TRANSPORT GOVERNANCE SYSTEMS AND TRADE EXPANSION

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Paper Prepared for Presentation at:
The Uddevalla Symposium
Gothenburg, Sweden

June 14-16, 2001
I. INTRODUCTION AND OVERVIEW

While trade and the spread of economic activities across national borders has been increasing for a century or more, the spurt of international trade since World War II—growing much faster than income—has been notable. In the 1990s, trade in goods and services has grown twice as fast as global GDP in the 1990s; In an affluent economy such as U.S., trade has grown three times as fast as GDP in the last quarter century. In developing economies in the decade of the 90s the share of trade attributable to the developing countries has climbed from 23% to 29% (World Bank, 1999).

Two of the three major factors underlying this explosive growth of merchandise trade in recent times — namely, transport and information technical innovations, changes in trade regimes and institutions, and the reform of the cross-border transport sector -- are well noted and discussed. First, Information technologies (IT)—representing a confluence of computer and communication technologies – are transforming both the technologies of transport and communications and the technologies of products and processes. The notion that recent developments in the enabling and space-shrinking technologies of transportation and communication are fundamentally transforming the space-time relationships between all parts of the world is widely noted. These technologies make possible the management and coordination of globally distributed set of diverse economic activities. They permit increasing division of labor in the production processes as the component activities are further disaggregated and spatially reallocated. This partition of production processes (or the slicing the ‘production value chain’) across national borders results in different stages of production being carried out in many countries—raw materials and components coming from two different countries, with assembly in a third, and marketing from yet other countries in response to consumer signals from around the

1 The authors gratefully acknowledge partial financial support from the World Bank in the preparation of this paper.
world. Parts and components are ‘sourced’ internationally (a process likely to be expanded with growing Internet use) accounting for a $800 billion trade (World Bank, 2000); and the whole process is globally coordinated. A significant portion of global value added is in the resultant global production networks. These networks offer economic opportunities to all countries, especially in the developing world. The developing countries that invest in effective transport and communication systems plug into these networks and increase their trade.

The role of the second factor behind trade growth, namely the emergence of open trading regimes, is also widely commented on. The increasingly free trade regime for cross-border trade results from international efforts such as The General Agreement on Tariffs and trade (GATT), WTO (world trade organization) which have reduced tariffs and other barriers to interregional and world trade. It is in this context that there has been a surge in the formation of regional trading blocks, such as NAFTA, EU, Mercosur, etc. Each trade bloc represents a cluster of neighboring countries, which link their economies and seek to create dynamic comparative advantages to facilitate their insertion in the global economy on favorable terms.

The third factor promoting the recent spurt in international trade is the reform of the transport governance systems (begun two decades ago), which determine the environment (and the consequent costs of) for cross-border goods flow. Even as the tariff and other barriers have fallen under the impetus of Free Trade Areas (FTAs), trade within an FTA is still not completely “free”, in the sense that cross-border movement of goods is no more costly than the movement of the same goods over the same distance within a country. This situation derives from a number of transport system characteristics, inherited from the era of closed trade regimes, that act as non-tariff barriers hindering free cross-border goods flows.

A transport governance system, or a trade and transport facilitation system, is a combination of two major cross-border goods flow facilitation components, which jointly influence the speed, ease, and costs of cross-border freight flows. The first component of this trade and transport facilitation system reduces the prevalent physical barriers to transport and cross-border transit by appropriate physical infrastructure -- such as transport infrastructure and facilities, and communication infrastructure that complements transport infrastructure. The second major component can be termed as non-physical infrastructure. Non-Physical infrastructure refers to Knowledge and competencies about how to transport and communicate in specific legal, economic, financial, and governance frameworks in various parts of the world,
and how such frameworks may be changed (under rapidly evolving technical and economic conditions) to facilitate improved transport and trade facilitation.

Such knowledge and Competencies applied to the cross-border goods traffic embrace:

* the economic institutions governing transport (economic regulation, privatization of transport assets, etc.),
* rules governing cross-border physical flows (customs and other border inspections, rules for size and weight of vehicles, etc.),
* mechanisms for financial coordination across economies scattered over the globe and,
* business logistical innovations.

This paper on transport governance systems has three objectives. First, it aims to characterize the cross-border transport governance system, evolving in support of international trade expansion. It identifies the various elements of this transport governance system and the role of each in facilitating efficient cross-border goods flow.

As trading regimes have become progressively more open in recent decades, the transport systems governing international goods flow have been required to reinvent themselves in order to service the emerging global economy. The second objective of this paper is to highlight this on-going process of reform and reinvention of transport systems governing trade. Such reform has appeared in the last two decades particularly in N. America, Europe, and Japan in many guises: in the form of transport and information technological innovations which make physical movement of goods faster, cheaper, and more predictable; in the form of business logistics innovations that squeeze out time and cost delays from the goods supply chain; in the form of new mechanisms that improve financial coordination; in the form of reinvented economic institutions and policies governing the transport sector; and reformed practices (inspections, harmonization of vehicle and driver standards) governing the cross-border physical goods flow. While this paper highlights all these reforms, it focuses in particular on the last two of these transport governance systems.

Third, the paper describes the uneven development of the transport governance systems in different world regions and the consequent variations in competitive advantage these governance systems confer on these regions. A major purpose of this comparison is to identify lessons that can be gained from the experience of The North American and European FTAs and
which may help developing countries as they upgrade their transport and trade facilitation systems.

The paper illustrates the discussion throughout this paper with the knowledge gained from the case studies of transport governance systems in selected FTAs—NAFTA, European Union, Mercosur, South Asian Subregion, and the Maputo corridor. (Lakshmanan, Subramanian, Anderson and Lautier, 2001).

II. ANATOMY OF A TRANSPORT GOVERNANCE SYSTEM

A transport governance system refers to the specific economic, financial, legal and political frameworks which define the environment or the conditions under which goods can be transported across national borders. The frameworks relate to regulations governing transport services, rules of cabotage, privatization of infrastructure, banking practices and payment systems, the nature of customs and other goods inspection, and harmonization of vehicle standards, and trade practices. As merchandise trade grows over time, these frameworks have evolved to facilitate trade, in the process transforming the environment for goods flow in affluent industrialized countries. In these countries, in the best practice characterizing this environment, transport is becoming increasingly faster, more flexible and (with jet transport, fast container ships, container handling practices and intermodal systems) more predictable within a narrow time range; Transport and Information Industries are being privatized, and (along with banking) deregulated. New logistical innovations such as just-in-time and quick-response are reengineering business systems, as well as production and commodity flow systems; Containers and cargoes are continually tracked around the world by automatic identification devices and are continually ‘visible’ in transit to shippers and carriers; The traditional slow and tedious paper trail that accompanies goods to secure clearances across borders from Customs, Revenue agencies and Financial intermediaries is being replaced by Electronic Data Interchange (EDI) and e-commerce. Customs Agencies, Finance ministries and Regulators are beginning to reinvent their practices in this new environment.

As compared to these state-of-the-art systems in North America, Japan, and Europe, the prevalent transport and trade facilitation systems in FTAs located in developing countries such as
Mercosur and the South Asian Region are deficient in terms of supporting physical infrastructure and in terms of the knowledge and competencies necessary for the efficiency and speed of domestic and cross-border transportation of goods, and the harmonization and simplification of processing the information (that accompanies the goods) across a border. The greater the gap between the state-of-the-art transport and trade facilitation (TTF) systems and the system available in an FTA, the greater the penalty the specific regional trading bloc will pay in terms of foregone trade and economic growth.

This efficiency penalty of an inadequate transport and transit facilitation system in Mercosur or another regional trading bloc can be experienced in several ways. International agencies estimate that the costs of the current antiquated types of trade administration and the failure to adopt (Information Technology) IT-supported trade facilitation and the downstream effects of those systems account for 7% of the value of the goods (Schware and Kimberley, 1995).

If existing and emerging FTAs in developing countries such as Mercosur, or in South Asia, or in South Africa have substandard transport and trade facilitation (TTF) systems, they can not participate effectively in the global production networks. As noted earlier, the increasing division of labor in the global economy leads to a partition of the production ‘value chain’ among production locales that are spatially distributed in many countries. One third of world trade in the mid-90s occurred within such global production networks (World Bank, 1999).

Manufacturing industries continue to be reallocated in these networks from industrial countries to developing regions such as Mercosur, trade expansion is likely not only in goods but also in services, which, becoming increasingly tradable, may well become dominant in the future. Third, unimproved transport and transit facilitation systems can reduce trade in Mercosur and thereby restrict the realization of the benefits of globalization—markets for exports, acquisition of new technology and the favorable effect of competition on the efficiency of domestic producers.

The long term benefits of a superior transport and trade facilitation system lie, beyond the cost reduction and trade expansion benefits noted above, in the potential for cross-border integration of manufacturing and service activities and the potential for exploiting the economies of scope and scale in the larger Mercosur market. The latter developments lead in time to self-sustaining economic expansion. While such developments take time, they can set in motion a
sequence of cumulative processes that lead from falling costs from output increases to incentives for the creation of spatial agglomerations of production (cities), on to rising output and profits, in turn attracting more production to these cities.

The Components of an Advanced TTF System

An advanced transport and transit facilitation system (See Table 1) reduces the barriers to transport and cross-border transit in two ways: through physical infrastructure (such as transport infrastructure and facilities, and communication infrastructure that complements transport infrastructure) and non-physical infrastructure (knowledge and competencies applied to the physical infrastructure). The latter include knowledge about how to transport and communicate in specific legal, economic, financial, and governance frameworks and how such frameworks may be changed to facilitate improved transport and trade.

Table 1: Components of A Transport and Transit Facilitation System

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<tr>
<th>A. Physical Infrastructure Systems</th>
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<td>1. Transport Subsystems</td>
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<td>2. Information Subsystems</td>
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<td>a) Non-Physical Infrastructure (Knowledge and Competencies in Transport</td>
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<td>And Trade Facilitation)</td>
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<td>1. Overall Governance of the Transport and Trade Facilitation</td>
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<td>2. Business Logistical Systems</td>
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<td>3. Quality of Financial Coordination</td>
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Physical Infrastructure

The physical infrastructure of an advanced TTF system has both transport and information components, both of which will be discussed here. An effective intermodal transport system will reduce the physical constraints of potentially cost-effective corridors linking neighboring countries. Effective corridors and efficient intermodal facilities are abundant in NAFTA and EU, but numerous constraints to effective movement exist in Mercosur and in the South Asian and South African regions. These constraints include: physical bottlenecks of road
networks (e.g. missing links, ferry crossings, narrow and unsturdy bridges) and poor maintenance; multiple gauges in the rail system; inadequate dredging, poor lighting and bad positioning of navigation aids in inland waterways; inadequate transshipment / storage and container facilities at cross-border stations.

A second class of physical infrastructural inadequacies in developing regions derive from a lack of investment in what is termed as microinfrastructure (for example the poorly developed physical facilities for parking, handling, storage, etc at customs areas in border crossings). These inadequacies lead to costly delays in customs clearance. These inadequacies lead to costly delays in customs clearance.

Investments in railway modernization, highways sector improvements, upgrading of ports and inland waterways and airports, and intermodal coordination should address both of these two types of transportation infrastructure deficiencies.

Information technologies (IT) make possible the rapid collection, transfer, and analysis of ‘intelligence’ associated with the merchandise being traded. This accelerated information processing and information exchange promotes preclearance and prereconciliation at various stages of trading transactions. Costs are much lower than those of the traditional paper systems, and incompatibilities of technology, time and distance are more easily resolved. Information is exchanged between computers by a process known as electronic data interchange (EDI).

The EDI associated with international transport, substitutes the legal transmission of electronic information in the customs process for paper inputs—leading to major savings in time and money. Implementation is done using the UN/EDIFACT document standard. The internet and electronic commerce services can play an important role in a reengineered trade facilitation process within countries and across borders.

Nonphysical Infrastructure

Four aspects of an advanced transport governance system are noteworthy:

1. **Overall governance of transport and trade facilitation.** This defines the economic, institutional, legal, and administrative frameworks within which cross-border transport activities are carried out. Examples of recent reform of these frameworks in order to promote trade include: deregulation of transport services in North America, and Europe; Progressive removal
of cabotage restrictions and other residual economic regulations; privatization of transport infrastructures, etc.

2. Business Logistical Systems. Business capabilities are enhanced by new logistical systems that offer fast, reliable, and low-cost service. Logistical systems represent an integrated analysis and active management of a production firm’s overall supply chain, from the spatially far-flung sources of inputs to delivery of finished products (Chatterjee, 2000). These systems also can provide competitive advantage by slashing costs (minimum inventory), quickening market feedback and expanding market reach.

3. Financial Coordination. Since money is exchanged for the transfer of property rights to the goods at the time of goods delivery, financial coordination across different economies in a vast global economy is crucial. Financial coordination is improved by trade-friendly banking practices and new payment systems. Risk-reduction innovations can reduce the costs of linking the shipper and the customer. Organizational innovations can create efficient entities for marketing and distribution in the rapidly evolving marketplace.

4. Governance of Physical Flows. Goods moving from one side of a national border to the other are normally subject to a variety of processes governed by a multiplicity of rules. Examples of such rules pertain to the size and weight of vehicles permitted in freight across borders, customs inspection practices, forms of other border inspection relating to agricultural products, drugs, etc. To promote seamless intermodal freight flows across borders, knowledge and competencies related to such governance systems (that vary across borders) and ways of reforming them are crucial:

In the last two decades or more, these different components of the transport governance system—originally fashioned in the earlier less open economies—are being reinvented to support the freer trade regimes. The rest of the paper will focus on this process of reform of transport governance. Specifically, the paper concentrates on only two components of the transport and trade facilitation which require considerable institutional and organizational reform:

A. Overall governance of transport and trade facilitation, and
B. Governance of physical flows

There are remarkable changes, indeed transformations, in other components such as Physical infrastructure, financial coordination systems, and in business logistical systems (See
Box 1). However, the focus in this paper is on the recent complex institutional and organizational improvements in transport governance necessary to promote free trade, namely the components A and B noted above.

**Box 1. Best-Practice Trade and Transport Logistics**

Propelled by the enormous growth in cross-country trade—and the anticipated explosive potentials of international business to business transactions via the internet—a variety of business logistics innovations is appearing in order to improve global supply chain efficiency and address effectively foreign trade rules and regulations, as well as payment issues. In order to be fully responsive to the needs of their customers in a dynamic context, the developers of these logistical systems in the U.S. are developing strategic relationships and partnerships with their client businesses. Such collaborations between users and developers of logistical software systems have led to several recent innovations.

First, reengineering existing logistical practices in the context of new technology yields significant new efficiencies. Global Positioning Satellite (GPS) technology is transforming the effectiveness of current transportation services. New systems blend three existing capabilities—planning and scheduling logistics software, in-cab communication systems for scheduling and monitoring trucks, and electronic links between the firm developing logistics systems and the retailer supply chain. Such a system uses GPS to monitor the location of trucks and dispatch them to assure faster delivery and merchandise stocking at the retailers’ shops.

Second, the designers of new Trade / Transport Chain logistical systems are moving towards comprehensive systems that manage the entire supply chain, in the process blurring the distinction between production transport and distribution activities. Sowinski (2000) describes new logistical software systems that bring together diverse information on raw materials, input suppliers, factories, transport vehicles, and on points-of-sale in real time. Such information and analytical systems allow a firm a) to make decisions on how many and where warehouses or plants should be built, and what modes of transport to use, and b) compute tradeoffs between production run length and inventory costs, and develop information necessary to decide when to open or close production lines.

Third, new logistical systems that can support efficient crossborder supply chains offer information not only on transport, insurance and other costs, but also information relevant to crossborder transit of goods. A New York firm offers clients information via the World Wide Web—a low-cost source for access to pertinent export regulation information. The resulting Automated Export System (AES) is certified by the U.S. Customs Service and the Foreign Trade Division of U.S. Census Bureau to permit electronic filing of export documentation used by exporters and freight forwarders. Other systems supply exporters over 700 international trade documents in 21 languages and a variety of international banking requirements for trade activities. Such information systems help small and medium enterprises to lower the time and cost of crossborder trade and transport.
III. REFORM OF OVERALL GOVERNANCE OF TRANSPORT SYSTEMS

The reform of the elaborate and divergent economic regulations governing transport in the different countries that make up an FTA is often a prerequisite for the promotion of a seamless cross-border freight flow among these countries. This derives from the fact that the transport sector has been regulated much of the 21st century in affluent countries to varying degrees. In North America, processes of transport deregulation and privatization have played complementary roles with trade liberalization to promote transport integration. After all the economic regulatory reform that has occurred in Canada, Mexico, and the U.S., there is still remnant economic regulation in the form of cabotage rules that hinder efficient transborder operations. As noted below, Europe has witnessed more recently similar deregulation and privatization processes. We also discuss the progress towards these goals in FTAs in developing countries, such as Mercosur.

The North American Experience

The public policy regimes in transport in North America have included a high level of economic regulation for nearly a century. This derived from the fact that transportation carriers, which are integrated with fixed facilities and vehicles and enjoy network economies, were able to engage in monopoly pricing, market segmentation pricing and similar actions that seriously disadvantaged shippers and communities.

Since 1887 the U.S. instituted economic regulation of railroads that allowed the Interstate Commerce Commission (ICC) to assure a normal rate of return for railroads’ assets while balancing the advantages of shippers and equity of service to communities. To this end ICC engaged in elaborate control of investment, pricing, and operations in the railroad industry by specifying the conditions of entry, exit, the creation of complex rate structure, and even rules of operations--without the ability to compute costs effectively. During the 1930s similar economic regulation was extended to motor carriers and airlines. Canadian carriers have also been subject to economic regulation, though more lightly than in the US and predominantly at the provincial level. Mexico also regulated through the award of transport concessions, the grant of route capacity and freight rate structures.
The adverse effects of such intrusive regulation became very evident by the 1970s in the poor financial performance of U.S. railroads and high truck rates in the LTL (less than truckload) sector. Economic analyses have shown that the price and entry regulations introduce inefficiency by creating a vicious cycle of artificially high prices, high service quality competition and the resultant losses due to raised costs (Douglas and Miller, 1974). Three sets of such regulatory distortions have proved costly. First, in both road and rail, rates were set above marginal costs--costing the economy $1 billion annually (Winston, 1985). Second, the entry and exit regulations cost the carriers dearly--the prohibition on railroads on exiting from poorly performing lines leading to annual production cost inefficiencies of $2.5 billions (Winston, 1985). Third, restrictions such as disallowing backhauls, designation of routes, etc. led to X-inefficiency costs of several billion dollars (Winston, et al., 1990) -- besides hindering productivity growth, technical change, and service quality.

The resulting drive for deregulation led in short order to regulatory reform of airlines (1978), railroads (1980), and motor carriers (1980) first in the U.S. Entry conditions were eased; freedom to price was promoted; reliance on the market and competition was encouraged. Canada followed suit through the National Transportation Act (NTA, 1987), the Shipping Conferences Exemption Act (SCEA), the Motor Vehicle Transport Act together with the amendments to other legislation such as the Railway Act.

Transport deregulation came to Mexico as part of the late 1980s economic restructuring intended to promote domestic investment-friendly policies. Liberalization of the motor carrier industry occurred in 1989--permitting greater pricing freedom, opening the market to private carriers, and allowing Maquiladora operators to use their own fleets to move goods in both directions.

Major changes occurred in the U.S. in the conduct, performance, and structure of airlines, trucking and railroads after deregulation--more competition among all modal carriers, lower prices, wider set of service offerings, and new entry into most geographic and product markets (Figures 1 and 2). Carriers have been able to rationalize their networks, improve the efficiency of their operations, and set rates in line with competitive market conditions. There was a significant change in the cost structure of the railroad industry following deregulation with productivity growing at well over 2% a year (Bereskin, 1996).
Several studies have shown that average airfares (in constant dollars) have fallen since 1978 and competition stays rigorous on most city-pair routes, though concentration has gone up in the industry (US GAO, 1990; NRC, 1991). U.S. domestic airfares adjusted for distance have been consistently lower in the last two decades than in Europe, Asia or the world.

Shippers, confronting technological change and globalization, have begun to coordinate their production activities more effectively with their transportation services--with consequent productivity gains. The experience in Canada since 1987 has been broadly similar, with competitive pressures lowering rates in international air traffic, railroads and trucking (Figure 4.) Trucking deregulation in Mexico in 1989 increased competition and lowered rates--29% lower a few years later (Strah, 1995). It also promoted expansion of intercity routes and the vehicle fleet.

Figure 1

Operating Costs of Less Than Truckload and Truckload Carriers, 1977-1995, in 1995 dollars per vehicle mile

Source: Morrison and Winston, 1997
**Figure 2**


**Figure 3**

Difference between International Fares (U.S.-Foreign) and U.S. Domestic Fares Adjusted for Distance

Figure 4. Canadian Railroad costs in 1980-91 (in 1986 cents per revenue ton-mile)

Source: IBI

Cabotage

One class of these barriers pertains to the remaining economic regulation, in particular, cabotage. Cabotage refers to the ability of foreign vehicles and labor to transport goods within a country. The cabotage rules and regulations that limit the freedom of foreign transportation carriers instituted by Customs and Immigration Departments are typically symmetric. Such rules involve the use of labor and equipment of one country in the other -- e.g. foreign drivers cannot carry domestic freight and the use of foreign equipment is restricted to domestic movements that are incidental to international movements. The existence of these cabotage-rule barriers increases the cost of transborder transport. Railroads are less affected by cabotage restrictions, though they too incur additional costs because of the need to change crews at the border.

Another major remaining cabotage barrier is the existing U.S. restrictions on trade in domestic water transportation. In the large, multi-coastal U.S. economy, foreign participation in its intercoastal trade is restricted by the 1920 Jones Act. The Jones Act--justified by the need to secure a sufficient merchant marine capacity for U.S. defense needs -- reserves the shipping cabotage traffic to U.S. built and registered ships that are predominantly owned and crewed by
U.S. nationals. The U.S. maritime carriers and other stakeholders have excluded these provisions from the GATT and NAFTA. The Jones Act permits domestic shippers to levy rates substantially above comparable world prices, effecting thereby a massive transfer from U.S. users of water transport users to U.S. maritime carriers-- a welfare cost around $3 billion in 1989 according to a recent analysis of the Jones Act (Francois et.al., 1996).

Aviation is an important component of foreign trade, for example accounting for $355 billion or 27% of U.S. trade in 1995--60% of which is hauled in U.S. carriers (US GAO, 1996). The rapid growth in international air freight services reflect the emergence of global systems of producing and distributing goods and the associated ‘just-in-time’ inventory and supply chain management systems. Such services are handicapped, however, by the bilateral international aviation agreements that specify traffic rights – the routes, the number of flights on each route and the number of airlines that can fly them. Such restrictions on transborder airline traffic have been recently relaxed by the U.S. negotiations on ‘open skies’ agreements with many European countries such as Germany and Netherlands. In 1995 the U.S. and Canada signed the Open Skies Agreement, under which carriers in each country were given full access to destinations in the other, procedures for international fare approval were streamlined, and gates at some of the busiest U.S. airports were dedicated to Canadian flights. The agreement extended both to passenger and all-cargo air services. The agreement with Mexico (1991) is not ‘open’ but liberalized to include open routes, no capacity restrictions, freedom to transfer cargo for ‘onward flights’, and operational flexibility but restricted in the number of airlines allowed to operate (one on any city pair segment), and double approval pricing.

As economic regulatory barriers fall, cabotage and other barriers in the form of safety and technical regulations in such areas as vehicle size and weights, driver certification and hours of service, and safety remain. As the rules governing these matters diverge in the different countries, because of past national decisions on bridges, infrastructure, or social and political issues governing transport, the resulting inefficiencies in transborder areas will spur the demand for uniformity and harmonization.

The overall message is that inconsistencies in transport regulations between countries that are part of a Free Trade Area will generate economic inefficiencies and disparate opportunities, thereby generating demand for harmonization. As both production and transportation firms in all three countries rationalize their operations across the NAFTA region, the transport non-tariff
barriers noted in this section cause inefficiencies and generate the political demand for their relaxation. The direct effect of these barriers—as the transportation carriers are required to operate around these restrictions—would be higher costs; the longer term indirect effect would be less competitive and efficient activities in the logistics industry and the consequent loss of productivity in the NAFTA region.

*The European Experience*

Creating an integrated transportation system within the EU area requires progress on three interrelated objectives: interoperability, free market access, and interconnection. Interoperability refers to the harmonization of technical standards for infrastructure elements ranging from rail gauge to air traffic control systems as well as rules applying to service providers such as truck size and weight restrictions—a subject we would return to in the next section. Free market access refers to the removal of restrictions that prevent providers of transportation services based in one member state from operating in another. Interconnection refers to the problem of linking up national infrastructure networks. The relatively sparse connections among these networks were partly due to the fact that many borders coincide with physical barriers such as mountains, rivers, and seas. It also reflects the fact that national networks have been developed primarily to meet the domestic needs of member states.

The reasons for slow progress in achieving these goals are varied, but most relate to the traditional mandate of national governments in transportation policy and their unwillingness to transfer authorities to the EU. For example, nearly all national governments were owners of major transportation suppliers, including railways and airlines, and therefore had interests in preserving their local monopoly powers. Furthermore, transportation policy is frequently used as a means of pursuing national economic goals. The role of sub-national and even local governments in transportation complicates the process of harmonization further. Thus the member states had some interest in preserving the status quo of policy fragmentation.

By the 1980s, groups representing consumers of transportation services who were increasingly frustrated with high costs and poor quality began to bring both political and judicial pressure for the EU to take action. In 1985 the CJE ruled that the European Commission had failed to act appropriately to implement the Common Transport Policy required under the Treaty of Rome. This ruling related specifically to opening up national transportation markets to
suppliers from other member states, but it marked a major turning point after which the Commission and Parliament became more active in all aspects of transportation policy.

Between 1987 and 1992 major new legislation was enacted regarding air, marine, road, rail, and inland water transportation. This legislation dealt mostly with issues of market access and interoperability, as well as common work rules for transportation employees. In the 1990’s, however, the Commission began to focus more on issues of interconnection. For example, a 1993 White Paper on growth, competitiveness, and employment emphasized the transformations in production systems, methods of organizing work, and consumption patterns that were already being adopted in North America and Asia. Economic fragmentation and adherence to traditional practices made it difficult for European businesses to manage complex value chains and spawn small innovative firms, placing the EU in a weak competitive position vis-à-vis other major production regions.

Repeating a goal that had already been enshrined in the 1992 Treaty on European Union, the White Paper called for the development of integrated and complementary information, transportation, and energy Trans-European Networks (TENs). This led to the announcement in 1994 of a major infrastructure program specifically geared to filling gaps in the existing European transportation networks.

Rules of market access for transportation services have been contentious from the inception of the EU. The final language of the Treaty of Rome left considerable room for interpretation. For example, while the Treaty committed the member states to a Common Transport Policy, it did not call for a common market in transportation. Also, specific reference was made only to road, rail, and inland waterways, leaving the impression that air and sea transport were excluded from EU control. Furthermore, competition (anti-trust) rules contained language excluding transportation.

Air transportation is an especially interesting case. Up until the 1980s, all member states had ownership interests in national flagship airlines. These airlines had long been considered instruments of national economic policy and influential public sector unions dominated their labor forces. Furthermore, national airlines were a matter of prestige for most states. Thus, despite the fact that most of them lost money, member states were loath to allow competition that might threaten the viability of national flagship carriers.
Regulation on inter-country service was handled via bilateral arrangements whereby the two national governments designated carriers, defined timetables, set fares, and divided the revenues (O’Reilly and Sweet, 1998). For the most part, independent carriers were closed out of these routes. Also, foreign carriers were given access only to major national airports, with service to regional airports limited to national carriers.

Impetus for change came primarily from business groups, who argued that the poor quality and high cost of air travel within the EU was a major barrier to economic integration and global competitiveness. They had a sympathetic ear in the European Commission, whose 1979 attempt to institute a program of airline liberalization had been thwarted by the member states. By the middle of the 1980s they also had the support of two member governments – the United Kingdom and the Netherlands – that had begun their own deregulation initiatives.

An example of the objections of member states is provided by Greece, who argued that economic, regional development, and security priorities depended upon year round service between the mainland and the Greek islands. If independent operators were allowed into this market they would offer services only during the lucrative summer tourist season, leaving the unprofitable months to the national carrier.

A key event in the breakdown of the old system came when the French government prosecuted some independent airlines offering domestic services below the regulated fares. A French court referred the case to the ECJ, which found that although air travel was protected from some elements of competition policy, it was not completely immune and that the European Commission had some authority regarding airline practices.

In the aftermath of this decision the Commission attempted for the second time to reform air travel. It did not propose a wholesale American-style deregulation, but rather that national regulation regarding inter-country flights be removed in favor of a EU regulatory regime. Under a new set of rules agreed upon in 1987, many of the old restrictions remained, but avenues for greater competition were created including:

- permission for carriers to offer restricted service with fares discounted below the reference rate approved by the two member states;
- a requirement that each state permit more than one airline from another state access to its airports (although not necessarily more than on to the same airport);
• under some restrictions, permission for carriers to offer service to a regional airport in another country; and
• under carefully controlled circumstances, permission for an airline from one country to provide service between two other countries.

Note that an airline in one country still cannot offer service between two points within another country (cabotage) (O’Reilly and Sweet, 1998).

The result of this transformation is a more competitive and efficient environment, but not a fully deregulated one. This environment led to a restructuring of the industry, including the emergence of cut-rate carriers and a number of international alliances. The result has been greater choice and lower fares for EU air travelers (McCormick, 1999).

In those areas of transportation services where governments have been less involved in the supply side, much greater strides have been made toward achieving a true common market. Transportation of freight by road (trucking) is a good example. Under 1992 regulations, any operator with a “community authorization” has unlimited access to the market for freight movement between member states. This includes both trips beginning or ending in the state where the carrier is based and trips between any other two states.

The liberal community market access rules also extend to cabotage. Starting in 1990, any carrier with a “community cabotage authorization” can carry goods within any state in the EU 15. These authorizations were issued under an increasing quota system until 1998, when all quotas were scheduled to be removed. Complementary rules with respect to licensing of and work rules for drivers and other employees are also in place.

There are provisions to protect national trucking industries from extreme damage from foreign competitors with either community or community cabotage authorization. If a significant number of domestic firms are found to be in danger of severe financial damage, a crisis period is declared during which market access is restricted. The restrictions are imposed for six months, renewable once (DG Transport, 1999).

**Mercosur Region**

Transport service liberalization and deregulation—a necessary preparation for the development of an efficient trade / transport chain-- arrived in the 90s in Mercosur countries.
They were propelled by the inability of publicly offered transport services in these countries to improve operational efficiency and services, to arrest cost increases, to attract new investment, to achieve quality maintenance, and to lower public subsidies. Transport industries—along with others such as telecommunications, utilities, etc.—were privatized to varying degrees in Mercosur countries. Argentina was one of the leaders of privatization program in the early 90s, when the government sold off various public enterprises, including the Aerolineas Argentinas (one of the largest airlines in Latin America), railroads, and important turnpikes. Brazilian railways were privatized more recently and need to catch up with their Argentine counterparts (Zinn, 1999).

The transport privatization efforts in Argentina, which together with Chile and Mexico went further than most Latin American countries in liberalizing various parts of the transport sector. Unlike in the power and telecommunications sectors which were sold outright, Argentina granted transport concessions of 10 to 30 years, with ownership and control of assets returning to the government at the end of the concession. The concession dealt with the problems that motivated privatization without limiting government’s future options or flexibility. While these efforts in rail, road, and ports and waterways are described in detail in Lakshmanan, Subramanian, Anderson, and Lautier (2001), a few summary comments are in order.

A major consequence of rail privatization was savings in railroad subsidies (which averaged U.S.$ 1.4 billions annually in the 80s and now reduced to U.S.$ 0.1 billions / year and intended only for commuter railroads and subways). These savings derived from a combination of increased labor productivity and abandonment of lightly used (inter city passenger) services and lines. Ridership was increasing in urban commuter rail (45%) and subway (18%). The freight volume reached the 80s levels, but some of the freight lines had difficulties stemming from the intense competition from truck services which were helped by geography and public policy. The condition of the privatized highways has improved significantly and the cost of maintenance was off the government budget. However, there is no direct evidence that the cost of road maintenance is lower for the private sector (Gomez-Ibanez, 1997). Road usage has also climbed partly due to road improvements and mainly from economic recovery.

The mix of privatization and deregulation in ports and waterways sharply dropped port charges and barge and ocean shipping tariffs. Shipping costs for containers from Argentina to Northern Europe fell from 30% to 70% between 1991 and 1993; for grain and bulk shipments, a savings of 10% materialized. The savings largely derived from labor productivity—employment
at the ports of Buenos Aires fell from 8000 to 2500. The concession for the Atlantic Ocean-Santa Fe waterway was expected to offer considerable savings—maintaining the channel cheaper than the public agency used to spend, while obliged to maintain deeper channel depth north of Buenos Aires (Gomez-Ibanez, 1997).

IV. REFORM OF GOVERNANCE SYSTEM FOR PHYSICAL FLOWS

The NAFTA Experience

In addition to economic regulation, cross-border transportation is subject to a host of technical regulations and standards. These include:

- size and weight regulations for trucks
- size, weight and other technical standards for locomotives and other railroad stock
- age, language, licensing and health regulations for vehicle operators
- conventions for road signs and traffic signals
- procedures for ensuring vehicle safety
- procedures of transportation of hazardous goods

Technical Regulation Of Goods Flow

In all of these cases, somewhat different regulations, standards, and procedures have evolved over many years in the three NAFTA partners and increase the cost of moving goods across borders, as compared with moving the same goods the same distance domestically—constituting a form of non-tariff barrier.

Inconsistencies in truck size and weight regulations are a good example. These regulations are imposed for two reasons. The first is that excessively large vehicles will not operate effectively in mixed traffic streams, resulting in congestion, delays, and accidents. The second is that oversized vehicles result in accelerated wear and damage to road infrastructure, and may result in the failure of bridges.

Truck size and weight regulations can be complex. For example, not only the gross weight of the truck, but also the weight per axle, the way the weight is distributed to the front and back axles, and the distance between the axles, may be included in the regulations. Truck length
regulations may be defined on overall length, on the length of tractor and trailer independently or even on the length of the trailer beyond the back-most axle.

Unfortunately, there are some significant inconsistencies between these regulations in the three NAFTA partners. Even on the most basic dimension – gross truck weight – there is no consistency. As Table 2 indicates, the United States limits all trucks to a gross weight of 36,288 kg (80,000 lbs.). Both Mexico and Canada allow higher weights for all categories of trucks and increases the weight limit for trucks with more than the standard 5 axles. This inconsistency is due mainly to conservative assumptions by U.S. officials about the maximum weight that can be supported by bridges.

**Table 2: Maximum Gross Vehicle Weights in the NAFTA Countries (in kg)**

<table>
<thead>
<tr>
<th>Truck Type</th>
<th>U.S.</th>
<th>Canada*</th>
<th>Mexico</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tractor – Semitrailer (5 axles)</td>
<td>36,288</td>
<td>39,500 – 41,500</td>
<td>44,000</td>
</tr>
<tr>
<td>Tractor – Semitrailer (6 axles)</td>
<td>36,288</td>
<td>46,500 – 53,000</td>
<td>48,500</td>
</tr>
<tr>
<td>Double Trailer (6 axles)</td>
<td>36,288</td>
<td>47,600 – 43,500</td>
<td>47,500</td>
</tr>
</tbody>
</table>

* range of provincial regulations


To make matters worse, different regulations may apply in different places. For example, Canadian regulations are set at the provincial level, and despite recent efforts at standardization some variation remains across provinces. There are also some state level variations in the United States and different regulations apply on different parts of the highway network. (This is especially true for regulations applying to trucks hauling more than one trailer.)

These inconsistencies have the potential to add significantly to the cost of cross-border transportation. For example, it is already the case that some Canadian trucking firms must maintain separate fleets of trucks for shipments into the U.S. and for domestic shipments (Prentice and Wilson, 1998). Also, given these inconsistencies, each country must take measures that trucks entering their territory are not in violation of its rules. This implies border inspections, which add to the cost of border operations and may contribute to costly border delays (see below.)

Recognizing the potential problems arising from inconsistencies in technical regulation of transportation, a provision of NAFTA established the Land Transportation Standards Subcommittee with responsibility for harmonization in all of the categories of technical
regulation listed above. To date, significant progress has been made in the regulation of vehicle operators and in harmonization of road signs and signals. The issue of safety compliance, especially with reference to Mexican trucks coming into the U.S., still presents problems (See below).

A special working group has concluded that complete harmonization is probably an unrealistic goal, but that it may be possible to eliminate some of the most onerous inconsistencies. Complete harmonization will be difficult for a number of reasons. For one thing, carriers in all three countries have considerable investments in fleets designed for compliance with national regulations. Also, in each country infrastructure design and construction has been done based on assumptions that embody the national regulations. Finally, as with any question of harmonization, there is an important political dimension. Since international freight accounts for a relatively small percentage of trucking activity in the U.S., it is unlikely it to change its regulations substantially. The other two partners, however, may see the adoption of U.S. rules as tantamount to sacrificing their political autonomy.

Border crossing areas may be subject to long delays. This is partly because most national frontiers are crossed by a relatively small number of road and rail links, resulting in traffic bottlenecks. Furthermore inspection and documentation activities that must occur as vehicles cross the border are time consuming. If delays at borders are long enough they can to add significantly to transport costs. Labor must be paid and valuable vehicle capital must sit idle while waiting at border crossing.

Canada and the U.S. have traded large volumes of goods for a number of decades, and in the process both governments have worked cooperatively to develop relatively efficient border crossing routines. The border crossings along the U.S.-Mexican frontier is plagued by long delays and many Mexican trucks must be sent back due to violations of various U.S. regulations.

Large volumes of freight movement at the U.S. Mexican border are a more recent development, so there has been less time to work out the kinks. Also, the issues of illegal immigration and transport of drugs in commercial vehicles is a major concern. Finally, the Mexican truck fleet is in a relatively poor state and Mexican carriers and drivers are not well informed on U.S regulation, so many trucks fail inspection.
The situation along the Mexican border has presented a major impediment to full implementation of NAFTA provisions. NAFTA specifies a timetable for providing full freedom of truck movement across the U.S. – Mexico border. Initially, Mexican trucks were only allowed to operate in a relatively small commercial zone extending only a few miles into the territory of the four states that border Mexico. (Mexican goods bound for destinations outside this zone must be transferred to American trucks.) The NAFTA December 1995 deadline for Mexican trucks to be allowed to make deliveries throughout the territories of the border states and U.S. trucks to have similar access to Mexican border states has been delayed. By 2000, Mexican trucks should be able to travel throughout the U.S. and American trucks should be able to travel throughout Mexico. Thus, cabotage restrictions notwithstanding, Mexico and the U.S were to have a similar arrangement to the one that now exists between Canada and the U.S.

At the time of this writing, the access for Mexican trucks that was planned for 2000 has not yet been granted. The main reason for this delay is that the U.S. government and especially the governments of the bordering states fear that Mexican trucks will not meet U.S. regulations and may therefore cause accidents and damage infrastructure.

This would not be a problem if effective surveillance could be applied to prevent non-compliant trucks from entering the U.S. The inspection process, however, must necessarily be highly complex because various federal agencies (Customs, Immigration and Naturalization, Department of Agriculture, Food and Drug Administration) all have concerns about what may cross the border in trucks. Inspection of the trucks themselves (as opposed to their contents of personnel) comes under the jurisdiction of state Departments of Transportation, who receive some limited assistance from the U.S. Department of Transportation.

The checking by border states of trucks for size and weight violations and for safety violations such as worn tires, improperly secured loads, inadequate brakes etc. is handicapped by a relatively small number of inspectors assigned, and by the limited facilities it is only possible to conduct spot inspections. In these spot checks, roughly 50% of the trucks inspected have been put out of service due to some violation. It is not surprising therefore that state officials are reluctant to allow Mexican trucks to travel further into their territories until either a more stringent inspection process can be put in place or a much lower rate of violation can be observed in spot checks.
There is considerable potential for new information and communication technologies that come under the general heading of Intelligent Transportation Systems (ITS) to speed border crossings by eliminating much of the need for paper handling, remotely reading truck identification and cargo information, and conducting certain basic checks on weight, length, height, and width while the truck is in motion. Also, electronic databases can be used to identify trucks and drivers with previous violation histories so that inspection efforts can be concentrated on them.

In the long run, probably the most important measure to deal with the current problems will be cooperative efforts that are now under way to encourage the Mexican government to follow domestic inspection procedures that are more consistent with U.S. procedures. The objectives of these efforts is to bring the general condition of the Mexican fleet up to a level where U.S. officials will permit them to have broader access to U.S. highways.

The European Experience

Achieving interoperability in European transportation systems involves two related tasks. The first is to see that all new infrastructures incorporates a common set of design standards. The second is to ensure that equipment and employees operating on existing infrastructure meet a common set of technology and safety standards. The program for achieving interoperability in high-speed train (HST) networks is an example of the first task.

Because most ongoing HST projects receive some support under the TEN (Trans European Network) program, EU is well-placed to insure consistency of technical standards. However, under the “new approach” to interoperability the goal is to establish only those common standards that are necessary to achieve a smooth interface between systems, rather than stifle innovation by insisting on a full set of common specifications. A body known as the European Association for Inter-operability is charged with proposing an appropriate set of Technical Specifications for Inter-operability (TSI). This body is made up of representatives from railways and related industries, rather than officials from either the Commission or member state governments. The TSI are submitted to the Commission, which approves them after consultation with an expert committee (DG Transport, 1999, Doc. 1.1.2).

Adopting and enforcing a common set of road vehicle weight and dimension standards are preconditions for interoperability. A new set of standards was adopted in 1996 to apply to
vehicles operating throughout the EU. These include the maximum length, height, and weight for different categories of trucks, including “road trains” that can be as long as 18.75 meters and weight up to 44 metric tons (DG Transport, 1999, doc. 2.13.1).

Given the complex nature of these regulations, checks at borders to insure that incoming trucks meet regulations can be time consuming. Given the high level of harmonization of EU standards, however, it has been determined that such checks are no longer necessary. Since all EU trucks must conform to common standards, there is no reason to treat domestic and foreign trucks any differently. Thus foreign trucks can be subjected to the same spot-checking procedures that are used for domestic trucks, and authorizations for cabotage etc. can be checked at the same time. Border checks for control of both authorization and size and weight rules were eliminated at the end of 1989 (DG Transport, 1999, doc. 2.11.1).

**Developing Countries**

By way of contrast, the existing procedures governing cross-border flows in FTAs in developing countries are both cumbersome and time-intensive, reflective of the earlier conservative trade policies of these regions. Customs clearance procedures can add significant costs and delays even though they represent a relatively small part of the logistics chain. Poorly defined or complex procedures and documents reduce transparency, especially when the approval of many people is required. An extreme of serious barriers to cross-border goods flow is provided in the S. Asian Region (see table 3).

**Table 3: Transport and Transit Performance Indicators in South Asia**

<table>
<thead>
<tr>
<th>Country</th>
<th>Dwelling Time</th>
<th>Customs</th>
<th>Physical</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>In Ports</td>
<td>Clearance</td>
<td>Inspection</td>
</tr>
<tr>
<td>Argentina</td>
<td>4/5 days</td>
<td>3 hours</td>
<td>30%</td>
</tr>
<tr>
<td>Cameroon</td>
<td>22 days</td>
<td>48-72 hours</td>
<td>80%</td>
</tr>
<tr>
<td>China</td>
<td>20 days</td>
<td>72-120 hours</td>
<td>10%</td>
</tr>
<tr>
<td>India</td>
<td>10-25 days</td>
<td>48-120 hours</td>
<td>100%</td>
</tr>
<tr>
<td>Malaysia</td>
<td>15 days</td>
<td>120 hours</td>
<td>80%</td>
</tr>
</tbody>
</table>

*Source: The World Bank*
### B. Transport and Transit Performance Indicators in South Asia

<table>
<thead>
<tr>
<th>Path</th>
<th>Border Crossing Costs (US$/ton)</th>
<th>Transit Costs (US$/ton)</th>
<th>Transfer Costs (US$/ton)</th>
<th>Loss Costs (% of value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcutta-Pertapole-Benapole-Dhaka</td>
<td>2-3</td>
<td>64</td>
<td>7-8</td>
<td>1%</td>
</tr>
<tr>
<td>Kathmandu-Biratnagar-Haldia</td>
<td>1.5-3</td>
<td>10-40</td>
<td>7-8</td>
<td>1%</td>
</tr>
<tr>
<td>Kathmandu-Birganj-Calcutta-Haldia</td>
<td>300</td>
<td>20-40</td>
<td>7-8</td>
<td>1%</td>
</tr>
<tr>
<td>Gauhati-Shillong-Dawki-Tamabil-Chittagong (Road)</td>
<td>5-10</td>
<td>8-10</td>
<td>7-8</td>
<td>1%</td>
</tr>
</tbody>
</table>

*Source: Presentation of Ms. Uma Subramanian.*

### V. BENEFITS OF TRADE & TRANSPORT INTEGRATION: AN EXAMPLE

As the transport and transit facilitation systems improve in Mercosur, the direct effects of improvement -- in terms of a virtuous cycle of lower costs, increasing trade volume, economies of scale and scope in distribution and production activities and so on—set in motion a variety of adaptive responses on the part of various economic agents in the trade bloc. These agents--producers, shippers, carriers, distributors, and other facilitators--begin to see Mercosur as an integrated market rather than a set of separate markets and reconfigure their activities accordingly. It is during this restructuring and rationalization of production and distribution activities that further economies of scale and scope can emerge to continue the virtuous loop. Such long term consequences represent the full benefits of trade liberalization and a supportive trade / transport chain.

Some inkling of such benefits is discernible from the experience of some large North American corporations that operate global production and distribution networks. These companies seize the integration opportunities offered by Mercosur, and begin to integrate their
prior nation-based activities into a Mercosur-wide framework. The rest of the paper briefly describes two case studies of such future-oriented supply chain systems developed in Mercosur by Kodak and Kellogg’s as reported by Zinn (1999). Supply chains represent a network of firms that carry out production, distribution, and other relevant supporting activities that link the producer and the consumer

**Kodak: Multi-country Warehousing from a Single Location**

Kodak has taken advantage of the rise of Mercosur trading bloc to integrate its prior separate national operations of warehousing and distributing its high value, low volume, and low weight products into one large market (Mercosur and Peru) supplied from a single warehouse in Brazil. The major advantage of a multi-country facility derive from: economies of scale in distribution and the resultant cost savings, the more efficient use of transportation assets, warehousing equipment, software, etc. with higher volumes. Further, a single large location can offer the customer a high level of stock availability per inventory investment. Zinn (1999) notes another reason for Kodak’s choice of a Brazilian (the largest national market) location—a tax incentive Brazil offers for imported products earmarked for re-export.

Kodak was able to increase its negotiating leverage by consolidating shipments to fewer oceanic ports. Also, the cost of supporting the expansion of Kodak’s business into new markets was lowered when supplied from a centralized facility.

The feasibility of the Kodak’s strategy of a single facility for a trade bloc is clearly contingent on a seamless trade / transport chain. First, cost-effective transportation and complementary information must be available to serve a large market from a single location. Other barriers include the higher costs of operating through Brazilian ports (as compared to international levels), the excessive documentation burden, the longer cycle times at customs which are not open 24 hours a day, and the delay-inducing propensity for multiple governmental agencies to work in sequence rather than in parallel Kodak’s. Only when such conditions improve can companies with products of lower value / weight ratios than Kodak follow its strategy.
**Kellogg's: Integrated Supply Chains for Brazil and Argentina**

Kellogg’s --producing in Argentina and Brazil, and importing from United States, Mexico and South Africa designed a supply chain for the joint Argentina-Brazil market. Such a supply chain’s design depends on: Mercosur-wide criteria for allocating production, a reasonably free flow of goods between Argentina and Brazil, and the extensive use of third party logistics for local warehousing and distribution and for operating the main distribution centers (DCs) close to the largest markets of Sao Paulo and Buenos Aires. This paper can not do justice to this complex system in the space available, and will instead outline the types of obstacles to its efficient implementation in the Mercosur environment.

The key to success in the Kellogg’s system is the speed, reliability, and the cost of shipment across the Brazil / Argentina border. The key obstacles are: lack of harmonized documentation between Argentina and Brazil, tax legislation that makes it cheaper to serve customers from a more distant out-of-state warehouse than from an in-state warehouse, and the involvement of customs in every shipment on both sides of the border.

In the long run as Mercosur’s trade / transport chain becomes more efficient in the context of more investments in transport and communication infrastructure and improved cross-border transit processes.
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