitation at the border. It also involves the ability to invest in facilities, protection of intellectual property, international movement of businesspeople and workers, and access to and use of technology. The policy-related factors that affect the operation of supply chains are numerous and interrelated. Regulatory requirements regarding health, product safety, security and the like often add a layer of complexity to the customs clearance process. Investment-related policies may restrict foreign companies from wholly owning critical operations. Exclusivity or preferential treatment for state-owned or state-supported enterprises (such as postal monopolies) may impede supply chain services. The exercise of market power by a dominant entity that controls access to a gateway, facilities or networks may hinder the functioning of some parts of a supply chain; examples include port operations and airport cargo handlers. Moreover, groups that have a vested interest in the status quo, such as customs brokers, freight forwarders and domestic trucking industries, may resist reforms. In short, a variety of factors may raise the cost of operating a supply chain and impede reform efforts.

“Logistics” as such is not the focus of any one government department or entity, but rather the purview of a number of different agencies. An approach centred on all the policies that significantly affect supply chain efficiency will improve a country's competitiveness and may substantially enhance the commercial relevance of trade agreements. International negotiations have focused primarily on reducing tariff and non-tariff barriers to trade for specific products and sectors. The lack of a “whole of the supply chain” focus in trade agreements means that key factors affecting supply chain efficiency are not addressed. The benefits of traditional trade negotiations are thus significantly reduced.

Research has shown that the different dimensions of national logistics efficiency – as measured by the World Bank's Logistics Performance Index (LPI) – are the most important determinants of the trade costs that prevail between any given pair of countries. Improving LPI performance would reduce average bilateral trade costs ten times more than an equivalent percentage reduction in average tariffs.⁴⁸ A significant reduction in trade costs has positive effects on wages and labour demand, as lower costs allow more productive firms to expand. Consumers and businesses benefit through greater and more timely access to critical goods, such as medical devices or components needed for production. They also benefit from lower prices, higher quality or both, not least because the incentive for goods to enter the market through informal channels is reduced.

Regional and multilateral cooperation in this area could help identify best practices, assist in overcoming resistance to reform from vested interests, and enhance transparency and accountability for results. But progress in improving the policy environment need not and should not wait for international agreements. Countries need concerted domestic regulatory reforms – informed by an understanding of the importance of coordination – to ensure that reform efforts have a positive impact on supply chain efficiency. There is much that governments can and should do to improve the logistics environment in their own countries to capture the gains from participation in supply chains.

The following sections identify critical areas for action by governments, both at the national level and through international cooperation.

A Domestic Agenda to Improve National Supply Chain Performance

The case studies illustrate the need for a holistic approach focusing on all major aspects of the supply chain. Reform efforts should target factors with the greatest impact on operational efficiency and should prioritize those that are relatively easy to implement – the “low-hanging fruit”. Governments need to work with businesses and analysts to identify the binding constraints – policies and procedures where a concerted effort moves companies past the tipping point to enable successful transactions.

To identify the key constraints, governments can draw on data compiled by the World Economic Forum's *Global Enabling Trade Report* and the World Bank's *Logistics Performance Index* and *Doing Business* reports. These capture different dimensions of the determinants of countries' supply chain performance, including: border management; the quality of trade-related infrastructure and transport and logistics services; and related intermediation services, such as timeliness of delivery and the ability to track and trace consignments. However, while existing country-level indicators are useful measures of overall performance, they cannot capture the heterogeneity in the factors that matter most for different types of supply chains and industries. Identification of binding constraints requires information and analysis of impacts on a sector and industry basis, including assessments of the distributional effects of policies – that is, which social groups pay the price and which get the benefits.

Policy recommendation 1: Create a national mechanism to set policy priorities for improving supply chain efficiency based on objective performance data and feedback loops between government and firms.

It is critically important to establish credible mechanisms at the national level to monitor performance and progress. These mechanisms can generate feedback from businesses and other stakeholders to the government entities responsible for implementation of reforms. Firms need to be proactive and willing to invest resources in collecting relevant information and putting it in the public domain. This will help mobilize a “user voice” from businesses that rely on access to imports – whether to sell on the domestic market or to export – as they and their customers are the beneficiaries of lower trade costs.

Creating or mandating an institution to interact with business and to act as a depository for logistics performance data would help ensure that policy efforts are maintained over time and that governments are held accountable for outcomes. These could build on the “logistics performance observatories” that a number of countries have put in place. Such bodies would have a mandate to do the requisite analysis and then put the information in the public domain. One of its functions would be to aggregate data so that individual businesses need not be concerned about “retaliation” by regulatory agencies or releasing commercially sensitive information. There are good practice models that could inform the design of such mechanisms, such as the Productivity Commission in Australia and the Canada Gateway project. It is important that concepts and data tools be comparable across countries to allow for comparisons and benchmarking, an agenda that could be supported by international development organizations.

There are also many existing tools that can be deployed, such as corridor- or gateway-specific observatories, regulatory impact assessments, and trade and transport facilitation audits. A public-private partnership model that brings together business, government, regulators and civil society could be a good option to consider. An example is the partnership between the government of the Netherlands and Dinalog – the Dutch Institute for Advanced Logistics.

Policy recommendation 2: Create a focal point within government that has a mandate to coordinate and oversee all regulation that directly affects supply chain efficiency.

The examples discussed in this report illustrate that there are often many different regulatory and control agencies, some representing local or regional authorities and others the central government. These agencies do not have an economy-wide mandate or vision – each focuses on the attainment of its specific mandates. The result is not just complexity for business but potential redundancy, excess costs, and a lack of policy coherence.

Given the importance of tipping points, governments need to recognize that industry-specific supply chains are affected by different clusters of policies. Improving supply chain performance requires coherence and coordination across many government agencies and collaboration with industry. The authors recommend that governments create a high-level body to oversee all regulation directly affecting the supply chain. Governments should establish effective coordination mechanisms linking the various regulatory and control bodies that set and enforce product and process regulations affecting supply chain efficiency. Insofar as governments are addressing this issue, efforts tend to focus either on policies regulating and controlling the movement of merchandise (for example, through a “single window” approach) or on the movement of vessels (including containers or trailers) – for example, through a logistics agency (as has been done in Panama).

What is needed is greater integration of such efforts that bring together all the relevant regulatory authorities. Doing so will help government “think supply chain” in the design and implementation of border management, transport, trade facilitation, and logistics-related policies. In some cases it may be appropriate to focus on specific gateways, trade lanes or corridors. Most countries have just one or a few freight gateways and transport corridors, and it may be easier to pursue a coordinated whole of the supply chain approach for one of these rather than for the country as a whole.

Policy recommendation 3: Ensure that SME interests are represented in the policy prioritization process and that solutions are designed to address specific constraints that disproportionately affect SMEs.

Another area for action concerns small- and medium-sized enterprises (SMEs). SMEs tend to face proportionally greater barriers to engaging in international trade, some of which are related to logistics and related transactions costs. The eBay case study suggests that some of these barriers could easily be addressed. For example, governments could create a quick win by adopting higher *de minimis* provisions, allowing goods under a certain threshold value to forgo clearance whenever the amount of duty collected is less than the administrative cost to process the shipment. Currently *de minimis* levels vary widely; within the APEC region. For example, thresholds vary from US\$ 1 to more than US\$ 1,000. While a uniform global standard may be difficult to achieve in the short term given differences in per capita incomes and reliance on customs revenue, *de minimis* standards should be high enough not to make small transactions prohibitively expensive. What matters most is that in “thinking supply chain”, the interests of SMEs are considered explicitly as they may differ in important ways from those of large shippers and logistics providers. Today, trade facilitation measures such as authorized economic operators or trusted trader programmes generally target large traders and shippers. It is important that such initiatives to reduce regulatory compliance costs be complemented by programmes and solutions for SMEs to help them address regulatory complexity and lower their costs.

Note that these *policy recommendations* apply to high-income countries as much as they do to developing nations. The former have better business environments, infrastructure and border management systems, and thus higher levels of logistics performance. But dealing with regulatory coordination and removing policy biases against small firms are as important for OECD countries as they are for low-income economies. “Think supply chain” is not a policy agenda that is relevant only to developing nations and emerging markets.

Options for International Cooperation

Although much of the policy reform agenda associated with a “whole of the supply chain” approach is national, there are areas where international cooperation – joint action – is needed. Examples include agreement on common standards for documentation; moving toward electronic (paperless) transaction systems; norms regarding sharing of data and privacy; harmonization of *de minimis* standards for customs clearance; Open Skies agreements for aviation; and convergence on the application of rules of origin. International cooperation may also help address political constraints that prevent reforms from being implemented. Some groups gain from current complexity of procedures or barriers to entry that result from specific policies, and may be powerful enough to block reforms. International agreement to pursue a certain approach can help overcome such resistance. Last but not least, international cooperation can be a valuable mechanism for learning about good practices, obtaining assistance in pursuing reforms, and getting help in financing required investments. Multilateral development banks and specialized international organizations can help countries design, coordinate and implement both national and multi-country trade facilitation and logistics projects.

Policy recommendation 4: Whether through multilateral or regional agreements, governments should agree to pursue a “whole of the supply chain” approach rather than pursuing negotiations in separate pillars or silos.

A “whole of the supply chain” approach toward international cooperation implies bringing together a variety of service sectors and subsectors that are relevant from a logistics perspective. These include cargo handling, storage, warehousing, agency services and related ancillary services, along with freight services (air, road, rail, maritime, express/courier). Negotiating commitments on these various services – treated as a “bundle” or “check-list” – along with parallel negotiations on trade facilitation focusing on border management procedures and disciplines pertaining to product standards and technical regulations, offers the prospect of addressing many of the policies affecting the operation of global supply chains (see appendix, US-Mexico Competitiveness Agenda: The urgency of accelerating the pace). To date the focus of trade negotiation efforts has been on a silo approach: each issue area is addressed independently, rather than being informed by a supply chain perspective. Additional cross-cutting issues such as e-commerce, investment policy, and some elements of competition policy (to address concerns regarding the behaviour of dominant suppliers) should also be taken into consideration.

Two important questions are: 1. Whether international cooperation is best pursued at the global level or within smaller groups such as regional arrangements; 2. Whether cross-cutting/horizontal or sectoral approaches are best. A more integrated approach to reducing policy-induced supply chain inefficiencies can be pursued both at the global level and among smaller groups of countries. It is also important to recognize that binding international

treaties are not the only option. Other forms of cooperation may also be effective in addressing bottlenecks. Constraints may be very supply-chain specific – supply chains for electronic products are very different from textiles – and the political forces that drive policies are likely to differ with the level of logistics performance and the short- to medium-term trade potential this implies. While a differentiated approach will be necessary, certain common commitments that are relevant and applicable to all sectors could be pursued through international agreements.

A specific option that could be considered is negotiating an international supply chain agreement (ISCA).⁴⁹ This could follow the negotiating precedents provided by the Information Technology Agreement and the World Trade Organization’s (WTO) Basic Telecommunications Agreement and Financial Services Agreement. A distinguishing feature of these agreements is that they apply on a most-favoured-nation basis: all countries, whether they join the ISCA or not, would benefit from the outcome. An alternative approach is to limit benefits to signatories in areas permitted by the WTO. Even a non-discriminatory approach may in practice exclude non-signatories that do not satisfy minimum regulatory standards, suggesting that members of an ISCA should provide assistance to non-members to help them benefit from its provisions.

Given the lack of progress in the WTO, cooperation among a group of like-minded countries may be more achievable in the short term. Some progress has been made in recent regional fora; an example is the Asia-Pacific Economic Cooperation (APEC) commitment to improve the region’s supply chain performance by 10% by 2015, a goal articulated under the 2010 Yokohama Vision. In the context of the Trans-Pacific Partnership (TPP) negotiations, business is advocating the elimination of barriers to trade and redundant regulation. Business is also pressing for efforts to enhance cross-border physical connectivity, and for improved communication and coordination of regulatory practices that affect trade. A major element of the TPP’s proposed approach is regular communication and interaction among officials, regulators and industry representatives with a view to identifying problems and potential solutions and monitoring progress in reducing needless policy-created supply chain costs. A premise is that cooperation needs to centre on the attainment of specific performance targets, such as time-to-release commitments or a common list of data requirements for shipments; agreement on regulatory principles; establishment of consultation processes that allow industry to identify specific choke points; and mechanisms to address these chokepoints in a timely and collaborative manner.

Policy recommendation 5: Launch a global effort to pursue conversion of manual and paper-based documentation to electronic systems, using globally agreed data formats.

Certain sources of supply chain inefficiency require global solutions. Examples include harmonization of data formats, implementation of uniform electronic documentation standards and agreement on common approaches to security objectives. Many of the excess costs and inefficiencies in the operation of supply chains reflect a lack of reliability due to delays and uncertainty stemming from manual paper-based documentation, redundancy in data requirements and the absence of pre-arrival clearance and risk management-based approaches. As a generalization, paper- and human-based systems are more expensive, time-consuming, error-prone, and open to corruption. Given that trade is international, efforts to adopt common documentary and data/information standards should be global.

6. Case Examples

Agriculture Co.: Exporting Agricultural Products from Brazil

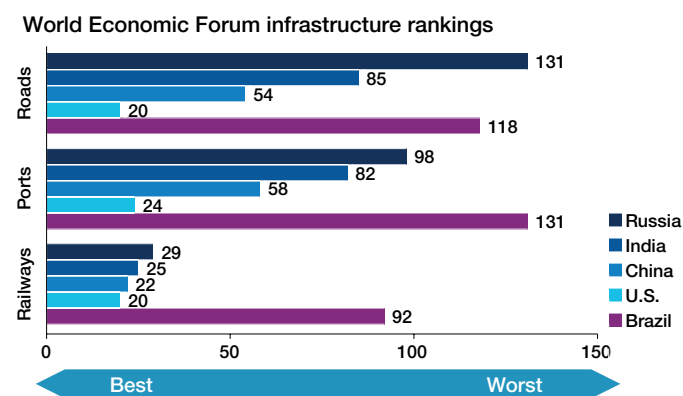
Agriculture Co. is a global agribusiness that relies heavily on Brazil for its raw materials. Moving goods across Brazil's huge land area and widely dispersed agricultural production regions requires efficient transport and communications infrastructure, which is lacking today. The resulting bottlenecks in Agriculture Co.'s supply chain and increased complexity of exporting to other markets are exacerbated by bureaucratic customs procedures at Brazil's borders. The barriers increase operating and working capital costs and constrain sales opportunities.

Agriculture Co. is a global agricultural and food company. The company operates in 40 countries, with a significant proportion of raw materials sourced from Brazil. Its local facilities in Brazil are extensive, including several sugarcane mills, a fertilizer blending operation and one of the world's largest wheat mills. In Brazil, Agriculture Co. exports over one-third of its several million metric tonne volume, relying on independent trucking as well as on rail and waterway transportation companies to transport goods to coastal areas where they are then shipped mainly to the EU and Asia.

Like other large exporters, Agriculture Co. depends on a high-quality transport infrastructure to navigate Brazil's continental-sized territory to move goods from its inland facilities to coastal ports. But road, rail and seaport transportation networks in Brazil today rank among the lowest in the world (see figure).

- **Roads** – The country's poorly maintained and often flooded roadways reduce trucks' weight capacity and speed and increase maintenance and repairs.
- **Railways** – Brazil's rail network is old and poorly maintained, with 10% of its 28,000 kilometres of track out of commission. Only about one-quarter of the network operates productively. Because rail lines were originally drawn to serve political rather than economic ends, shippers are often forced to rely on trucks to carry longer haul cargo where rail transportation would typically be more efficient.
- **Ports** – Port use at some of the main ports is high (e.g. Santos operates at some 80%), which puts year-round pressure on export flows. This pressure can be especially high from March to June, the height of the harvest season. Capacity chokepoints also occur when cargo is unloaded from trucks at port sites. As a result, cargo "dwell times" between its arrival in port and when it is cleared for departure are significant – some five to ten times longer than in Chile and developed nations.

Figure 15: Brazil ranks lower than most major countries on all hard infrastructure



Source: A decade of transformation in infrastructure, Brazilian Association of Infrastructure (ABDIB) report, 2011.

Inadequate transport infrastructure and resulting delays drive up Agriculture Co.'s operating costs. The poor-quality rail system forces Agriculture Co. to resort to less-dependable truck transportation to move the bulk of its goods. Sixty-four per cent (64%) of the volume of the company's shipments travels by road and only 36% by rail. Beyond the inherently higher costs of moving goods by truck rather than train, delays also occur due to traffic on Brazil's congested highways.

Wait times at ports result in Agriculture Co. incurring demurrage costs of one Brazilian real (BRC 1.00) per hour for each tonne of freight delayed beyond five hours. For trains, delays at ports cost Agriculture Co. 40 Brazilian reals (BRC 40.00) for each hour after 18 hours of waiting. Agriculture Co. also incurs costs of as much as US\$ 25,000 per day for each vessel on which the company's goods are carried that is held up in port. These delays require Agriculture Co. to maintain a buffer stock of inventory and extra warehouse capacity which sits idle when harvest season ends.

Beyond the onerous transport costs that tie up working capital and hit Agriculture Co.'s income statement, Brazil's unreliable communications and technology infrastructure adds disruptions and unpredictability to the company's supply chain. The government's electronic freight invoice system lacks the capacity to hand all transactions. Agriculture Co. estimates that it encounters five or six hour delays about twice a week when government servers crash. In one instance, according to Agriculture Co., an accident involving one truck occurred at a time when fibre optics communications were down, preventing Agriculture Co. Brazil headquarters from learning about the incident. Agriculture Co. estimates that unreliable information and communication technology systems and processes cut the annual operating efficiencies of its truck fleet by about 4%.

Beyond the logistical complexities and costs of moving its goods from the agricultural interior to ports, Agriculture Co. must contend with border administration challenges and customs processes that add to delays. Agriculture Co.'s exports require customs clearance from no fewer than five government authorities – from the health and agriculture ministry to the federal police and the tax agency. Together the Brazilian paperwork can consume up to 24 hours compared with just one or two hours in Europe. When workers at one of the government agencies go on strike – an occurrence that Agriculture Co. estimates happens about once a year and lasts for as long as a full month – Agriculture Co. must go to court to clear its cargo, a process that can take up to a week. Meanwhile, Agriculture Co. incurs additional warehousing costs.

Agriculture Co. pays a larger price for its supply chain inefficiencies in the form of opportunity costs of lost sales, missed trades, and customer dissatisfaction. Also, the need to maintain high inventory levels even when commodity prices are high prevents Agriculture Co. from trading to capitalize on low market prices.

Rubber Products from South-East Asia: Trade Frictions Arising from Government Monopolies Disrupt Markets

South-East Asia dominates global rubber production, but substandard infrastructure, poor quality control and long lead times make the supply chain for finished goods unreliable. Suppliers of medical disposables and devices have little room to bargain when negotiating prices and are forced to endure supply chain bottlenecks that result in high inventory costs and tie up capital. Eliminating supply chain barriers could reduce inventory lead times by as much as 90 days and lower supply chain costs by some 60%.

South-East Asia accounts for 70% of the world's production of rubber,⁵⁰ the indispensable raw material used in countless final products, including surgical gloves and many other healthcare applications. Their monopoly position gives producers in the region the power to impose high prices that squeeze distributors' margins. Because they tend to set prices at the point of delivery rather than where and when customers place orders, price levels are volatile and unpredictable.

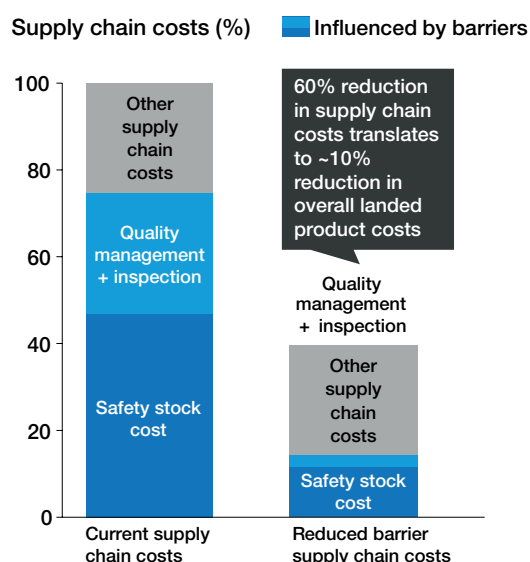
Market factors strongly influence the price of rubber. Production is seasonal, with yields falling during winter months; demand fluctuations, investor speculation and adverse weather conditions combine to make raw material prices volatile. Speculation led to a rubber price spike in 2011 and prices have declined sharply since then. But governments of some of the top rubber-producing countries across the region distort prices by attempting to control supply.

Top exporting countries have tried to influence prices with a variety of policies. These included measures by the Thai government in 2012 to purchase product directly when prices fell below 120 baht per kilo and a zero-interest 15-billion-baht loan programme to assist struggling rubber farmers.⁵¹ Last August, the governments of Thailand, Malaysia and Indonesia agreed to trim exports by 3%, or 300,000 tonnes, for six months to shore up prices. When those measures proved ineffective, the three top rubber producers set a price floor, agreeing to intervene in the rubber market when prices fall below US\$ 2.70 per kilogram.⁵² The coordinated action did manage to lift the global rubber price, imposing higher costs on producers, distributors and end users.

Another reason why these markets hold more power is that Indonesia never developed a strong rubber products industry,⁵³ limiting the supply. As the largest rubber producer, it was well positioned to develop this market when AIDS became more prevalent. A certain European-based distribution company hardly ever sources from Indonesia, as it perceives it as corrupt⁵⁴ and generally finds it difficult to operate in the country. It believes these business environment factors prohibited the development of strong infrastructure and technological capabilities. One of its business development managers mentioned a Malaysian manufacturer who moved to Indonesia, but that he was "forced to pay bribes just to keep the electricity on. Many producers encountered similar challenges. Most ended up closing up shop within 3 to 5 years or so."

In South-East Asia, the rubber market is also beset with supply chains made unreliable by labour unrest, substandard infrastructure, natural disasters and widespread official corruption. Quality levels are inconsistent, requiring buyers to maintain costly quality control teams on staff to certify quality before the product is brought to port. Order processing also creates bottlenecks because the manual procedures used in local plants cannot accommodate electronic orders placed by European distributors. Facing long lead times of up to five months, suppliers risk delivery delays requiring them to accumulate large inventories sufficient to cover orders for 120 days, raising financing costs and cutting profit margins. A large US supplier that depends on rubber sourced from South-East Asia estimates that if supply chains were reliable, it would be able to reduce its inventories to just a 30-day supply. Together with reduced quality controls this could lower supply chain costs by some 60% (see figure).

Figure 16: Lowering supply chain barriers would reduce supply chain costs by some 60%



Note: Reducing barriers assumes 75% reduction in safety stock costs based on decline in inventory lead from 120 days to 30 days, 90% reduction in quality management + inspection fees. Source: Company data; landed cost per container ex. Asia.

Beyond having to contend with unreliable supply chains in producing countries, distributors' sales are affected by unfair competition resulting from the different controls they face in end markets. In particular, technical and quality standards in the European Union (EU) differ from those in the US, with adverse effects on the production process. Manufacturers adapt by trying to manufacture all of their products to satisfy the higher EU quality standard, but inspections are infrequent at European borders and very common for goods coming into US ports. Shipments that do not meet US Food and Drug Administration (FDA) standards are refused entry and their distributors are put on alert status, requiring them to ensure that their next five consecutive shipments are clean to have the alert lifted. Repeat violations ratchet up the penalties and potential fines the FDA will assess. The discrepancy between the levels of enforcement of quality standards ends up hurting EU customers and benefiting those in the US. Shipments of substandard products that are refused entry to the US are most probably dumped at below-market prices in the EU, where hospitals and other buyers sensitive to product quality are using them.

Healthcare Co.: Customs Prescriptions for Moving Healthcare Products Vary around the Globe

Healthcare Co., a global healthcare company, manufactures and distributes healthcare products around the globe, encountering a wide range of customs procedures that vary by market. Many countries have adopted one of several trusted trader programmes that diverge considerably in the requirements they impose on importers. For example, in Canada, the market with the most effective programme, goods are processed by account rather than by individual transaction, enabling Healthcare Co. to import product based only on periodic check-ins. Other countries, including China, continue to conduct rigorous inspections and customs assessments that can take many days but only reduce their frequency. These extensive customs procedures can result in lengthy delays that can increase Healthcare Co.'s customs costs nearly tenfold.

Healthcare Co., a US-based healthcare products company with annual import/export volumes in excess of US\$ 2 billion, derives substantial revenues through the sale of products and services to healthcare providers around the world. The company's products must clear customs and security in each country in which it operates, resulting in inventory delays and increased costs. Customs procedures vary considerably by country, but they basically follow two broad approaches:

1. Account-based clearances require customs authorities to assess and inspect only a small portion of the total shipments a company imports
2. Transaction-based procedures require the extensive inspections of a generally larger proportion of a company's shipments and a review of each customs declaration.

Countries are increasingly moving towards the account-based approach through trusted trader programmes that motivate higher-volume importers to implement practices that will ensure their compliance with streamlined customs regulations, including less frequent inspections, reduced paperwork and speedier entry, among other import-friendly advantages. Although many countries have implemented some form of the programme, their implementation varies considerably. Nevertheless, for importers like Healthcare Co., following the account-based trusted-partner paradigm of "trust but verify" would confer major benefits over the old transaction-based system.

The principal benefit of a switch to simplified account-based procedures would be to significantly lower Healthcare Co.'s cost of doing business – chiefly, by shortening the time needed to clear customs and by increasing the consistency and certainty of those time savings. Reliability in being able to move all but a very small percentage of its shipments through the supply chain with minimal interruption would result in major savings in warehousing and handling costs, as well as the expense of having larger inventories.

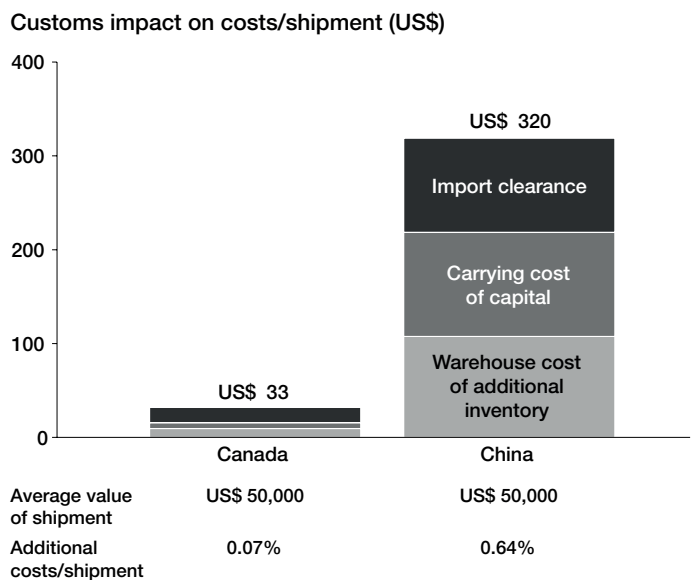
A comparison of Canada's highly evolved trusted-trader programme and China's onerous transaction-based customs procedures illustrates just how big a cost and efficiency difference a streamlined approach could make.

Healthcare Co. has already attained the highest level of trust by authorities in both countries. In Canada, whose programme takes a risk-profiling approach based on the company account, Healthcare Co. is required to perform a customs self-assessment in order to qualify for expedited border crossing. Canadian authorities physically inspect only around five out of every 10,000 Healthcare Co. shipments, reducing the daily amount of incremental inventory to clear customs by half.

In China, by contrast, where Healthcare Co. has established a proven track record for reliability in its conformity to customs regulations, the company is still subject to the country's transaction-based rules. Chinese authorities physically inspect nine out of every 1,000 Healthcare Co. shipments, resulting in long delays and uncertainty that add approximately nine full days to incremental inventory in transit.

The additional delays Healthcare Co. encounters at Chinese borders require holding additional inventory, driving up the company's warehousing outlays and increasing its carrying cost of capital. Furthermore, administering customs clearance on a shipment by shipment basis with its attendant extensive documentation and review processes makes customs clearance into China nearly six times more expensive for Healthcare Co. than into Canada. Together with the costs associated with the higher inventory, the total costs of importing a US\$ 50,000 shipment into China is on average US\$ 320 versus just US\$ 33 for an equivalent shipment to Canada.

Figure 17: Healthcare Co.'s customs-related costs to China are nearly ten times higher than to Canada



Source: Company data

The heavier cost burden that Healthcare Co. faces on its Chinese shipments appears to derive almost entirely from the burdens imposed by China's transaction-based clearance procedures. In neither its shipments to China nor to Canada have Healthcare Co.'s customs procedures required a significant number of corrections resulting either from its own or its agents' discovery of errors. Through the significant investment the company made in processes and systems to conform with requirements of both programmes, Healthcare Co.'s level of paperwork accuracy is high in both markets. Indeed, the company's accuracy level in shipments subject to period reporting was slightly higher, leading Healthcare Co. to doubt whether a complex transaction-based system adds any real value.

The EU and the US appear to be moving in the direction of account-based clearance, and it would benefit other countries and customs authorities to consider doing the same. Though not evaluated specifically within the scope of this analysis, it is likely that countries as well as importers would benefit from the wider adoption of account-based trusted trader programmes. Once importers like Healthcare Co. establish their reliability with customs authorities, the administrative costs borne by governments that move to the streamlined approach should start to fall. More importantly, the supply chain efficiencies resulting from the account-based approach should ultimately lower the cost of healthcare for the nation's consumers.

Chemical Co.: The Cross-border Movement of Chemicals Must Clear Many Complex and Poorly Coordinated Regulatory Hurdles

The experience of Chemical Co., a diversified chemical manufacturer, reveals the wide range of unique challenges chemical exporters confront shipping products around the world. Trading in products that come under tough regulatory scrutiny for their security, safety and environmental risks, chemical producers face strict market access barriers that result in costly delays. As the company's efforts to navigate the very different regulatory requirements of the US and Brazil shows, compliance can lead to lost sales, storage problems and potentially even confiscation of their products.

A diversified manufacturer of chemicals that find a wide range of end uses by its customers around the world in everything from food and textiles to paints and coatings, Chemical Co. encounters market access barriers common to companies in its industry. Because many of its products are inherently dangerous or can have dual uses that make them attractive to terrorists or drug traffickers, the company must comply with regulations imposed by many agencies on both the export and import side of the movement of its products. As the company's experience in the US and Brazil shows, surmounting the barriers can be cumbersome and costly, and coordination among the authorities that impose them is not always optimal.

In the US, chemical shipments face oversight by many poorly coordinated agencies

For Chemical Co.'s US products that find their way into international trade, the company is subject to the oversight of five different agencies, on average, and never fewer than three. Chemicals that are used in food need to meet safety standards set by the Food and Drug Administration (FDA). Other

compounds used by international drug cartels are subject to regulations set by the Drug Enforcement Agency (DEA). Some products that risk falling in the hands of international terrorist groups are policed by the Department of Homeland Security and the Commerce Department's Bureau of Industry and Security (BIS). Communication among the agencies is limited, saddling chemical producers with the heavy burden of navigating their way through the regulatory thicket. The coordination challenge results in delays which in turn result in excess costs for storage and demurrage fees.

In the case of acetyl products, a lack of coordination between customs and the DEA results in the delay of nearly 30% of inbound shipments. A major reason for the delays is the DEA's outmoded license application procedures, which require that hard copies of documents need be faxed rather than transmitted digitally. The paperwork holdup can last a month, burdening Chemical Co. with steep costs. For example, when a bulk vessel carrying more than 8,000 metric tonnes of material fails to unload in time, it will face demurrage charges of US\$ 60,000 per day. Usually after one day the vessel loader will return the shipment to a plant in Mexico as "dead freight". When a shipment is not cleared after eight days, officials can even seize it as contraband.

One particularly cumbersome requirement the company faces is the need to obtain export licenses for many of the products it ships – most commonly for exports of acetyl products, one of Chemical Co.'s biggest sellers. Controlled by the DEA, half of all Chemical Co. acetyl product shipments need a license, which can only be obtained after a customer signs a purchase contract. The license must identify the customer by name and location and specify the quantity of product to be sold and the date the contract became valid. Because the process can take between three and five months from the time of sale to the issuance of the license, Chemical Co. runs the risk that the customer will tire of waiting and acquire the product from another supplier outside the US that is not subject to the license requirement. Cancellations happen in nearly 5% of sales due to export license delays.

Further adding cost and inefficiency for chemical shippers is a US security programme called the Customs-Trade Partnership Against Terrorism (C-TPAT), launched in the wake of the 9/11 attacks. Participation in the programme required Chemical Co. to equip over 50 of its facilities with fences and monitoring equipment and to hire a specially qualified consulting firm to help with certification at a cost of US\$ 60,000 per facility. Nominally a voluntary programme, companies like Chemical Co. are expected to join, although some competitors that have not done so have been able to avoid the cost.

In Brazil, the chemical industry faces higher tariffs and import barriers

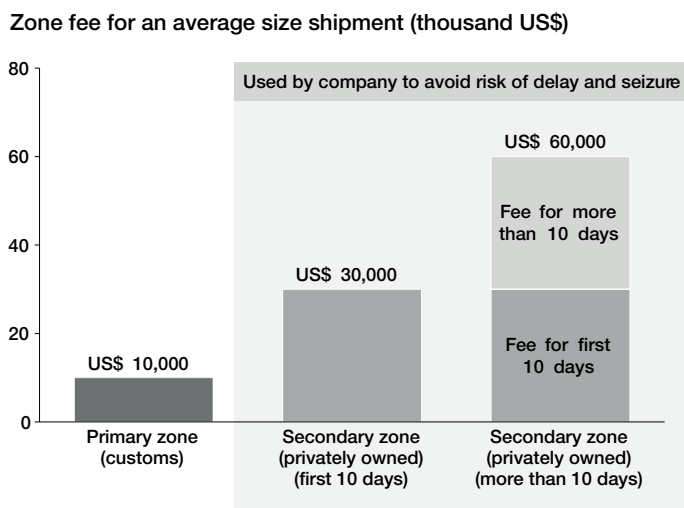
Brazil's market access regulations are tight and getting tighter. Duties on chemical imports increase yearly, with tariffs on more than 100 products rising last September. The new charges hit three Chemical Co. products, with duties on one of them jumping from 14% to 25% and cutting deeply into the company's volume and profits. Brazil also has approximately 40 anti-dumping cases under investigation against producers in China, South Korea, the EU, Mexico and Argentina. By contrast, other South American countries have only around 20 dumping investigations underway.

Procedures for moving goods through customs are costly and create delays. Paperwork requirements are onerous, with most importers needing to go through nine registration processes before they are qualified to begin actively trading. Registration can take between four and six months to complete and many of the steps require annual renewal. Each company and product type must obtain separate authorization, and documentation requirements are so exact that importers usually hire specialists to monitor license applications. Brazil has made it easier for importers to coordinate the requirements of the government agencies in charge of imports through its well-established Sixcomex system that automates interagency communications.

For goods crossing into Brazil, the government uses a four colour system based on the product being imported, the value of the shipment and the importer's historical performance to determine how long the process will take. For example, "green channel" products are eligible for automatic clearance, typically within 6 to 12 hours. Chemical Co. products generally qualify for green clearance. Imports required to pass through the "yellow" or "red" channels can clear customs within as little as 48 or 72 hours, respectively, but usually require from three days to as long as three months. Products steered to the "grey" zone must be physically inspected and have their documentation audited, procedures that can take from as little as one week to as much as four months, depending on the availability of customs staff.

Importing companies can choose between two main zones to process incoming goods (see figure). In the primary (customs) zone, they pay just 50 cents per kilogram for goods that clear within three days. After three days, however, customs will seize unclaimed products, requiring the owner to restate their ownership and pay storage during the delay. Sometimes the seized goods end up being lost in the system. Because delays resulting from labour union activity are common, many importers choose to move their goods through the secondary (private) zone. These imports face a far-higher clearance fee, equivalent of 2% of CIF (cost, insurance and freight) for the first ten days and another 2% if delayed longer. But the shipper has 30 days to clear customs before the unclaimed product is seized – a longer time that most importers are willing to choose as a precaution.

Figure 18: Brazil's secondary zone is expensive but used to avoid seizure after delays



Note: Based on a shipment of 20 metric tonnes and a value of US\$ 1.5 million.

Source: Company interview.

Mexican Chemical Co.: A Harsh Business Environment Limits Participation in Global Trade

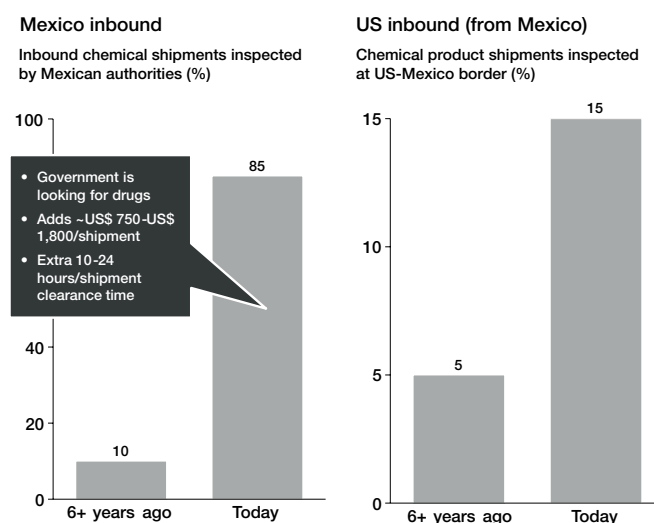
Mexican Chemical Co. is hampered by numerous barriers from participation in global trade and supply chains. In particular, inspection and testing regulations in the European Union limit market access and an adverse business climate related to the rise of Mexico's illegal drug trade imposes burdens that harm exports.

Mexico's chemical manufacturers are subject to strict market access measures imposed by the European Union (EU) that limit Mexican exporters' ability to compete. Specifically, an EU regulation called Registration, Evaluation, Authorization and Restriction of Chemical Substances (REACH), imposed in 2007 and in full compliance with World Trade Organization (WTO) guidelines, sets testing standards that Mexican producers find difficult to meet. Applying to all non-EU chemical manufacturers, REACH requires prospective importers to the EU to conduct registration testing in certified European laboratories. Tests conducted outside the EU are not accepted as valid, even when they use the same methodologies. The restrictions result in registration delays that can run for several weeks.

The industry in Mexico is also hobbled by an adverse business environment created by the rise of drug cartels and drug-related violence in recent years. An increasingly aggressive inspection regime by Mexican authorities intended to curb the trade of chemicals used to synthesize illegal substances has imposed heavy burdens on chemical imports. The inspections add between US\$ 750 and US\$ 1,800 to the cost of a shipment and increase lead times by between 10 and 24 hours.

Concerns that Mexico is a supplier of illegal drugs to the US market have also increased inspections of chemical shipments at the US-Mexico border, raising shipment costs and causing delays (see figure).

Figure 19: Negative business environment – due to war on drug cartels – increased revisions



Source: Interview with Asociación Nacional de la Industria Química (ANIQ), Mexico's national chemical industry association.

An expanding number of specific chemicals that can be used to synthesize illegal drugs come under especially rigorous scrutiny by Mexican authorities. The government bans their use, even though many such products are not necessarily direct precursors of the unlawful substances. By putting these chemicals off limits or highly restricting permission to import them, the government creates major inconvenience and extreme delays for companies that need them.

One compound that falls under the ban is pseudoephedrine, a key ingredient in cough and cold medicines, as well as an illegal drug precursor. As a result, cold medications in Mexico will lack this compound, rendering them less effective, or their manufacturers will have to settle for a less suitable substitute. Adding further complexity to the stiff drug control laws, some of the controlled products are not regulated as strictly or at all in other markets.

The conflicting rules bite hard when products are designed and synthesized in a global supply chain. Governments could potentially alleviate the problems they create by agreeing to harmonize restrictions on a global basis rather than country by country.

eBay: Ramping up trade growth among smaller enterprises

Most international trade occurs through large companies. These firms have lengthy, sophisticated supply chains and can handle the fixed costs associated with global distribution networks. Small- and medium-sized enterprises (SMEs) – important in domestic economies as a source of jobs and growth – traditionally do little exporting. But the Internet helps SMEs participate in global business, and using preliminary data from eBay experiments and pilots, it has been estimated that lowering supply-chain barriers for these companies could increase e-commerce cross-border trade by as much as 60%-80%.

SMEs make up a significant part of every country's economy. In 2011, 58% of gross value added in the 27 European Union countries came from SMEs.⁵⁵ In OECD countries, SMEs account for approximately 99% of enterprises and two-thirds of employment.⁵⁶ Innovative SMEs fuel employment and economic growth. Nearly all net job creation in the US between 1997 and 2005 came from firms less than 5 years old.⁵⁷ Additionally, SMEs – Internet-based SMEs in particular – create a broader supply since they are able to serve niche markets independent of their location.

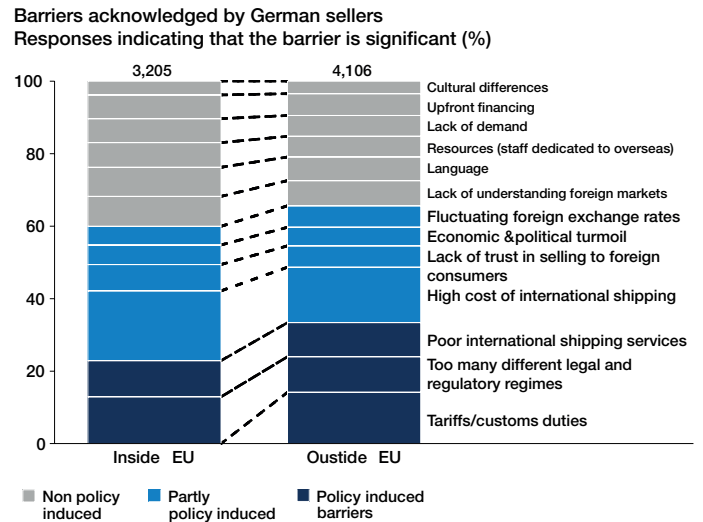
In the past, few SMEs engaged in exporting. A study of French firms (excluding Internet-based companies) found that 65% of the largest companies export while only 3% of the smallest do. But the Internet has shifted the dynamic by providing SMEs with easier access to international markets. Of the firms doing business on eBay, for instance – many of which are micro-small businesses with fewer than five employees – 97% of those with more than US\$ 10,000 in annual sales sell their goods internationally.⁵⁸

Although the Internet facilitates cross-border trade, supply chain barriers still interfere

The Internet reduces some traditional barriers to trade, such as the need for a middleman. As traditional barriers are lowered, however, logistics and supply chain barriers become more important. Shipping costs, for example, directly affect both buyer and seller and are now a major consideration.

Some of these trade barriers, such as tariffs, depend on policy decisions. Others, such as the availability of international shipping services (see figure), do not.

Figure 20: A significant part of factors limiting trade mentioned by merchants are policy induced



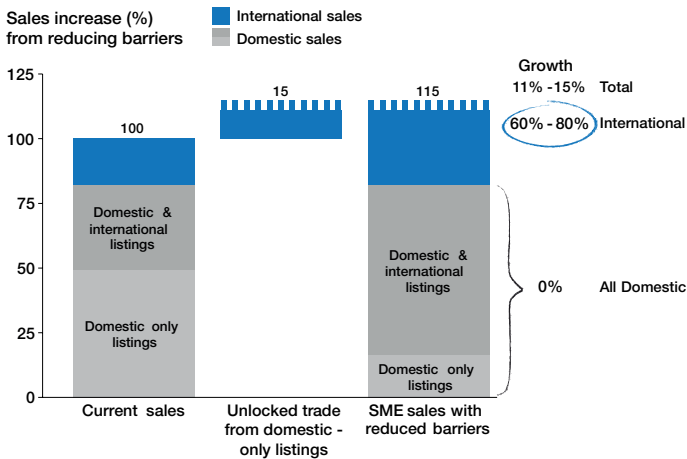
Source: eBay, Bain analysis.

These barriers should not be considered separately, because it is the combination that is daunting for an SME. Few SMEs can easily understand the customs and documentation requirements, tariff schedules, and regulations of every country they might sell to. Few know much about local shipping services in individual countries. If merchants decide to sell internationally, therefore, they will typically limit their sales to the countries whose regulations are easiest to navigate and whose shipping services are most reliable. Or else they may try to transfer the risk and complexity to the buyer. Buyers, however, may not be able to track their packages through customs, and they may not know how much the items will ultimately cost. If any of these factors occur, the buyer may have a poor experience – another disincentive to the seller.

Calculations based on eBay data suggest that lowering these barriers could trigger a 60% to 80% increase in cross-border SME sales

Supply chain barriers raise the cost of trade and lengthen the time required to complete a transaction. But their biggest impact is on trade volume, as merchants limit the countries where they sell and buyers are discouraged from ordering from other countries. Removing the barriers would likely boost trade substantially, as preliminary results from various short-term, highly targeted eBay pilot programmes show. Under these pilot programmes, eBay worked with some of its pre-selected small business users to make the small business listings visible to a global customer base (whereas the listings had previously been visible only to a domestic audience). It then undertook to eliminate the barriers for international buyers and sellers by providing transparency on fully landed costs and delivery dates, by facilitating communication between people who might speak different languages, and by handling shipping. These sellers entering the international sphere will face sales increase from international markets, as suggested by preliminary results of the pilot programmes. Using these preliminary results, estimates suggest⁵⁹ that addressing barriers such as these can result in expanded cross-border activity by small business sellers by 60% to 80% (see figure), equivalent to a US\$ 4.8 to US\$ 6.4 billion⁶⁰ gain in trade. If this behaviour held for the entire global e-commerce market, international trade from the Internet might unlock ~US\$ 95 billion.⁶¹

Figure 21: Based on pilots, there is an estimated 60% to 80% increase in cross-border sales by reducing barriers



Note: Assumes same average revenue per listing in domestic and international. Author calculations based on US eBay pilot studies preliminary results.

Source: Company data; interviews; based on preliminary, targeted US pilot results. Authors' calculations

Barriers to trade are a key factor in companies' supply chain decisions, and so help determine a country's overall competitiveness

Countries are in constant competition for investment, and companies look for comparative advantages between countries in making choices. So judgments about trade barriers are always relative, and whatever benefit a country has in one trade dimension, it might lose in another. Additionally, trade barriers can limit the economic potential and market development of a region by completely shutting off investment or integration with global trade networks.

The scale of the market opportunities is of great importance. However, when evaluating new market opportunities, the ease of serving the market and the relative complexity of the barriers to cross-border commerce are also important considerations. In fact, when faced with various markets representing similar economic opportunities, the ease of serving the market, including the challenges related to customs, duties, tariffs and other regulatory factors can be determinative in terms of market entry and other investment decisions.

To provide the necessary level of service to users both in the new market country and cross-border trading partners in existing countries, eBay is required to evaluate the mix of hurdles and barriers to cross-border commerce and determine if a commercially justifiable level of investment can address the concerns in a manner that will enable successful businesses to provide a positive user experience. For example, one market may involve very expensive, unreliable or technologically unsophisticated shipping services, while another might include a tariff regime that includes both high rates and also highly complex compliance procedures. Government efforts to reduce the types of barriers that are especially disruptive to cross-border small business commerce increases the likelihood that technology-based small business commerce platforms will help foster greater small business trade and growth.

International Air Transport Association (IATA): Electronic Declarations for Air Cargo Would Yield Large Savings – But Only if Everyone in the Supply Chain Moves to Adopt Them

The movement of goods by air is the sinew of 21st-century global trade, but the air cargo industry still relies heavily on slow and inefficient paper-based shipping processes. In 2005, the International Air Transport Association (IATA), in partnership with other major associations in the air cargo supply chain, launched an industry-wide project to adopt lower-cost, more reliable electronic documentation. To date, government regulations, barriers in information and communications technology, and the failure to achieve a critical mass of users to achieve network-effect benefits have prevented the e-freight initiative from being universally adopted. But if fully implemented, e-freight benefits would be substantial. According to the analysis undertaken in this report based on IATA projections, e-freight could yield annual savings for shippers and the air transport industry a total of nearly US\$ 12 billion.

Air cargo transport represents less than 2% of total commercial transport by volume but accounts for approximately 35% of total value. Air shipments differ by industry and fall into four broad categories, each requiring distinct type of service. *Emergency freight* includes time-critical shipments of spare parts as well as business or financial documents that cannot be transmitted electronically. *High-value freight* like gold, jewellery, currency, artwork, electronics and luxury goods rely on air freight for security and speed. *Perishables* such as seafood, fruits, vegetables, pharmaceuticals and flowers require fast delivery and temperature control to preserve freshness. *Rapid replenishment shipments* used by industries with fast turnover like fashion, electronics, or just-in-time manufacturing help control inventory when demand is volatile. More than 60% of air freight travels in the belly of passenger planes, with the balance carried by cargo aircraft. Shipment volumes also vary considerably by category across trade routes.

Air cargo transport continues to rely on reams of paperwork, with the average shipment typically generating more than 30 documents. These include customs forms; transportation docs, like airway bills and flight manifests, as well as commercial documents such as invoices, packing lists and certificates of origin. That blizzard of forms, moreover, passes through the hands of up to seven distinct parties, including shippers, freight forwarders, ground-handling agents, airlines, customs brokers, customs agents and other government authorities. With each step in the shipment's chain of custody, the volume and complexity of paper expands, along with its cost and susceptibility to human error.

The paper burden does not end upon delivery of the goods. The physical documents must be stored for future reference or audits, making them cumbersome to access. Retrieving an archived invoice or air waybill in a storage facility can take as long as 40 minutes. Paperwork-related delays carry additional costs to shippers in terms of higher freight rates to expedite time-sensitive shipments by air, or insurance charges to cover loss of perishable products and lost sales.

Much of that inconvenience, cost and delay can be prevented by switching to e-freight. Using digital technology to pre-clear shipments before they arrive at the airport, for example, could prevent between 70% and 80% of paperwork-related delivery delays at destination. E-freight can also help break through other shipment choke points. For example, freight forwarders' warehouses are often not in the same location as the office, requiring that documents be moved physically before a shipment can proceed. With e-freight, the goods can already be on the move while the electronic documentation is being completed.

The IATA e-freight initiative: Obstacles and opportunities

To eliminate extraneous costs and reduce trade barriers faced by the air transport industry, IATA launched an e-freight initiative in 2005. For e-freight to succeed, the new paperless system would need not only standardized electronic customs declarations but also industry-wide acceptance of common procedures for digitizing all commercial support documentation.

Making paperless border crossing a reality depends critically on the willingness of governments to lift regulatory roadblocks to electronic customs processing. The countries that have already taken that step represent just one-third of global air cargo by volume. IATA's and its partners' efforts to persuade other governments to adopt e-freight measures so far have met with only varying success.

Notable among the nations that do not yet permit electronic customs clearance are the four largest and fastest-growing emerging markets – Brazil, Russia, India and China – that stand to benefit most by reducing long customs delays. Efforts to bring them on board are underway in Russia, where a private-public partnership has been formed to develop an administrative framework to streamline regulations, and in China, where a pilot programme has begun. To date, e-freight has made little headway in India or Brazil.

Electronic customs procedures are a necessary but far from sufficient precondition for participants in global air shipment to reap e-freight's full benefits. One condition for true success is for all parties to support and adopt the paperless process. The industry is still far from that goal. Even in markets where customs procedures have been digitized, only 10% to 15% of all air cargo stakeholders have fully implemented an electronic system, from shipper to carrier to forwarder, resulting in a global e-freight penetration of just over 4% of global air cargo shipments.

Who will take the first step?

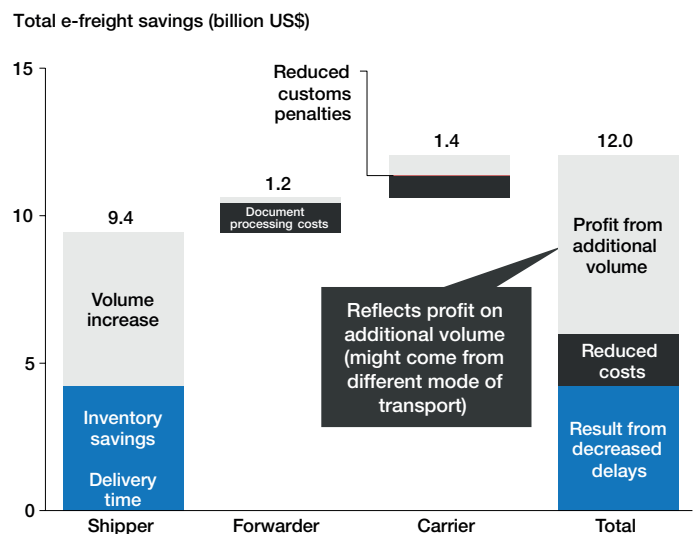
Getting all parties in the air cargo transport supply chain onto the same digital page presents a classic game theory dilemma: A large part of the benefits of e-freight only accrue to an individual participant when everyone else along the chain automates simultaneously. Using an electronic system for one only part of the process makes little sense if another part of the chain remains manual.

Compounding the challenge, the parties that would potentially see the greatest benefit from e-freight are not necessarily the ones that are best positioned to influence its implementation. IATA's model, reviewed by the authors of this report, shows that, if universally adopted, e-freight could generate total annual savings of US\$ 12 billion⁶² for shippers and the air transport industry when fully phased in after eight years, but the gains and costs from achieving them are not born equally.

To address this challenge, IATA has paired with other representative associations from the air cargo supply chain, and designed a joint roadmap for the implementation of the initiative,⁶³ aiming to accelerate change. While this will help, unique challenges will remain.

Shippers: Shippers stand to benefit the most, largely in terms of the time they would save and the flexibility faster shipments would give them (see figure). In aggregate, an IATA model estimating e-freight effects forecasts that by cutting delays by a full day, shippers could reap some US\$ 4.2 billion in savings – US\$ 2.8 billion stemming from lower inventory buffer stocks and another US\$ 1.4 billion from a lowering of their cost of capital. Shippers would also participate in the resulting 1% increase e-freight could generate in total value of international trade. Their 12% share of the US\$ 41.8 billion trade boost would add US\$ 5.2 billion to shippers' bottom lines.

Figure 22: Potential savings accrue mostly to the shipper



Source: International Air Transport Association/Bain model.

Shippers' customers would also benefit from accelerated, lower-cost deliveries. Zara, a "fast fashion" retailer, exemplifies the benefit of reducing air cargo shipment total transit times. Zara updates clothing lines at least once a month. Its ability to track, in real time, what is selling lets management know immediately what styles and colours are drawing customers to its stores – information it immediately sends to its manufacturers. But the Zara business model works only if it is able to get its designs into stores in a matter of days or weeks, not months, which makes it a heavy user of air transportation. Less encumbered air-freight shipment in the future is likely to boost opportunities for more business models based on speedier turnover.

As big as these benefits are, however, shippers have little influence on e-freight's adoption. They are a fragmented group of air transport users, and their involvement in freight and customs documentation is minimal. The bigger role in determining how – or whether – e-freight is implemented will be played by air carriers and freight forwarders.

Though not as big as the cost savings and volume increases the shippers would reap, the carriers and forwarders stand to realize substantial gains. When fully implemented, they would share in savings of US\$ 1.7 billion from reduced document processing costs alone, according to IATA's forecasting model, with the carriers pocketing a little over 40% of those savings and the balance accruing to the forwarders. They also stand to split US\$ 1.8 billion resulting from an estimated 1% increase in the volume of air cargo shipments.

Freight forwarders: As intermediaries between shippers and carriers and serving clients across a wide range of industries and geographies, forwarders have a strong incentive to pursue e-freight's attractive potential. But the balkanization of their business landscape makes it difficult for them to unilaterally impose their individual e-solutions on customers or carriers. And some forwarders, whose business is based in part on the ability to help their customers navigate the complex, paper-based documentary procedures involved in shipping cargo, may be reluctant to switch to e-freight.

One area where forwarders can act on their own to achieve efficiencies is applying digital technologies to the vast archives of paper documents they maintain. An analysis by IATA quantified the benefits to be gained from e-archiving. Electronic document storage boosts productivity by reducing the need for manual printing and organizing of forms, while making information accessible from any location at any time. One case study showed that freight forwarders can reduce document processing time, eliminate paper, ink and printer maintenance costs, and free up office space, saving between US\$ 1 and US\$ 2.40 per shipment. An added bonus: e-archiving improves customer service by increasing responsiveness, improving record security and boosting environmental sustainability. Totalling up the costs and benefits of converting to e-freight solutions, IATA estimates that a forwarder that handles 1,000 shipments per month can break even on its investment in electronic archiving technology in just two years.

Carriers: Because they are generally large players operating in consolidated markets, carriers have much to gain from digitization. E-freight implementation has generally proven easier in Asian markets, where air cargo transport is more centralized than in Europe or the US, around key shipping centres, and where air carriers' relative market power is higher thanks to a higher need for capacity going from Asian markets to Europe and America, than on the return trips.

In Hong Kong SAR, for example, locally headquartered carrier Cathay Pacific led a switchover from paper airway bills to a paperless system supported by a data messaging platform called Ezycargo. As Hong Kong's dominant carrier, Cathay Pacific was able to create and enforce a process where freight forwarders it works with use Ezycargo data entry for all shipments it carries. Cathay has enjoyed a boost in both productivity and traffic gains from the change to electronic documentation. As e-freight came into full effect between 2010 and 2011 in Hong Kong, the number of shipments Cathay carried jumped from 300 to 3,600, while those carried by its rivals increased from 600 to 6,400. Productivity at Cathay, measured by the level of manpower saved or reassigned to other tasks, rose 19%. IATA calculates that were e-freight fully adopted at airports worldwide, productivity in airlines' export, import and accounting processes could increase by nearly one-half.

Pharmaceutical Companies: Market-access Barriers Intended to Lure Investment End Up Increasing Costs and Delaying the Delivery of New Drugs

International pharmaceutical manufacturers face different obstacles in advanced and emerging markets. In advanced markets like the US and European Union, companies must contend with customs barriers to enable their supply chains to

function smoothly. Meanwhile, many emerging markets, eager to improve their citizens' access to affordable, high-quality healthcare, try to encourage pharmaceutical companies to invest locally. This undermines efficiency and drives up operating costs with price caps and other regulations that end up limiting the availability of new treatments.

As participants in one of the global economy's leading high-value growth industries, pharmaceutical companies face conflicting challenges in advanced and emerging economies. In the US and EU where most leading drug research is based, pharmaceutical companies strive to work around inconsistent standards, customs and infrastructure barriers that handicap the efficient operation of their downstream supply chains. Meanwhile, governments in developing countries impose market access barriers as a way to encourage pharmaceutical companies to maximize their local investments in different aspects of their operations from manufacturing and distribution centres to R&D and clinical trials. These measures present obstacles to greater efficiency that would foster the industry's continued global growth and would ensure greater access for people to newer medications.

Country-specific measures that restrict imports and increase local investment are a significant source of friction in the cross-border trade of pharmaceutical goods (see figure). In Indonesia, for example, only pharmaceutical companies that set up their own factories or sign a transfer license with a local manufacturer will be eligible to sell their own drugs in the fast-growing market following a two-year transition period. Vietnam sets import quotas for active pharmaceutical ingredients and inner packaging materials, restricting imports to pharmaceutical companies that invest in local manufacturing or storage facilities. Thailand established a burdensome permitting process that obliges pharmaceutical companies to periodically disclose proprietary information, resulting in delays of as long as a year to satisfy all the requirements. Pharmaceutical companies acknowledge that market access barriers like these force them either to delay the introduction of new drugs into the market or not to enter it at all. Companies that do set up local production generally bear higher financial costs and are unable to capture economies of scale that boost production efficiency.

Figure 23: Pharmaceutical companies face major market access barriers in Asia's emerging economies (not exhaustive)

Country	To sell pharmaceutical products locally companies face certain requirements					Other barriers
	Local manufacturing investment	Local distribution network investment	Licensing	Local clinical trials	Other paper work	Lack of IP security
Indonesia	●*		●		●	●
Vietnam	-	●	●	●		
Thailand			●	●**	●	●
Philippines					●	
Malaysia			●		●	

● Requirement - Has an alternative

*Companies must either establish a factory in Indonesia or transfer licenses to a local manufacturer. ** Safety monitoring period: 2-4 years.

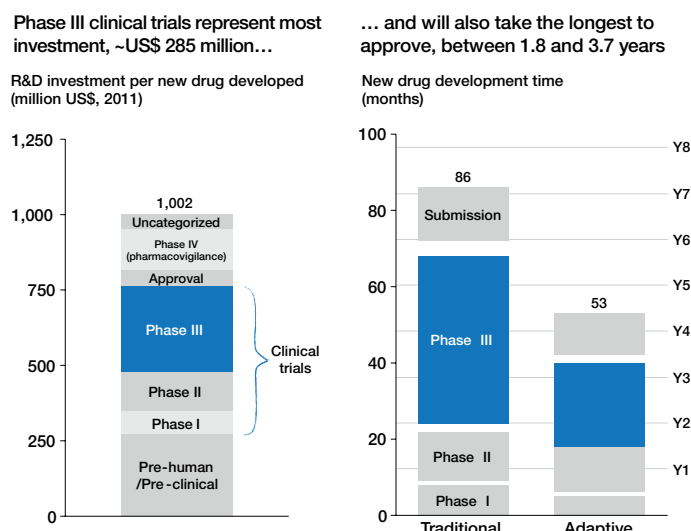
Source: Pharmaceutical company interviews; European Chamber of Commerce, European Commission Market Access Database; American Chamber of Commerce; World Bank.

The cumulative effect of local manufacturing requirements is to increase pharmaceutical companies' investments needs, which in turn reduces the number of new drugs they release and increases the time-to-market for those that end up getting produced. Developing the new products may necessitate installing new technology at a plant. Those investment costs multiply when a company operates several plants spread across the globe and must upgrade them all. Pharma companies have a strong incentive, of course, to focus their investments first on the bigger, mature markets. It can take years before they get around to reequipping plants in less developed regions, depriving them of access to new medication in the meantime.

An increasingly large burden the pharmaceutical industry faces is the requirement more countries are imposing on them to conduct local clinical trials to determine the safety and efficacy of new drugs. With upfront new-product development costs averaging some US\$ 1 billion,⁶⁷ clinical trials are one of the most expensive and time-consuming investments pharmaceutical companies make, taking anywhere from four to seven years (see figure).

Currently, most clinical trials are carried out in the US, EU and other countries with advanced economies, where markets are big and regulatory standards are strict and well-established. As testing requirements have become more standardized internationally in recent years, developing countries can present an attractive opportunity to offshore clinical trials because the costs per patient participating in trials can run half or less than in an advanced market. In 2011, developing markets attracted some 16% of total pharmaceutical company spending on drug trials.⁶⁸

Figure 24: New drug development requires about US\$ 1 billion and between 4 and 7 years of clinical trials



Source: R&D Investment from Datamonitor, adapted from European Federation of Pharmaceutical Industries and Associations, 2011 referenced in "R&D Trends 2012"; development time from Health Decisions, 2011, referenced in Datamonitor "R&D Trends 2012"

Some developing nations are using clinical trial requirements as a lure to boost direct investment by pharmaceutical companies by restricting imports only to companies that conduct local trials – even for drugs that may already have won clearance from US or EU regulators. Overall, redundant local clinical trials add significant costs to drug development and delay their market entry. For example, Vietnam requires local trials for multinational drug companies when their product has been available in their country of origin for less than five years but not for local manufacturers.⁶⁹ Certified drugs imported into Thailand are subject to a mandatory two- to four-year safety monitoring period, but government-owned pharmaceutical firms are

exempt.⁷⁰ Chinese authorities mandate local clinical trials for products seeking registration, which can require companies to repeat tests for some earlier clinical stages and result in delays of up to five years. Both Russia and India also insist that companies conduct local clinical trials in order to gain market access.⁷¹

Restrictive market access measures intended to increase and accelerate local drug development usually backfire because of the resulting inefficiencies and higher costs they cause. They harm emerging markets because they delay entry of new life-saving medications as they undermine the competitiveness of the industry.

Apparel Co.: Apparel in Africa

Madagascar's low labour costs and duty-free status make the African nation competitive in the apparel industry. Yet as other countries eliminate tariffs, persistent supply chain barriers threaten to erode the economy's competitive edge. Inadequate infrastructure and border administration hurdles cause delays that render the supply chain unreliable, costing apparel manufacturers business in a global industry that values speed.

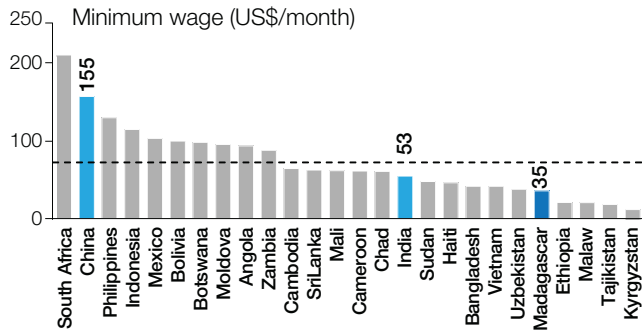
Labour-intensive, low-skill apparel manufacturing is a ferociously competitive industry in which Madagascar struggles to maintain an advantage due to its low labour costs. The African island nation benefits from other conditions favourable to its competitiveness (see figure). For one thing, many nearby African countries produce high-quality cotton with desirable fibre characteristics, offering the potential to integrate supply chains regionally. Also, apparel production is concentrated in a specially designated free zone, which facilitates imports and exports through electronic customs declarations and procedures that fast-track clearance. Preferential trade agreements give Madagascar apparel companies access to major world markets.

Nevertheless, apparel is a time-sensitive business, and a manufacturer's supply chain must be fast and reliable to remain competitive. This is where Madagascar struggles. Supply chain barriers undermine the competitiveness of Madagascar companies like Apparel Co., particularly relative to Asia-based rivals. Most apparel firms source production in Asia, despite the higher labour costs and the tariffs Asian apparel manufacturers still face. Indeed, Apparel Co. itself sources 85% of its shipments from Asia, even though its near neighbour Mauritius is an abundant producer of good-quality raw materials. As more countries eliminate trade duties with the US and Europe, Apparel Co.'s preferential trade advantages will erode.

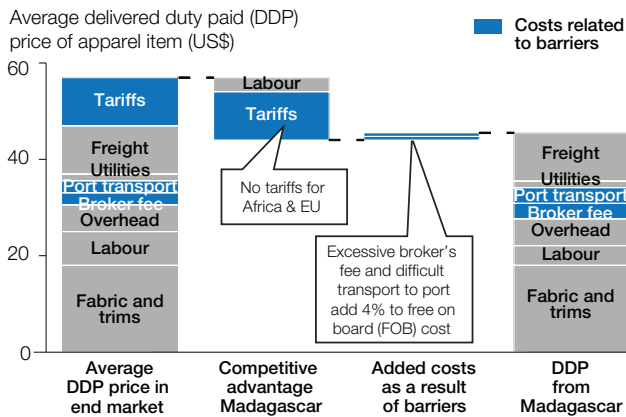
Apparel Co. encounters two barriers in particular that impede the smooth functioning of its supply chain – border administration delays and inadequate infrastructure. Even with electronic document processing, Madagascar's border administration procedures present operational problems that result in significant delays. Because there is no comprehensive strategy to protect against risk, each outbound container needs to be scanned. Long queues and wait times and unpredictable random checks can hold up a shipment for two additional days, on average. And because customs offices are open only during short operating hours, some 70% of shipments arrive when customs is closed, further driving up costs and delays.

Figure 25: Madagascar has labour-cost and free-trade advantages, but supply chain barriers erode competitiveness

Madagascar's labour costs and lack of tariff give it a competitive advantage



...but barriers add costs that can tip the balance to the next low-cost country



What if tariffs are removed?

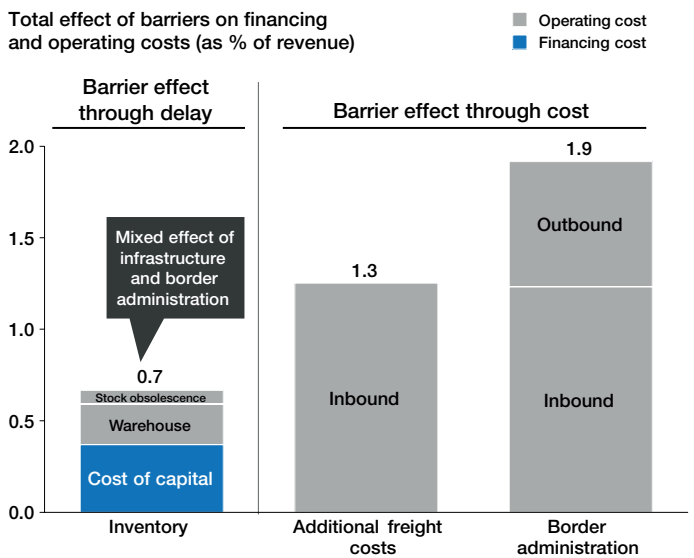
Source: Euromonitor 2011 data for labour costs; Bain analysis; company interview.

Magnifying border-crossing problems, poor local infrastructure is an even bigger source of supply chain unreliability. Shipping services in Madagascar's small market are limited by low trade volumes with just one outbound ship sailing each week. Moving goods the 530 kilometres from Apparel Co.'s mill to port over Madagascar's deficient roads takes 14 hours, resulting in high fuel costs and accident risks. Given these rough conditions, even just a one-day border administration delay can add a full week to a shipment. Together, operating costs resulting from administrative and infrastructure barriers cut into Apparel Co.'s total revenues by 3.2%.

Apparel Co. tries to compensate by holding buffer inventory that increases operating costs and impinges on working capital, further undermining the company's competitiveness. In order to be able to respond quickly to customer demands when goods are delayed in transit, Apparel Co. keeps some six weeks extra stock on hand, equivalent to 0.7% of company revenues (see figure).

Even backup inventory, however, cannot overcome supply chain barriers that limit Apparel Co.'s access to some of the industry's most attractive markets. With its 14% annual growth rate, for example, the high-turnover fast-fashion segment now makes up almost 20% of the apparel market – a segment of which Madagascar cannot capture a significant share. With inventory turns every two to eight weeks, fast fashion companies, like Zara and H&M, depend critically on reliable deliveries. Apparel Co. pays a high cost for its late shipment rate of about 10%, adding up to anywhere between 0.5% to 9% (according to benchmarks) in air freight, penalties, lost sales due to cancellations or returns. But the largest opportunity cost comes from limiting market opportunities. To put it in perspective, each additional 1% gain of the fast-fashion segment would yield the Madagascar economy an additional US\$ 54 million in revenues.

Figure 26: Supply chain barriers raise Apparel Co.'s operating costs by approximately 4% of total revenue



Note: Freight costs are only inbound since garments are cold free on board. Inventory costs consider financing costs of inventory, warehouse rent, insurance and obsolescence costs. Source: Company interview; company data.

Global Co.: The Big Role of Small Trade-related Frictions in the Cross-border Movement of Goods

The economics of trade figure prominently in any company's analysis of where to site production, supply and distribution facilities for goods it ships across national boundaries. For some multinational producers, especially sellers of price-sensitive and low-margin products, even small trade-related frictions within and between markets where very few formal trade barriers exist can have a disproportionately large weight in their facility-planning investments. Over the years, Bain & Co. has worked with many companies weighing the merits of trading with, or moving production to, Mexico. In doing this analysis, Bain has been able to quantify the costs of many of these relatively hidden considerations. A hypothetical company, Global Co., considering the relocation of its manufacturing capacity to Mexico, would discover that counterbalancing some of Mexico's obvious advantages from a capital expenditures and labour cost perspective are transportation, security and infrastructure barriers tied to trade. While Mexico might have a 25% cost advantage, more than half of that advantage could be eliminated by supply chain friction costs.

Like any profit maximizing firm, Global Co. should perform a rigorous analysis about where to site production to squeeze the maximum attainable operational and distribution efficiencies available across Canada, Mexico and the US. Although all three markets are signatories of the North American Free Trade Agreement (NAFTA) that ended most formal trade barriers across the continent, the investment team has discovered that trade-related frictions should factor prominently in its calculations and will weigh heavily on the ultimate selection it makes.

Weighing the alternatives

Global Co.'s first level of analysis would likely establish Mexico as the leading choice. Capital expenditures to build the facilities might be some 10% lower in Mexico than in the US or Canada, and hourly wage rates in Mexico are only about one-fifth of those in the US. But as the investment team probes deeper into the details of the business case for producing and distributing to all of North America from a base in Mexico, a host of issues would arise that would subtly shade the company's calculations.

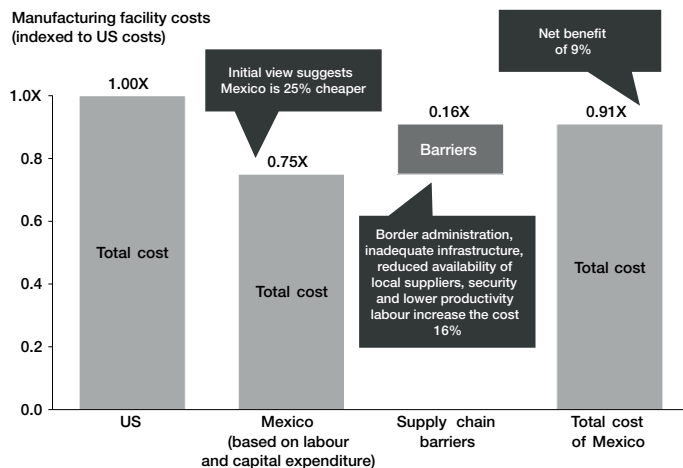
Economic considerations related to product mix

The attractiveness of Mexico as a production centre would depend partly on Global Co.'s product mix. The products best suited for production in Mexico share a common profile. First, they have the highest direct and indirect labour content. Second, they are made from basic materials that can be easily sourced in Mexico. Third, because the final products will be shipped long distances, they will have the highest value-to-weight ratios. Finally, they do not need to be stored in protected warehouses or transported via insulated or refrigerated trucks that drive up the cost of handling and shipping. However, even if Global Co. has a significant subset of goods that are both high in labour content and have attractive shipping characteristics, the company would need to reckon with yet another range of costs and complexities.

Hidden costs complicate the evaluation

In helping companies dig more deeply into such issues, there are three broad categories of direct business costs and trade-related considerations which may combine to mask the true returns from investing in Mexico.

Figure 27: Labour and capital expenditure savings need to be weighed against supply chain barriers and border friction



1. *Higher direct costs of doing business in Mexico:* Partially offsetting Mexico's top-line labour cost advantages are market-specific impacts that significantly lower – or raise – the marginal cost of siting facilities in Mexico. For one thing, Mexico's federal and provincial governments provide fewer incentives to companies that invest in Mexico than their counterparts in the US or Canada do. Global Co. could find that the effect of this would be to increase its investment costs by 1%. Secondly, Mexican factories rely far less on automated production process than those based north of the border do. This lack of automation would require Global Co. to increase its production-line workforce and negate a big part of Mexico's labour-cost advantage. Further adding to labour costs would be the lower productivity of Mexican hourly workers. To compensate for the reduced output, Global Co. might need to boost staffing levels by as much as 25%.

2. *Border administration and other trade-specific frictions:*

Differences in country trade rules within the North American free-trade area could have specific consequences – potentially both favourable and adverse – for Global Co.'s investment decision. For example, there could be a trade distorting subsidy in the US that makes commodity inputs more expensive there, which would weigh in favour of basing production in Mexico. That advantage would be offset somewhat by the increased costs resulting from rules affecting the transportation of goods by truck. The most onerous restrictions requiring shipments originating on the Mexican side of the border to switch drivers and cabs at border crossings in order to continue their journey into the US were lifted in 2011, nearly two decades after NAFTA's ratification. However, Mexican trucking firms that carry cargo into the US must still purchase US insurance at the highest possible rate, putting them at a competitive disadvantage to US carriers.

3. *Trade-related obstacles affecting supply chain.* The absence of formal trade barriers greases the wheels of cross-border commerce, but it also lays bare underlying issues that stem from added pressures increased trade imposes on Mexico's economy. These would show up specifically in Mexico's inadequate telecommunications and transportation infrastructure. Gaps in road and rail connections require shipments to travel extra distances. Moreover, because Mexico is a net exporter, trucks that carry full loads of goods north must return empty. Together this could push the cost of moving finished goods up by more than 3%.

Global Co. may also have difficulty finding high-quality suppliers in Mexico for key production inputs, adding perhaps 3% to the cost of each unit of finished goods. And when Global Co. looks into recruiting senior executives to run its Mexican operations, the company may find that Mexico's shallow pool of qualified management talent would drive up the compensation costs for top roles by 8%.

Finally, Global Co. would need to factor in the higher security costs it would face in Mexico, where crime rates are higher than in the US and Canada. Both initial costs to safeguard building assets and higher ongoing operating costs to protect goods in transit could raise Global Co.'s fixed costs by 7% per year.

To compensate for the higher level of instability it would face, the company would likely require a higher internal rate of return on an investment in Mexico.

While these last obstacles associated with an expanded volume of trade are not a consequence of trade-inhibiting government regulations, their existence – and the need to remove the constraints they present – provide a reliable roadmap to guide future public and private investments needed in order to capture the full benefits of open borders.

CPG Co.: Making Business Work in Africa's Harsh Environment

Doing business across the African continent is as fraught with complexity for multinational companies like CPG Co. as it is filled with opportunity. In Nigeria, Ivory Coast, Kenya and Zimbabwe, the company struggles against an adverse business environment that elevates its risks and a patchy infrastructure that undermines operational efficiency. These barriers limit Africa's integration into global supply chains and the breadth of goods available to African people.

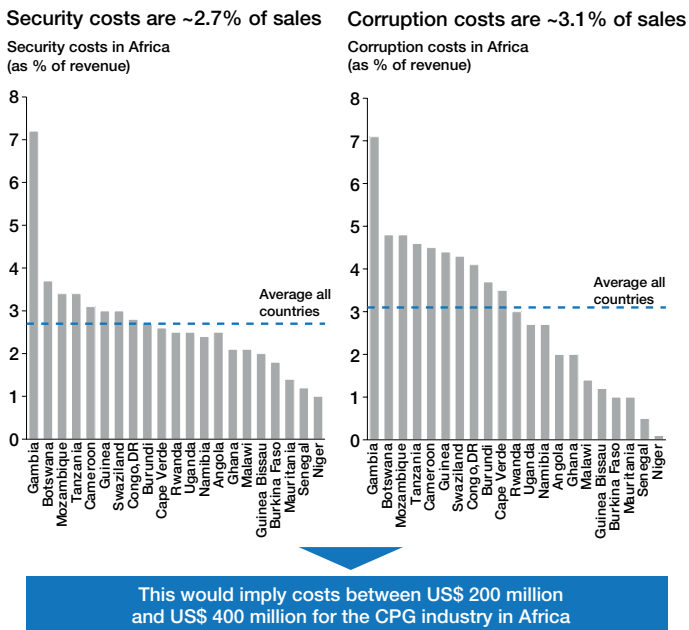
Companies like CPG Co., a consumer packaged-goods producer, that hope to capitalize on Africa's strong growth potential must be prepared to encounter an adverse business environment that gives rise to a wide range of problems that makes it difficult for them to operate. Unstable politics within and among African nations have riven the continent with a wide range of internal conflicts that pose a significant threat to industry. Civil unrest in Nigeria, for example, has brought CPG Co.'s business to a temporary halt in the past.

Political risks raise costs and complicate financing

National policies in the region lack continuity, further heightening uncertainties CPG Co. faces during and immediately following elections. When Kenya held elections recently, for example, CPG Co. stockpiled between two and three times its normal level of inventories, a precaution that proved prudent when the highly contested election outcome was followed by violence and a civil political crisis. Following Zambia's 2011 presidential election, a switch in the party in power paired with political and economic mismanagement has had heavy implications for businesses.

Africa's often disruptive political environment increases personal safety and security concerns that lead many companies to decide not to enter problematic markets. For those that do, crime rate and theft across the transport chain drive up operating costs. Though less dangerous, endemic corruption further burdens operations. So-called "soft corruption" in the form of bribes paid to officials at borders and ports in order to speed up the shipment process has a negative impact in the form of severe delays on companies like CPG Co. that refuse to pay. The World Bank has estimated that corruption can absorb some 3% of revenues for business in Africa, roughly equivalent to what they pay in security costs⁷² (see figure).

Figure 28: Security and corruption absorb some 6% of revenue



Source: Private Sector Development blog, World Bank.

Risks and uncertainties scramble the company's willingness and ability to arrange financing. In the historically highly unstable markets of Zimbabwe and Malawi, CPG Co. withholds credit and insists on ending each month in a positive cash-flow position. The company's reliance on its ability to generate cash limits its growth, curtails investment and inhibits ongoing operations in both countries. When cash collections needed to keep the business running lag, CPG Co. has been forced to suspend operations – in one instance stalling production in a country for some four to five weeks.

Not surprisingly, perceived instability and deep uncertainties in high-risk countries are a major influence on corporate investment decisions and have major consequences for country competitiveness. For example, CPG Co. has lost € 6 million (US\$ 7.9 million) because of currency depreciation in one instance alone, an important factor in its decision not to tie up capital in the country affected. But CPG Co. is open to re-evaluating investment decisions when policies warrant, as it is doing in response to the recent relative stability enjoyed by Zimbabwe. Any change, however, will require that the investment have a rapid payback period in order to mitigate the still extraordinarily high risk of committing capital there.

In African countries characterized by a moderate risk environment, CPG Co. applies its more general global criteria on investment decisions and focuses specifically on the risk to cash flow. For an investment to get a green light, its expected return on investment (ROI) and payback period must be on par with global standards – typically, an ROI of between 25% and 50% with a payback period of less than four years, depending on the investment. In some cases, the business need for making the investment may influence CPG Co.'s decision to proceed. For example, the company decided to invest in a warehouse in Nigeria despite a slight lower ROI and longer payback period because the lack of logistics services in the country made having one urgent.

Depending upon the country and degree of risk it presents, CPG Co. weighs three different investment options for building its market presence. The first approach, importing finished goods, requires no investment and exposes CPG Co. to the least risk, but it results in the most expensive landed unit costs. One factor that drives up costs is the need to import three to four months' worth of stock with the attendant freight, clearance and duty expenses. The second approach, manufacturing goods locally through third-party contractors, requires minimal investment, but it exposes CPG Co. to greater risk than importing does. Local contract manufacturers lack the scale necessary to maximize production efficiencies, resulting in higher overhead costs per unit. The final approach, producing goods onshore, carries the highest risk. Heavy investment is needed to build capacity, but controlling production results in the lowest cost finished goods. As scale ramps up, unit costs fall.

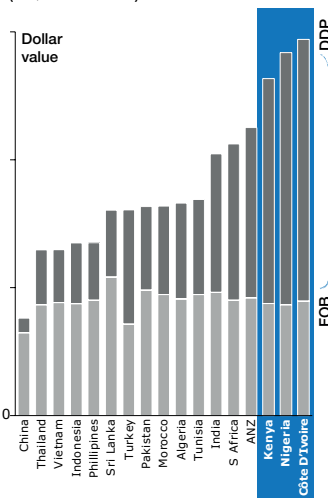
Poor infrastructure hobbles operations

The poor quality of infrastructure across Africa slows the movement of goods through the supply chain and cuts off access to some regions. Ports operate beyond capacity at most African harbours. At Mombasa, Kenya, the main port for all of East African trade, docking and unloading can stretch out from five to 14 days. Lagging telecommunications infrastructure makes it difficult to track containers, rendering operations and planning cumbersome and time consuming. As a result, vessels departing from Mombasa sometimes depart half-empty due to poor tracking infrastructure that leaves containers "lost" within the system. Finally, weak road and rail infrastructure make it difficult to reach many inland markets. The less efficient transport means that raw materials shipped to African destinations will face higher overall logistics costs than other destinations with fewer barriers (see figure). The inaccessibility and high cost to reach some markets requires CPG Co. and other large shippers to set up additional regional plants to cover the geography and to carry excess inventories at each node of the supply chain.

Figure 29: African countries are at a disadvantage – they have less competitive input costs

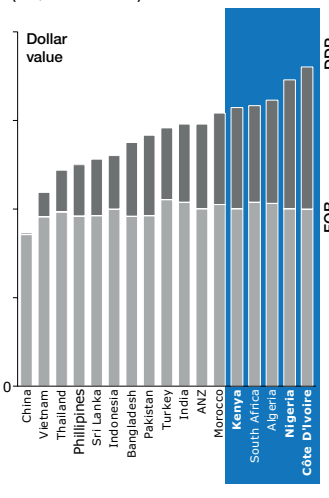
Raw material 1 costs are higher, mainly driven by logistics

Raw material 1 - sourcing costs (US\$/metric tonne)



Raw material 2 cost difference is also driven by logistics

Raw material 2 - sourcing costs (US\$/metric tonne)



Semiconductor Co.: Global Chip Manufacturer Deals with Customs Delays and Other Obstacles in Finished Goods Sales

Semiconductor Co. has manufacturing facilities, suppliers and customers throughout the world. Among its challenges as a global operator are:

- **Managing inventory and delays** – Long customs procedures in some countries create bottlenecks in Semiconductor Co.'s supply chain, making it difficult to manage inventory levels and finished-goods shipments.
- **Operating in uncertain business environments** – In some countries, business regulations are not standardized and poor business practices hamper operations.

These barriers have significant impacts on Semiconductor Co.'s business, including its ability to meet customer demands. The company also uses a sophisticated model for investment decisions about production that takes the barriers into account.

Semiconductor Co. designs and manufactures microprocessors and chipsets. Its products are used in a range of applications, from personal computers to medical devices. The company sells to original equipment manufacturers (OEMs), original design manufacturers (ODMs), and industrial and communications equipment manufacturers around the globe. It employs three different sales models: DTD (door-to-door), DTP (door-to-port), and delivery outside the country. Semiconductor Co.'s economic models for investment decisions about production and sales take into account not only ordinary business factors, but also the magnitude of supply chain barriers in each country under consideration. Semiconductor Co. may negotiate with governments for incentives that compensate the company for these barriers.

Certain barriers are common to many countries. Regulations may be unclear or inconsistent. Security levels are often low, increasing the risk of theft. Export licenses may be hard to obtain – an issue that is becoming more serious for Semiconductor Co. as some of its products are radiation hardened and may fall under munitions control laws. Local-content and technical-standards requirements (often leading to the same) are growing more stringent as countries attempt to move up the value chain and develop their own high-tech industries.

Customs delays are a particular problem: though shipments are typically sent by air, they may be held at customs for several days. Delays generate higher costs for working capital, administration and warehousing, and lead to lower customer satisfaction.

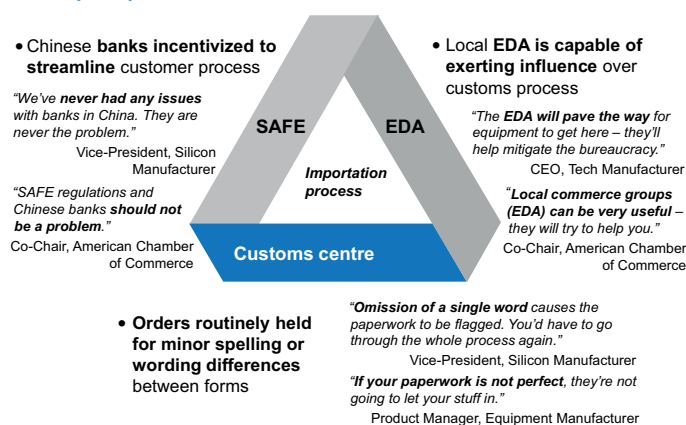
China

China is central to Semiconductor Co.'s supply chain. The company's main issues in this country are regulations and customs delays, specifically between bonded zones.

Some regulations in China are vague and inconsistently enforced. For example, regulations require that bonded assets – items that receive tax exemptions – be kept under customs control. But there are no clear rules for tracking these items, or even for which items fall under the regulation. Moreover, many areas are not covered by sufficient regulation, creating uncertainty regarding compliance requirements.

Where imports are concerned, customs are by far the greatest bottleneck, more significant than other possible obstacles, such as the State Administration of Foreign Exchange (SAFE) or the Economic Development Authority (EDA) (see figure). Since there is no official feedback mechanism to the General Administration and Customs authorities, companies such as Semiconductor Co. may have little recourse in addressing concerns. Typically, both imports and exports require half a day at

Figure 30: Customs centre serves as primary bottleneck for the import process



Note: EDA – Economic Development Authority

Source: Expert interviews, Bain analysis.

customs. But mismatches are common and often lead to delays of a day or more. At Chengdu, for example, the error rate is between 1% and 2% in customs declarations, and there are many other areas where mismatch is possible – for example, incorrect or missing paperwork. Since many mismatches are due to human error, this could largely be resolved by electronic declarations. Customs offices do not operate 24/7, even though factories work around the clock and customers demand same-day delivery. Inventory levels must be kept relatively high to compensate for the customs schedule.



Our customers are constantly demanding a cut-off time of 12 noon or even 2:00 pm for same-day delivery. With the current Customs operating hours, Semiconductor Co. will never be able to offer that stretched service level.



Supply Chain Capability Manager

Bonded zones - Customs crossings between China's special economic zones, known as bonded zones, are particularly problematic. Bonded zones offer tax benefits and other incentives and are managed by a customs entity. Compliance requirements for bonded zones are burdensome, and delays are endemic. "Air shipment between two bonded zones usually takes four to five days," says a Semiconductor Co. executive, "while our customers usually request one-to-two day delivery." In some cases it is easier and faster to export goods first (to Hong Kong) and then import them back to China, rather than transporting them between bonded zones.

Vietnam develops an electronic customs clearance system

In collaboration with Semiconductor Co. and its suppliers, Vietnam has developed an IT customs infrastructure that automates customs paperwork for Semiconductor Co.'s shipments. Its objective is to shorten the entire clearance process to just a couple of minutes. Because this system is new, customs officials designed it to allow manual intervention, so the full transition to an automated system is not complete. Still, the automated database has already reduced the customs process to about two hours, in some cases only 20 to 40 minutes.

Recently, Japan gave Vietnam two grants, totalling US\$ 40 million, to transition to an electronic clearance system like that used in Japan.⁷³ This system will automate declarations, duty fees and screening processes, and will greatly shorten the processing time between declaration and approval for all shipments, including those of Semiconductor Co. Vietnam aims to complete the transition by the end of March 2014.

Barriers have a big impact on Semiconductor Co.'s sales models. If customs or other issues are too complex, the company will ship DTP instead of DTD, and will sacrifice control over part of its supply chain. The issues vary from one country to another.

Russia

Semiconductor Co.'s sales in Russia are inhibited by complicated regulations and long custom delays. The company ships its products to Finland, where Russian distributors arrange for pickup and transport. Since shipments to Russian distributors have payment terms of net 30 days (starting before Russian customs clearance), the distributors must tie up a lot of cash in inventory. This negatively affects their return on investment and increases their risk.

Customs clearance can take from 14 to 21 days. Customs regulations are subject to interpretation, which often leads to disputes between customer, company and customs agents. Customs delays significantly increase distributor inventory levels. As inventory grows old, customer returns are at the highest allowable level (3%), and as Russia has an export fee, customers can't ship the product back and 98% needs to be scrapped.

Brazil and Argentina

DTP sales in Brazil and Argentina are significantly hindered by security issues and general uncertainty. An unpredictable regulatory environment makes the cost of doing business high. Labour disputes and general instability disturb the supply chain. Security is often a major problem, with serious risk of theft at several points in the chain; corruption is also a concern.

India

DTP in India represents a large but still underdeveloped potential market. But customs creates delays and customers face security issues. Import procedures are one hindrance for customers: products are frequently held at customs, and though clearance should require only about two working days, most customers assume one week. These delays increase costs and can lead to missed sales for the customer. Random delays because of customs inspection are particularly risky, and may lead to scrapping the product.

India is also one of the most risky destinations from a security perspective, with the most theft in Asia. The main point of risk is at the warehouse monitored by customs. The forwarder or importer cannot see the cargo when it arrives. The consignee (customer) often receives paperwork indicating the shipment is there, but when it gets through customs it may be in bad shape or partly stolen.

Tech Co.: Preferential Market Access Raises the Cost of Manufacturing

Indian government policies allowing for the duty-free import of high-tech goods promoted technological development and provided incentives for companies to invest. But they also stunted the growth of domestic manufacturing as imported goods became more price-competitive than domestically produced ones. Now a new set of regulations known as preferential market access provides preference to domestically manufactured products in government procurement. The new rules threaten to increase costs for manufacturers. One of the companies affected is Tech Co., a US-based manufacturer of high-tech products. Estimates indicate that local manufacturing costs would be 10% higher than the manufacturing costs in China.

Tech Co. is a US-based corporation that designs, manufactures, and sells high-tech products. The company does not manufacture goods in India but imports them from its other Asian factories.

Recent regulations imposed by the Indian government have altered Tech Co.'s ability to compete in the Indian market. Under the umbrella of India's Preferential Market Access (PMA) policy, the rules protect India's domestic high-tech manufacturers by requiring the Indian government to direct a minimum percentage of its purchases in the sector to local companies. Covering almost all telecom and IT equipment, goods qualifying as "local" under PMA are required to meet a minimum threshold of value added in India. Both the percentages and the amount of local value added are slated to increase over time.

Under PMA, domestically produced goods sold to the government are subject to price and quality matching with the lowest bidder. When a domestic bidder is unavailable, the contract will go to the lowest international bidder. As currently applied, PMA's impact is limited. But as the local content and government minimum purchase requirements ramp up, a shift by one company to locate production in India will require competitors to do the same in order to remain competitive. A further expansion of the regulation to cover sales to private companies would have additional major consequences for the competitiveness of foreign producers.

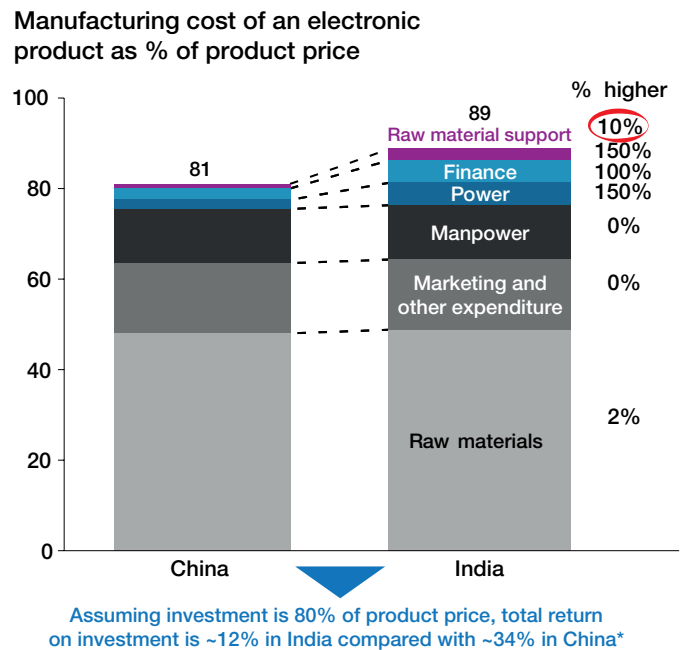
Although Indian authorities justify the preferences as necessary on cyber-security grounds, they are largely viewed by competitors based outside India and their governments as measures intended to bolster domestic production. In a communiqué sent to India's prime minister, a consortium of industry and business associations representing foreign manufacturers said that a widening of PMA's application "would represent an unprecedented interference in the procurements of commercial entities and would be inconsistent with India's WTO obligations."

The consequences of PMA would be significant if it sparks reciprocation by other countries. That would result in the decreased international competitiveness of domestic producers deprived of access to overseas markets as well as higher costs, reduced quality and fewer choices for customers.

The cost of producing in India is much higher than in other Asian countries like China. A recent analysis by the Federation of Indian Export Organizations revealed that transaction costs range from 19% to 22% for Indian exporters, compared to 2% to 3% for exporters in developed economies. Based on these costs, a local manufacturer would face a total return on investment of approximately 12% for a 50% value-added product, compared to approximately 34% in China. This translates to a 10% increase in Indian total manufacturing costs per electronic product compared to Chinese total manufacturing costs.

The hit to Tech Co. has been limited so far, since PMA applies only to its sales to the Indian government, which account for between 10% and 20% of the company's total revenue in India. The consequences would hit much harder, however, if the regulations were extended to private sector customers, which is not unlikely. Total manufacturing costs for producers of high-tech hardware to serve non-government customers in India are nearly six times greater than costs to serve government buyers.

Figure 31: Due to domestic market challenges, Indian manufacturers face high transactional costs



Note: India has a central sales tax of 2%, which affects cost of raw materials and total selling price. *The analysis is done by the Federation of Indian Export Organizations (FIEO) on a 50% value-added product with an assumed sales price of INR100, 0% refund on VAT in India, and 8.5% refund on VAT in China.

Source: Report of Taskforce to suggest measures to stimulate the growth of IT, ITES and electronics hardware manufacturing industry in India.

The global high-tech industry broadly believes the Indian government could support domestic production more effectively by following a different course. Rather than apply local content requirements, the industry recommends that the Indian government target the manufacture of select products and gradually ramp up the industry's capabilities. For example, it might focus initially on supporting the production of low-end commodities like plastics and metal and over the next 10 to 15 years move up the value chain towards production of silicon and memory. Doing this would enable the domestic industry to achieve economies of scale for select IT products that reduce manufacturing costs.

Handset Distribution Co.: Mastering the Art of Importing and Distributing Mobile Phone Handsets in Complex, Ever-shifting Latin American and African Markets

Latin America and Africa are home to some of the world's fastest-growing markets for mobile telephony, but the rules governing tariffs, local content and supply-chain logistics also make them the world's hardest to navigate for mobile handset importers and distributors. Managing these complexities and the costs they impose requires sophistication and nimbleness. Handset Distribution Co., a leading wireless handset distribution company, managed to find its way in these hard-to-serve markets by mastering trade barriers.

A leading mobile handset distributor, Handset Distribution Co. has built a local presence on six continents serving some 43,000 customers that include manufacturers, operators and retailers with specialized wireless distribution and services. With annual revenues exceeding US\$ 5.7 billion in 2012, the company has been able to use its sophisticated supply chain to provide value-added sales in both advanced and hard-to-serve developing countries. Handset Distribution Co.'s activities in Latin America and Africa, both fast-growing regions for mobile telephony, demonstrate the company's management of complex trade issues and the logistics challenges they present.

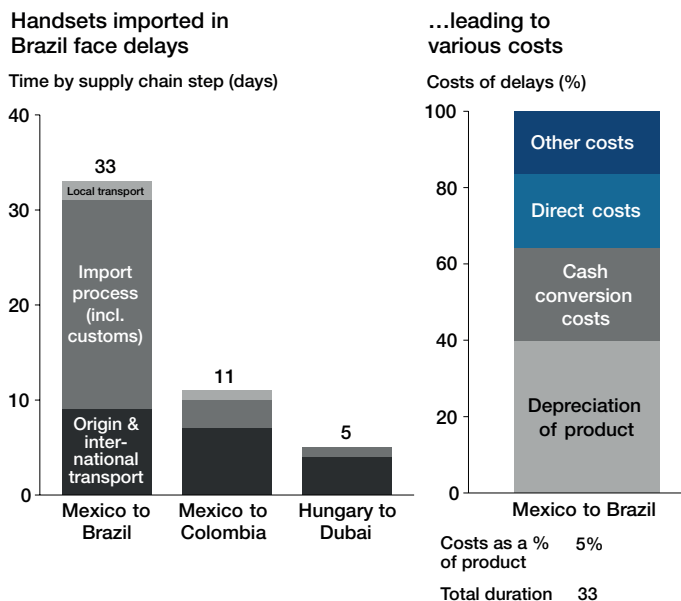
A tangle of taxes, tariffs and trade frictions in Latin America
Latin America's largest market, Brazil is also one of the continent's most complex for importers of low-margin, fast-changing mobile handsets. Facing a stiff 16% tariff on imported goods, the already high price of entry is compounded and significantly increased by Brazil's complicated, multi-tiered federal and state tax scheme.

Including value-added taxes and a supplemental social integration tax, the combined tariff and tax complexity has led most companies – including mobile handset distributors – to assemble goods domestically. Not only do locally assembled mobile handsets escape the tariff itself, they are free of the taxes that are layered on top of the tariff. The difference is striking. A handset imported into Brazil will incur tax liabilities that drive up its cost by 83%, while a handset assembled in the country will incur over the same value only 32% tax.⁷⁴ As is usually the case, the end-consumer bears the additional cost burden. The costs of producing locally would of course be higher and are estimated at 10%-15%⁷⁵.

Beyond tariffs and taxes, delays resulting from customs clearance bottlenecks, international freight handoffs and frequent labour disputes complicate the movement of handsets through Handset Distribution Co.'s supply chain and drive up distribution costs. The duration and source of delay can vary widely among Latin American countries. For example, shipments going to Argentina may take over 3 weeks to clear customs because all importing companies must fill out an application with details of the business transaction and then wait for a special government permit to import the products. By contrast, products shipping to Colombia reach the market in just 11 days.

The costs of delay are steep and can add up fast, but they also vary widely by market. The total cost for goods crossing the border into Brazil exceed US\$ 20 per handset. In nearby Colombia, by contrast, the cost of delay adds less than 50 cents. Direct costs include warehousing and brokerage costs, of course, but delays also stretch out the cash conversion cycle for a distributor like Handset Distribution Co., which must pay the original equipment manufacturers when it picks up the goods but can only collect payment from its customers upon delivery. In extreme cases, like the unstable Venezuela market, where Handset Distribution Co. remains one of the few distributors serving the country, the cash conversion cycle can last up to 180 days before the company is paid, adding foreign exchange hedging costs to the final tally. For fast-changing products like mobile handsets, delays can even impact depreciation costs, which can amount to as much as 2% per month.

Figure 32: Customs in Brazil cause expensive delays



Note: Delays from Mexico to Brazil are mostly related to scrutiny of the certificate of origin; Dubai does not include logistics to African countries; "other costs" are an estimate.

Source: Company data; Bain analysis.

Other indirect costs arising from frequent, unpredictable and sometimes prolonged strikes in Brazil also drive up transit costs. All of the complexities surrounding product shipments, short product lifecycles and mismatched supply and demand contribute to a grey market for handsets (see sidebar).

The grey market "safety valve"

The existence of unofficial, unauthorized (although not necessarily illegal) grey markets are certainly not sanctioned by manufacturers, but they are sometimes a necessary evil – particularly for products like mobile handsets. The grey market is a safety valve that lets producers release excess capacity.

The markets are the results of price and supply/demand differences in the world. Flashing price differences, of as much as 150%, present significant opportunities for arbitrage. But as even the best forecasting methods only work about three-quarters of the time, supply chain barriers and the resulting supply/demand mismatches add to this opportunity. Unexpected delays can derail forecasting and even render orders obsolete, further feeding goods into the grey market.

Latin American trade-related barriers and delays – and the opportunities they present for improvement – virtually ensure that supply chains will not remain static. One major set of changes will likely occur for Handset Distribution Co. if Colombia joins the now five-nation Mercosur common market of Argentina, Brazil, Paraguay, Uruguay and Venezuela. Handset Distribution Co. Colombia currently imports some products from Mexico and pays a 5% duty. With Mercosur, the tariff for imports from Brazil will fall to zero, likely shifting Handset Distribution Co.'s supply chain accordingly. As tariffs and barriers evolve in Latin America's changing political climate, supply chains will be in constant flux.

Steep tariffs and patchy infrastructure in Africa

Handset Distribution Co. delivers handsets to more than 20 African countries, but nearly all of its distribution to the continent is staged out of Dubai as, according to the vice-president of operations, “the barriers listed in the Global Enabling Trade Report are exactly the reason to have a distribution centre in Dubai and not in Africa.” Approximately 40% of the product it ships goes to operators, delivered to the port in country; the balance goes to merchants, dealers and local distributors, often handed over to them in Dubai.

Tariffs are but one of many factors that discourage firms from directly basing operations in Africa – and in fact are causing many to leave. In Nigeria, for example, steep fees total 13.5%, including a 5% duty, 7% port charge and a 1% import charge. The fees are likely intended to entice foreign companies to assemble products locally, and they also are a source of government revenue. But they also provide an incentive for local markets and channels to find ways to circumvent the barriers by developing better connections, but also to engage in bribes and smuggling.

African import rules are not particularly difficult to follow, but companies that pay the duties and comply with regulations put themselves at a severe disadvantage. That is one reason why Handset Distribution Co. chooses not to deliver in Nigeria or the Democratic Republic of the Congo. Prices of products imported to Nigeria by operators are far more expensive than goods in the market.

Even in African markets like Kenya, which impose no import duties, shipping from Dubai offers benefits that make it a better location to base operations, even when doing so adds about 4% to 5% to the cost of products it ships. Among the biggest barriers would-be importers face in Africa is inadequate infrastructure – not just poor roads, prohibitively expensive real estate, and poor port facilities, but also insufficient telephone networks, the lack of Internet availability, and even a reliable affordable power supply. Another obstacle is the small size of many African markets, which makes it uneconomical to serve them by direct air routes or even to support sufficient warehousing.

With its low barriers and strong direct connections to other markets, by contrast, Dubai enjoys sufficient scale that makes it a more suitable location for companies like Handset Distribution Co.

PC Co.: Managing Supply Chain Barriers to Trade to Reach Attractive Growth Markets

Like most global manufacturers of mass-market technology products, PC Co. is unencumbered by traditional trade barriers like quotas and tariffs on the goods it exports around the world. PC Co. must, however, contend with a wide range of supply chain barriers to trade in the form of local content requirements, rules-of-origin restrictions and pilferage at the border crossings, which can stretch out customer delivery times and result in significant losses. PC Co. has tried to mitigate the barriers by reconfiguring how goods travel in its supply chain and by making business decisions based on the unique challenges of the markets where it sells its goods.

A leading personal computer company, PC Co. books annual revenue of over US\$ 15 billion from sales of its technology products to consumers in more than 150 countries. The company employs a large workforce in over 50 countries to produce its commercial and consumer PCs, as well as servers, workstations and a portfolio of mobile Internet devices.

Like other big PC manufacturers, PC Co. sees the fast-growing Middle East region and Indonesia as a hotspot for its own growth plans. The Gartner Group forecasts that PC sales in these markets will grow at a pace of better than 20% through 2016 to some 34.5 million units. In none of these attractive new markets do traditional quotas and tariffs present a significant barrier. In the Middle East, duties on imports are uniform and low, at just 5%. As a party to a free-trade agreement with China, Japan and India, Indonesia accepts most shipments of imports duty free.

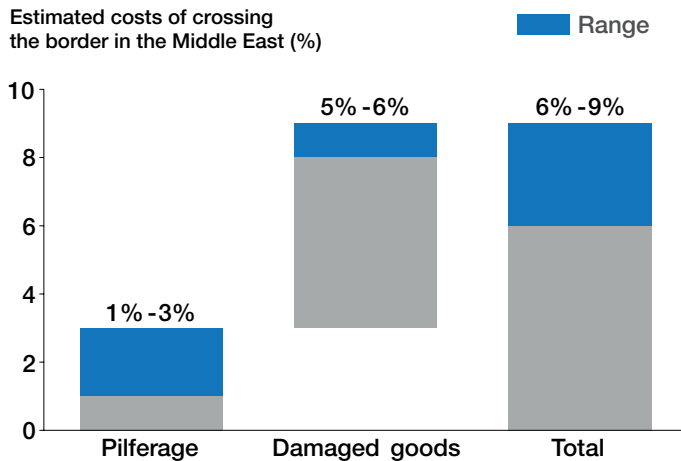
A wide range of non-tariff measures, however, add complexity to the supply chains of high-tech importers like PC Co. that drive up the direct and indirect costs of doing business. Strict rules of origin and local content, which vary from market to market, involve elaborate inspection procedures and significant amounts of paperwork. In Saudi Arabia, for example, the Saudi Arabian Standards Organization requires importers to apply for certification by an accredited lab and inspection of sample products before goods can be produced and shipped. In Egypt, by contrast, the General Organization for Export and Import Control requires importers to produce its goods prior to inspection and certification. Large, well-known companies like PC Co. can receive certification relatively quickly, but the process can take up to three weeks for smaller companies.

In addition to complying with documentation rules about the products they sell, importers must satisfy requirements about the labelling on their products – notably the requirement that products shipped to some Middle East countries be labelled in Arabic. The added complexity increases the likelihood of border delays if labels for products destined for one country are confused in PC Co.’s factories, where workers do not have knowledge of Arabic, with goods going to another market. The mix-up can result in weeks of delays by customs authorities while the labels are replaced.

Maybe even more problematic are the way rules are implemented. The Saudi Arabian government authorities can implement new regulations without giving companies time to react. Often a circular is received only couple of days before implementation. For example, a rule that all the importers must submit proof of payment to customs before clearing the cargo was circulated early November and very strictly adhered to the next day.

Administrative challenges at many Middle East border crossings like Saudi Arabia cause further delays and sometimes the loss of goods, particularly when customs offices shut down during the celebration of seasonal festivals (see figure). The observation of a one-week festival like Eid, for example, can result in delays of up to three weeks when the additional two weeks needed to clear the kilometre-long backlog of trailer trucks held up at the borders are added. The long period when border activity ceases during festivals also sees a big jump in the normal 1% to 2% incidence of pilferage, particularly of high-value tech products like phones and laptops. Having no good alternatives, PC Co. simply stops the movement of all of its goods transiting between Dubai and Saudi Arabia during holiday periods, warehouses them in Dubai, and resumes shipments only after it can confirm that the post-holiday backlog has been cleared.

Figure 33: Pilferage and damage to goods increase costs of Middle East border crossings



Note: Based on crossing the border into Saudi Arabia - might not be representative of every Middle Eastern country.

Source: Company interview.

Beyond goods being stolen, the damage they suffer due to the lack of proper cargo handling facilities at border crossings can be significant. For example, the need to unload pallets of cargo from trucks for customs inspection owing to a lack of forklifts causes damage to more than 5% of goods when shipped to Saudi Arabia compared to a less than 1% damage rate in Europe and the US. Together, pilferage and damage add between 6% and 9% of PC Co.'s costs of moving goods across the border from Dubai to Saudi Arabia.

PC Co. experiences similar challenges in the licensing and customs clearance process at Indonesia's borders. The company estimates that it takes four weeks for its products to make their way from Shanghai to Indonesia. For each container held at the port, PC Co. incurs charges averaging some US\$ 200 each day and tripling to US\$ 600 daily after one week.

Seeking a safe haven in Dubai

To alleviate some of the challenges that come with serving individual countries directly, PC Co. sidesteps supply chain barriers by making business-friendly Dubai its hub for the Middle East region. Ranked first among Middle East nations by the World Economic Forum's Global Enabling Trade Report 2012, Dubai draws importers like PC Co. with simpler and more flexible customs and inspection procedures that help reduce delays.

But PC Co. pays a price for those advantages, since routing goods through Dubai results in a transport process that the company estimates is more than 1.5 times longer than it would face were it able to ship directly. Were other Middle East markets to remove the supply chain barriers that impede direct shipment, PC Co. believes its supply chain performance would significantly improve. In particular, shorter lead times would be a boon for PC Co.'s retail customers who demand short turnaround times from the placement of orders to receiving delivery of finished goods.

Computer Co.: Importing Computers and Peripherals into Russia

The Russian market for electronics, such as computers and peripherals, has experienced significant growth since the country's recovery from the 2009 financial crisis. The market is largely served by multinational corporations (MNCs), most of which import finished products into the country. Significant barriers to trade exist today, especially at the border, mainly in the form of licensing requirements and documentation, and import price controls. These saddle importers with burdensome paperwork, administrative costs and time-to-market delays.

Russia has become one of the world's most attractive markets for electronics. The country's rapid economic recovery since 2009 has led to rising disposable income for a growing middle class. Retail sales of computers and peripherals, the No. 1 growth market in this segment, increased at a 35% annual rate compounded through 2012. MNCs, including market-share leaders Logitech, A4 Tech and Samsung, have a presence in the market. The top 10 players make up some 35% of computer sales and eye Russia as a critical growth market going forward.

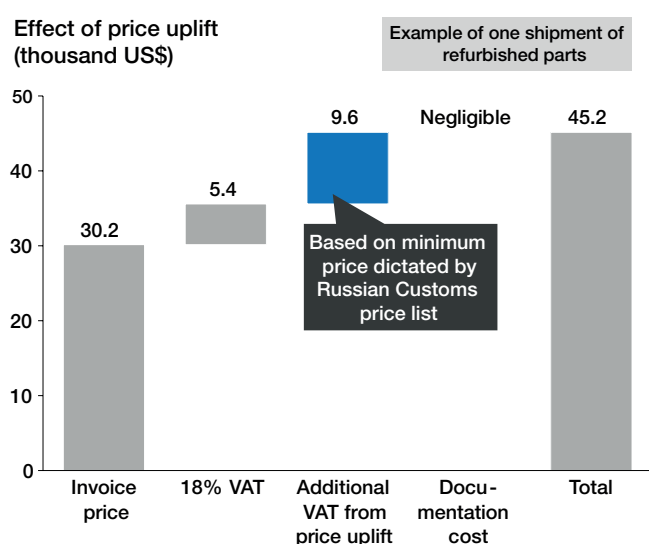
Currently number six among MNCs by share in Russia, US-headquartered Computer Co. imports notebook and desktop computers, along with spare parts (refurbished and new), to the consumer market. Computer Co. also works with retail partners to import notebooks, printers and enterprise servers for sale to business customers. But like its MNC competitors, Computer Co. is hobbled by a series of import restrictions, mainly in the form of licensing and documentation requirements at the Russian border. Depending upon the category of products being shipped, the resulting delays in moving goods to market can range from about 10 days to as much as eight weeks and add significantly to Computer Co.'s costs.

- Products with wireless applications: These include computer mice, keyboards, notebook and desktop computers and certain Wi-Fi networking equipment. Under current rules, 74 types of products in this category can be imported freely without need of import licenses. However, other products (such as some notebook and desktop computers) must meet two kinds of approval, which can be obtained only upon the arrival of each shipment at the border. First, the products must be tested, a process that can take about two weeks. Second, the importer must submit an import license application from the Ministry of Industry and Trade. Obtaining the license requires the presentation of several pieces of documentation, including a buy-sell agreement and a tax registration certificate. The paperwork typically takes three to four weeks to complete. Beyond the delay of some six weeks to move the goods through the official hurdles, the US\$ 300 testing fee and US\$ 80 cost per license together add approximately US\$ 1.90 to the cost of each unit imported.
- Products with embedded cryptography: These include routers, virtual private networks and some personal computers, among others. Eleven categories of equipment within this category qualify for expedited clearance, requiring just 10 days or so to receive notification approval from the Federal Security Service. Other products, however, encounter a delay of about four weeks to receive notification approval and an additional three to four weeks to complete the Ministry of Industry and Trade import license application process, resulting in a total delay in time to market of up to nearly two months.

The costs add up fast, particularly for products that have both wireless and encryption functionality. One all-in-one desktop PC, for example, carries an average invoice price of US\$ 1,043 per unit, but the paperwork authorizations, testing and warehousing increase the unit cost by an additional US\$ 5.13.

Although they affect only a small proportion of Computer Co. products, outright price controls imposed at the border represent yet another set of barriers to electronics importers. Russian customs authorities use a reference price list for a range of products to set a price floor on imports. Applying the price-list guidelines, as they often do, for example, in the case of refurbished spare parts, customs officials have discretion to impose “price uplifts” and charge a higher value-added tax based on the new price. Not only does the importer incur higher taxes, but when its goods repeatedly have price uplifts imposed, it risks being investigated and potentially fined for customs fraud. Importers that want to maintain their original, lower price bear a significant burden of proof, requiring them to present bank documents, seller confirmation and current price lists verified by authorities in the country of export, among other things.

Figure 34: Impact of price uplifts



Express Delivery Services Co.: Overcoming Border Barriers to Deliver on the Promise of Express Delivery

Express delivery services exist to serve industry’s need for speed. However, companies like Express Delivery Services Co. often struggle to operate in some markets due to customs clearance delays, a lack of standardized procedures, and, to a lesser degree, due to poor infrastructure in less-developed regions. These barriers affect regional competitiveness and raise logistics costs, which may or may not be within Express Delivery Services Co.’s power to control. How countries choose to address these factors will ultimately influence their competitiveness.

The availability of reliable express delivery services has become a vital tool for supply chain management by companies that need to function smoothly in today’s integrated global marketplace. The ability of global express delivery firms, like Express Delivery Services Co., to satisfy their clients’ need to

move goods speedily anywhere in the world is a basic underpinning of their competitive advantage. Because express delivery is expensive, shipment delays at any point in the delivery network can negate the value of the service. Significant, persistent delays related to hold-ups at customs clearance and other border crossing nodes raise costs, degrade service levels and frustrate efforts to improve supply chain efficiency and reliability.

Delays arising from customs clearance bottlenecks and border administration inefficiencies are the major barriers express delivery companies encounter, particularly in less-developed countries where a lack of investment and weaker institutions handicap efficiency. Some common sources of delay are easily addressable. For example, a more widespread use of risk-analysis tools to guide which shipments are subject to border inspection could significantly speed up clearances. In the US, where customs officials target only potentially high-risk parcels for inspection, 92% of Express Delivery Services Co. shipments are cleared prior to shipment arrival at the border, and not all of the remaining shipments are physically inspected. In the Netherlands, officials rely on an analysis of electronic information to determine which shipments will be subjected to physical inspection, reducing the need for examination to just 2% to 3% of parcels. In Mexico by contrast, authorities physically inspect 10% of all shipments and sometimes carry out a secondary inspection by independent contractors to guard against customs errors or wrongdoing. The 10% inspection rate in Mexico is an improvement over the previous regime, where, like in other countries, customs officials inspect 100% of shipments. According to the Customs Capability Reports published by the Global Express Association, 37 out of 114 countries surveyed have a risk-based selective approach to shipment inspections, 18 countries physically inspect all shipments, and the remaining countries inspect shipments randomly or at an official’s discretion.⁷⁶

The limited number of hours that various countries’ customs offices are open is another major impediment to the speedy clearance of express deliveries. At major hubs in advanced markets like the US and Europe, customs is open round the clock, enabling express services companies to count on minimal downtime. This is not the case in China, India and across much of Latin America, where Express Delivery Services Co. must sequence arrival of packages to coincide with customs opening hours. Further handicapping expedited clearance in some markets are staffing and resource allocation decisions that appear to be made to satisfy political goals rather than on grounds of operational efficiency. In Brazil and China, for example, customs staffing at airports does not necessarily reflect the volume of traffic passing through them.

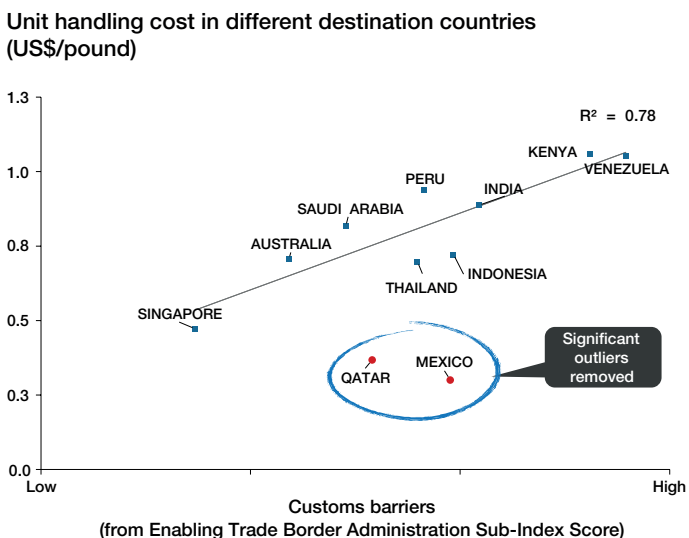
A more systemic source of express shipment delay is a lack of standardization and coordination in clearance process across (and sometimes even within) countries – even within the integrated market of the European Union. Each EU member state maintains its own computer systems, making clearance procedures correspondingly complex. In Germany, for example, customs is not set up to allow centralized customs clearance, requiring the registration and customs clearance process to be executed with customs in each location/port where shipments physically arrive. This decentralization leads to non-harmonized procedures within the country. In neighbouring Netherlands, by contrast, customs clearance is managed centrally with common paperwork and practices for shipments arriving at any of its ports.

The World Customs Organization (WCO) partially addressed the standardization issue by identifying a set of best practices. Under the WCO's Kyoto Convention guidelines, countries should aim to create simplified custom procedures that can be carried out in a predictable, consistent and transparent environment. Customs should make maximum use of information technology and risk analysis to speed up the clearance process and maintain its integrity through the application of objective tests and procedures. WCO recommends that customs agencies use "single window" electronic procedures, whereby documents are submitted once and are easily transferred across agencies and borders. Just 81 of WCO's 178 member states have signed on to these common sense procedures, although many others adhere to its recommendations.⁷⁷ In 2011, for example, Mexican authorities mandated the electronic filing of customer information to reduce clearance time and improve risk analysis based on advance information.

Compounding the customs barriers, insufficient infrastructure that renders remote inland regions inaccessible also impedes express delivery services. In Brazil, for example, the density of airports is just one-third that of the US and road connections are sparse.⁷⁸ Among Latin American countries overall, road density is only about one-fourth of what it is in the US.⁷⁹ Express Delivery Services Co. is able to work around infrastructure limitations by investing, for example, in aircraft technicians and maintenance facilities to compensate for substandard airports. But higher infrastructure-related costs will affect a country's competitiveness, since Express Delivery Services Co. must ultimately pass the added logistics costs on to its customers.

Limited freedom to manoeuvre around customs barriers
Express delivery firms like Express Delivery Services Co. try to exercise what control they have to minimize delays. The company keeps additional staff on hand in customs zones that are notably inefficient and complicated to navigate, accepting the higher payroll cost to expedite package clearance. However, higher handling costs resulting from customs and administrative barriers require the express delivery companies to pass on higher handling costs to their customers, rendering some countries like Venezuela and Kenya less competitive. Express Delivery Services Co. charges lower handling costs in Mexico and Qatar than would otherwise be expected by their customs barriers, improving their competitive position (see figure).

Figure 35: Handling costs for express services are highly correlated with customs barriers



In cases where customs barriers are beyond Express Delivery Services Co.'s ability to take measures to compensate for delay, the advantages of express shipping services start to disappear (especially for time-sensitive product shipments). Barriers will reflect on the dwell time shipments encounter (time a shipment is held at customs) and the associated brokerage, warehousing and higher personnel costs that shippers must bear. Dwell time effects represent nearly one-quarter of the shipping costs companies pay per package, on average. Among markets evaluated,⁸⁰ Singapore is the top performer and Saudi Arabia, Venezuela and Peru show room for improvement. How individual countries choose to address these through increased investment and standardization will ultimately determine whether they remain competitive.

Shipping Co.: Maritime Cabotage Complicates Logistics and Adds Costs

National restrictions on cabotage – the movement of goods between two points within a country's borders – increase both the costs and environmental impact of those goods. Though justified for decades as national security measures, many cabotage regulations, particularly those affecting in-country transfers of imports and exports shipped by water, are motivated largely by protectionist concerns for local industries and employment. The United States Jones Act and China's international relay regulations are examples of maritime cabotage that affect a significant share of global trade. While some countries have taken small steps toward liberalization, a mutual relaxation by the US and China of their regulations would set a global example for other nations to follow.

For centuries, nations have invoked their sovereign rights to restrict the movement of passengers and goods – or cabotage – within their borders. Although the historic justification for these restrictions has been national security, the clear intent of many cabotage regulations today, particularly those affecting transportation of goods by water, is to protect local industries and labour interests.

The most restrictive example is the United States Jones Merchant Marine Act of 1920, which states that merchandise can only be moved between American ports by vessels that are US-owned, US-crewed and US-built. China has similar restrictions (though it does not require ships to be of Chinese construction).

Despite the benefits to flag carriers or local shipyards, such barriers actually damage local economies and saddle businesses and consumers with significant costs. Lack of competition forces businesses to use high-cost logistics suppliers and requires international export/import businesses to use inefficient trans-shipment operations – which come with high environmental costs.

National security concerns and political interests make complete abolishment of cabotage regulations unlikely, but opportunities for reform exist to varying degrees among the two basic types of cabotage: domestic transport and international relay.

Domestic transport – Cabotage restrictions originally focused on the movement of goods that originated and ended within the country. These rules were motivated by the need to maintain a national merchant fleet, protect local waterways and other national security concerns, and their reform would likely be a slow process. However, a prudent approach that gradually relaxes the strictest regulations could help open markets to competition without putting security at risk. For example, the United States could continue mandating national flags but remove other Jones Act restrictions.

International relay – The regulation today of in-country transfers of imports or exports is largely motivated by commercial concerns. These rules create weak links in global trade lanes, and their negative impact on cost and efficiency is typically not balanced by their contribution to any nation's individual security.

The US and China

The US and China offer examples of the opportunities for reform of international relay restrictions. Neither country is likely to deregulate unilaterally, but together they represent a significant share of the global trade volumes and could serve as role models for other nations if they were to jointly lift some restrictions.

The Jones Act is the most restrictive of global cabotage laws and an anomaly in an otherwise open market like the United States. Political advocacy for the Jones Act is unwavering, led primarily by shipyards and associated industries, maritime labour unions and congressional delegations from the non-contiguous states of Hawaii and Alaska. Critics of the law include domestic and foreign shippers (and their consumers) as well as international logistic companies.

US International Trade Commission studies have found that the Jones Act adds substantial costs,⁸¹ but Congress is unlikely to reconsider it without being prompted. Even if pressure for reform mounts, it would likely require small steps over a number of years.

Still, international relay reform offers a promising first step. The alternative to using international shipping services for relay in the United States is typically to move goods via land. Estimates suggest that more than 500,000 qualifying international containers moved over highway and rail in 2012.⁸² If these containers were allowed to stay on the water and trans-ship on international liner services, the economic benefit to supply chain participants – shippers, carriers and consumers – could exceed US\$ 200 million. In addition, the potential reduction in road congestion and environmental impact would be significant: Trucks and rail are substantially less energy efficient than ocean vessels.⁸³

China's cabotage regulations largely mirror those of the US. It, too, has vocal supporters of the regulations, typically local transportation interests, as well as those who favour reform, notably trade interests seeking lower transportation costs for exports.

Were China to allow international relay, some 10 million standard shipping containers (TEU) that today must be re-routed via international ports (including Hong Kong SAR) would instead be trans-shipped through Chinese ports. That volume represents a potential income of some RMB 2 billion (US\$ 321 million) for local ports, generating frustration among port operators over the regulatory favouritism shown to Chinese shipping lines.

Relaxing China's international relay restrictions would also save logistics providers (and exporters) around US\$ 500 to US\$ 700 million per annum from lower port charges and optimized shipping networks. Furthermore, inefficient relay solutions add five to 10 days to the transportation time and carry significant costs for cargo owners. For example, trans-shipping the 10 million TEU through Chinese ports instead of rerouting them could save up to US\$ 0.5-1 billion⁸⁴ in inventory costs.

Taking steps toward reform

Several other nations have considered relaxing international relay regulations, particularly growth markets like Brazil, Indonesia and India, where efficient infrastructure is a key to the future development. In India, 50% to 70% of exports and imports are trans-shipped abroad.⁸⁵ A September 2012 effort to relax relay rules hinted at progress, but this is supposed to affect only a single port⁸⁶ – hardly a systemic solution and one that illustrates the challenges of appeasing competing interests.

In the European Union, cabotage was fully liberalized in 1998 among the EU15 and then in 2009 with the new member states,⁸⁷ a possible model for other nations. The European Commission has confirmed that EU countries can still restrict national connections, but urged countries to consider the substantial cost savings that result from exempting international relay from such restrictions.⁸⁸

Abolishing or relaxing cabotage regulations around the globe would reduce costs, but will require a gradual approach, particularly when it comes to the legitimate national security concerns that surround domestic transport. The wisest course will focus first on protectionist international relay restrictions, whose abolishment will bring economic and environmental benefits that clearly outweigh security concerns.

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Notes

1. Ferrantino, Geiger and Tsigas, "The Benefits of Trade Facilitation - A Modelling Exercise".
2. Companies approached were mainly World Economic Forum partners and Bain clients, and cover various industries: agriculture, air transport, aircraft manufacturing, apparel, automotive, chemicals, consumer goods, defence, express delivery service, food and beverage, healthcare, information and communication technology, Internet retail, logistics, machinery, mining, metals, pharmaceuticals, phone operators, retailers, shipping, technology, and others.
3. The analysis in this section was performed by Michael Ferrantino, Thierry Geiger, and Marinou Tsigas. Ferrantino and Tsigas are affiliated with the United States International Trade Commission and Geiger with the World Economic Forum. This analysis is solely the work of the analysts, and is not meant to represent the views of the United States International Trade Commission or any of its commissioners. Please see "The Benefits of Trade Facilitation - A Modelling Exercise" in the Online Appendix for a more detailed analysis.
4. The authors use the model of the Global Trade Analysis Project (GTAP), using a 2007 baseline (see www.gtap.agecon.purdue.edu/models/current.asp for documentation and resources relating to the GTAP model). Simulated results for trade refer to goods trade excluding oil and gas. Estimated changes in GDP and trade are expressed in volume terms, i.e. at constant prices.
5. The estimates of the effects of tariff liberalization should be viewed as upper bounds. For reasons explained in the Online Appendix, the tariffs appearing in the 2007 baseline of the simulation model used here may be higher than those currently implemented or agreed to; thus, the remaining gains from removing tariffs actually applied may be lower than those portrayed here.
6. For example, the GDP gains from tariff reduction are in the nature of Harberger triangles, while the gains from trade facilitation are "rectangle" gains associated with cost reduction.
7. The improvements in trade facilitation are modelled as applying to all merchandise sectors other than oil and gas.
8. SPS/TBT refer to sanitary and phytosanitary measures and technical barriers to trade.
9. Based on a World Economic Forum survey fielded by Transport Intelligence, Chartered Institute of Logistics and Transport, Freight Transport Association, Global Shippers Forum, Council of Supply Chain Management Professionals (only manufacturing and retailing results used), the total increase in landed costs (cost, insurance and freight prices) attributable to the 4 issue areas can be divided as follows; 20% is for market access and 21% is for business environment (which are not modelled) and 25% is for border administration and 34% for transport and communication infrastructure, which are modelled. The ratio of non-modelled costs to modelled costs is thus $(20+21) / (25+34) = 41/59 = 69.5\%$.
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62. Based on an IATA e-freight business case, but with added volume impact on shippers (model adjusted by the authors of this report). Part of the US\$ 12 billion has already been achieved.
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77. As of August 2012
78. US Central Intelligence Agency, World Factbook.
79. 2004 data from the World Bank.
80. Average dwell time provided for the following markets: Australia, India, Indonesia, Kenya, Mexico, Peru, Qatar, Saudi Arabia, Singapore, Thailand, and Venezuela.
81. In 1999, the US International Trade Commission found the economic cost for the Jones Act was as much as US\$ 1.3 billion for 1996, and in 2002, it found that repealing the Jones Act would have an annual positive welfare effect of US\$ 656 million on the economy.
82. Based on industry data. Corridor examples include US West Coast-Houston, Baltimore-Norfolk, Newark-Philadelphia.
83. WWF and UN Global Compact, Smart Goods Study, 2010 estimates the CO2 emitted to transport one metric tonne of goods one kilometre was 10-40 grams for an ocean container carrier versus 30-150 for rail and 60-150 for trucks.
84. Estimating costs requires assumptions on average delays, cost of capital and value of goods (can range from US\$ 10-US\$ 500,000 for a TEU). An example could be value of goods is US\$ 25,000 per TEU, cost of capital is 10% and delay is 5 days. Costs are then $25,000 \times 10\% / 365 = US\$ 6.8$ per day $\times 5$ days = US\$ 34 (if applied to all 10 million TEU = US\$ 340 million).
85. Krishnakumar, R., "The Vallarpadam container transshipment terminal in Kochi is struggling for a place on the world maritime trade map", Frontline, 9 March 2012. Joseph, George, "Cochin port extends rebate on vessel-related charges", Business Standard, 5 October 2012.
86. International Container Transshipment Terminal (ICTT) at Vallarpadam (Cochin, West Coast of India).
87. Eurostat, European Commission.
88. Note COM(2003)595, in which the Commission states: "It should be noted, however, that allowing a company to perform feeder services for the carriage of international cargo following or preceding an international voyage by the same company may lead to substantial savings in the cost of transport." Source: "COM(2003) 595 final", Commission of the European Communities, 22 December 2003.



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