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INTERNATIONAL TRADE IN TRANSPORT SERVICES

Institutional Pathways to Promote Efficiency
in Logistics: The Case of India

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Regional Development and Integration
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Introductory Note

International trade in services is an increasingly important part of global commerce. Services are defined as anything that is not a “good” and is characterised by high degree of intangibility and generally requires that production and consumption happen simultaneously. They cover a wide range of economic activities extending from tourism, health-care, education, insurance, banking, software development, transport and communications, etc. Transport services, in turn, include consultancy, construction, management, inter-country movement of vehicles, inter-country movement of human capital, warehousing, distribution, supply chain management, etc.

The international trade in services is regulated by the World Trade Organisation’s General Agreement on Trade in Services (GATS) which categorises group of services under Four Modes—cross border, consumption abroad, commercial presence and presence of natural persons. So far as trade in transport services is concerned, there has not been much progress in terms of liberalisation under these Modes both with regard to supply of services and investment in related infrastructure. Several barriers exist which impede free trade in this area. For example, while financial capital is free to move, movement of human capital as service providers is highly restricted.

The share of developing countries in international trade in transport services has been comparatively far less than that of the developed countries. This is despite the fact that the former have a huge potential for providing such cross border services. In this context, there is a strong case for regional cooperation which to begin with may be more feasible and desirable particularly with the proximate countries of the region. The potential gains from reciprocal liberalisation are likely to be substantial.

It is axiomatic that for promoting export of services in transport, the domestic economic structure should adopt policies of liberalisation and competitiveness, enhance skill development and promote technological innovation. It is equally necessary to set up regulatory regimes and institutions that would facilitate this framework. An efficient and economic domestic base would provide the necessary stimuli for export of transport services.

This issue of the Asian Journal exclusively addresses such aspects of trade in transport services that are relevant to India, with a particular emphasis on the rapidly evolving logistics industry in the country. The journal carries six papers by eminent authors and practitioners in the area of intermodal trade, transport and logistics.

The article authored by Dr Rajat Kathuria in conjunction with Messrs Deboshree Ghosh and Parnil Urdhwareshe provides a close link between reforms to expedite infrastructure related services particularly logistics services and growth in manufacturing

trade. Ms Arpita Mukherjee and Ramneet Goswami, in their article, argue that how India has unilaterally liberalised its logistics services sector as reflected in its bilateral as well as multilateral engagements such as GATS. The paper also presents a comparative status of commitments of countries, till date, in transport sector under WTO's GATS.

Dr Denis Loskant, in his article, reproduced through courtesy Railway Gazette International, explains how DB International, while working in about 100 countries since 1966, offers a range of consulting and engineering services, from feasibility studies and planning to project supervision and commissioning. In addition to its presence in the Middle East, DB International has been specially active in China and Brazil; and having been appointed to act as quality and safety consultant for the 25 km elevated metro project in Kochi, it plans to make a further thrust in India with its own office at Bengaluru.

Discussing the criticality of logistics services within a global value chains production network and the emergent new geography of production and consumption, Dr Pritam Banerjee in his article enumerates the policy related challenges in the Indian context which impede, or prevent, the efficient roll-out of service functions related to three different types of connect - physical, transactional, and regulatory, also suggesting policy interventions necessary for the purpose.

Examining the role of private sector investment, with its opportunities and constraints, in logistics infrastructure in the country, the penultimate paper in the issue by Ms Smita Miglani also provides a bird's eye-view of the trends and patterns of investment in India's logistics sector in the last two decades. The essay by Mr Raghu Dayal, at the end, traces the rationale and promise of dry ports as an instrument of development and integration of the South Asia and Southeast Asia region, with empirical instances of their growth in India relevant to mutual advantages of the countries across the region.

K.L. Thapar
Chairman

Institutional Pathways to Promote Efficiency in Logistics: The Case of India

Rajat Kathuria, Deboshree Ghosh & Parnil Urdhwareshe*

INTRODUCTION

With the fast globalising world, the success of an economy critically depends on evolving the efficiency of its trading and business activities. In order to maintain competitiveness, it is crucial for a country to understand the factors that affect this efficiency both in domestic and international market. A positive relationship between logistics and economic growth has been well established in the literature.¹ In addition, it is not possible to develop the infrastructure without access to resources that growth produces.

This symbiotic relationship is an integral part of modern economies. With growing complexities in the trade patterns including the rise of Global Value Chains (GVC) and regional production networks, the importance of an efficient logistics network cannot be over-emphasised. Accordingly, any growth strategy for India should regard development of logistics infrastructure as an integral part of that effort.

The global logistics industry is worth approximately \$4 trillion and accounts for roughly 10 per cent of global GDP with Europe as the hub of most major logistics service providers and the United States (US) as the largest consumer. It is not surprising to observe that countries that have invested in an efficient logistics infrastructure have been able to capture the benefits of trade extensively (Jacobs, 2012).

* Dr. Kathuria is currently Chief Executive and Director of the Indian Council for Research on International Economic Relations, New Delhi. This paper borrows from work he has previously done with the National Transport Development Policy Committee for the "India Transport Report: Moving India to 2032".

Deboshree Ghosh and Parnil Urdhwareshe are Research Assistants at the Indian Council for Research on International Economic Relations.

¹ Miglani, S., Le, H., Hsu, Y. "Logistics Services Sector: Possibilities for India-Taiwan Trade and Collaboration" in *Enhancing Trade and Cooperation between India and Taiwan*, Pal. P, Mukherjee, A., Hsu K. (eds.), ICRIER, 2013, Academic Foundation

What constitutes logistics has changed over time, reflecting the dynamic nature of production and distribution systems. With expansion of both domestic and international trade, there has been a transformation in logistics networks, which today encompass and integrate several functions along the supply chain. For example, distribution services that were delivered internally tend under certain conditions to be contracted to external service providers because it is more cost effective to do so (Box 1).

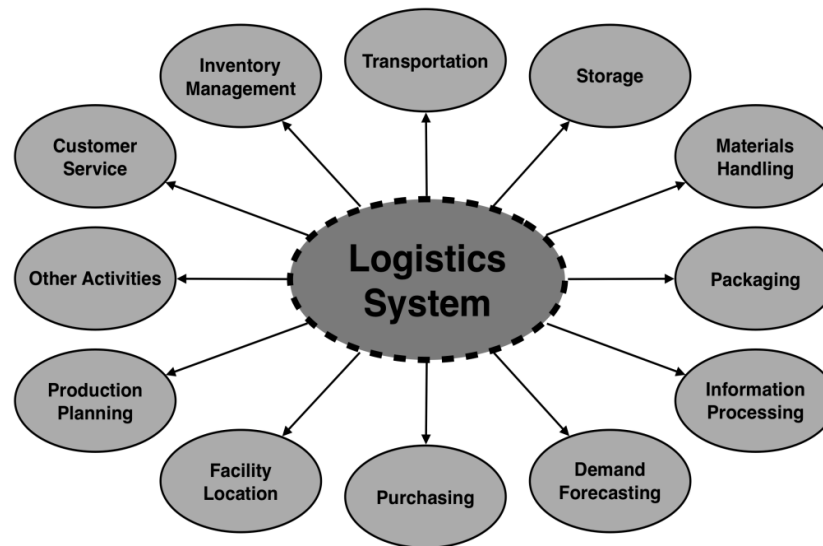
Modern logistics can be defined as a customer oriented operations management system, which includes the entire process of materials and products moving into, through, and out of the firm (Tseng et al, 2005). An efficient logistics network, while critically dependent on a strong transportation backbone, includes a range of other physical and non-physical activities such as inventory management, warehousing facilities, information processing, among others, to help the firm attain and preserve competitiveness (see Figure 1).

Box 1: Evolving logistics services

There may be five broad classifications of inter-connected (and often overlapping) layers of logistics services.

- **First Party Logistics (1PL)** – Cargo owners (whether shippers or consignees) handle the logistics processes themselves with distribution internalised by the firm.
- **Second Party Logistics (2PL)** - This includes carriers that are providing a transport service over a specific segment of a transport chain. Example, a maritime shipping company, a rail operator or a trucking company.
- **Third Party Logistics (3PL)** - This includes freight forwarders who offer comprehensive freight distribution services along transport chains. Example, warehousing, terminal operations and even forms of light manufacturing such as packaging and labelling.
- **Fourth Party Logistics (4PL)** – 4PL firms integrate the competencies and intellectual capital of 3PL providers, consulting firms and other technology providers in order to leverage their skills, strategies and reach. It has been described as *“the practice of consulting firms, as non-asset based managers, in overseeing the work of multiple 3PL providers in managing global supply chains”*. (Hosie et al, 2007). 4PL providers attempt to create supply chain solutions that no single 3PL firm can provide.
- **Fifth Party Logistics (5PL)** – Proposed evolutions to 4PL, 5PL providers do not have assets but also focus on technological improvements and management in order to exploit further efficiencies in the supply chain. It has been proposed elsewhere that *“any notion of 5PL will depend on providing a service capacity to develop and implement a networked, flexible supply chain capable of seamlessly integrating and meeting the demands of all partners, including manufacturers, suppliers, carriers, and vendors. Such productivity gains will probably result from breakout technologies capable of fully integrating and mobilising all the business aspects of SCM”* (Hosie et al, 2007).

Figure 1: Components of a Logistics System (GIZ)



A common and recurrent lament of Indian industry has been the high cost of doing business. There are many drivers of these costs, including infrastructure shortages such as electricity supply, roads and ports, among others. Private solutions to overcome such shortages significantly add to costs. When this is combined with the high transaction costs related to an inefficient regulatory framework, waste due to poor logistics infrastructure reaches 4.3 per cent of GDP (McKinsey, 2010). The high transaction costs of producing and trading has meant that India's participation in global and regional production networks remains minuscule, save for a few sectors such as pharmaceuticals and electronics, that rely less on ground transportation.² At the same time, an ICRIER study shows that, while the foreign content in domestic exports has been rising, it remains one of the lesser integrated emerging economies compared with Taiwan, Korea, Philippines, Vietnam, Malaysia, Thailand and China. Import content in India's exports has increased steadily from about 11 per cent to about 22 per cent in the time period 1995

² Athukorala, P. "How India Fits into Global Production Sharing: Experience, Prospects and Policy Options", Paper for the Tenth Annual India Policy Forum Workshop, India International Centre, New Delhi, 16-17 July, 2013.

to 2011. The rise in import content was relatively greater for merchandise exports than for services exports.³ Foreign content in final exports is a reasonable surrogate for capturing India's integration in global supply chains and the evidence in this regard so far is rather sobering. The fragmentation of production processes across countries means that higher exports can no longer be guaranteed with higher production since imports also need to increase commensurately. For fiscal year 2013-14, India missed the export target of \$325 billion it had set in the Foreign Trade Policy⁴, in part reflecting weak global demand and in part India's supply side bottlenecks.

It is now widely recognised that supply side problems have come home to roost. Both the manufacturing sector and India's involvement in global value chains suffer as a result. Besides inadequate logistics, regulatory services relating to trade and business facilitation such as customs clearance, domestic tax collection and processing add to the costs of doing business. Recently, the global CEOs of Vodafone and Honda rebuked the Indian system as being amongst the most difficult in the world to navigate, although their claim needs to be seen in the context of their own compulsions.⁵ A Manichaeian view of India is certainly not useful or constructive. India must, however, address public service weaknesses relating to urban transport, ports, highways, rail container movement, air cargo, to name a few. Encouragingly, a once reactive State is becoming more responsive to business.⁶ In some areas India is already working hard to lessen the

³ Dr. Deb Kusum Das et.al, 'Estimating Domestic Value Added and Foreign Content of India's Exports', ICRIER, sponsored by the Department of Economic Affairs, Ministry of Finance, GoI.

⁴ "New Foreign Trade Policy will be "different": Minister", PTI, Hindu Business Line, 10 September 2014 (Available at < <http://www.thehindubusinessline.com/economy/new-foreign-trade-policy-by-septend/article6397031.ece>>)

⁵ Vodafone India was involved in a very public dispute with the Indian Tax authorities over a demand for USD \$2.5Billion that was quashed by the Indian Supreme Court. A retrospective amendment to India's tax law in response the Court's decision is currently the subject of an international arbitration dispute between Vodafone and India. "Difficult to do business in India: Vodafone India", IANS, The Hindu, 12 September 2014 (Available at < <http://www.thehindu.com/business/Industry/difficult-to-do-business-in-india-vodafone-india/article6404025.ece>>); "Doing business in India difficult, Honda Motor chief says", PankajDoval, The Times of India, 13 September 2014 (Available at < <http://timesofindia.indiatimes.com/business/india-business/Doing-business-in-India-difficult-Honda-Motor-chief-says/articleshow/42385801.cms>>)

⁶ "Govt against high taxation; both pro-business, pro-poor: Jaitley", PTI, The Hindu, 16 August 2014 (Available at < <http://www.thehindu.com/business/govt-against-high-taxation-both-probusiness-propoor-jaitley/article6324256.ece>>); Mahajan, Anilesh, "BJP manifesto promises to facilitate business activities via IT", Business Today, 7 April 2014 (Available at <

constraints to business, for instance, through easing the regulatory environment for FDI, getting stalled projects moving in roads, rail, coal and gas. Corporate Federalism is being invoked to devolve power to the states and to persuade them to compete with each other to raise standards and private investment.

A comprehensive programme of reform to identify and correct institutional and regulatory bottlenecks to efficient cargo movement within India and from its borders is necessary for India to raise manufacturing activity from 15 per cent of GDP to 25 per cent thereby creating the basis for deeper engagement in production networks. The share of manufacturing in GDP stagnated at around 15 per cent since the 1980s and has not recovered since. According to India's National Manufacturing Policy (NMP 2011), the contribution of manufacturing to India's GDP is "much below potential". The target is to boost the share to 25 per cent, comparable to other Asian economies where it has consistently been 25 per cent or higher.⁷ This would need participation and cooperation of ministries, state and local governments, and also the private sector, and would require the hitherto absent political will for deep reform. Improving India's logistics network is, therefore, an important part of the medium and long term reform agenda. Technological upgradation and institutional overhaul of Indian logistics are necessary, although not sufficient conditions to ensure realisation of the goals set in NMP 2011. Labour market reforms, easing trade and business facilitation and introduction of the long awaited Goods and Services tax (GST) should also be pursued simultaneously to unlock the massive potential of manufacturing in India.

An efficient logistics network creates positive spillovers for the manufacturing sector since one of the major cost components for the firm is sourcing raw material. A good example of a well-developed and competitive logistics network is the United States. Since US is the world's largest consumer market, both the government as well as multinational firms have invested in the logistics infrastructure to ensure a smooth flow of their goods across the country. This has been possible in part due to the relatively low regulatory burden. Elsewhere, East Asia presents a compelling example of successful export-led manufacturing based, inter alia, on robust logistics infrastructure and connectivity.

Japan, South Korea and China are three of several countries that benefitted from the boost to manufacturing at different points in history. Labour costs are now rising in

<http://businesstoday.intoday.in/story/bjp-manifesto-promises-to-facilitate-business-activities-via-it/1/204983.html>>)

⁷ National Manufacturing Policy, 2011- The share of manufacturing in GDP for both China and Korea was 30 percent in 2010.

China, while Japanese firms are shifting production from China because of geopolitical reasons. The timing to leverage these external developments is just right for India.

India's immediate requirement is to enhance the manufacturing base for which investment in logistics infrastructure is necessary. Japan has recently assured massive support for India's growing need for infrastructure funding, including for an efficient and robust logistics network.⁸ On its part, India has assured an end to unnecessary bureaucratic red tape.⁹ This would help India to increase its share in global production networks and lock in the benefits of increased backward and forward linkages. Currently, India attracts a lot of market seeking FDI, but that needs to widen in scope to attract FDI of resource seeking variety since countries such as Taiwan view India as a favourable destination due to its cost advantage (Pal et al, 2013). This cost advantage has not yet translated into investments due to logistics inefficiencies. Procurement is expensive and hence the processes of value addition become costly, defeating the very purpose of locating the manufacturing base in India (Jacobs, 2012). Although India has a plethora of investment seeking schemes like the SEZs and the National Manufacturing and Investment Zones (NMIZs), their success is still mired in infrastructural and logistical bottlenecks.¹⁰

The logistics sector not only supports manufacturing but in recent times has also proved to be critical for online retail or the E-commerce industry. Online retailing has a strong nexus with the logistics sector since it thrives on timely delivery. India is considered a ripe market for online retail, but predictably suffers due to lack of efficient logistics support.¹¹ Development of logistics infrastructure in India is faced with several challenges such as high operating costs, low profit margins, skill shortages, technological obsolescence and a weak institutional and governance structure. This paper underscores the need for institutional reform, although as emphasised above, piecemeal and incremental changes will yield minor benefits. The rest of this paper is organised as follows. The next section describes the current scenario of Indian logistics industry and

⁸ ANI, "PM Modi, Abe pledge cooperation in infrastructure sector", Business Standard, 1 September 2014 (Available at < http://www.business-standard.com/article/news-ani/pm-modi-abe-pledge-cooperation-in-infrastructure-sector-114090101308_1.html>)

⁹ TNN, "Narendra Modi promises Japan Inc 'red carpet, not red tape'", The Times of India, 3 September 2014 (Available at < <http://timesofindia.indiatimes.com/india/Narendra-Modi-promises-Japan-Inc-red-carpet-not-red-tape/articleshow/41549823.cms>>)

¹⁰ Deloitte, "Logistics and Infrastructure: Exploring opportunities", 2010

¹¹ Nair, Radhika P., "Growing Online Retail Industry a Boon for Logistics Companies", The Economic Times, 21 February 2014 (Available at < http://articles.economictimes.indiatimes.com/2014-02-21/news/47559341_1_logistics-companies-third-party-logistics-firms-indian-logistics-industry>)

how it compares globally in terms of performance and sustainability. The third section focuses on problems arising due to an uncoordinated institutional framework and conclusions in the last section.

COMPARING INDIA'S LOGISTICS TO THE WORLD'S

A review of India's existing logistics infrastructure and its performance relative to other countries is instructive. Comparisons with countries such as China and the US reveal important structural and organisational differences, with both countries employing rail networks in significantly greater proportions than India. Rail accounts for between 45 and 48 per cent of freight transport in China and the US - markedly higher than in India, where the railways count for 36 per cent of freight transport. The story of rail's constantly decreasing share in Indian logistics has been well-documented¹² and important causal factors have been identified. These include high investment in highway networks, the subsidization of diesel fuel and the cross-subsidisation of passenger fares with freight charges. Such prioritisation and the resultant impacts on rail freight performance make delivery times uncertain – an issue of some concern where certainty of delivery schedules has been argued as equalling the importance of transportation costs (Mitra, 2008).

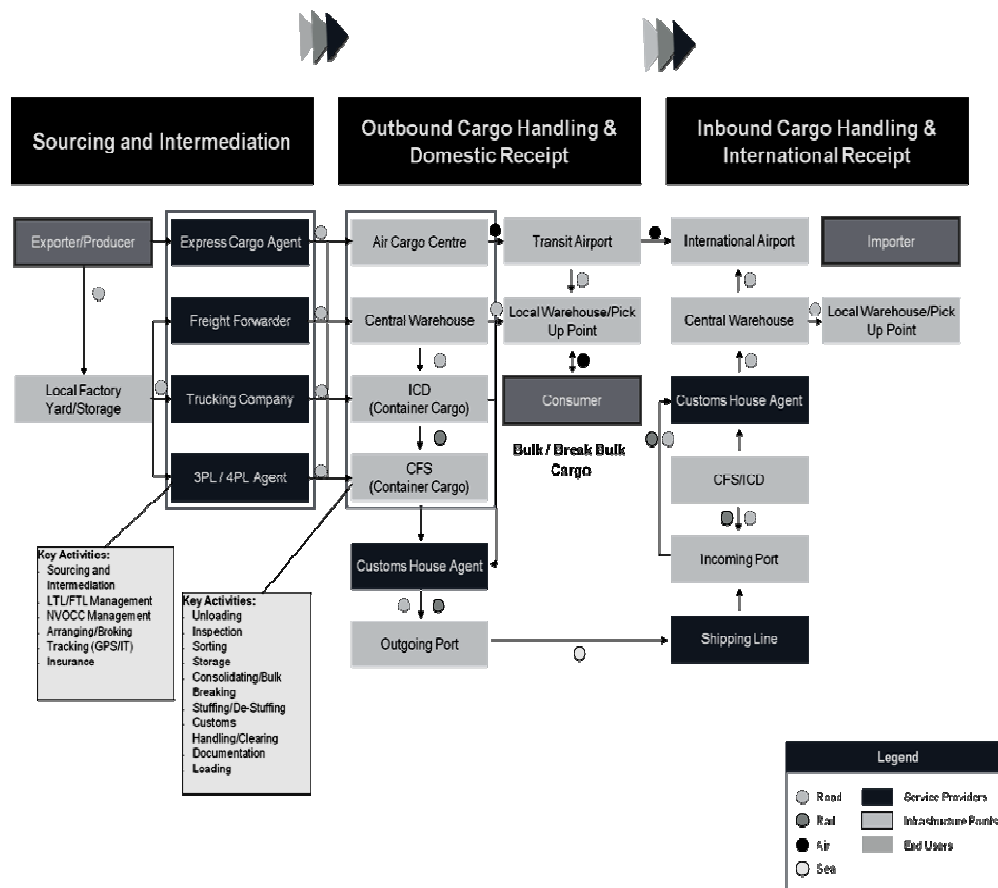
As a result, India's freight transport is far more dependent on roads, which service 57 per cent of freight transport, in sharp contrast with the US (37 per cent) and China (22 per cent coupled with substantial use of inland waterways). Moreover, despite this comparatively higher reliance on the road network, India's road performance compares unfavourably – India lags behind China across indicators such as average truck speeds and distances covered, as well as four-lane and national highway lengths (KPMG). India also ends up paying considerably for this skew in the form of increased energy and freight expenditure as well as both palpable and hidden environmental costs.

India's logistics market is further characterised by significant fragmentation and lack of organisation, with both factors adding to logistical complexity. The vast majority of the market has been determined as unorganised – comprising small enterprises (often with less than five trucks and affiliated to brokers or transport companies) and dispersed across multiple regions, services and sectors (KPMG; Mitra, 2008). The top 20 logistics companies in India together constitute a mere 2 per cent of the industry (KPMG). Such fragmentation is further aggravated by the nature of India's logistics chains, which are often spread across a variety of activities, transport modes and infrastructure points with

¹² Recognising this as an issue of some concern, the 2014 Railway Budget outlined initiatives such as the setting up of a PPP based private freight terminal network and increasing focus on Dedicated Freight Corridor project implementation.

little centralised monitoring or coordination (KPMG, see Figure 2).

Figure 2: India's Complex Logistics Chains (KPMG)



INDIA'S LOGISTICS PERFORMANCE

Cost estimates for logistics in India differ across studies, ranging between 12 and 15 per cent of GDP (firm decisions regarding the outsourcing of logistics functions and warehousing often affect the accounting of logistics costs¹³ - see Box 1). According to one measure, logistics costs in India as a percentage of GDP grew from 13.41 per cent in 1999-

¹³ National Transport Development Policy Committee, "Integrated Transport: Strategy and Logistics" in 'India Transport Report – Moving India to 2032', Deb, S. (ed.), Chapter 4, Routledge, 2014

2000 to 14.97 per cent¹⁴ in 2005-06, to 13 per cent in 2012¹⁵ (US \$241 Billion). Meanwhile, India's container trade has grown at approximately 9.5 per cent between 2004 and 2012 (see Figure 3). Nevertheless, the range of estimates of logistics costs still presents an uncomfortable picture of Indian logistics (see Figure 4).

Figure 3: India's Container Port Traffic (World Bank)

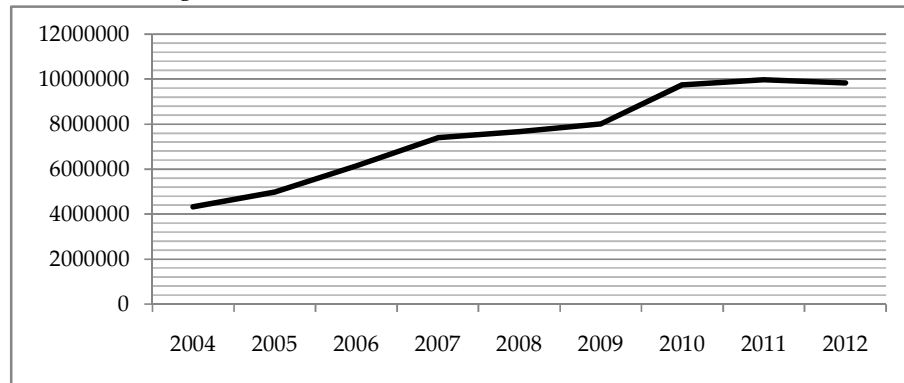
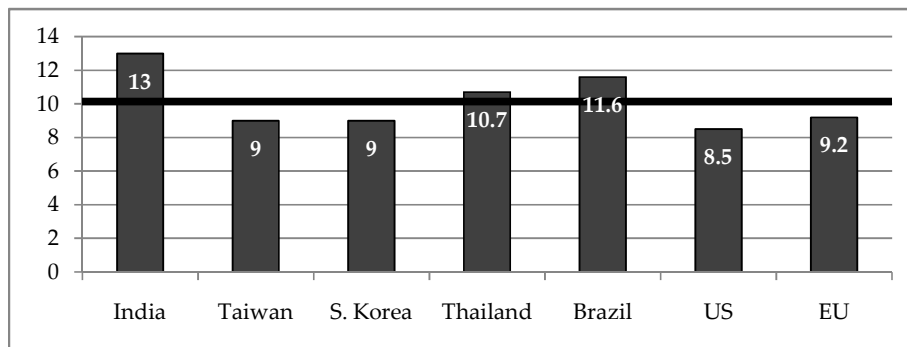


Figure 4: Logistics Costs as per cent of GDP



Logistics and transportation thus add significantly to costs. This results in freight comprising a large part of the cost of a product in India.

Logistics performance across countries is tracked on the World Bank's Logistics Performance Index (LPI). Perspective on India's comparative performance can also be

¹⁴ "Report of the Working Group on Logistics", Planning Commission Transport Division, 2007.

¹⁵ Global 3PL Market Size Estimates (Available at <http://www.3plogistics.com/3PLmarketGlobal.htm>)

obtained from UNCTAD's Liner Shipping Connectivity Index and the World Bank's Air Connectivity Index.¹⁶

The LPI is based on a worldwide survey of global freight forwarders and express carriers across 160 countries on six criteria – Customs, Infrastructure, International Shipments, Logistics competence, Tracking and Timeliness. The LPI report emphasises that central to a country's logistics performance is the reliability and predictability of its supply chains and the 'service delivery available to producers and exporters'. As of the 2014 Index, India ranks 54th, scoring, particularly, low on Customs (the efficiency of the clearing process by customs and other border control agencies) and Infrastructure (trade and transport infrastructure including roads, railroads, ports and IT) (see Table 1).

Table 1: India's Comparative performance across Indices

Country	Position in World Banks Logistics Performance Index, 2014	Position in UNCTAD's Linear Shipping Connectivity Index, 2014	Position in World Bank's Air Connectivity Index, 2011
Germany	1	8	3
China	28	1	46
Malaysia	25	5	83
Thailand	35	31	75
Brazil	65	35	125
India	54	30	88

One of the major factors contributing greatly to India's poor performance under the Customs metric is the delay caused by excessive red tape and opacity (NTDPC). Logistics movement in India must contend with numerous clearance forms and inspections across multiple agencies (See Table 1). The increase in cost that results from such delays reduces India's competitiveness domestically and globally. An illustrative example of the distortions caused by logistics hurdles is the high variance in agricultural prices and high agricultural wastage across the country (Mukherjee, et al, 2013).

¹⁶ Hoda, A., Rai, D. "Trade and Investment Barriers affecting International Production Networks in India.", Working Paper 281, Indian Council for Research on International Economic Relations, 2014.

Table 2: India's Comparative performance across Indices

	% of shipments meeting quality criteria	# of import-clearance agencies	# of export-clearance agencies	# of forms (imports)	# of forms (exports)	clearance time without physical inspection (days)	clearance time with physical inspection (days)	% of imports physically inspected	% of imports with multiple physical inspections
Germany	76	3	3	4	4	1	1	3	3
US	87	4	3	3	3	1	2	4	2
S. Korea	97	2	2	2	2	1	1	18	18
Brazil	82	4	4	4	5	5	8	8	3
Malaysia	97	2	2	4	4	1	2	2	1
China	76	3	3	5	4	2	3	7	2
S. Africa	83	2	2	4	4	1	4	9	2
India	67	3	3	4	4	1	2	22	8

Apart from the unbridled clearances, inspections and forms previously mentioned, a number of procedural and regulatory issues have been identified by the National Transport Development Policy Committee (NTDPC). Examples include a lack of dedicated airport facilities for important trade-regulating agencies that focus on food, drugs, chemicals, etc., the multiplicity of licences that cargo terminal operators are required to maintain as well as the difficulty of obtaining customs clearance. The lack of harmony among states over retail and consumption taxes reduces incentives for warehouse locations to be logistically optimised; these are, instead, relocated to the states with the lowest tax burdens. This results in regional concentration of warehousing and increases the tension between logistical efficiency (which require reductions in transportation costs) and minimising tax burdens, making it overly difficult to complement both. There also exist conflicts between regulatory agencies as well as between regulations themselves (See Box 2).

It is clear that a variety of issues need to be addressed in order to streamline Indian logistics. This is desirable not just in the abstract but because there are opportunities that India can be primed to exploit. Sophisticated logistics networks that enable efficient but complex supply chains reduce costs and thus make feasible the transport of other goods that previously would not be. As a result, improvements in logistics can both increase the demand for goods as well as create markets for other goods (NTDPC). Meanwhile, India has much to gain by keeping in mind the significant increases that the logistics requirements of other Asian countries are primed to witness. Asia-related trade lanes are projected to play a significant role over the next two decades in serving the busiest trade

routes in the world. Additionally, intra-Asia trade is expected to see significant increases in the amount and value of goods traded (NTDPC).

While the list of items that can be addressed to streamline the logistics industry is formidable (streamline border crossing procedures, upgrade infrastructure, address

Box 2: Conflict between regulations

“The rules related to the storage and handling of pharmaceutical products are governed by Schedule M of the Central Drugs and Cosmetics Act of 1945 (with amendments in 2010), while the norms that define compliance with these regulations are designed by state-level food and drug administrations. In most states, such norms insist on physical separation of inventory, not by product, but by client (i.e., by pharmaceutical producer or distributor), with separate security and personnel for every client. Essentially, this entails the setting up of several separate smaller warehouses within a larger warehouse. In turn, this results in some logically perverse outcomes: the same class of pharmaceuticals requiring the same temperature controls but manufactured by different firms must nevertheless be maintained in distinct storage areas; product specific skills and management is discouraged and separate personnel must be maintained for the same class of products preventing scale economies from developing.”

- India Transport Report: Moving India to 2032

transportation skews, coordination across licenses, taxes and agencies, etc.) and a large variety of issues need to be fixed for an optimal logistics network to emerge, steps that enable the creation of a well-coordinated and integrated logistics network should be viewed with priority. Key to this is the strengthening and harmonisation of institutions and regulations within the logistics sector.

INSTITUTIONAL AND REGULATORY GAPS

India’s logistics system clearly does not meet the country’s current needs both from the point of view of the physical network as well as efficiency. Performance outcomes highlighted above reflect the inefficiencies while inadequacies in physical infrastructure are palpable in India’s choked ports, ill equipped inland container depots, overcrowded railways and urban roads and congested airports. The deficiencies manifest themselves in higher prices, longer journey times, reduced reliability, lower availability of quality services, restrictions on the types of cargo that may be serviced, higher risks of damage or pilferage and more complex administrative procedures.¹⁷

One of the key weaknesses of India’s logistics architecture is its fragmentation between modes and across levels of government. For example, each mode of transport

¹⁷ NTDPC 2014, Chapter 4

has a separate Ministry with policy and regulatory functions largely carried out in silos in disregard to the essentially interconnected and interrelated nature of the sector. This results in several adverse consequences, for instance, a non-optimal intermodal distribution of freight traffic. This has estimated to have cost the Indian economy Rs. 385 billion in the year 2007, constituting 16 per cent of the total transport cost. It has also affected energy efficiency of transport: a study by the Asian Institute of Transport Development (AITD) concluded that rail consumes 75-90 per cent less energy for carrying freight traffic and 5-21 per cent less energy for passenger traffic compared to road.¹⁸ Rail transport scores over road in respect of financial, environmental and social costs by a huge margin by virtue of its scale and safety.¹⁹ The diversion of freight and passenger traffic to roads thus produces many undesirable consequences - revenue loss for Indian Railways, a larger freight cost to GDP ratio and higher environmental cost per route kilometre.

Ergo, integrating India's institutional and regulatory capacity to achieve minimum capabilities is the urgent need of the hour. The reason is that integrated national transport policies transcend or augment individual modal interests and achieve superior planning and coordination. A unitary Transport Ministry is a vital step towards good regulatory design along with independent regulatory institutions in each transport sector that includes a separate dispute settlement arrangement. In Australia, Brazil, Canada, Germany, Japan, Russia and the United States, among others, unitary transport ministries at the level of the central government have been created whose role is to develop and administer policies to protect and promote public interests across the transport sector. There is no doubt that all transport sectors will require coordination even in the short term. Policy on a common platform encompassing the entire transport network spanning different modes and addressing critical issues such as pricing, timely deliveries, and cost effective service needs to be positioned.

Modern logistics has redrawn the transport map insofar as the latter is merely a matter of distribution while effective logistics includes characteristics relating to time, cost and efficiency (See Figure 1 above). According to the NTDPC, logistics can make a product better when measured by quality or cost.²⁰ Logistics services, however, are primarily a private sector undertaking, the government's role essentially relating to policy and providing infrastructure, given the endemic market failures prevalent in provision of physical infrastructure. Yet it is not clear that where the market has failed, government through its several instruments will be able to improve the outcomes. Thus reform will have to be carefully calibrated based on available evidence.

¹⁸ Asian Institute of Transport Development, 2002

¹⁹ *Ibid*

²⁰ NTDPC, Chapter 4

Regulation is an essential part of the foundation for collaboration between public and private sectors in delivering and managing transport infrastructure and logistics services. Government may choose to provide this infrastructure (ports, railways, roads etc) of its own accord, in partnership with the private sector, or merely by enabling private investment. Growing fiscal deficits and lack of fiscal consolidation, however, restrict the ability of the state to fund capital-intensive infrastructure projects. As a result, public investment will surely coexist with private in all transport sectors, including as public-private partnerships (PPP). The state, therefore, will function as service provider, regulator, contractor and policy maker to obviate, *inter alia*, conflicts of interest. Private sector participation means creating independent and effective regulatory mechanisms to ensure, on the one hand, fair returns to private investment and, on the other hand, protection of consumer interest, including safety and affordability.

One of the main goals of regulation is to induce firms to produce the service at the lowest possible costs to align prices with costs so that firms do not make super normal profits (which they could without appropriate regulation). Given the growing use of PPP contracts in transport, an increasing role for the regulator will also be to ensure compliance with the PPP contracts. The challenge is considerable not only because of the complexity and that it requires a learning process, but also because of the lack of a regulatory tradition and track record, scarcity of expertise, and weak formal and informal norms protecting private rights. This problem is everywhere since private participation in transport infrastructure is still an evolving phenomenon. In addition, we know that the availability and quality of infrastructure services are often highly politicized. Independent regulation possesses the advantage of potentially limiting political convenience.

Designing good regulatory institutions is, however, a non-trivial task. Attributes such as independence, transparency, accountability, expertise, legitimacy and credibility are the foundation on which the new regulatory institutions should be created within the scope of local legal tradition. No doubt, this is a challenge, but one that will be an important causal factor in determining the future quality of our transport and logistics services. Effective regulatory institutions must be designed to provide credible commitments for investors who incur large sunk costs; they should protect consumers from excessive prices and poor-quality service, and devise a strategy for achieving universal service goals. Besides, safety and social regulations to reduce health and environmental impacts are now integral to good regulatory institutions. By its very nature, setting and enforcing standards is an integrated activity, involving multiple interventions. These interventions need to be combined and implemented in an integrated manner to derive the maximum benefits from each intervention.

Each transport sector in India is beset with numerous legislations. It is, therefore, imperative to simplify the legal structure. This has begun to happen in sectors such as Ports and Civil Aviation but clearly a lot more needs to be done. Existing sector-specific enactments need to be unified into a single statute. This will simplify procedures and make compliance easier. Certain sections of the existing acts which are anachronistic would also have to be deleted and even some acts repealed. Unification of the legislations must be supplemented by the setting up of a statutory regulatory agency for each transport sector. The primary regulatory need for Railways is independent price regulation, to reduce, for instance, the persistent cross-subsidization between freight and passenger services and begin to restore shift freight traffic toward railways. Road transport includes a number of regulatory challenges including managing PPPs in road construction; increasing safety and reducing environmental impact of road-based transport; ensuring competition in road transport services; and potentially using regulation among other tools to ensure widespread access to road transport.

The PPP option is on the agenda for all transport infrastructures, but particularly for roads in which technology is more straightforward and project structures can be replicated as “model documents.” Expert regulation is particularly important for resolving disputes after the concession. In addition, functions such as tariff setting, regulation of service quality, assessment of concessionaire claims, collection and dissemination of sector information could be performed by an independent body with expert staff tasked with making technical decisions. The primary regulatory priority for Indian ports is to unify national and state regulatory structures. The existing regulatory framework, comprising many regulators and multiple legislations is complex and needs simplification to enhance integration and improved coordination. India needs legislation which is, *inter alia*, compatible with the functioning of a market oriented economy and the global character of the maritime transport. A new set of incentives needs to be put in place as part of regulatory restructuring. The existing Ministry-centric port management system is a complex bureaucratic process and distorts incentives.

For Civil Aviation, a central regulatory agency should be created replacing the existing DGCA and AERA (this could be called the “Civil Aviation Authority” (CAA)). Similar to other infrastructure sectors, multiple regulations and overlapping jurisdictions between institutions cause confusion and delays. The CAA would consolidate the existing fragmented regulatory functions and combine economic, technical, safety, environmental concerns and consumer protection regulation. A dispute settlement body separate from the CAA will serve to fast track disputes in the sector. The relationship between the sector-specific dispute settlement authority and the CCI will evolve over time and should be guided by the same principles that underpin this institutional relationship in other sectors.

Given the socio-economic-political context, robust institutions for regulatory governance in transport will, no doubt, take time, first to create and then for these to mature and gain legitimacy in India. Merely delegating regulatory powers, including enforcement, may not be enough to minimize regulatory risk. But good decisions are more likely if regulatory design is sound. Badly designed regulatory and legal institutions can become a source of performance problems. For example, the improper design of regulatory and ownership structures are believed to be major causes of poor performance in sectors such as gas, electricity and transportation leading to significant economic costs to the order of 1 per cent of GDP. The guiding principles of good regulatory institutions include independence, transparency, accountability, expertise, credibility and legitimacy. Although independent regulation in India is relatively new, there is a wealth of evidence from the telecom and power sectors that can help design and implement a performance enhancing regulatory mechanism for transport that emphasizes local needs and the local context.

Riding on good regulation and infrastructure services, the private sector can potentially realize the objective of reducing transportation costs that have been inordinately high due to the reasons described above. Already, logistics needs are being outsourced to so-called third-party logistics (3PL) providers who specialize in inventory management, packaging and labelling, product return and offer an end-to-end service. Manufacturing firms often outsource their logistics needs to dedicated 3PL providers to advantage from reduced costs (See Box 1 on evolution of logistics services). 3PL is the extent to which specialised outsourcing has taken root in India, but will, no doubt, evolve to 4PL and beyond as firms compete to reduce costs and benefit from increased specialisation and modern technologies such as Global Positioning Systems (GPS) and Radiofrequency Identification (RFID).²¹ The suite of services in the integrated end to end supply chain includes customs facilitation, testing, inspection, reverse logistics and route optimization, among others.

To enable transformation in the logistics sector, so necessary to achieve India's manufacturing goals, the government must begin by restructuring transport governance and adopt a strategy informed by long term drivers of transport demand. A new central body, the Central Logistics Development Council as recommended by the NTDPDC comprising of industry members, ministry representatives, and financial and academic institutions should be set up with the mandate of promoting the logistics industry. The body will collect information, advice on required infrastructure and changes to policy

²¹ NTDPDC; 4PL firms integrate the competencies and intellectual capital of 3PL providers, consulting firms and other technology providers in order to leverage their skills, strategies and reach. 5PL providers do not have assets but also focus on technological improvements and management in order to exploit further efficiencies in the supply chain (see Box 1).

and regulation, propose standards on equipment, technology and manpower.²² For transport infrastructure, the regulatory agencies proposed should be freed from political pressure to the extent possible, besides getting functional autonomy in day-to-day activities. The Ministry should continue to be responsible for broad policy guidelines and directives. The agency for each mode will need to acquire legitimacy which in practice, means following a transparent consultative process of decision making with opportunities for judicial review. Open house discussions and posting consultation documents on the regulators website are part of this process. This enables the regulator to collect evidence and also take account of the views of those who have an interest in the outcome. Consultation is an essential part of regulatory accountability – and it has now become intrinsic to the regulatory process. Judicial review of regulatory decisions is a reasonable safeguard to regulatory authority.

CONCLUSIONS

A comprehensive programme of reform to identify and correct institutional and regulatory bottlenecks to efficient cargo movement within India and from its borders is necessary for India to raise manufacturing activity from 15 per cent of GDP to the targeted 25 per cent, thereby creating the basis for deeper engagement in production networks. The share of manufacturing in GDP stagnated at around 15 per cent since the 1980s and has not recovered since. Improving India's logistic network is, therefore, an important part of the medium and long term reform agenda. This would need participation and cooperation of ministries, state and local governments, and also the private sector, and would require political will for deep institutional and regulatory reform. An efficient logistics network creates positive spillovers for the manufacturing sector. Not only that, we now know the logistics sector has also proved to be critical for online retail activity.

Development of logistics infrastructure in India is faced with several challenges such as high operating costs, low profit margins, skill shortages, technological obsolescence and a weak institutional and governance structure. This paper has highlighted the need for institutional and regulatory reform, although as emphasised above, piecemeal and incremental changes will yield minor benefits. It is time we embarked on an integrated strategy towards transport and logistics creating depoliticized and independent and unified regulatory institutions. While we can learn from other countries that have gone down this route, its best to create these within the ambit of the local context.

²² NTDPC Ibid

REFERENCES

1. Arvis, J., Saslavsky, D., Ojala, L., Shepherd, B., Busch, C., Raj, A. *"Connecting to Compete 2014 – Trade Logistics in the Global Economy – The Logistics Performance Index and its Indicators"*, The World Bank, 2014.
2. Asian Institute of Transport Development, *"Environmental and Social Sustainability of Transport: Comparative Study of Rail and Road"*, Asian Institute of Transport Development, New Delhi, 2002.
3. Boston Consulting Group. *"The Shifting Economics of Global Manufacturing An Analysis of the Changing Cost Competitiveness of An Analysis of the Changing Cost Competitiveness of the World's Top 25 Export Economies"*, Boston Consulting Group, 2009.
4. Button, K. *"Infrastructure investment, endogenous growth and economic convergence"*, The annals of regional science, 32(1), 145-162, 1998
5. Cai, Z., & Zhou, J. *"Logistics and Regional Economic Growth-Evidence from the Space Econometric Panel Data from China"*, Economic Management Journal, 1(1) 2012.
6. Das, D., Sengupta, S., Chandradas, P. *"Estimating Domestic Value Added and Foreign Content of India's Exports"*, ICRIER, BN Goldar (Research Guide), sponsored by the Department of Economic Affairs, Ministry of Finance, GoI.
7. Deloitte, *"Logistics and Infrastructure: Exploring opportunities"*, 2010
8. Department of Industrial Policy & Promotion, *"National Manufacturing Policy 2011"*
9. Hoda, A., Rai, D. *"Trade and Investment Barriers affecting International Production Networks in India."*, Working Paper 281, Indian Council for Research on International Economic Relations, 2014.
10. Hosie, P., Eganm V., Li, Y. *"Drivers of Fifth Party Logistics (5pl) Service Providers for Supply Chain Management"*, Curtin University of Technology School of Management Working Paper Series, 2007.
11. Jacobs, W. *"The Role of Port Infrastructure and Logistics in Global Networks"*, International Institute of Social Studies, 2012.
12. KPMG. *"Logistics in India"*, KPMG, 2011
13. McKinsey & Company, *"Transforming the Nation's Logistics Infrastructure"*, McKinsey, 2010

14. Mitra, S. *"Logistics industry: global and Indian perspectives"*, IIM Calcutta Research Papers, 2008.
15. National Transport Development Policy Committee (NTDPC), *"Integrated Transport: Strategy and Logistics"* in 'India Transport Report – Moving India to 2032', National Transport Development Policy Committee, Deb, S. (ed.), Routledge, 2014.
16. Pal, P., Mukherjee, A., Hsu, K. *"Enhancing Trade, Investment and Cooperation between India and Taiwan"*, Academic Foundation New Delhi, 2013
17. Planning Commission - *"Report of the Working Group on Logistics"*, Planning Commission Transport Division, 2007.
18. Rietveld, P., *"Infrastructure and spatial economic development"*, The Annals of Regional Science, 29(2), 117-119, 1994.
19. Tseng, Y., Yue, W., Taylor, M. *"The Role of Transportation in Logistics Chain"*, Proceedings of the Eastern Asia Society for Transportation Studies, Vol. 5, pp. 1657 - 1672, 2005.
20. Wenjie, Z. *"Regional Economic Development and Modern Logistics"*, China Business and Market, 1, 12-14, 2002.
21. World Economic Forum, Bain & Co., World Bank, *"Enabling Trade Valuing Growth Opportunities"*, World Economic Forum, Geneva, 2013.
22. Yang Z., Zhang, L., & Cheng, X., *"Cointegration Test for Regional Logistics and Regional Economic Growth [J]"*, Journal of Beijing Jiaotong University (Social Sciences Edition), 1, 008, 2012.

Logistics Services in the WTO and Bilateral Agreements: The Case of India

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INTRODUCTION

Logistics services sector includes services involved in planning, implementation and controlling the flow of goods, services, information, and funds between the 'point of origin' and the 'point of destination' to meet customer requirements in an efficient and effective manner. It encompasses various forms of freight transportation (such as road transport, rail transport, air transport, inland waterways and maritime transport services); consolidation of cargo; and other services such as storage and warehousing, courier and express delivery, border clearances and payments (Gunasekaran and Choy, 2012; Meidute et al., 2012). According to Tseng et al. (2005) logistics services comprise of both physical activities (e.g. transport, storage) and non-physical activities (e.g. supply chain design, selection of contractors, freightage negotiations, information communication technology enabled tracking and tracing, and etc.).

The logistics sector has witnessed significant growth with globalisation, liberalisation, technological development and emergence of new business models. With increased use of information technology (IT) and new business models, the sector has become more closely integrated with other services sectors such as software services, telecommunication and e-retailing. Increase in global trade has created the need for faster end-to-end reliable delivery models. This has led to the growth of multinational logistics services providers such as the Deutsche Post DHL and Federal Express (FedEx). Along with them there are companies which operate in specific countries or regions and there are a large number of local mid-sized and smaller companies in countries such as India.

The global logistics market grew from \$10 billion in 1992 to \$4 trillion in 2013 (Evotech, 2014; Mitra, 2008). In 2013, the logistics sector represented 10 per cent of global gross domestic product (GDP) (Evotech, 2014). On an average, logistics costs account for 7–8 per cent of the final cost of a finished product in developed countries, but are much higher (usually more than 10 per cent) in developing countries. Though most of the large logistics players are headquartered in Europe, the US is the world's largest logistics market, capturing one-third of the global logistics market. Among developing countries, China and India are attractive markets for global logistics players. The logistics services

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sector in these two countries are growing at a fast pace but the markets are still unsaturated; there is scope for this sector to continue to have a high growth rate in these markets.

With the growth in logistics services and emergence of large multinational companies providing such services, logistics sector has now become a key component of trade agreements (multilateral, regional and bilateral), involving both developed and developing countries. In recent years, this sector has witnessed significant liberalisation under bilateral and regional trade agreements, specially the trade agreements involving the United States (US), the European Union (EU) (Horn et. al. 2009) and China (Wang, 2011), among others. Efforts have been made by different regional groups to implement measures for transport facilitation and there are several bilateral agreements to liberalise the air and maritime transport sectors. For example, the Association of Southeast Asian Nations (ASEAN) Economic Community Blueprint proposes to integrate the logistics market by 2015. The EU, through different directives, has established a common market which depends on seamless transport and logistics network. As of October 2012, over 400 bilateral open skies agreements have been signed by 145 countries including India (ICAO, 2013). Of these, over 100 of agreements were signed by the US; and the US has one of the most liberal agreements with developing countries such as India and China. Many countries/regions are also engaged in liberalising maritime transport through bilateral maritime agreements such as EU-Chile Association Agreement and the EU-China Agreement on Maritime Transport. Trade facilitation has become one of the important provisions of bilateral free trade agreements (FTAs)/preferential trade agreements (PTAs). About 95 per cent of regional and bilateral FTAs contain trade facilitation component (Neufeld, 2014). Although the Doha Round of World Trade Organization (WTO) negotiations have slowed down, WTO member countries - came up with an Agreement on Trade Facilitation during the Bali Ministerial in December 2013.¹ The main aim of this agreement is to facilitate a seamless logistics network.

As a founder member of the WTO, India is actively engaged in the WTO negotiations. The country has signed a number of trade agreements which include services (including logistics services or some components of it) and is engaged in several bilateral trade negotiations such as the India-EU Broad-based Trade and Investment Agreement and the Regional Comprehensive Economic Partnership (RCEP) Agreement in which logistics services will be a key component of the agreement. Till date, India has a defensive position in liberalising logistics services sector under the WTO and its bilateral trade agreements. It has not even offered to bind the existing level of unilateral

¹ http://www.wto.org/english/tratop_e/tradfa_e/tradfa_e.htm (last accessed on August 18th 2014)

liberalisation in its trade agreements. Given that, India has unilaterally liberalised the logistics services sector and is a proponent of services sector liberalisation in the WTO and in its trade agreements. This paper tries to examine India's existing negotiating position in logistics services in the WTO and bilateral agreements; and suggests way forward.

The next section examines the coverage of logistics services in the WTO and bilateral trade agreements. Section 2 provides a brief overview of the logistics sector in India and its trade and investment in logistics. Section 3 examines the liberalisation of logistics services in the WTO with a focus on India, and Section 4 focuses on bilateral trade agreements. Section 5 presents the way forward.

COVERAGE OF THE LOGISTICS SECTOR IN THE WTO AND BILATERAL TRADE AGREEMENTS

In the WTO, negotiations on trade in services are under the General Agreement on Trade in Services (GATS)². When the WTO was formed in 1995 during the Uruguay Round of negotiations, logistics services was a new and evolving sector. The WTO member countries used a services sector classification known as W/120 (MTN.GNS/W/120, 10 July 1991) based on the United Nations Central Product Classification (UNCPC) for the purpose of multilateral negotiations on services. The W/120 does not have an exclusive classification for the logistics sector. It provides classification for different components of logistics services such as transport services and postal and courier services. It further divides transport services into different sub-sectors such as maritime, air, rail and road transport services and services auxiliary to all modes of transport and other transport services. Due to the lack of a comprehensive classification, a number of WTO members used their own classification to schedule commitments – either by linking to UNCPC or to its revised versions or by clarifying their own definitions. The lack of a comprehensive coverage of the sector made it difficult to have complete liberalisation of all services which are required to establish an efficient logistics network. Moreover, as the services sector evolved, the UNCPC has become outdated. At present, the UNCPC Version 2 is in place which has a wider coverage of logistics services. In the second round of the WTO negotiations, i.e., the Doha Round,

² The GATS was the first agreement that tried to define trade in services through four modes. These include (a) from the territory of one Member into the territory of any other Member (Mode 1); (b) in the territory of one Member to the service consumer of any other Member (Mode 2); (c) by a service supplier of one Member, through commercial presence in the territory of any other Member (Mode 3) and (d) by a service supplier of one Member, through presence of natural persons of a Member in the territory of any other Member (Mode 4).

countries such as Australia, Hong Kong China, Mauritius, New Zealand and Switzerland and regions such as the EU, which are keen to liberalise logistics services, raised concerns that lack of classification is leading to lower commitments. They also provided an alternative classification of logistics services based on UNCPC using a “checklist” approach. This approach divides logistics-related services into three groups: Group I consists of core freight logistics services; Group II consists of freight transport services, and Group III consists of related logistics services (for details, see Annex 1). This classification is also used in many bilateral trade agreements such as agreements involving the EU.

The GATS follow a positive list approach³ for scheduling commitments while a number of bilateral agreements, especially the ones involving the US, follow a negative list approach. Since in negative list⁴ approach countries have to specify the restrictions, the limitations on logistics services are more clearly defined. Although the progress of the WTO negotiations has been very slow, significant efforts have been made at the WTO through Agreement on Trade Facilitation and under bilateral and regional trade agreements to streamline the movement of goods and establish an efficient supply chain. This is expected to lead to liberalisation of logistics services.

LOGISTICS SECTOR IN INDIA

After the liberalisation of the economy in the 1990s, the logistics services sector has been one of the fastest growing sectors in India. The Indian logistics market is valued at \$100 billion; and is projected to reach \$385 billion by 2015.⁵ This sector employs around 45 million people.⁶ Logistics cost by value accounts for around 13.5 per cent of the GDP of India, compared to 8.5 per cent in the US, 10 per cent in Europe, 11 per cent in Japan, 18 per cent in China and 16 per cent in Thailand (Deloitte and ICC, 2012). Due to high growth and its future growth potential, Indian logistics sector is viewed as one of the most attractive sectors for investment by domestic and foreign companies.

Transport constitutes the largest component of logistics. Road transport is the dominant mode of transport which accounts for 61 per cent of freight movement in India, compared to 37 per cent in the US and 22 per cent in China (Deloitte and ICC, 2012). Rail transport is considered a relatively cheaper mode of transport and is used mainly for transporting bulk materials over long distances; and accounts for 30 per cent of freight

³ Under this approach, countries decide the sector/sub-sectors in which they will undertake commitments and then list the restrictions.

⁴ In a negative list approach, all sectors/sub-sectors are open except those in the negative list.

⁵ <http://www.newindianexpress.com/cities/chennai/Indian-Logistics-Sector-to-be-Worth-385bn-by-2015/2014/03/08/article2097037.ece> (last accessed on August 4, 2014)

⁶ Deloitte and ICC (2012)

movement. The remaining share of freight transport is handled by maritime transport (coastal and inland) and by air carriers. For international trade, shipping is the dominant mode of freight transport, accounting for about 90 per cent by volume and 70 per cent by value followed by air transport (KPMG and CII, 2013).

The Indian logistics sector is highly fragmented with a number of mid-sized and small companies and a few large pan-Indian players. The larger companies account for bulk of the revenue of this sector. With liberalisation of the economy, a number of Indian business houses and foreign companies [such as FedEx (US), TNT Express (Netherlands), DHL (Germany), United Parcel Services or UPS (US); TMT Logistics Pvt. Ltd. (US); SDV International Logistics Limited (France)] have invested in this sector; and the sector is undergoing transformation and modernisation. Integration with the global economy has increased the demand for 3PL and 4PL logistics services.

The Indian government encourages private investment in logistics and has liberalised the sector in a phased manner. Today, 100 per cent foreign direct investment (FDI) is allowed in most sub-segments, except a few sectors such as air transportation where there are partial FDI restrictions. Between April 2000 and May 2014, cumulative FDI inflows in transport sector (including air transport, sea transport, railways and ports) were \$3.9 billion, which accounted for around 1.8 per cent of total cumulative FDI inflows (DIPP, 2014). The government is keen to develop dedicated railway freight corridors, logistics hubs and parks through foreign investment and has recently announced liberalisation of FDI in areas such as rail corridor projects, freight terminals, suburban corridors, dedicated freight lines and high-speed train systems. Thus, there is scope for further investments in logistics sector of India. A number of Indian companies such as Gati Limited, First Flight, Transport Corporation of India (TCI) Global, Essar Shipping Limited and Global Express Services are investing abroad or have established offices in foreign countries. Between April 2013 and January 2014, Indian outward investments in transport, storage and communication services were valued at \$8.9 billion and this accounted for 30.4 per cent of total outward investments of India (CARE, 2014).

In the past two decades, India's international trade has increased many-folds, creating a huge demand for logistics infrastructure. However, there is no official estimate of trade in logistics services. The WTO provides data for India's trade in transportation services which shows that India was ranked 10th largest exporter and 4th largest importer of transportation services in 2011 (WTO, 2013). However, India has a large negative trade balance in this sector which has increased substantially since 2004 (see Table 1).

It is also important to note that the cost of doing business in India is very high. In 2013, India ranked 132nd among 186 countries in the Ease of Doing Business Index of the

World Bank compared to 91st rank of China (World Bank, 2013). In the Logistics Performance Index of the World Bank, India ranked 54th in 2014, among 160 countries, which is much below China (28th rank) and Thailand (35th rank) (World Bank, 2014). The Indian manufacturing sector is fast losing its global competitiveness due to poor infrastructure and logistics facilities; and India's share in the global merchandise trade is only around 2 per cent. The logistics sector needs urgent government's attention to enhance its competitiveness and exports.

Table 1: Trends of India's Trade in Transportation Services (\$Billions)

Year	Exports	Imports	Total Trade	Trade Balance	Per cent share in World Exports	Per cent share in World Imports	Per cent share in World Trade
1980	0.4	1.8	2.2	-1.8	0.3	1.1	0.7
1990	1.0	3.4	4.4	-3.4	0.4	1.3	0.9
2000	2.0	8.7	10.7	-8.7	0.6	2.1	1.4
2001	2.1	8.5	10.5	-8.5	0.6	2.1	1.4
2002	2.5	8.5	11.0	-8.5	0.7	2.0	1.4
2003	3.0	9.3	12.3	-9.3	0.8	1.9	1.4
2004	4.4	13.2	17.6	-13.2	0.9	2.2	1.6
2005	5.8	20.7	26.4	-20.7	1.0	3.0	2.1
2006	7.6	24.9	32.4	-24.9	1.2	3.3	2.3
2007	9.0	30.8	39.9	-30.8	1.2	3.4	2.4
2008	11.6	42.7	54.2	-42.7	1.3	4.1	2.8
2009	11.0	35.5	46.4	-35.5	1.6	4.3	3.1
2010	13.2	46.5	59.7	-46.5	1.6	4.8	3.4
2011	17.7	57.9	75.5	-57.9	2.0	5.2	3.8
2012	17.5	60.4	77.9	-60.4	2.0	5.3	3.8
2013	16.9	57.1	74.0	-57.1	1.9	4.9	3.6

Source: Compiled from WTO Services Database, last accessed on August 12, 2014).

LOGISTICS SERVICES AND THE WTO

This section discusses the commitments and offers of some key WTO member countries and India.

Logistics Services: Uruguay Round

As mentioned earlier there was no comprehensive coverage of logistics sector in the Uruguay Round and the negotiations focused on transport and auxiliary services. In that Round, the extent of liberalisation in the transport and auxiliary services was very limited (both in terms of sectors covered and modes of delivery) and only a few countries had undertaken commitments. Many countries such as Singapore, which are major logistics hubs, had not undertaken any commitments in transport and auxiliary services. Countries such as New Zealand only undertook commitments in rail and road transport services.

By sub-sectors, 35 countries undertook commitments in air transport, 18 in rail transport, 32 in road transport, 22 in auxiliary services, 5 in postal, and 34 countries made commitments in courier services.⁷ The negotiations on maritime transport were suspended due to lack of consensus among major players, namely, the US and the EU. Railway transportation has been public monopoly in many countries and is in the process of being liberalised. Hence, only a few countries made commitments. Due to the public goods' argument and presence of public monopoly, postal services also witnessed limited liberalisation.

Among the different modes of supply, Mode 2 received the maximum number of commitments. By sub-sectors, there are some noticeable trends. For example, in air transport, out of the 35 WTO members which undertook commitments, around 31 members committed in aircraft repair and maintenance services, 23 in computer reservation systems, and 20 in selling and marketing of air transport services. In road transport, in Mode 1, many important WTO member countries, including Australia, Canada, Japan and South Africa, and the EU, have not made any commitments; whereas other countries including Brazil, Finland, Mexico, Norway, Sweden and Turkey undertook partial commitments with market access restrictions such as economic needs test⁸, citizenship requirement, incorporation requirement, establishment requirements and equity limitations. Under services auxiliary to all modes of transport, the

⁷ Extracted from WTO Database on Services - I-TIP, available at <http://i-tip.wto.org/services/ComparativeReports.aspx> (last accessed on August 4, 2014).

⁸ It is referred to as a test using economic criteria to decide whether the entry into the market of a foreign firm or service provider is warranted or not.

commitments were largely made by the developed countries (such as the US, the EU, Canada, Japan etc.). Some developing countries (such as Mexico and Brazil) also undertook commitments in selected sub-sectors. In Mode 4⁹, there were no sector specific commitments.

A number of countries undertook most favoured nations (MFN) exemptions which allow them to give discriminatory treatment for bilateral trading partners. For example, in road transport, countries such as Czech Republic, Finland, Hungary, Norway, South Africa and Switzerland undertook MFN exemption for both passenger and freight transportation services, while others such as the US did it for freight transportation only for Mexico and Canada. Austria did not undertake commitment in passenger and freight transportation but undertook MFN exemption to provide preferential treatment for passenger and freight transportation with countries it has bilateral agreements on road transport. Most of these exemptions involve granting various partners preferential treatment on rights concerning passengers/cargoes to, from, across and into their territory and on operating conditions, either on the basis of bilateral agreements, existing or future, or on the basis of reciprocity. In nearly all cases, they apply to all countries and cover existing and future agreements.

In general, commitments are more liberal for countries that acceded to the WTO after the Uruguay Round (Mukherjee, et. al., 2012).

Logistics Services: Doha Round

In the beginning of the Doha Round, many WTO member countries/regions including Australia, Canada, China, Japan, India, Switzerland, the US; and the EU either individually or as a group, issued communications on liberalising transport services. While some of these proposals (for instance, the EU proposal) covered all modes of transport, some were specific for certain transport modes (for instance, the proposals of New Zealand and Columbia¹⁰ focused only on air transport).

Among the WTO member countries, Hong Kong (China) and Switzerland were first to express their interest in extending the services negotiations to include a comprehensive coverage of logistics services which will not only include transport and auxiliary services but also business services such as inventory management and order processing (UNCTAD, 2006). The Hong Kong, China's proposal¹¹ referred to inclusion of

⁹ Commitments in Mode 4 were given in the horizontal schedule and restricted to high-skilled workers only

¹⁰ WTO (2001a) and (2001b).

¹¹ WTO (2001c).

customs clearance services. In 2004, a group of eight WTO members¹² (including Australia, Hong Kong, Liechtenstein, Mauritius, New Zealand, Nicaragua, Switzerland and the Separate Customs Territory of Taiwan, Penghu, Kinmen and Matsu) submitted a joint proposal on logistics services which included the Logistics Services Checklist (given in Annex 1) based on which members can undertake commitments. The proposal also outlined several areas such as acceptance of electronic versions of trade documents, non-burdensome customs procedures and prevention of anti-competitive behaviour where additional commitments (under Article XVIII) will facilitate trade. In February 2005, a group of 20 countries¹³ submitted a joint statement, emphasising on the importance of availability of efficient freight logistics infrastructure and urged all WTO members to participate actively in the negotiations with a view to achieving substantial liberalisation in logistics services.¹⁴

A proposal submitted by the EU¹⁵ highlighted the need for reducing unnecessary trade distortive barriers while preserving the quality of service, public safety and the regulation. The EU also proposed that commitments should facilitate multimodal transportation through broad-based commitments in auxiliary services and transport. The EU proposed that although hard rights like traffic rights are excluded from the GATS, commitments can be sought in services such as ground handling services, freight and mail handling and ramp handling services subject to safety, security and employment conditions. Canada, Japan and the US, on the contrary, are of the view that ground handling is directly related to traffic rights and, therefore, should not be under GATS.¹⁶ In this context, it is important to note that airlines and airports have been traditionally providing the ground handling services. With liberalisation, there are specialised companies such as Swissport International Limited (owned by Ferrovial, Spain) and Singapore Airport Terminal Services Limited (in which Singapore Airlines has a major shareholding), which offer ground handling services. Although countries have differences in opinion, sub-sectors such as ground handling have been discussed in the Doha Round.

The Doha Round negotiations were initially based on a request-offer approach. Accordingly, WTO members made bilateral request to their trading partners in areas of

¹² WTO (2004).

¹³ Australia, Canada, Chile, Djibouti, the EC, Hong Kong, China, Iceland, Japan, Korea, Liechtenstein, Mauritius, New Zealand, Nicaragua, Norway, Panama, Peru, Singapore, Switzerland, the Separate Customs Territory of Taiwan, Penghu, Kinmen, and Matsu and the US.

¹⁴ WTO (2005a).

¹⁵ WTO (2000).

¹⁶ WTO (2005a).

export interest. In the plurilateral negotiations which commenced after the Hong Kong Ministerial Conference (December 2005), Australia, Chile, New Zealand, Norway Switzerland, and the EU made a request to over 22 member countries (including India) in air transport services¹⁷ while another collective request on logistics services¹⁸ was made by seven member countries (namely Australia, Chile, Hong Kong, Japan, New Zealand, Switzerland and Chinese Taipei) to 33 countries comprising of 26 developing countries including India (UNCTAD, 2006). The plurilateral request in air transport services covered ground handling services and airport operation services. The request called for opening up of Modes 1 and 2. In Mode 3, the demandeurs has particularly asked for the removal of economic needs tests, restrictions on foreign equity participations and local partnership requirements, among others. The plurilateral request also called for removal or reduction of MFN exemptions. The collective request in logistics followed the Logistics Services Checklist. The purpose of this request is to ensure that service suppliers are allowed to supply freight logistics services in combination, they can access and use core and related freight services on a reasonable and non-discriminatory terms, the customs clearance procedures are not burdensome, and electronic versions of trade administration documents are accepted.

Although an analysis of the requests shows that countries interested in liberalising transport and allied sectors are looking for broader commitments, the analysis of the revised offers shows that they fall short of the expectations. As of July 2014, 66 WTO member countries have offered commitments on air transport services, 58 on rail transport services, 57 on road transport services, 55 on auxiliary services, 13 in postal services, and 60 in courier services.¹⁹ Table 2 presents a comparison of offers and the Uruguay Round commitments. Since the maritime negotiations were suspended, this sub-sector is not included.

On the whole, the offers of Australia, Japan, the EU, the US, and Thailand shows improvements over the Uruguay Round commitments (see Table 2). However, a close look at the revised offers of many countries shows that they are subject to conditions which make it difficult to actually understand the extent of opening up. For instance, the

¹⁷The full text of the collective request is available at <http://commerce.nic.in/trade/Plurilateral%20Request%20in%20Air%20Transport%20Services.pdf> (last accessed on August 10, 2014).

¹⁸The full text of the Collective request is available at <http://commerce.nic.in/trade/Plurilateral%20Requests%20on%20Logistics%20Services.pdf> (last accessed on August 10, 2014).

¹⁹ Extracted from WTO Database on Services - I-TIP, available at <http://i-tip.wto.org/services/ComparativeReports.aspx> (last accessed on August 4, 2014).

EU offer on airport management (for airport operators) is subject to the right to take any measure deemed necessary relating to security and safety in any services sector.

Table 2: Comparison of Commitments and Offers of Selected WTO Member Countries in Logistics Services

Country	Air Transport	Rail Transport	Road Transport	Services Auxiliary to all Modes of Transport	Postal	Courier
Australia	⊕	⊕	⊕	⊗	×	×
Brazil	×	⊗	⊗	⊗	×	⊗
China*	×	⌘	⊕	⌘	×	×
EU	⊕	⊕	⊕	⊕	⌘	⌘
India	⌘	×	×	×	×	×
Japan	⊗	⊗	⊕	⊗	⌘	⌘
Korea	⊕	⌘	⊗	⊗	×	⌘
New Zealand	⊕	⊗	⊗	×	⌘	⌘
Singapore	×	×	×	×	×	⊗
Thailand	⊕	⊕	⊕	⊕	×	×
Turkey	⊗	⊗	⊗	×	⊗	⊗
US	⊗	⊗	⊕	⊕	⊕	⊕

Source: Compiled from commitments of countries in the Uruguay Round and Revised Offers in the Doha Round.

Note: (i) '×' refers to 'no commitment'; '⊕' refers to 'improvement in revised offer'; '⊗' refers to 'no improvement in revised offer'; and '⌘' refers to 'no commitment in Uruguay Round but in revised offer'.

(ii) *For China the improvements are over its accession commitments. China acceded to the WTO in December 2001, after the Uruguay Round.

The Doha Round is still on-going. In December 2013, the Agreement on Trade Facilitation Agreement (TFA) was presented at the Bali Ministerial Conference. The TFA contains provisions for faster and more efficient customs procedures through effective cooperation between customs and other authorities on trade facilitation. It also contains provisions for technical assistance and capacity building in this area. It is expected that the TFA will come into force once two-thirds of the members have completed their domestic ratification process.²⁰

India's Commitments in the WTO

In the Uruguay Round, India's commitments in logistics services were limited, both in terms of sectors covered and modes of delivery. India only made commitments in maritime transport services but this was not useful as the negotiations were suspended. In the Doha Round, India submitted its Revised Offer in August 2005²¹ which does not show substantial improvements over Uruguay Round in spite of the fact that the domestic regime is fairly liberal. Precisely, India has opened up different segments of logistics services for FDI inflows but is not keen to bind them in the WTO. Lack of a binding commitment may result in operational uncertainty for foreign service providers, especially in a sector such as logistics services which may have a long gestation period.

In the year 2014, India signed the WTO's Trade Facilitation Agreement and the country is undertaking domestic reforms to implement the agreement. This will reduce barriers to trade in logistics services.

LOGISTICS SERVICES IN FTAs OR PTAs

In the past 15 years, there has been a proliferation of bilateral/regional trade agreements. Many of these agreements are in the form of New Age FTAs, which encompassed trade in goods, trade in services, investment, trade facilitation, cooperation, government procurement and competition, among others. The gap between the unilateral liberalisation in logistics sector and the WTO commitments indicates that there is scope for liberalising this sector bilaterally. Countries such as the US and regions such as the EU tend to seek commitments in logistics services or specific sub-sectors of logistics services through their trade agreements. For example, the US FTAs, in particular, look at securing commitments in express delivery services. The US has restrictions in the postal sector in the form of reserved area, weight and price multiple, etc. Therefore, US PTAs have not focused much on postal sector liberalisation. By contrast, the EU PTAs focus on both postal and courier liberalisation. Singapore, New

²⁰ http://www.wto.org/english/tratop_e/tradfa_e/tradfa_e.htm (last accessed on August 18, 2014).

²¹ The Revised Offer of India is available at http://www.commerce.nic.in/trade/revised_offer1.pdf (last accessed on August 4, 2014).

Zealand and Japan are some examples of countries whose bilateral commitments in logistics services exceed their commitments in the WTO. Studies have shown that the negative listing of sectors in PTAs with clear mention of restrictions have somewhat helped countries to overcome the inadequacy of GATS classifications and ensured better commitments in bilateral agreements (Zhang, 2008).

In the case of air transport sector, the FTAs like the WTO have also not been able to obtain significant liberalisation since air transport agreements are based on reciprocal bilateral arrangements as per the Chicago Convention, 1944 of International Civil Aviation Organization. However, in the road, railways and auxiliary services, many FTAs seem to have better commitments than the WTO. For instance, Chile did not offer to make any commitments on road and auxiliary services in the Revised Offer of July 2005²² in the WTO, but in the EU-Chile FTA, which was signed in 2002, Chile made commitment in road transport and auxiliary services. In general, developing countries are more likely to undertake commitments in logistics services in bilateral agreements than in the WTO. This is especially true for trade agreements with large developed economies such as the US and the EU. Since the bilateral agreements also tend to address regulatory issues more than the multilateral agreement, it is important for a developing country to have a sound regulatory regime in logistics services before entering into FTAs. The US and EU PTAs have WTO plus provisions, and they often use the PTAs to transfer their own regulatory regimes to their trading partners (Horn et. al. 2009). Therefore, trading partners should have a sound regulatory framework in place before negotiating such agreements.

India's Commitments in Bilateral Trade Agreements

To date, India has signed comprehensive FTAs with Japan, Malaysia, Singapore, and the Republic of Korea. India is negotiating comprehensive agreements with regional blocks such as the EU and countries such as Australia, New Zealand, and Thailand. The existing agreements and those being negotiated include transport and logistics services.

In all bilateral agreements, India adopted positive list approach similar to the GATS. India did not undertake commitments in postal, courier and sub-segments of transport services such as rail and road transport services.

Table 3 presents the comparison of India's WTO Revised Offer with all four bilateral FTAs such as India-Singapore Comprehensive Economic Cooperation Agreement (CECA), India-Korea Comprehensive Economic Partnership Agreement (CEPA), India-Japan CEPA and India-Malaysia CECA. The table 3 shows that India has

²² WTO (2005b).

given liberal commitments in some of its FTAs compared to its Revised Offer submitted to the WTO in August 2005. For example, in the India–Singapore CECA (signed in June 2005 and became operational in August 2005)²³, India undertook commitment in new sub-sector such as international air freight transport in which India had not offered commitment in its Revised Offer to the WTO. In India-Malaysia CECA (signed in February 2011 and became operational in July 2011)²⁴, India gave improved commitments in maritime freight transportation and storage and warehousing services (see Table 3).

However, in some FTAs, India had given lesser commitments compared to its Revised Offer in the WTO. For example, in India-Japan CEPA (signed in February 2011 and became operational in April 2011)²⁵, India had kept mode 1 ‘unbound’ in services such as maintenance and repair of sea-going vessels and maritime freight forwarding services.

The India-Republic of Korea CEPA (signed in August 2009 that became operational in January 2010)²⁶ has a provision to cooperate in maritime transport, development of roads, airport construction, etc.

Table 3: Comparison of India’s Commitments in Bilateral FTAs with GATS
Commitments in Logistics Services (Modes 1, 2 and 3)

Service	India-Singapore CECA	India-Korea CEPA	India-Japan CEPA	India-Malaysia CECA
Maritime transport services				
Freight transportation	Ø	⊗	⊗	⊕
Passenger transportation	Ø	⊗	⊗	⊗
International rental/charter of vessels with crew or on bareboat basis	×	⊗	⊗	×
Maintenance and repair of sea-going vessels	⊗	⊗	Ø	⊗

²³ The full text of the agreement is available at http://commerce.nic.in/trade/international_ta_framework_ceca.asp (last accessed on August 10, 2014).

²⁴ The full text of the agreement is available at <http://commerce.gov.in/trade/IMCECA/title.pdf> (last accessed on August 10, 2014).

²⁵ The full text of the agreement is available at http://commerce.nic.in/trade/ijcepa_basic_agreement.pdf (last accessed on August 10, 2014).

²⁶ The full text of the agreement is available at <http://commerce.nic.in/trade/india%20korea%20cepa%202009.pdf> (last accessed on August 10, 2014).

Service	India-Singapore CECA	India-Korea CEPA	India-Japan CEPA	India-Malaysia CECA
Air transport services				
International freight transport	×	×	×	×
Maintenance and repair of aircraft	⊗	⊗	⊗	×
Services auxiliary to all modes of transport				
Ship broking services	⊗	⊗	⊗	×
Maritime cargo handling services	⊗	⊗	⊗	×
Maritime agency services	⊗	⊗	⊗	⊗
Maritime freight forwarding services	⊗	⊗	Ø	⊗
Storage and warehousing services in ports	×	⊗	⊗	⊕
Custom clearance services	×	⊗	⊗	×
Container station and depot services	×	⊗	⊗	×

Source: Compiled by India's commitments in various FTAs and WTO (2005c).

Note: '⊗' refers to 'similar commitments in FTAs'; '⊕' refers to 'improvement in FTAs'; 'Ø' refers to 'lesser commitments in FTAs'; '×

The discussion also highlights that India has significantly liberalised the logistics sector, and the government is encouraging inflow of foreign investment in this sector. However, the sector is highly fragmented which leads to inefficiency. The cost of doing business in India is high, India ranks much lower than competing countries such as China in logistics performance indicators; this has adversely impacted the performance of Indian industry especially the manufacturing sector. Within services, India's negative trade balance in transport and allied services is rising. Given this circumstances, India has to not only improve the performance of the domestic logistics services sector but also take measures to enhance export of logistics services and to attract FDI in this sector. For this, the country should have a short-term and long-term strategy/vision document to establish efficient logistics network and global supply chain. There is need for inter-ministerial coordination; a dedicated ministry for logistics services will enable the sector to grow and become competitive.

India not only should undertake domestic reforms but also demonstrate its commitments to reforms by undertaking commitments to bind the existing regime in trade agreements. A binding commitment in WTO and trade agreements will ensure operational certainty for foreign firms and lead to inflow of foreign investment, technology and best management practices. Overall, the country needs to change its negotiating position in logistics services from defensive to an offensive approach. This will make it a stronger player in the services negotiations. India can offer forward looking commitments in sectors such as logistics to bargain for greater market access for professionals. However, if it only binds the autonomous regime, the country will not have that bargaining power.

It is important to realise that, if the logistics sector is liberalised and trade facilitation measures are implemented, cost of doing business will reduce. India can develop as a global manufacturing hub and become a part of the global production network, given its advantages of low cost labour. Liberalisation of logistics services is also important to pursue the country's own strategies of development of economic corridors.

REFERENCES

1. Credit Analysis & Research Limited (CARE) (2014), 'Outward FDI Investments by India', March, Mumbai.
2. Department of Industrial Policy and Promotion (DIPP) (2014), 'Fact Sheet on Foreign Direct Investment - from April 2000 to May 2014', May, Ministry of Commerce and Industry, Government of India.

3. Deloitte and Indian Chamber of Commerce (ICC) (2012), 'Logistics Sector, Present Situation and Way Forward', Gurgaon.
4. Evotech (2014), 'Overview and Outlook in Logistics Industry', April, Evotech Capital, US.
5. Gunasekaran, A. and K. L. Choy, (2012), 'Industrial logistics systems: theory and applications', *International Journal of Production Research*, Vol. 50, No.9, pp. 2377-2379.
6. Horn H, PC. Mavroidis and A Sapir (2009), 'Beyond the WTO? An Anatomy of EU and US Preferential Trade Agreements', CEPR Discussion Paper No. DP7317, Centre for Economic Policy Research, UK.
7. International Civil Aviation Organization (ICAO) (2013), 'Liberalisation of Market Access', Working Paper ATConf/6-WP/60, February, Canada.
8. KPMG India and Confederation of Indian Industry (CII) (2013), 'Transportation and Logistics - Logistics game changers Transforming India's logistics industry', Gurgaon.
9. Meidutė, I., Litvinenko, M. and A. Arankas (2012), 'Logistics Cooperation: Integrated Logistics Services. Business: Theory and Practice/Verslas: Teorijair', *Praktika*, Vol. 13, No.4 pp. 343-351.
10. Mukherjee, Arpita, Pal Parthapratim, Mitra, Subrata, Goswami, Ramneet and SouvikDutta (2012), 'Facilitating Trade and Global Competitiveness – Express Delivery Services in India', Oxford University Press, New Delhi.
11. Mitra, Subrata (2008), 'Logistics Industry: Global and Indian Perspectives', Indian Institute of Management, Kolkata.
12. Neufeld, Nora (2014), 'Trade Facilitation Provisions in Regional Trade Agreements - Traits and Trends', Staff Working Paper ERSD-2014-01, January, Economic Research and Statistics Division, WTO, Geneva.
13. Tseng, Y-y, Yue, W.L. and M. A. P. Taylor (2005), "The Role of Transportation in Logistics Chain", *Proceedings of the Eastern Asia Society for Transportation Studies*, Vol. 5, pp. 1657–1672.
14. United Nations Conference on Trade and Development (UNCTAD) (2006), 'Negotiations on Transport and Logistics, UNCTAD/SDTE/TLB/2005/3, Geneva.
15. Wang, Heng (2011), 'China, Free Trade Agreements and WTO Law: A Perspective on the Trade in Services', EIU Working Paper MWP 2011/05, European University Institute, Italy.

16. World Bank (2013), 'Doing Business 2013: Smarter Regulations for Small and Medium Size Enterprises', Washington DC.
17. World Bank (2014), 'Connected to Compete – Trade Logistics in the Global Economy', Washington DC.
18. World Trade Organization (WTO) (1991), 'Services Sectoral Classification List - Note by the Secretariat', MTN.GNS/W/120, 10 July, Geneva.
19. WTO (2000), 'Communication from the European Communities and their Member States', WTO Document S/CSS/W/41, 22 December, Geneva.
20. WTO (2001a), 'Communication from New Zealand', WTO Document S/CSS/W/92, 26 June', Geneva
21. WTO (2001b), 'Communication from Columbia', WTO Document S/CSS/W/124, 27 November, Geneva.
22. WTO (2001c), 'Communication from Hong Kong, China', WTO Document S/CSS/W/68, 28 March, Geneva.
23. WTO (2004), 'Communication from Hong Kong, China; Liechtenstein; Mauritius; New Zealand; Nicaragua; Switzerland and the Separate Customs Territory Of Taiwan, Penghu, Kinmen and Matsu', WTO Document TN/S/W/20, 25 June, Geneva.
24. WTO (2005a), 'Communication from Australia, Canada, Chile, Djibouti, the European Communities, Hong Kong China, Iceland, Japan, Korea, Liechtenstein, Mauritius, New Zealand, Nicaragua, Norway, Panama, Peru, Singapore, Switzerland, the Separate Customs Territory of Taiwan, Penghu, Kinmen and Matsu, and the United States', WTO Document TN/S/W/34, 18 February, Geneva.
25. WTO (2005b), 'Chile - Revised Offer', WTO Document TN/S/O/CHL/Rev.1, 5 July, Geneva.
26. WTO (2005c), 'India - Revised Offer', WTO Document TN/S/O/IND/Rev.1, 24 August, Geneva.
27. WTO (2010), 'Logistics Services', Note by the Secretariat, WTO Document S/C/W/317, 10 June, Geneva.
28. WTO (2013), 'International Trade Statistics 2013', Geneva.
29. Zhang, Ruosi (2008), 'Liberalisation of Postal and Courier Services: Ready for Delivery?', in Marchetti and Roy (eds.), "Opening Markets for Trade in Services: Countries and Sectors in Bilateral and WTO Negotiations", WTO and Cambridge University Press

Table A1: Coverage of Logistics services

1. Core Freight Logistics Services	
11. H. Services auxiliary to all Modes	a. Cargo handling services, including container handling services (CPC 7411) and other cargo handling (CPC 7419) b. Storage and warehousing services (CPC 742) (including distribution centre services and material handling and equipment services such as container station depot) c. Transport agency services (CPC 748) (including customs agency services and load scheduling) d. Other auxiliary services (CPC 749) (including through-chain logistic services, reverse logistics, container leasing and rental services)
2. Freight Transport Services	
11.A. Maritime transport services	11.A.b. Freight transportation (CPC 7212) 11.A.c. Rental of vessels with crew (CPC 7213) 11.A.d. Maintenance and repair of vessels (CPC 8868) 11.A.e. Pushing and towing services (CPC 7214) 11.A.f. Supporting services for maritime transport (CPC 745)
11.C. Air transport services	11.C.b. Air freight transport (CPC 732) (excluded from GATS, s.t Annex on Air Transport Services) 11.C.c. Rental of aircraft with crew (CPC 734) (excluded from GATS, subject to Annex on Air Transport Services) 11.C.d. Maintenance and repair of aircraft (CPC 8868) 11.C.e. Supporting services for air transport (CPC 746)
11.E. Rail transport services	11.E.b. Freight transport (CPC 7112)
11.F. Road transport services	11.F.b. Freight transport (CPC 7123) 11.F.c. Rental of commercial vehicles with operator (CPC 7124), and without operator (CPC 83102)
3. Other Related Logistics Services	
1.F.c, 1.F.d. Management consulting and related services (CPC 865, 866) 1.F.e. Technical testing and analysis services (CPC 8676) 2.B. Courier services (CPC 7512) 4.A. Commission agents' services (CPC 621); 4.B. Wholesale trade services (CPC 622) 4.C. Retailing services (CPC 631, 632, 6111, 6113, 6121) (including inventory management of goods, assembling, sorting and grading of goods, breaking bulk, re-distribution and delivery services) - Other supporting services not covered by 11. H: CPC 743, 7113, 744 (excluding 7441) and 746	

Source: Compiled from WTO (1991 and 2004).

Supporting Rail Projects Worldwide

Dr-ING Denis Loskant *

INTRODUCTION

The globalisation of business has led to dramatic changes in the world market, requiring new approaches to the movement of people and goods. As a result, there is growing demand for rail to play a bigger role, which in turn means finding smarter methods for the construction and management of railways. DB International is addressing these challenges with a team of experienced project managers and specialists, drawing on knowledge gained from many projects in Germany and around the globe. Since 1966, we have worked in more than 100 countries, and three current schemes in Saudi Arabia, China and Brazil highlight different strands of our activities.

About 1,200 people from 46 countries now work for DB International, based at 12 locations in Germany and 21 project offices around the world. Thanks to our technical railway and economic expertise, we can offer a range of consulting and engineering services, from feasibility studies and planning to project supervision and commissioning. Our customers include train operators, infrastructure managers and governments as well as public transport companies and private investors.

These services can be divided into three main areas: engineering, system consulting and business consulting. Engineering includes planning, project management and construction supervision for infrastructure projects. System consulting provides technical support for holistic and interdisciplinary solutions covering all modes of transport. The business consulting arm offers management guidance in the context of the overall rail system, including strategy and planning advice, profitability analysis and process optimisation.

Much of our successful international business is based on our work at home. National projects provide important references for winning contracts abroad, demonstrating expertise to potential customers and giving our staff the practical experience they need for use elsewhere. We also operate on an 'extended workbench' principle, where some of the planning and development for international projects can be undertaken in Germany.

* Head of Resources & Competency Management, DB International GmbH

HIGH SPEED IN SAUDI ARABIA

The Middle East is a significant region for DB International, which is active in many countries. Our largest current project in the region is the Haramain High Speed Line, connecting the pilgrimage cities of Makkah and Madinah with Jeddah, the main port in Saudi Arabia (RG 7.12 p32).

The number of pilgrims attending the Hajj and Umra festivals is increasing year-by-year, with more than 3.5 million people visiting Makkah for the Hajj in 2013. At the same time, increasing numbers of tourists, local residents and guests are visiting both Makkah and Madinah throughout the year, requiring better transport links.

The first high speed line on the Arabian Peninsula, the 450 km double-track railway has been designed to transport 8,000 passengers per hour in each direction, with the trains running at a maximum speed of 320 km/h. It will serve five stations at Makkah, Jeddah, Jeddah International Airport, King Abdullah Economic City and Madinah, which are being built on a modular basis to combine high quality with short delivery and construction times. Two depots and several workshops are planned to service and maintain the fleet of high speed trains, which are being assembled in Spain. The train control system will be ETCS Level 2 and GSM-R. Representing a total investment of €7 bn, the works are being undertaken by two consortia bringing together 14 companies, mostly from Saudi Arabia and Spain. Construction began in 2012, and will be commissioning in 2015. Together with our joint venture partner Dar Al-Handasah, DB International is supporting project promoter Saudi Railways Organization with a range of project management services, under a contract running from June 2012 to September 2017. These include:

- plan checking, during the concept, design and execution phases;
- supervision for the construction and installation of all railway infrastructure, track and systems;
- auditing of the rolling stock production in Spain;
- monitoring operations during the first year following the opening of the line.

For this project, we have put together a multinational team, drawing experts from Germany, the UK, Jordan, Egypt and India. One particular challenge is the spatial distribution of employees, who are based at three different sites, requiring particular focus on co-ordination at the interfaces. The majority of the team is based at an office in Jeddah, but those overseeing the construction of the trains are in Madrid, while the plan evaluation is undertaken in Frankfurt-am-Main.

Within Saudi Arabia, cultural and religious sensitivities and climatic conditions bring numerous challenges. For example, working hours are restricted during Ramadan

and the Hajj period, which particularly affects any Muslim members of the team. The extreme conditions will impact on both the construction and operation of the line, as well as the design of the rolling stock, which must cope with temperatures up to 70°C, plus sand and dust where the route runs through the desert.

In addressing these challenges, DB International has been able to draw on experience from other projects in Saudi Arabia over many years. In particular, the company played a role in the development of the 18 km Al Mugadassah metro which transports pilgrims between the tent cities of Arafat, Muzdalifah, Mina and Jaramat and the holy sites within Makkah. Here, we supervised construction and the installation of technical equipment, managed the rolling stock approval process, and provided technical support to the metro operator during both the 2012 and 2013 Hajj periods. DB International has also participated in the automated metro project at Riyadh's Princess Noura Bint Abdulrahman University for Women, the North- South Railway and the early studies for the Saudi Landbridge scheme.

BUILDING BRIDGES IN CHINA

Also focusing strongly on high speed, but in a completely different context, is our work in China. Here, the railway is already well established as the most important transport mode, handling around two-thirds of long-distance passenger traffic and half of all freight movement. The Chinese rail network is expanding rapidly, with the 11 000 km of high speed line built in the last decade expected to reach 16 000 km by 2020. At the same time, the total network is projected to reach 120,000 route-km. That is 3.5 times the size of the German network, although of course the country's surface area is 27 times as large as the Federal Republic. For the past 10 years, DB International experts have provided construction supervision and site support for many of the high speed line projects. Since 2010, we have been working on a 277 km double-track section of the new Datong – Xi'an line, which will link the provinces of Shanxi and Shaanxi when it opens later this month. With the construction work completed, test running is now underway on the line ahead of the start of revenue services.

Designed for 350 km/h operation, this 900 km line serves 29 stations, of which 18 are new and the others rehabilitated. With trains running at 300 km/h, the end to end journey time will be cut from 16 h to just 4 h. No less than 90 km of the line runs on elevated structures, with a total of 114 bridges and viaducts. Of these, there are 15 bridges with a length of more than 500 m. There are also three tunnels with a total length of 12 km. The line is being laid with slab track, mostly using the so called Chinese Railway Track System, which, in many respects, is comparable with the German Rheda 2,000 track-form. Similarly, the train control uses the ETCS-derived CTCS, with GSM-R for the communications.

DB International was contracted to provide construction supervision for the bridges, tunnels, track superstructure, stations and railway systems, including the signalling and overhead line equipment. A special feature of the section we have been working on is that the track structure is almost entirely supported on piles, because of poor ground conditions. These are driven to a depth of between 45 and 60 m to ensure a firm foundation.

In addition, the route crosses over three other railways, whose operation could not be interrupted. So for the first time the bridges were installed using an incremental launching method. Pre-fabricated steel spans were welded together on site and supported on temporary structures, and then advanced step by step as each segment was completed.

Another challenge was the construction of a bridge over the Yellow River, which is the fourth longest in the world. The line crosses the valley on a 10 km viaduct with 172 piers up to 45 m high and a superstructure that uses a mix of single span beams and continuous beams in a cantilever arrangement. The river bridge itself extends for 3 km, with spans of up to 108 m. The bridge piers are supported on bored piles of up to 2 m diameter, which are driven 100 m into the rich soil.

BRAZIL'S QUALIFICATION CAMPAIGN

A completely different kind of project is now underway in Brazil, where our business consulting arm is assisting with the development of a railway training centre on behalf of the National Service for Industrial Training, known as Senai. This private non-profit organisation provides a diverse range of education and training for Brazilian industry, as well as technical services, promoting innovation and working to improve industrial processes. Senai's regional unit in São Paulo state alone has around 3,400 teachers in more than 160 training centers, which are used by around 200,000 people each year.

There is a strong sense of resurgence in the Brazilian rail sector, associated with a modernisation and investment programme valued at €30 bn including the construction of 10 000 km of new line and the introduction of open access operations on the former national network. Senai-SP recognised the urgent need for more railway professionals, and decided to establish a training centre to promote the development of the rail sector and improve the efficiency of freight and passenger transport. The core of the project is the Rail School and the Rail Innovation Centre.

To ensure that the training content and other activities reflect the current state of the art in the international rail industry, in November 2013 Senai-SP appointed DB

International to support the development of the centre and assist in the preparation of the training courses. For this, we were able to draw on the resources of our sister company DB Training in Germany.

The project consists of three modules. The first is to define a range of job profiles and career paths for different professional groups in the rail sector. The second looks at which technologies and infrastructure are required to offer the education and training to cater to these career paths. The third module is developing the concept for the Rail Innovation Centre. In each case, we need to analyse the current level of knowledge and skills available at Senai-SP and consider how it could best be transferred to the new facility.

Senai-SP is a highly motivated partner, and is keen to build a long-term partnership with DB International in the field of railway-specific training. To this end, it has already built a model simulator based on a German ICE.

SEEKING OPPORTUNITIES

These three projects are examples of the wide range of services which DB International is providing around the globe, under the most complex conditions. Our business is continuing to expand, and we are currently looking to recruit more experts for a wide range of disciplines.

Looking ahead, DB International is continuing to seek opportunities in emerging markets. Last year, we announced the opening an office in Bangalore, following our appointment to act as quality and safety consultant for the 25 km elevated metro now under construction in Kochi at a cost of Rs 51.7 bn.

With India expected to invest up to €200 bn over the next decade to expand and enhance its rail infrastructure, including conventional, high speed and urban rail projects, DB International Chairman Niko Warbanoff said the new initiative had 'strategic significance in the light of the continuing process of globalisation and the rising prominence of the Indian market. We are confident that we can lend our support to India with our expertise in all areas of rail transport'. 325 m strings at a third-party flash butt welding yard approximately 20 km south of the port. These long-welded strings were then taken to the work front on a train supplied by Fortescue, which could carry up to 40 at a time in four layers.

The rail train was propelled backwards along the spur, and the long welded strings off-loaded onto rollers temporarily installed on the sleeper rail seats. The rails were towed into position by a tractor with a wheelbase wide enough to straddle the sleepers on the formation, which was developed jointly with the vehicle supplier.

Once a pair of rails was in position, the rollers were removed and the rails nominally clipped up, with the ends fish plated to the previous pair. The rail train would then proceed backwards on the newly-laid rail to the point where the next pair of strings could be offloaded. Based on the available paths for the rail train, plus the time for offloading and reloading, it was possible to deliver approximately 36 track-km per month.

While the rails were being off-loaded, a road-rail mobile flash-butt machine followed along behind, welding the joints. Once the empty train was ready to return to Port Hedland, a temporary closure would be fitted to bridge the gap created by the rail consumption of the flash-butt process. Welding continued during the absence of the rail train, and by the time the loaded train returned to site, the majority of joints would have been welded up to the work front. To keep up with the average number of rails delivered to site by train, the team needed to complete approximately eight joints per day. This was done using two machines, which were also used to assemble the turnouts.

Given that Fortescue operates with axle-loads up to 42 tonnes, all mobile welds were subject to ultrasonic testing and magnetic particle inspection. Detailed parameters of all welds were recorded in the weld register.

Once the welding had been completed, the final fastening of the rails was done with a small team using clip up machines. The use of Pandrol e-clip fastenings and mechanical clipping made for a highly efficient process which was the least time-consuming task.

BALLASTING

As mentioned earlier, the ballast stock pile was located at 234 km, next to the main line 60 km south of the Solomon Spur. Fortescue provided a ballast train of 100 tonne wagons, capable of carrying approximately 3500 tonnes, which was sufficient for approximately 1.3 km of track.

In fact, the ballast was off-loaded in two stages. The first drop would be done using the skeleton track to deliver approximately 70 per cent of the total. This was then lifted and tamped twice, before a second drop was scheduled to deliver the remaining 30 per cent. Due to the logistics of running the ballast train on the main line for reloading, it was cycled to deliver a load every second day.

In total, the track was lifted, tamped and regulated four times to achieve the final level and line. MDAR used a combination of its own plant, some supplied by Fortescue, and others hired from sub-contractors. At the height of construction, the Solomon line

required two tampers and two ballast regulators. Tamping was mainly carried out at night to avoid any conflicts with work trains and other track machines.

On completion of the final tamping run, the line and level were verified and the track swept with a ballast broom. This facilitated the inspection and verification of the rail fastenings and sleeper spacing, as well as the measurement of rail stresses.

Inspection & Test Plans were progressively completed for every aspect of the track construction. On completion of the Material Data Report for each section or element, a joint 'walk through' would be undertaken with the client's supervisors for quality assurance purposes. The rail's stress-free temperature was measured at 1km intervals using a verse frame. The SFT measurements were analysed to identify and need for distressing. This was carried out at a rate of 2 track-km per day using the two hi-rail flash-butt machines with distressing heads.

SUCCESSFUL COMPLETION

MDAR successfully completed the work with a track construction rate that peaked at more than 3.5 km per day. An audit conducted by Fortescue's Health Safety & Environment department just prior to project completion determined that the joint venture had achieved the highest overall score for any of the contractors on the T155 Rail Expansion Project, which had reached a total investment of more than US\$2 bn by mid-2013.

Opportunities and constraints for investment in the Indian logistics sector

Smita Miglani*

INTRODUCTION

The Government of India, in the year 2011, announced its National Manufacturing Policy. The objective of this policy was to increase the share of manufacturing sector in gross domestic product (GDP) from 16 per cent then to 25 per cent within 10 years and create 100 million jobs.¹ There is a realization on Government's part that such growth in manufacturing, trade or infrastructural development will be achieved only when it is backed by an equally efficient and strengthened logistics sector in the country.

Logistics is recognised as an inseparable part and catalyst in ensuring smooth interplay of various agents in an economy. Economic literature too reveals that there is a strong positive correlation between economic growth and need for logistics² infrastructure (Shao and Zheng, 2011). Logistics development helps to boost industrial activity, economic growth (Liu, 2009; Yuan and Kuang, 2010), and improves overall competitiveness (Navickas et al., 2011). Additionally, it is seen that FDI in logistics is one of the driving forces of economic development (Yang and Wang, 2010).

The issue of logistics and infrastructure development has recently gained importance, not just, efficient domestic movement but also in enhancing India's participation in global value chains or international production networks. The sector is given a crucial place in India's trade negotiation agreements and other bilateral partnership treaties internationally.

This paper aims to examine the nature of logistics infrastructure in India. It specifically highlights the role played by private sector investment and the opportunities and constraints to such investment at present and in future. Section one provides a brief

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¹ This policy was announced after the realization that share of manufacturing sector in India had stagnated at 15-16 per cent since 1980 while the share in comparable economies in Asia is much higher at 25-34 per cent.

² Logistics can be defined as "the management of goods and resources between the 'point of origin' and the 'point of consumption'. In India, the sector is marked by a complex chain of processes across multiple modes of transport; transport infrastructure like ports and warehouses; and auxiliary services such as cargo handling and customs clearance, storage and warehousing, inventory management and packaging.

background of the Indian logistics sector covering aspects such as trends and patterns of investment in the last two decades. Section two highlights constraints or problems confronting the sector and how this adversely impacts returns on investment. This is followed by a section on opportunities to new investment in the sector. The last section summarizes the discussion.

A BACKGROUND OF THE INDIAN LOGISTICS SECTOR

Logistics can be defined as 'part of the supply chain process that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services, and related information between the point of origin and the point of consumption in order to meet customers' requirements' (Council of Logistics Management, 1991).

Ostensibly, the size of Indian economy is huge. It is home to the world's second largest population and is the world's second largest producer of food after China and a significant importer of commodities. The country's logistics sector has a turnover US\$ 107 billion and has grown at the rate of 8-10 per cent per annum in the last five years. However, it is still developing in nature with features of underutilized capacity, inefficiency and low technological advancement.

Transport constitutes an important segment of logistics. Roads account for a majority (about 60 per cent) of domestic freight movement; railways accounts for about 33 per cent; maritime (coastal and inland) close to 5 per cent³ and the remaining is through air carriers. For international trade, shipping is the dominant mode of freight transport, accounting for about 90 per cent by volume (70 per cent by value).⁴

The nature of the sector varies from segment to segment. While few segments such as railways and aviation are organised,⁵ others like road transport and warehousing are largely fragmented and unorganised. Only a few service providers specialise in providing 3PL/4PL services and reverse logistics.⁶

³ Inland water transportation is underdeveloped despite 14,000 kilometers of navigable rivers and canals.

⁴ Rest of international trade is through air transport; less than 1 per cent is through land transport. Trade through roads and railways is only with neighbouring countries.

⁵ Corporatised in case of aviation sector; road transport and warehousing are non-corporatised in comparison.

⁶ 3PL and 4PL stand for third party logistics and fourth party logistics respectively. 'Reverse logistics' stands for operations related to resources getting at least one step back in supply chain for value addition, disposal or re-manufacturing.

The governance structure in the sector is quasi-federal in nature. Certain segments (such as railways, national highways, major ports, international shipping, civil aviation and inland waterways) are under jurisdiction of the Central government, while others (such as state and rural roads, non-major ports, coastal shipping and trucking) are under state governments. Also, there are areas of joint jurisdiction (rural roads) wherein state governments work in coordination with local/municipal bodies and the central government.⁷ There are different ministries/departments looking after transport, shipping, road transport, highways, civil aviation, airports, airlines and those dealing with rural roads. There is no single independent regulator for the entire logistics sector, but some sector specific regulators such as the Warehousing Development and Regulatory Authority (WDRA)⁸ and the Directorate General of Civil Aviation (DGCA) are in place.⁹

Some segments such as railways and postal services have virtually been operating as public monopolies. In India, logistics is not recognized as a separate industry; there is no government mechanism providing disaggregated data for revenue generation, contribution to GDP and employment for the sector as a whole. According to the National Sample Survey Office (NSSO), transport and storage segments¹⁰ together contribute close to 7 per cent to India's GDP (at factor cost and 2004-05 prices).¹¹ The share has increased over time from about 3 per cent in 1950s. The contribution to employment is about 4.5 per cent of the total workforce.

The opening up of the economy in the 1990s brought about a significant rise in economic activity and the country's trade volumes increased both domestically and

⁷ Apart from transport ministries and departments, a number of other ministries such as the Ministry of Finance, the Ministry of Environment and Forests and the Ministry of Consumer Affairs, Food and Public Distribution (which regulates inter-state movement of goods) regulate this sector.

⁸ The WDRA regulates and ensures implementation of the provisions of the Warehousing (Development and Regulation) Act, 2007 for the development and regulation of warehouses, Regulations of Negotiability of Warehouse Receipts and promotes orderly growth of the warehousing business.

⁹ The responsibility of the DGCA is regulation of air transport services to/from/within India and enforcement of civil air regulations, air safety and airworthiness standards.

¹⁰ The National Sample Survey Office (NSSO) classifies transport sector in the category 'transport, storage and communications', in which 'transport' is divided in two sub-segments - 'railways' and 'transport by other means'.

¹¹ The contribution also increased over time. In the 1950s, the sector contributed about 3 per cent, in 1980s, the share increased to 5 per cent and in 2002-03, the share increased to 6.2 per cent. In 2002-03, transport sector valued at around US\$26 billion and in 2009-10, it reached around US\$ 61 billion. Source: Calculated, using Central Statistical Organization (CSO) data.

internationally. With increased trade, supply side inefficiencies in logistics came to, therefore, and the need to build a strong supply chain network was recognised as a critical backbone to sustain the growth process. In all these years, the sector was opened up to private sector investment. With the relaxed FDI norms and other incentives along with high margins in the industry, private (domestic and foreign) investment increased over the years.¹² Today up to 100 per cent foreign direct investment (FDI) under the automatic route is permitted for almost all logistics services except a few as shown in the following table.

Logistics segments with restrictive FDI in India

Sector	FDI Policy
Air Transport (Airlines)	<ul style="list-style-type: none"> Up to 49 per cent FDI allowed (100 per cent for non-resident Indians - NRIs) in scheduled air transport service/ domestic scheduled passenger airlines through automatic route. FDI up to 74 per cent and investment by Non-Resident Indians (NRIs) up to 100 per cent allowed in non-scheduled air transport services (Automatic up to 49 per cent and government route beyond 49 per cent and up to 74 per cent). <p>Foreign airlines are allowed to invest, in the capital of Indian companies, operating scheduled and non-scheduled air transport services, up to the limit of 49 per cent of their paid-up capital under the Government approval route.*</p> <ul style="list-style-type: none"> FDI up to 74 per cent and investment by NRIs up to 100 per cent allowed in ground handling services (Automatic up to 49 per cent and government route beyond 49 per cent and up to 74 per cent).
Railways	Public monopoly; FDI not allowed in freight transportation, pushing and towing services. FDI is allowed in maintenance and repair of rail transport equipment and supporting services, railway-related components, warehousing, and freight corridors.

Source: Department of Industrial Policy and Promotion (DIPP), Government of India

Notes: Air Transport Services would include domestic scheduled passenger airlines; non-scheduled air transport services, helicopter and seaplane services.

The sector is evolving and many new changes have taken place in recent years. To give a rough estimate, between April 2000 and June 2014, FDI in ports, sea transport and air transport accounted for around US\$ 3,435 million (around 1.53 per cent of cumulative

¹² Source: DIPP, Government of India.

inflows) into the country.¹³ If related activities such as construction and railway-related components are included, FDI inflows in this period amounted to about US\$ 6,677 million.

In the last one decade or so, procedures have been streamlined and best practices introduced. New infrastructure including extensive roads and highways network has been built. In the roads segment, full truck load (FTL) players have started diversifying towards new segments such as container rail transportation and less than truck load (LTL) movement. Ports are being privatized to meet the tremendous financing requirement for increasing their performance levels, and new non-major ports developed to meet the increasing traffic.

New segments such as project logistics and cold chain have emerged. The services side of logistics is evolving from freight forwarding dominance to give way to more sophisticated processes such as 3PL/4PL, whereby many logistics service providers offer end-to-end cargo management capabilities, while attempting to establish asset ownership in key parts of the value chain.

CONSTRAINTS TO INVESTMENT IN THE INDIAN LOGISTICS SECTOR

Despite various new developments and progress for modernisation made in the sector, logistics is a high-cost business in India with the gestation period to investment rather long and margins low at times. Logistics cost as percentage of GDP stands high at 13-14 per cent as compared to 7-8 per cent in developed countries and 9-10 per cent in BRIC countries.¹⁴ The Logistics Performance Index (LPI) 2014 of the World Bank puts India at a low scale at rank 54, far behind countries of not only the OECD¹⁵ Europe but also the less advanced European countries (Austria-22, Finland -24, Slovenia-38, Romania-40, or Malta-51), South Asia (Singapore-5, Hong Kong-15, Taiwan-19, Malaysia-25) and China (28). Its score is particularly low on parameters such as customs, infrastructure and tracking/tracing. Similarly, the World Bank's '*Doing Business Report 2014*',¹⁶ puts India at a

¹³ If allied areas of construction; automobile industry; railway related components; and earth moving machinery are considered, this figure is more than 10 per cent as per DIPP Statistics, http://dipp.nic.in/English/Publications/FDI_Statistics/2011/india_FDI_June2011.pdf.

¹⁴ The BRIC countries are made up of Brazil, Russia, India and China.

¹⁵ OECD stands for Organisation for Economic Co-operation and Development.

¹⁶ This report has been tracking reforms aimed at simplifying business regulations, strengthening property rights, opening up access to credit and enforcing contracts by measuring their impact on 10 indicators. It provides a quantitative measure of regulations for starting a business, dealing with construction permits, employing workers, registering property, getting credit, protecting investors, paying taxes, trading across borders, enforcing contracts and closing a

low rank of 134 in terms of ease of doing business among a list of 189 countries. Within this, India has a much lower rank than China (96), many South Asian economies and other parts of the world in 'the trading across borders' indicator, which reflects logistics and transportation issues.

Although the entry for private players has been significantly liberalised, there are a number of areas of concern. These include lack of adequate infrastructure, delays in processing documents, and lack of legal certainty due to evolving regulations.

A detailed analysis can be made for different sectors. The road network in India is one of the largest in the world. However, it is not well-developed and the national highways/expressways connecting different states constitute around 2 per cent of road network and carry 40 per cent of road traffic. Slow movement of cargo due to bad road conditions and multiple check posts, which are common at various stretches across many Indian states. India has an extensive road and highway development programme under the National Highways Authority of India (NHAI); but around 189 highway projects, involving investments of around US\$ 30 billion, are currently stuck due to problems of land acquisition, delays in forest and environment clearances, and other issues.¹⁷ Due to these problems and financial constraints, Indian developers are hesitant to respond to road project bids from time to time.

The Indian Railways (world's fourth largest) is the principal mode of transport for inland and long-distance bulk cargo but suffers from monopoly-induced inefficiencies including lack of customer orientation and recourse to best practices.

In the air transport sector, cargo storage facilities are inadequate at airports, especially when it relates to specialized (perishable) cargo. Additionally, lack of gateway and hinterland connectivity hinders smooth movement of cargo. There are delays in transfer of cargo between domestic and international airports.

In maritime transport, many of India's ports have higher loading and unloading times and suffer from low depth/draft. Ships suffer long wait for berthing; and the vessel turn-around time and waiting time in India are much higher than in international ports.¹⁸

business. Ranking on the ease of doing business is the average of the economy's ranking on these 10 indicators. Two new economies - Cyprus and Kosovo - have been added to the list.

¹⁷ <http://economictimes.indiatimes.com/news/economy/infrastructure/government-hopes-international-infra-firms-will-rescue-stuck-highway-projects/articleshow/41991622.cms>

¹⁸ Ships on Indian ports generally have to wait long in the channel for berthing, and productivity in loading and unloading is low. The national average turn-around time of vessels for dry bulk, and containers is 5.7 days and 1.9 days respectively. This is much more than major international ports like Hong Kong, Rotterdam or Singapore where vessel turnaround time is less than a day.

Most ports do not have the capacity to accommodate large ships, and can only accommodate feeder vessels. The equipment for cargo handling in ports is outdated with frequent breakdowns. There are reports that goods are also sometimes handled improperly. Despite cheap labour rates, Indian container-handling costs are considerably higher than in other ports in the region.¹⁹ The process of mechanisation is slow while the port handling charges are high as compared to countries like China, Malaysia and South Korea. Overall, cargo movement through Indian ports is slow and volumes low.

Congestion at seaports due to inadequate infrastructure, red-tapism and delays in clearances, coupled with unreliable power supply and slow banking transactions makes it difficult for traders to meet the deadlines for their international customers. Many large shipping liners avoid Indian ports for long turn-around times due to delays in loading/unloading and hence Indian exporters have to bear delays and costs arising from transshipment at ports such as Singapore, Dubai and Colombo. Sometimes, in order to expedite shipments, traders opt for airfreight which adds to the cost of products making them uncompetitive in international markets.

Low IT penetration, lack of visibility for operators and real-time tracking are some other undesirable characteristics of the Indian logistics sector. Apart from these, inadequate and poor skill levels of staff in sectors like road freight transport are also a problem. Many drivers do not have the correct training or ability to read road signs; and states use different criteria to evaluate skill levels. Logistics is seen as a primary job by management graduates, while the sector needs professionals specifically suited and trained to provide certain functions.

Inadequate power supply is again a major problem. Most warehouses in India are manually operated, and lack bar-coding and scanning facilities. Even though manpower is relatively inexpensive, companies often do not get the right skills and have to invest in training.

Despite the installation of risk management system, international consignments continue to be checked manually up to 30 per cent compared to less than 5 per cent in countries like China, Malaysia and Thailand. The Indian Customs Electronic Data Interchange System (ICES) has been operational for many years. However, a large number of processes for export and import clearances require paper copies, and signature endorsement of customs officials on such physical documents. Traders report that allied agencies require paper documents including physical endorsement from officials. In

¹⁹ Shipping a container from India costs close to US\$ 1200 while from China, it is in the range of US\$ 600 and Singapore about US\$ 400. Source: <http://www.assocham.org/prels/shownews.php?id=4657>

many cases, the same documents are required again and again by different departments such as the port authorities, Customs, Ministry of Finance/RBI, and the Ministry of Environment and Forests. This causes unnecessary delay and complications in the clearance process. Despite recognition of digital documents and digital signatures in the Information Technology (IT) Act, the requirement continues for providing several copies of excise documents or export promotion copies of shipping bills.

Many government and non-governmental studies have in the past tried to make a comparative assessment of infrastructure in other Asian countries and how this has remained unfavourable for the overall investment environment in the economy on many counts. Overall, it is found that the industry is fragmented in segments such as road transport²⁰ and warehousing. Many service providers are small to medium-sized and cannot provide the entire range of services. Their inability to go beyond basic functions and provide value-added services such as small repair work, packaging/labelling, order processing, distribution, customer support, etc. has not let segments like outsourced logistics to grow as well. The market sometimes comprises a number of intermediaries, which increases operational costs for users.

In the absence of a single goods and services tax (GST), the tax structure differs across states. This often causes disincentives to regular inter-state movement of certain goods such as agricultural products. Variations in taxes also make it difficult for warehousing companies to operate on a hub-and-spoke model or a pan-India supply chain. To save on central sales tax, many companies have long been operating through multiple clearing and forwarding agents or warehouse owners, instead of setting up an integrated and consolidated logistics network.

India's quasi-federal governance structure has resulted in a multi-layered administration in the sector. Intermodal issues arise because of the absence of one single Ministry of Transport.²¹ Presence of a large number of ministries has resulted in a fragmented approach towards the development of transport. There is a lack of inter-ministerial co-ordination and absence of a common multimodal transport policy framework.

²⁰ The road transport sector is dominated by small trucking companies and individual truckers. They can operate at low margins and are well-versed with Indian operating conditions but need to be trained in various skills.

²¹ Apart from there being a different ministry for every logistics segment, other Ministries such as Agriculture, Textiles, and Heavy Industries also play part in some logistics issues, making the entire management more complicated.

ROLE AND OPPORTUNITIES FOR PRIVATE SECTOR INVESTMENT

Strong economic growth and liberalisation have led to considerable increase in domestic and international trade volumes in the past few years in India. Consequently, the requirement for transportation, handling and warehousing has grown and is driving the demand for integrated logistics solutions. Globalisation of manufacturing systems with advancements in technology has compelled companies across verticals to concentrate on their core competencies and avail opportunities of outsourcing.

India's rank is low in virtually all logistics performance indices internationally. It is apparent that inadequate physical infrastructure, complex regulatory environment and unavailability of skilled manpower have constrained the growth of logistics sector in India. Recognizing that the sector has a multiplier effect on development of manufacturing sector and indeed for the entire economy, there is a need to boost new investment, simplify procedures, and bring fresh growth sentiment into the sector.

Inadequacies in transport infrastructure and inefficiencies in processes at the gateways reduce India's competitiveness and lower its attractiveness as a destination for overall FDI and trade hub. For instance, although the government has focused on investment in improving highways, there is still under-capitalisation in the segment. The quality of state highways and local roads needs to be improved. The new Government has set a target of awarding projects for construction of 8,500 km of highways by the end of March 2015 and is reworking on areas that need amendments in order to expedite completion of projects.²²

Freight traffic on Indian Railways has seen a consistent increase in the last ten years. However, creation of infrastructure has not kept pace. Rail infrastructure has been facing stress and major routes face congestion and over-saturation, particularly in freight segment, from which Indian Railways has been losing market share to roads sector. Given that rail transportation is hugely important especially for transportation of major bulk commodities like coal, cement, food grains and iron ore, the need for adequate railway capacity expansion and modernisation cannot be over-emphasised. The Planning Commission, in its Twelfth Five Year Plan (2012-17) document also noted the scope for improvement in productivity levels of railways in comparison to the Chinese and Russian railways.

Railways suffer from congestion in the corridors linking industrial centres, making freight transport by rail unreliable in terms of timeliness of delivery. There is scarcity of

²² <http://economictimes.indiatimes.com/news/economy/infrastructure/government-hopes-international-infra-firms-will-rescue-stuck-highway-projects/articleshow/41991622.cms>

space in the Indian airports – specifically, dearth of storage facilities for perishable cargo, shortage of landside truck docks and an inadequate number of dedicated bays for freighter traffic. The gaps in both roads and railways can be bridged by infusing private sector investment, adding on to the existing inadequate public sector investments.

More than 80 per cent of merchandise is transported by sea and the availability and quality of shipping services and port facilities is critical for international production sharing. India's major ports are congested and capacity constrained. Unlike East Asian countries such as China and South Korea, there has been lack of investment and planning in construction in Indian ports. As a result, problems such as congestion and lack of hinterland connectivity are observed. There is also inadequate draft in channels and harbours, which is why Indian ports are ignored by large liner vessels. Port authorities must make regular investments in dredging facilities.²³ To address the problem of long queues of incoming and outgoing vehicles, the solution is to build access-controlled expressways or carriageways as in other advanced countries.

The primary growth drivers of this industry for the future are expected to be:

- The growing GDP of the economy. The enormous market size and high economic activity in upcoming sectors like organised retail are likely to drive the entry of new investment in the near future.
- Focus on increasing the share of manufacturing sector in GDP. Government of India has been emphasising its plans to develop industrial corridors, incorporating smart cities with transport connectivity as a cornerstone of the strategy to drive India's growth in manufacturing and urbanisation.²⁴
- Streamlining of the indirect tax structure. The introduction of the proposed introduction of a single GST is expected to reduce the number of warehouses manufacturers are required to maintain in different states, resulting in an increase in demand for integrated logistics solutions.
- With implementation of the GST across the country, the existing landscape of warehousing is likely to change. Large hubs in key locations, coupled with smaller spoke warehouses closer to production and consumption centres are expected to

²³ The very low depth at India's ports does not match global standards. Most of the major ports have a depth under 10 metres. The depths at the major ports are inadequate to handle higher capacity ships for bulk transport and container ships with capacity to carry 14,000 TEU or more. Inadequate depths at India's major ports entail extra time and cost for moving cargo and a large number of ships have to be routed via trans-shipment ports such as Singapore and Colombo.

²⁴ Union Budget 2014-15 Speech by Finance Minister, July 10, 2014.

emerge. This reorganisation is likely to lead to significant investments in modern warehousing infrastructure with new processes. Extensive use of IT would be adopted to encourage accuracy, inventory tracking, and lower operational costs.

- New and emerging segments such as 3PL/4PL logistics solutions will transform country's logistics sector. With companies now concentrating on managing their supply chain mechanisms in a better way, the market for this segment would offer an attractive business opportunity.

The recent years have seen a shift in freight traffic from rail to road transport for various reasons.²⁵ The need to save on the time taken in transportation has led to adoption of business models of just-in-time manufacturing and increased use of freight transportation by air in international production sharing. In coming future, there is a need for development of freight centers concurrently with increased use of more environment-friendly modes (rail, sea and coastal transport) along with road haulage, especially for long distance deliveries. Development of multimodal freight facilities to support flexible connection between railways, waterways, and coastal facilities is required. Low emission vehicles; alternative fuels for vehicles, and proper driver training for better management are some options that will reduce costs and energy consumption.

Improving road safety is crucial. First, web-based services for shortest path finding, on-line vehicle routing, tracking/tracing systems, and fleet management systems are likely to be in demand. Second, in transportation, travel time information systems, electronic toll collection and the Global Positioning Systems would be needed.

Industries such as automobiles and auto-components, chemicals, IT hardware, electronics, textiles, fast moving consumer goods and retail are the main users of logistics services in India; they are expanding in scale. The focus for future is going to be technology and user-based service improvement. The country's automobile and lorry industries need advanced IT-based systems and capabilities, its road construction equipment and methods must be modernised to meet rising safety standards.

Much activity is going to be concentrated in manufacturing and organised retail. The Indian 3PL market is estimated to grow rapidly, as customers increase the level of outsourcing, encouraged by the ability of these companies to provide quality services. New storage models such as Multi Modal Logistics Parks, Mega Food Parks and Free Trade Warehousing Zones would continue to attract investment. These projects are expected to significantly improve the quality of warehousing and storage space in India,

²⁵ Despite having one of the world's largest rail networks, India's share of cargo transported by rail has declined steadily from over 85 per cent in 1950s to around 30 per cent presently.

while allowing customers to reduce costs through economies of scale, government incentives and optimal usage of multiple modes of transportation. Modern features in warehouses – racking systems, temperature control, fire and seismic resistance, leak proof structures, water harvesting, round-the-clock security, and integrated retail operations would be required. It was mentioned by the Finance Minister of India in the Union Budget 2014-15 Speech that ‘Increasing warehousing capacity for increasing the shelf life of agriculture produces and thereby the earning capacity of the farmers is of utmost importance.’ An allocation of Rs 5,000 crore was made to ensure availability of scientific warehousing infrastructure in the country for the year 2014-15. Development of cold chain/ warehousing infrastructure thus remains at the core of government’s plan to enable growth of rural areas, provide employment opportunities, and alleviate poverty.

Development of key infrastructure projects related to ports, highway and rail projects - such as the Golden Quadrilateral project, North-South, East-West project and the Dedicated Freight Corridor project - could result in the creation of new warehousing hubs aligned to these infrastructure points. Companies are also likely to invest in dedicated freight corridors for railway transport and dedicated air gateways.

India’s internal and external trade is expected to grow in future. India is one of the world’s major food producers but accounts for less than 1.5 per cent of international food trade. There is need for new investment and improvement in service provision in sectors such as maritime auxiliary services, cold storage, cargo management, construction and maintenance, automobile manufacturing, and clean-fuel technology transfers. In the long run, as infrastructure develops, greater opportunities for tie-ups are likely to emerge in 3PL/4PL services, toll and traffic management, and signalling services, among others.

The need of the future is an integrated approach to planned investments. For example, while greater private participation is resulting in rapid port capacity expansion, adequate evacuation infrastructure, i.e., roads and railways needs to be built to transfer goods between the hinterland and ports. Railway infrastructure needs to be developed faster, and the existing network strengthened on major freight routes.²⁶ Planning and implementation in these sectors must be undertaken in a coordinated manner.

Rapid evolution of warehousing would also need skilled manpower. For specialised cargoes such as pharmaceuticals, additional training might also be needed for staff in customs clearance and inspections. Moreover, rapid clearances of tender approval processes and addressal of land acquisition problems would be required, if the

²⁶ This is because roads get congested quickly with passenger as well as freight traffic despite rapid expansion.

government is to ensure speedy implementation of multi-modal logistics parks and free trade warehousing zones.

With focus of government and private sector on rural and agriculture related activities, rural logistics would receive special attention in the coming years. Rural logistics, though lucrative, has a number of challenges.

CONCLUSION

Increased economic activity and trade flows over the years have resulted in various structural changes in the Indian logistics sector which continues to evolve and modernise. Though there are many barriers to its development, India has many advantages too to grow as a logistics hub. These are its favourable geographic location on the world map, growing trade and economic activity, existence of a stable and democratic political climate, favourable legislative policies, focus on manufacturing, a large consumer base, and inexpensive workforce, among others.

The sector has made much progress. Private participation has increased; there has been much consolidation and growth. With GDP growing at more than 5 per cent annually, India is an important market for logistics service providers, and several multinational companies have already established presence here. Despite such developments, India is yet to have a logistics sector which can adequately and qualitatively meet its economic needs. It has a long way to go to be at par with the standards in developed countries or even the emerging Asian economies.

When seen internationally, India's FDI regime is liberal. Thus, for most barriers faced by companies, India needs to initiate domestic reforms. In the past, most private sector (especially foreign company led) investments have taken place in the high-investment areas of transport and warehousing. Given a changing logistics scenario in India, value-added services which have greater scope for margins and opportunities for investment is likely to exist in the future. These would involve streamlining approval processes and customs procedures and transparency in government procedures, regulatory reforms, fiscal and labour reforms.

The government has been trying to ensure an enabling policy and regulatory environment to improve supply-side efficiencies. There have been policy incentives for infrastructure developers (such as food processing parks and cold storage warehouses) in the form of tax breaks. Privatization and public-private-partnership (PPP) models (such as those in ports, airports and railways) have been other moves targeted at enhancing efficiencies and capacities.

There is a need for the sector to expand the size and coverage of its operations. The advantages of clustering and agglomeration can be utilised. These can enhance supply chain responsiveness, provide easier access, and lower costs. Such arrangements can also help increase India's participation in global production networks. With the fall in the traditional barriers to trade (tariff and non-tariff barriers), the importance of logistics has increased as a determinant of trade flows between countries.

It can be concluded that the main areas for improvement in the industry for future are likely to be the following:

- A balanced modal mix with more efficient trucking, and increased cargo movement through rail and sea.
- Private investment and capacity addition in ports.
- Efficiency improvement at airports.
- Better inventory management in warehouses.

The challenge for the Government is to ensure existence of a harmonised tax system in the country. A speedy implementation of GST is needed. This would open the way for centralized, multi customer warehousing facilities, and streamline domestic logistics, as well as make operations more competitive. This implementation will mean an enormous reduction in complexity of domestic distribution, and India will become a single market.

REFERENCES

1. Beke (2010), 'The Practical Experience of Adapting to the International Accounting Standards'. Review 110 of International Comparative Management, Volume 11, Issue 1, March.
2. Cefic (2012), 'The European Chemical Industry's Priorities in Industrial Policy', 10 October.
3. Council of Logistics Management (1991) Definition of Logistics.
<http://www.cscmp.org/>
4. Deloitte-ICC (2012), 'Logistics Sector: Present situation and way forward', January.
5. Deloitte-ICC (2014), 'Indian Logistics: Focus on infrastructure creation to sustain and drive growth'. February.
6. Government of India (2011), 'National manufacturing Policy'. Department of Industrial Policy and Promotion, Ministry of Commerce and Industry, Press Note No. 2 (2011 Series).

7. Hoda, Anwarul and Durgesh Kumar Rai (2014), 'Trade and Investment Barriers affecting
8. International Production Networks in India', ICRIER Working Paper 281. July
9. KPMG, 'Logistics in India', Part 1-3. KPMG Business and Industry Issue. November 2010.
10. Leunig, T., Minns, C. and Weinhold, D. (2009), 'International trade, express logistics and globalization: Part and parcel of the solution to current economic problems'. DHL-LSE White Paper. September.
11. Liu, Shuang (2009), "A Research on the Relationship of Logistics Industry Development and Economic Growth of China", International Business Research, July.
12. Mukherjee and Miglani (2011), 'Logistics Sector in India: Opportunities and Constraints for EU Business', *Journal of Indo-European Business Studies*, Reutlingen, Germany ISSN: 2192-7332. November.
13. Navickas, Valentinas, Leila Sujeta and SergejVojtovich (2011), 'Logistics Systems as a Factor of Country's Competitiveness'. *Economics and Management*, ISSN 1822-6515, p. 231-37.
14. Shao, Yang and Jiangou, Zheng (2011), 'Research on the effects of logistics industry on economic growth in Jilin Province in China", *Canadian Social Science*, Vol. 7, No. 6, pp. 134-137.
15. World Bank (2007), 'Connecting to compete: trade logistics in the global economy', The Logistics Performance Index and its Indicators. <http://lpi.worldbank.org/>
16. World Bank - International Finance Corporation (2014), 'Doing Business', Washington.
17. Yang, Wang and Luqian Wang (2010), 'The Economic Growth Effect of Logistics Industry FDI Analysis', *Business and Economics*, p. 377-81, December.
18. Yuan, Huaiyuand JianminKuang (2010), 'The Relationship between Regional Logistics and Economic Growth Based on Panel Data', *Logistics Policy and Strategy*, p. 618-23.

Connecting India to Global Value-Chains: The Role of Logistics Services

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GLOBAL VALUE CHAINS AND THE NEW GEOGRAPHY OF PRODUCTION AND CONSUMPTION

Global value chains (GVC) defined by fragmented production networks need to be facilitated by a host of enabling services ensuring that all such fragments representing the different specialised tasks within this value-chain are connected and are able to deliver goods and services efficiently to the market. Logistics is the critical enabling service which holds this global value chain consisting of productive 'fragments' together. Kierzkowski (1990) and Arndt and Kierzkowski (2001) have discussed in detail how increasing returns and the advantages of specialisation of factors within firms encouraged the location of different stages of production across geographical space connected by service links. The major chunk of such service links is a menu of services offering connectivity, primarily logistics and related services.

The new trade theory that emphasises firm level heterogeneity and competitiveness (as opposed to competitiveness of a region/country based on endowments of factors of production) as elaborated by Melitz (2003) and Helpman et al., (2004) point out that only few highly efficient firms are able to export and invest overseas as they are able to make sufficient profit to cover the large trade costs required for overseas operations. This firm level efficiency is a function of relationships that firm is able to establish in terms of efficiently accessing a host of inputs and outputs. Again, logistics becomes the critical differentiator in terms of creating this access or connectivity, especially for manufacturing industries.

In order to understand the evolution of logistics and its relevance in the evolving global geography of production and consumption, it is essential to differentiate between the older Fordist mass production oriented GVC and the emergent production networks that are qualitatively different from them. Fragmentation of production is not a new phenomenon; it had started in the 1980s fuelled largely by falling costs of logistics due to the containerisation and falling costs of communication and travel. Starting the late 1990s, fragmentation of production has been aided and augmented by lean engineering.

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Lean engineering is becoming possible with the use of computer controlled manufacturing, robotics and other uses of information technology for cost-effective smaller production runs. Production chains are switching from vertical integration (of fragments) representative of the mass or Fordist production systems that represented the older GVC, to vertically disintegrated forms of GVC that are fundamentally different in their design (Chatterjee and Tsai).

The advantages of scale economies in mass production are being replaced by economies derived from horizontal, globally based input-output linkages with use of such newer forms of industrial design and production techniques (Markusen, et al. 1996). The industrial process has also become more buyer driven and is defined by build to order rather than mass production, and with a greater degree of customisation. Such customisation requires far greater number of specialised tools and components. Needless to say, inventory management is a key to this new geography of production as component production facilities are distributed in a number of countries and regions within a country. It follows that countries or regions that have the best connectivity will be the success stories in this emergent economic geography. While logistics and connectivity were an important factor in the first round of Fordist type of fragmentation of production, it is central to the new technology-driven production networks that will replace current industrial models in the coming decade.

CENTRALITY OF CONNECTEDNESS IN GVC AND ROLE OF LOGISTICS AS ENABLERS

The literature recognises that logistics supports and drives the very design and operation of global value chains and its component fragments (Hesse and Rodrigue, 2004). The benefits arising from GVC could not be realised without co-developments in modern logistics services underpinned by innovations in smart IT-enabled containerisation, intermodal transport and the application of Information Technology (IT) in physical distribution and materials management (Memodevic, et al. 2008). The role of supply chain management and logistics in this evolving production networks goes beyond the simple management of the supply line. The modern logistics service provider needs to be a network manager enabling connectivity.

In order to understand logistics in the GVC perspective, it is important to understand the broader concept of connectedness in a globally networked economy. In a traditional outsourcing or trade relationship, the incidence of transaction costs that includes border costs and the cost of transporting goods from producers to users affects the volume, direction and pattern of trade. But in a GVC global value chain perspective, trade costs are integral to the competitiveness of firms and determine their ability to participate in the GVC through multiple exchanges of goods and services with other

participants in the network. When exchange relationships take place within such a production network, the traditional bilateral approach to the role of transaction costs has to be abandoned to adopt a holistic method, where the intensity of bilateral trade depends also on the strength of the “trade-investment” nexus with all other network participants (Escaith and Inomata 2013). Thus quality of connectedness with all other partners in the network becomes the central feature of a GVC.

Competitiveness within this network of connected exchange relationships requires constant adaptation to changing circumstances, and firms need to continually reorganise and re-orient their exchange relationships in order to stay ahead of the curve (Fine, et al. 2002). Logistics services offer a range of connectivity solutions (different modes and various services) that play an integral role providing firms the ability to continually redesign and reorient their exchange relationships within the GVC. Logistics service providers are becoming value chain coordinators and integrators (Ojala, et al. 2006). Logistics services coordinate manufacturing, marketing, distribution and sales. Modern logistic distribution centers go far beyond traditional distribution functions and perform simple manufacturing tasks such as assembly and packaging.

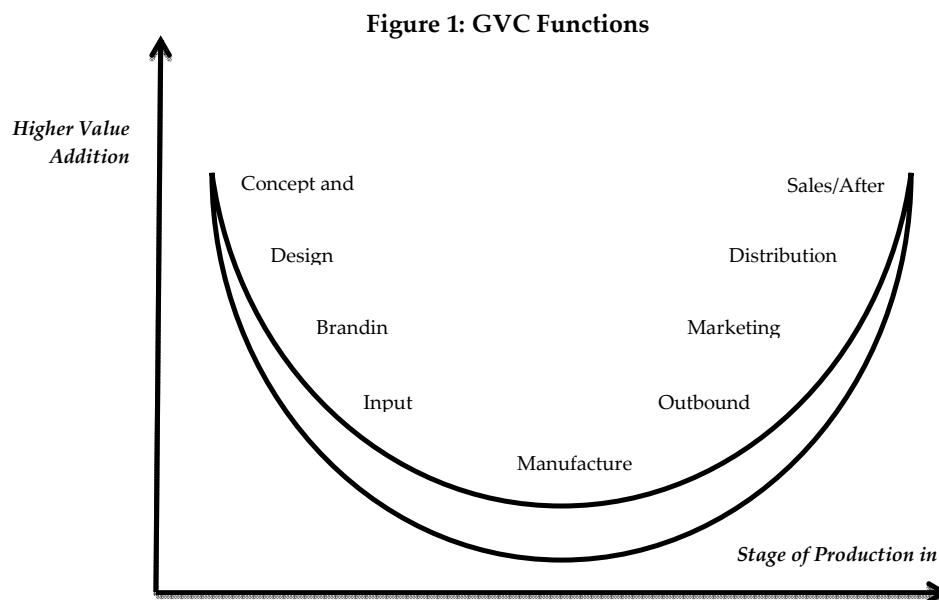
GVC LOGISTICS AND THE DIFFERENT DIMENSIONS OF CONNECTEDNESS

The concept of connectedness and the role of logistics in a GVC perspective is, therefore, far more elaborate than what is traditionally understood. The commonly understood dimension of connectedness is that of physical connectivity between different nodes of the production network in the GVC. But equally important today are the functions of transactional connect and regulatory connect provided by logistics services. Transactional connect refers to a host of value-added services that need to be performed for the smooth operation of the value-chain. Integrating transactional functions such as final assembly or labelling, collection of payment or documentation with logistics is an increasingly common phenomenon. As industrial processes becomes more customised to individual specifications (for both consumer as well as producer of goods), the role of such services would become even more critical to GVCs and even more integral to the overall mix of logistics services.

Regulatory connect refers to a host of services related to compliance with government regulations that govern cross-border (international as well as local jurisdictions such as provincial borders) movement of goods and services. It also refers to compliance with both public and private standards related to product quality and safety. Some of such compliance related services have been traditionally integrated with logistics. For example, customs brokerage services have always been integral to freight forwarding activities. But the increasing complexity of products, the diversity of production networks, and increasing demands for regulatory oversight along with

various dimensions of production and consumption require logistics companies to roll-out a number of specialised services that go much beyond customs brokerage in order to be able to credibly connect the different nodes of GVCs.

A good way to understand this broader concept of 'connect' within GVC and the role services play in production and delivery across multiple nodes within a network is to consider the very simple diagrammatic representation of the value-chain as specific activities or tasks as developed by Stan Shih (i.e. the Stan Shih smile curve), the founder of Acer. Figure 1 provides a modified version of the Stan Shih smile curve, and charts out the specific forms of 'connect' related functions that logistics services currently provide under each of the different activities identified in the smile curve in the associated table included in Figure 1. For example, if one considers the design activity or task in the GVC, then logistics supports this task by providing the means for expedited and secure movement prototypes and samples across different production location networks, i.e., physical connect. It also provides value-added services in terms of ensuring that any data and intellectual property (IR) remains secure in such transit, i.e., regulatory connect. The fact that logistics services are implicitly playing some role through specific functional solutions in enabling each and every activity or task within the GVC is a measure of the centrality of logistics services in the operation of the GVC.



S. N.	Items	Physical Connect	Transactional Connect	Regulatory Connect
1	Concept and R&D	Movement to and from labs, testing centers	Testing of factory to final consumption logistics (quality management, security)	Data Privacy, Intellectual Property (IP) Security
2	Design	Secure movement of prototypes, samples		Data Privacy, Intellectual Property (IP) Security
3	Branding	Movement of inputs that turn generic into brands (special zippers for jackets, prototype headphones for electronics etc)		
4	Input Sourcing	Managing all raw materials and intermediates movement across locations and using various modes (multi-modal)	Inventory management to aid lean manufacturing. Data analytics for optimum sourcing	Compliance with border agency regulations including private and public standards, Intellectual Property (IP) Security in cases applicable. Technology solutions to regulatory concerns
5	Manufacture	Basic final assembly.		
6	Outbound Logistics	Managing outbound to all destinations using multiple modes (multi-modal)	Quality management in transit as per buyer specifications. Staging of delivery (on-demand) and ability to meet locational specifications of buyers	Compliance with border agency regulations including private and public standards, Intellectual Property (IP) Security in cases applicable. Technology solutions to regulatory concerns
7	Marketing			
8	Distribution	Transport across various modes (multi-modal)	Warehousing and distribution center management. Packaging and labeling. Data analytics for optimal inventory management	Compliance with domestic regulations. Technology solutions to regulatory concerns
9	Sale/After Sale Service	B2C last mile transport. Reverse logistics including maintenance, repair and overhaul (MRO)	B2C services related to cash on delivery, point of sale support. Managing repair and return	Compliance with border agency regulations including private and public standards, Intellectual Property (IP) Security in cases applicable. Technology solutions to regulatory concerns

This introduction section sets the context of rest of this article by discussing theoreticality of logistics services within a GVC production network and the emergent new geography of production and consumption in the context of transition from mass production to more customised production and consumption patterns, and also putting forward the broader concept of connectivity as defined not just by physical but also by transactional, and regulatory connect functions that are provided by logistics services to participants in the GVC. The rest of the article that follows discusses in detail the different types of connect, i.e. physical, transactional, and regulatory that logistics services provide GVC participants, especially their India context through specific examples. It also takes up the policy related challenges in the Indian context that prevent (or impede) the efficient roll-out of these three broadly defined connect related service functions, and suggests policy interventions that could potentially remove the barriers to providing such services.

PHYSICAL CONNECT: THE ROLE OF TRANSPORT, WAREHOUSING AND DISTRIBUTION

As underlined earlier, the most commonly understood function of logistics services centres around the physical connectivity it provides production networks. Broadly speaking, the physical connect function provides solutions for transportation of products, its storage and inventory management (warehousing and distribution). Modern production networks are characterised by an ever increasing number of components that require such functional solutions. However, the exact nature of such functional solutions would depend a great deal on the specific production network and the value-chain that defines it.

The nature of solutions can differ due to whether or not the value-chain is technology-intensive or resource-intensive, or whether it is a producer good or a fast-moving consumer good (FMCG). The nature of the value-chain and the physical connect solution that it requires can also be a function of the extent of barriers and transaction cost imposed by policy on the physical movement and distribution functions. As Fung (2013) points out, value-chains can differ greatly depending on what they produce, how they produce and where they produce. Different varieties of global value chains have quite different characteristics, facing different challenges, and requiring different operating and policy environments. Needless to say, this variety adds complexity requiring the physical connect solutions to be just as diverse to deal with this complexity.

But there are three common underlying forces that every business in global value-chains faces and thereby shapes the nature of physical connect solutions. These three common underlying forces are cost of maintaining large inventories, having the flexibility to manage speed and cost of deliveries, and achieving credibility within the production network in which this value-chain operates through reliability of delivery. In the context

of maintaining low inventory, Elms (2013) points out that one of the most important roles for logistics services is managing inventory. This is because lead companies are increasingly pressing their vendors to manage inventory. This task now falls to suppliers or to the last rungs of the value chain.

Keeping inventory low and located at different levels of the chain dramatically increases the flexibility and agility of the value chain. It also lowers the costs because carrying inventory no longer appears on the company's bottom line. In this low-inventory world, reliability can only be ensured if logistics companies optimise the inventory flow by ensuring that the goods arrive at the right place at exactly the right time. Flexibility is also critical since the volume of products that need to be moved, and the speed at which they need to be moved at will differ due to a range of factors influencing the value-chain. What is essential to participants in the value-chain is having access to efficient physical connect solutions across different modes, i.e., multi-modal logistics services that provide a menu of choices to ensure inventory management, flexibility and reliability.

ACCESS TO EFFICIENT AND COST EFFECTIVE MENU OF MULTI-MODAL MEANS OF PHYSICAL CONNECT

As Elms (2013) points out, global business relies on efficient means of transportation. The exact method of transport depends on the business model. Many of the leading companies use multiple methods that include air, rail, road and ships. Some industries exclusively use air-cargo, especially express time-definite logistics for most of their shipments to final consumption destination. Good examples include high-end fashion, consumer electronics, and medical equipment. But while they might use expedited air-cargo for shipping their final products to markets, these same industries operate other aspects of their value-chain using slower, less expensive modes. However, the highest cost impact of logistics might not be for the bulkiest shipments or even the shipping of final products across a long distance, but those aspects of sourcing through within the value-chain which require expedited shipment.

As an illustrative example, let us use the export of 20,000 t-shirts from a factory in National Capital Region (NCR) in India to the US east coast. The logistics costs for manufacturing 20,000 T-shirts for the US market involve domestic trucking of raw cotton, warehousing of raw material, import by air express freight of customer specified accessories from Hong Kong, Malaysia, and USA, trucking finished T-shirts to port, and their onward export shipment by ocean to New York. Given market exigencies, there is need to maintain some inventory of finished products, and in some cases there is need for emergency shipment of finished T-shirts to the US. Table 1 below captures the cost of each of these elements (in USD).

Table 1: Typical Logistics Mix for a Shipment of T-shirts Outbound to US East Coast from India (NCR region)

<i>Truck</i>	
a) Shipment of raw materials to factory	300
b) Shipment of finished T-shirts to Port	200
<i>Air-Freight</i>	
a) Sourcing customer specified accessories	5000
b) Emergency deliveries	1200
<i>Ocean Freight</i>	1100
<i>Warehousing</i>	
a) of raw materials	400
b) of emergency inventory	250
Total Logistics	8450

Source: Author's calculations based on rough estimates

It is important to note that while exports of T-shirts (20, 000 pieces worth USD 80,000) are typically done by sea, express air-freight of critical accessories, and emergency shipments account for 73 per cent of the total transport and warehousing costs. A 20 per cent reduction in the cost of air-express freight services, and an increase in reliability of domestic trucking allowing for a halving of emergency inventory costs would lead to savings of USD 1365 in total logistics costs, or a reduction by 16 per cent of total costs. This translates to a reduction of 1.7 per cent in the landed product price of USD 80,000. In industries such as garments characterised by intense competition, a 1.7 per cent advantage could make or break a long-term supply contract. The essential point is that improvement across various modes of physical connectivity is critical to competitiveness, and a menu of choices of modes is essential as different aspects of the value-chain depend on different modes of physical connectivity. Table 2 below provides some indication of the menu of physical connectivity modes required by broad sectors, given the nature of the value chains they serve and production networks they operate within.

Table 2: Logistical Mode Requirements by Sector: Value and Production Network Based Priorities for Physical Connectivity

Sector	Final Product	Production Network	Modal Priorities
Heavy Engineering	Large sized heavy products. Predictable demand cycle with some instances of emergency requirement. Spares and replacement of parts of critical element	Typically uses a large network of component suppliers. But since tech intensive, sourced from a relative smaller number countries	Air-cargo, including express for more tech-intensive parts and for emergency upliftment of spares. Sea-cargo for more predictable movement of final product and bulkier parts, especially oversized cargo
Consumer Electronics	Sensitive to demand spurts and therefore requires fast time to market. Short product life	Component intensive intra-industry trade across a widely dispersed value-chain. Time sensitive.	Uses air-cargo and often express air-cargo for both final product as well as parts and component movement. Intensive road transport network for connecting main hubs to consumption centres. Distribution and sorting crucial functions
Apparel	Seasonal with high degree of obsolescence due to rapidly changing tastes and preferences. Mix of planned inventory and sudden demand spurts	Mix of bulk (raw materials) as well as time-sensitive specialised inputs (labels, zippers, packaging material). Typically sourced from widely dispersed but typically geographically close destinations.	Air-cargo for specialised inputs and meeting demand spurts. Sea-cargo for more planned inventory in between demand spurts and bulkier raw materials. Strong road network, sorting and distribution functions for final delivery and movement to and from major gateways
Automotive and Engineering	Demand cycle more predictable than consumer goods, but spurts in demand still possible. High inventory costs require just in time inventory management. Intensive requirement for repairs and return and spares	Fragmented and large supplier base. Network defined by outsourcing relations with many smaller SMEs	Inbound includes sea-cargo for raw materials and parts, as well as air-cargo for more tech intensive parts and components. Outbound is a combination of sea-cargo, air-cargo and even road and rail movement where feasible. Spares are typically air express or air cargo. Distribution using road and rail also important

Sector	Final Product	Production Network	Modal Priorities
Food and Agro Products	Seasonal variations. Perishables require quality management, and large inventories are costly due to need to maintain quality. Product variation means shipments range from bulk products to light packaged materials	More localised as raw material movement is typically in bulk and distance imposes costs, especially given perishable nature. But long-distance movement of bulk is also the norm in products such as unprocessed cereals (rice, wheat)	Mostly sea-cargo, and road and rail for gateway to hinterland (and where feasible cross-border). Air-cargo is the norm for high value perishables. Processed food typically uses sea-cargo with some exceptions. Temperature controlled transport, warehousing and distribution critical.
Pharmaceuticals	Mostly predictable demand patterns with some demand spurts. Temperature control and quality management most critical	Fragmented production networks that source from multiple locations for bulk drugs, and inter-mediate formulations. Nature of production cycles demand greater than average efficiency of the supply chain to reduce waste and costs	Inbound raw materials typically use sea-cargo and in some cases air-cargo for critical requirement. Outbound uses sea-cargo, air cargo and air-express depending on urgency of requirement, intensity of temperature control requirement, and quality management. Generics typically use cheaper sea-cargo and general air-cargo. High-value products typically move using air-express.
Chemicals	Predictable demand cycles, with very rare demand spurts or variations. Relatively higher lead time for planning logistics is available	Production networks are far less fragmented than engineering or electronics. But global sourcing is increasingly the norm. Bulk raw materials are important inputs.	Bulk and containerised movement using sea-cargo with rail and road providing the gateway to hinterland connectivity. Rail is preferred to road in places this is commercially and operationally feasible

Sector	Final Product	Production Network	Modal Priorities
Industrial Raw Materials	Predictable demand cycles, with very rare demand spurts or variations. Relatively higher lead time for planning logistics is available	Source countries are globally dispersed, but given the cost of bulk and containerised movement, geographically proximate locations are preferred.	Bulk and containerised movement using sea-cargo with rail and road providing the gateway to hinterland connectivity. Rail is preferred to road in places this is commercially and operationally feasible

Source: Author

The choice of mode might also depend on market conditions. This is where efficient logistics services that allow quick transition from one mode to the other and access to a menu of choices play a critical role. Using the t-shirt example above, the proportion of t-shirts that might need to be sent by air-freight might increase, if there is a sudden spurt in demand due to festival season in the US, for, e.g., thanks giving. Another slightly different example is eid festival-induced demand of Indian FMCG in Bangladesh. Typically, FMCG products between India and Bangladesh move using road transport. However, poor regulatory and physical infrastructure at the land border (Benapole-Petrapole) between the two countries means that this land border crossing becomes a bottleneck, especially during times such as the eid festival when there is a huge spurt in volumes going from India to Bangladesh. Many exporters out of India start air-lifting their cargoes to Dhaka at a much higher cost, in order to ensure that they meet the market demand during the limited period of eid festivities. This is an example of a regulatory and poor trade facilitation-induced choice of modes, where delays in what would have the mode of choice forces participants in global value-chains to opt for more expensive options just to meet market requirement and ensure they do not lose their business even if they lose some money in the process, as overall control of that market is a profitable proposition.

PHYSICAL CONNECTIVITY EFFICIENCY AND COMPETITIVENESS: IMPACT OF MULTI-MODAL OPTIMISATION

Sometimes a single leg of the movement in a value-chain might be optimised due to the use of multiple modes, and lack of ability to access such multiple-modes can in itself result in lack of competitiveness. To take an illustrative example, consider a movement of carpets between Kathmandu and London. It is a known fact that air-cargo costs are cheapest from locations that have large network connectivity of passenger airliners since a very high proportion of air-cargo travels on belly-space of commercial passenger aircraft instead of dedicated air-freighters. Thus, cost of booking an air-shipment directly out of smaller international airport such as Kathmandu is much more

expensive. If the option of trucking the same shipment by road to New Delhi and booking a passage out of New Delhi was a feasible option (i.e., the infrastructure and border procedures between India and Nepal allowed easy and relative fast trucking), then multi-modal (road-air) connectivity between Nepal and European destinations could be developed.

Box 1: Development of Multi-Modal Solutions as Game-Changers

The development of a new and cost effective multi-modal solution can become game-changers in the way global value-chains are organised. The gradual development of road-air networks in South East Asia leveraging the connectivity of major air-hubs like Bangkok, Kuala Lumpur, and Singapore has provided exporters and importers in the region use the specific network strengths of these hubs using road-air multi-modal products. For example, if Singapore is offering quicker and cheaper air-freight to West Africa, a Malaysian exporter can use the option of trucking shipments by road to Singapore and air-lifting to West Africa from Singapore instead of doing a direct shipment for Kuala Lumpur. Similarly, Vietnamese exporters increasingly use Bangkok as their air-hub of choice. The increasingly ability of SE Asian exporters and importers to have access to such a multi-modal choice is making them more competitive.

Another great example is the rail-based network connecting China to Europe. DHL Global Freight (DGF) has developed specific solutions that allow container trains to make the China-Europe leg in just about 18 days (compared to 42 by ocean route). While somewhat more expensive than ocean freight, the quicker transit makes it an attractive proposition. It also allows a multi-modal sea-rail product to connect Japan and Europe (i.e., by sea from Japan to China, and onward to Europe by rail). The existence of this multi-modal physical connect is leading firms to relocate some of their productions facilities to take advantage of this quicker transit to Europe and is providing China an added boost to its attractiveness as a manufacturing location

A very important role in efficiently managing the multi-modal menu of choices in an optimal fashion is played by third-party logistics or 3PL. The rapid growth of third party logistics is a function of the fact many manufacturing firms, especially SMEs would not be able to maintain relevant transport-related physical assets and dedicated staff for the same. They would also not be able to access multiple modes of transport and change quickly across modes when the need arises as efficiently as a dedicated logistics services firm that has access to both scale economies and price discounts due to long-term contractual relationships with transporters across various modes of transport. The criticality of multi-modal choice is also being increasingly underlined by the growing number of mergers between transportation service companies seeking to capture scale economies through freight movement consolidation across regions. But the most

important role 3PL firms provide is not just related to increasing cost-effective access to a menu of multi-modal physical connectivity solutions, but also a range of value-added services that can be described as transactional connect, which is the topic of discussion in section 3 that follows. Box 2 below provides the linkage between physical connect and transactional connect by using the specific example of availability of less-than-truck load or LTL services.

**Box 2: Less than Truckload (LTL) as a Facilitator of Physical Connectivity
for SMEs in the Production Networks**

There are important differences between the Truck Load (TL) and Less than truckload (LTL) businesses. The level of service quality required for offering to carry truck-load quantity of freight efficiently is not very high. Essentially one needs to have the ability to drive a truck from point A to point B safely and in a time bound manner, while meeting basic compliance requirements. LTL carriage, defined conventionally as shipments of less than 4.5 tonnes, is very different. The amount of handling required to provide this kind of service is much greater than the handling needed on truckload shipments. In order to maintain the safety and quality of different shipments, truck carriages would also need to have modern design elements, including segregation, compartmentalisation, specialised locking systems. The trucker would not just have to be a driver, but also an experienced inventory manager.

It also requires management of routes as a truck picks up and drops multiple shipments at multiple locations. This would mean that the trucking company offering such services would need to do efficient route-planning. LTL services might also require certain types of shipment to have specialised needs, and provision of such services would have to be taken into account. Finally, since LTLs include multiple shipments, the compliance complication related to such shipments increases, and truckers would have to be well aware of such compliance requirements and the means to meet with them.

Relatively low cost and efficient LTL shipment availability is essential to the emergence of a modern trucking sector. LTL shipments offer greater flexibility to shippers. They are ideal for SME manufacturers as they often do not have the volumes to justify full truck load. A network centric LTL also offers greater choice to shippers since a shipper might have LTL shipments going out to several destinations, and, if forced, to hire a full truck for every one of those drops it would drive up costs, and using a single truck to deliver all of them one after the other would increase the time required manifold.

However, small and intermediate trucking companies do not have the ability to provide LTL services. LTL is basically a network driven business, requiring investments in physical capital (large differentiated fleets of trucks), back-office services that sell LTL as part of a network and maximise truck routes in terms of efficiency, and a strong compliance management team that provides regulatory back-up. Only large trucking companies and/or large specialised third party logistics companies (3PL) can provide such services.

TRANSACTIONAL CONNECT

Participation in global value-chains for firms across the production network requires a system that enables transactions between these different firms. In other words, it is the ability to successfully close transactions across the value-chain that makes or breaks firms in the value-chain. Thus, physical connectivity must be bundled with a host of supportive services that ensures that all the pre-requisites of successful transactional relationships are provided for. These services can be described as providing transactional connect. Some of these services have already been described in Figure 1 previously in the context of the smile curve. The key transactional services can be categorised under some broad buckets. These are:

Inventory Management: All value-added services centered on warehousing and distribution functions of physical connect can be categorised as inventory management. Such services include processing and executing orders, IT-based inventory data management that ensures goods leave the warehouse only when they are required in destination factory, wholesale or retail operation, and back-office support to distribution management. Increasingly, logistics firms are developing IT-based solutions that integrate IT platforms with that of the consolidation and/or distribution network participants serving their clients to offer such services seamlessly. For example, a large logistics firm can integrate an entire retail network of pharmacists in a single IT platform that is managed by the logistics firm. The pharmacists' only need to login into this system to place orders to replenish their stocks.

The IT system will automatically execute the order by instructing warehousing managers what medicines to send to which address, create invoices and other regulatory documents, and even (with the help of bar-codes and scanners) allow precise pick-up of the stock from a large warehouse. A call-centre (also managed by the logistics company) allows pharmacists to call and resolve any issues that they might have. Major logistics firms including DHL Supply Chain (DSC) are developing very large multi-client site (MCS) warehouses in India that considerably reduce the costs of availing state-of-the-art warehousing services that come integrated with such value-added transactional services. As the markets for generics open up, individual large pharmacists' chains in EU and US markets will also want to integrate Indian generics producers through such advanced pharmaceutical logistics networks that offer efficiency and transparency. Having access to such services would then become critical to the success of managing Indian generics exports.

Box 3: Inventory Management in Completely Networked World

As every part and component becomes integrated through digital technology of embedded chips and IT communication systems, supply chains would undergo transformational change. For example, technicians would have full visibility of parts in a car through a centralised control tower observing performance parameters and working condition. Embedded chips would automatically indicate when a particular part would require changing or repairing. This information would be integrated with the logistics supplier who would arrange for physical repair/replacement of that part. Automobile firms like Volvo are already experimenting with such 'smart' parts and components in vehicles.

Basic Manufacturing: With increasing customisation, logistics firms are helping integrate the final basic manufacturing functions related to assembly and design with the physical connect function. A good example might be that a Singaporean customer wants a Persian carpet but only with yak-wool trimmings of Tibetan design. A free-trade warehousing zone (FTWZ) managed by a logistics company located in Delhi NCR India can import the Persian carpet from Iran using air-freight, source the yak-wool trimmings of Tibetan design from Sikkim in India, do the stitching and packaging in the free-trade warehousing zone in Delhi NCR, and export it to the client in Singapore by air-freight. With the help of this logistics company, and the basic manufacturing services it offers, a carpet exporter can offer infinite menu of choices of combination and permutation to his customers at a much reduced cost, thereby increasing their competitiveness in the global market.

Box 4: Future of Manufacturing Using 3D Printing and Role of Logistics

The rise of 3D printers to manufacture basic parts and components is on the rise and the cost and precision of such manufacturing will only improve over the next decade. Recently, the British Air Force (RAF) flight tested a Tornado jet using parts made by 3D printing. The future global value-chain would involve a combination of 3D printing and actual factory-produced precision-manufactured components. The logistics firm would integrate these functions. The logistics companies of the future would run industrial use 3D printers in local warehouses using their economies of scale to reduce the cost of 3D printing and doing away with the need for actual end-product users from having access to the physical capital of 3D printing. They would combine this with actual sourcing of those parts that need to be precision manufactured in factories and assemble the 3D printer-produced components and factory-produced parts sourced globally, allowing much greater customisation and flexibility. For example, an advanced textile dyeing machine could have advanced electronic parts sourced from Japan, and have basic components 3D-printed in Tirupur. Once an SME textile manufacturer in Tirupur places an order online for such a machine with customised requirements, a logistics firm would print the basic parts in its warehouse in Tirupur, and just air-express the more advanced components from Japan. They would then assemble the machine integrating all the parts. This would mean that the SME textile manufacturer would have the machine in his plant within 48 to 96 hours of placing the order.

Post Manufacturing Services: Logistics firms are increasingly doing the packaging, labelling, and final branding of products. Since labelling, packaging, branding (language and legal requirements), and pricing (currency) are often different across geographies, this is a critical service before products are sold or delivered. Many producer and consumer goods also require having extensive product use, recycling or other printed material. Integrating such material into the final product before delivery is also another example of post-manufacturing services. Another increasingly common post-manufacturing service provided by logistics companies is in giving inputs for the actual design of the product to ensure easier packaging, transit, and unpacking of the product. The industry term for this service is co-packing or contract packing. A good example of this is a logistics company providing inputs to SME furniture manufacturers in Rajasthan with the design of their products and packaging so that they can be easily shipped to the UK, and the unpacking of such furniture is less labour intensive. This increases the competitiveness and viability of such exports from India in destination markets.

Quality Management and Visibility: While logistics firms are implicitly responsible for the timely delivery and quality control of goods in transit, they are offering value-added services that go much beyond. A basic quality enhancement service is providing real time track and trace of a shipment. This allows firms to constantly monitor their supply chains and optimise planning. Integrating new-technologies such as GPS, logistics firms are able to provide their clients with very precise data of their shipments in transit as well as maintain much greater transparency. Special packaging and handling technologies allow logistics firms to provide not just temperature control, but also provide data on the temperature-controlled environment during the entire transit, allowing clients to observe and manage quality of products. Special packaging and handling services are also allowing dangerous goods (such as many classes of chemicals) to travel greater distances at lesser costs, opening up opportunities in the value-chains where such products play a part.

Data: A key value-added transactional connect service being provided by logistics today is the management of data. With the emergence of big-data analytics becoming an independent service industry, this component of value-added services would become a critical part of any logistics services offering. The equipment used in a modern logistics network, including GPS-enabled trucks, smartphones, RFID readers, webcams, and sensor networks adds a huge number of autonomous data sources. Devices such as these continuously generate data streams without human intervention, increasing the velocity of data aggregation and processing. The vast majority of such newly created data is related to camera images, video and surveillance footage. Specialised analysis of traditional data (such as quantity, temperature, or time in transit) or non-traditional data such as scanned images or video, provide logistics firms the ability to use such data for

prediction of market supply and demand, cost efficiency tools, optimal routes, inventory optimisation and many others (see Box 5 that follows). Needless to say that such data is critical to businesses world-wide. With ever growing customisation (as indicated by examples in Box A and B above), the nature of big data and the importance of analysing such big-data would become more critical, making this one of the most important transactional connect services provided by logistics.

Box 5: Big Data Analytics and Logistics

At operational level, transit points and transportation routes must be managed efficiently on a day-to-day basis. This involves capacity planning for trucks, trains, and aircraft as well as shift planning for personnel in distribution centres and warehouses. Often operational planning tasks are based on historical averages or even on personal experience, which typically results in resource inefficiency. Instead, using the capabilities of advanced analytics, the dynamics within and outside the distribution network is modelled and the impact on capacity requirements calculated in advance. Real-time information about shipments (items that are entering the distribution network, are in transit, and are stored) is aggregated to predict the allocation of resources for the next 48 hours. This data is automatically sourced from warehouse management systems and sensor data along the transportation chain. In addition, detection of ad-hoc changes in demand is derived from externally available customer information (e.g., data on product releases, factory openings, or unexpected bankruptcy). Additionally, local incidents are detected (e.g., regional disease outbreaks or natural disasters) as these can skew demand figures for a particular region or product. This prediction of resource requirements helps operating personnel to scale capacity up or down in each particular location. But there is more to it than that. A precise forecast also reveals upcoming congestions on routes or at transit points that cannot be addressed by local scaling. For example, a freight aircraft that is working to capacity must leave behind any further expedited shipments at the airport of origin. Simulation results give early warning of this type of congestion, enabling shipments to be reassigned to uncongested routes, mitigating the local shortfall. This is an excellent example of how big data analytics can turn the distribution network into a self-optimising infrastructure.

Source: DHL Research

Wholesale and Retail: Logistics firms are increasingly becoming the front-face of a transaction between final buyer and the seller. This ‘retailisation’ of logistics is most evident in the case of e-commerce where the express delivery staff also doubles up as the salesperson, collection payment (cash on delivery), explaining the product, discussing the repairs and return policies, and even doing demonstration of the product to the customer. Many logistics firms also double up as the wholesale managers for their clients out of their warehouses integrating physical connect with purely transactional services

functions. Increasing product customisation and increasing direct-selling (for e.g. e-commerce) would only increase the need for integrating the physical connect function with pure transactional connect functions of wholesale and retail in the logistics services. As cross-border e-commerce opens up opportunities for SME Indian exporters to reach a global clientele, access to such integrated logistics services would become critical to their competitiveness.

Reverse Logistics and MRO: A modern value-chain needs to have a credible return, repair and/or replacement system in place. The global Maintenance, Repair and Overhaul (MRO) business is estimated at USD 50 billion. At the heart of the competitiveness of global brands relative to their SME counterparts is their ability to credibly demonstrate that buying their products minimises disruptions in the production network due to lack of spare parts or replacements. Thus an efficient reverse logistics offering in itself provides transactional connect by instilling confidence in the credibility of the production network participant. Logistics firms are going a step ahead and working with their clients to integrate basic repairs and replacement functions at the distributions centre warehouses (similar to the basic manufacturing services discussed previously). These warehouses can test a product, decide on which parts need to be replaced, and undertake minor repairs, and quickly return the product to the customer, reducing the cost of this entire process, and more critically the time taken for this process of repair and return to be concluded.

Product and Market Development: Logistics firms are increasingly helping in the development of products and markets by investing in specialised services that makes transactions much simpler. A good example of this is 'Mango-Express' of DHL Express (DHLE). Mango Express allows Indian exporters of mangoes to ship their products to globally in pre-designed packaging ensuring the quality of such mangoes, and also do door-to-door delivery. The development of a specialised service like Mango Express allows individual mango exporters in India reach out to individual buyers globally, bypassing all middle-men. The credibility of mango-express in delivering fresh and safely packed mangoes to the final buyer helps develop a direct mango selling market from India to international customers.

Ability to access transactional connect determines what share of the value a participant can get in the global value chain. An illustrative example is provided by buyers from Europe in Jaipur directly sourcing textiles and garments from local SMEs and even individual craftsmen to high-buying and selling these for big profit to high-end fashion houses or through direct retail. These European buyers are essentially providing transactional connect, by arranging for shipping including pick up from Jaipur and drop in Europe. These European buyers manage inventory, develop a database of suppliers and procurers, and provide packaging and ensure quality control. If small Jaipur-based

traders could combine together and work with a logistics firm to get same transactional connect services along with the physical connect between Jaipur and Europe, then they would be able remove these European buyers who act as middle-man and extract a bigger share from the global value chain that they serve. Essentially then logistics firms have developed transactional connect-related services to remove the middle-man in the global value-chain and provide direct connectivity between sellers and buyers in the global value-chain-based production network.

Transactional services offered by logistics services, therefore, represent the broad trend of 'servicification' of global manufacturing and production networks. The ability to design and access transactional connect thus becomes the primary driver of strategic behaviour designed to move up the value chain. The design of the value chain itself in terms of specific firm behaviour and their relationships with the value-chain as a function of their location within the production network is a direct result of the servicification and opportunities for strategic behaviour by firms (Sundin et al. 2009 and Lodefalk 2013). Firms may seek to customise their offerings so as to differentiate them in the marketplace and earn higher returns or to spread risk by diversifying the output mix. But, in order to move up the value chain through greater servicification of the manufacturing aspect, the two critical drivers are: product quality and branding (i.e., IPR) and the other is logistics (distribution, after-sales service-related supply chain, and ability to ensure timely delivery of inventory across a wide distribution network, and ensure inputs reach in time), all aspects of transactional connect discussed earlier. A related and indirect aspect of transactional connect is provided by risk management and its fundamental relationship to the ability of firm to leverage maximum share of the value within the value chain.

EFFICIENT RISK MANAGEMENT AS TRANSACTIONAL CONNECT

As pointed out by Lessard (2013), that while it is generally assumed that individuals, firms and countries are generally risk averse that does not necessarily mean that they all choose to avoid risk or transfer it to others. Risk management in itself is a source of comparative advantage as actors with the greatest knowledge of risks, the greatest ability to mitigate or shape these risks, and the greatest ability to withstand the residual impacts of risks emerge as the most competitive actors within global value-chains. A fragmented production network can alternatively be perceived as the division of labour in terms of which the actor in the production network bears and deals with various uncertainties and risks inherent in meeting unpredictable macro and product demand (Samel, 2012).

Logistics services become the tool through which participants in the global value-chain understand risks, develop strategies to mitigate these risks, and create protocols

that help withstand the residual impact of risks. Risks can come in form of both short-term disruptions to the production networks (political instability or natural disaster) and more long-term systemic change (erosion of competitiveness, fundamental change in factor endowments). In either case, ability to sustain or re-orient production network relationships to optimise or maintain one's position in the value-chain or even extend ones share of the value and move up the value chain essentially depends on the menu of physical and more critically transactional connectivity available (Weil 2013).

One aspect of dynamic and continuous disruptions to the global value-chains arises due to regulatory (private and public) requirements. This disruption can be a million different micro-level compliance-related delays or transaction costs, or more systemic longer-term change in regulatory environment that require completely new design in how the logistics of a value-chain is designed and what solutions are required. The value-added services that need to be offered by logistics companies to deal with these issues can be defined as regulatory connect.

LOGISTICS SERVICES AND REGULATORY CONNECT

Whenever products cross jurisdictions (intra-national or international) they need comply with a plethora of rules and regulations that arise from legitimate administrative requirements (customs duties, VAT and other indirect taxes) or legitimate concerns (consumer and national security, environmental protection) of governments. Many MNCs impose their own private requirements on participants in the production network with whom they have a relationship. Such requirements are put in place to either ensure quality or adhere to ethical and social commitments that the MNC has made a part of its corporate mandate that is associated with the brand by its customers. Participants in the production network require having compliance with these public or private requirements, rules, regulations, or standards. Since logistics firms are the ones which manage the actual physical connect across different jurisdictions, they are increasingly choosing to provide a plethora of solutions and value-added services that help to achieve compliance efficiently and cost effectively. These value-added services can be described as regulatory connect. Being in control of the compliance-related functions helps both logistics firms as well since lack of compliance by their clients has implications for their overall operational efficiency (delays due to hold up at the border and associated costs) and reputation (for carrying non-compliant shipments).

As pointed out earlier, the most traditional form of such regulatory connect services is the bundling of customs brokerage with freight-forwarding services. The

freight forwarder not only assumes responsibility of the physical shipping of goods but also provides for customs clearance at the border destination. However, with increasing number of allied border regulations related to human and animal health, product quality and environment, several other types of clearances with individual agencies have also become the responsibility of the logistics service provider. This then becomes a complicated service offering that requires collection of various types of documentation, their proper submission, and obtaining of all necessary permissions to ensure final clearance of goods.

Door-to-door service providers like express firms not only integrate value-added services related to customs clearance and allied requirements at the border, but also ensure compliance with rules and regulations that impact the domestic leg of the journey and the crossing of intra-national jurisdictions (domestic tax and other regulations). Compliance with domestic regulations is also critical to logistics firms providing domestic trucking.

NEW TYPES OF REGULATORY CONNECT

With 3PL firms becoming responsible for the entire supply chain management, they have to develop the resources to be able to roll-out several different regulatory connect services. Just the warehousing and distribution function alone makes them subject to several different product market regulations and consumer safety-related norms. A very good example is warehousing specific to the pharmaceutical sector that needs to be compliant with national good distribution practice (or GDP). This means that 3PL firms would have to develop, staff, and secure warehousing premises in a manner that meets the GDP norms and the audit requirements on this score with food and drug safety officials. Advanced GDP requirements in the EU not only require proof that the product has been kept at the desired temperature during its transport, but for example, credible temperature mapping services are required for this. Cutting edge technologies such as DHL's 'Thermonet' are being rolled out to achieve such compliance. Pharmaceutical exporters to EU would require access to such regulatory connect services to be successful.

In addition to this, with increasing rise in counterfeit drugs that can have serious implications for patient safety, logistics firms have to train their staff and put in place stringent measures that ensure that there is no contamination of shipments with counterfeits (discussion in Box 6). The concerns around counterfeits are related to the

general concern around securing intellectual property during transit, including loss of sensitive information (e.g. theft of prototype). All of these concerns require putting together skills and staff that carry out tasks substantially more technical than pure tax and customs related clearance services. What is more important to note is that by creating a large, specialised team of staff to deal with such compliance related issues allows pharmaceutical firms to outsource such functions to their logistics providers and save on resources and costs and credible reach markets.

Box 6: Securing the Global Value-Chain from IP Theft and Counterfeits

Fake and counterfeit products are having a serious impact, especially on pharmaceutical, electronics, and engineering (especially spare parts) global value-chains. The projected market value of counterfeit products is estimated at USD 1.8 trillion, approximately the size of the current Indian GDP. While China and Turkey are seen as the two most important source countries, India too has been identified as an increasingly important source, especially for pharmaceuticals and auto spare-parts. Indian exporters, therefore, need to have logistics services that guarantee the sanctity of their products from counterfeit contamination. Logistics firms are investing in training of staff and technologies such as hologram, RFID chips, and nano-labels to secure their supply-chains. Marking with luminescent markers on individual products that can be read using a smart-phone are also being used to ensure that there is minimum contamination. Special locks and electronic devices to protect against theft of IP sensitive prototypes are another example of such security measures. As IP and counterfeits become increasingly critical, access to such kind of value-added regulatory services imposed through private contracts or public laws would become critical for participants in global value chains

Source: DHL research

New environmental requirements such as waste electrical and electronic equipment (WEEE) are leading to the development of even more complicated regulatory connect services. Countries that have imposed WEEE norms require firms to not just collect and recycle waste electronic materials, but also maintain proper record to ensure compliance. This requires putting together a complex logistical solution that integrates physical connectivity with transactional and regulatory connect functions (Box 7 for a brief example). In many cases logistics firms have come up with specific products that

help firms meet regulatory or socio-economic obligations. A good example of this is products like GoGreen which is offered by the DP DHL group companies (Box 7).

Box 7: Regulatory Connect on Environment: Examples of Value Added Services by Logistics Firms from DHL

Waste Electrical and Electronic Equipment (WEEE) directives are in place in EU, Japan, Korea, Australia and many other countries on the verge of implementing such directives. WEEE directives typically work on an 'Extended Producer Responsibility' framework that puts obligations on manufacturers and distributors selling electrical or electronic products in a market to be responsible for collection and recycling of such products in some proportion of what they are selling into that market. Given that compliance rules differ across countries, a manufacturer who sells products would save money and effort he could have single window solution. DHL envirosolutions offers this service by combining regulatory connect services such as preparing, assessing and recommending the most appropriate compliance route and consolidating registration, data gathering and submission systems to government with the actual collection, sortation and recycling for all waste streams.

GoGreen is another DHL initiative that allows global manufacturers to map the carbon footprint of their supply-chain and find solutions to reduce or offset their carbon footprint. Manufacturers have the choice of verifying their carbon footprint by different trade lanes, and choosing from a menu of options to either offset their footprint through recognised carbon protection projects managed by GoGreen team in DHL or work with DHL to invest in technology solutions to find specific solutions to reducing carbon footprint.

Data privacy and security are some of the new areas of regulatory connect. Since logistics companies need to collect and use so much of personal as well as financial data (especially for e-commerce), they are increasingly subject to stringent data privacy laws. Thus logistics firms have to work with their clients to make sure that all participants in the value-chain are compliant with data security and privacy-related regulations.

INNOVATING TO MEET REGULATORY NEEDS AND EARN REGULATOR CONFIDENCE

An important function of logistics services is to find ways to make the global value-chains more efficient without compromising on the legitimate compliance requirements of governments and private agencies. Thus, logistics firms often take the lead in working with governments and agencies to develop solutions to regulatory challenges by suggesting simplified means of meeting compliance that also makes logistics operations more efficient. One can term such innovations as providing regulatory connect as well.

The coming together of express companies in India under the aegis of Express India Council of India (EICI) with Customs to develop an Electronic Data Inter-change (EDI) for express clearances is one good example of such industry-led initiative. Another more popular example is where industry, especially logistics firms, has worked together with governments to develop regulatory solutions to speed up operations is the Approved Economic Operator (AEO) programmes that are in various stages of development in different countries. The AEO programme requires firms, especially logistics firms, to demonstrate to the regulator (typically, customs of that country) that their entire supply chain is secure under different parameters in order to become AEO certified. Once AEO certified, these firms get special privileges in terms of procedural and administrative compliance requirements related to customs and other clearances, thus ensuring faster movement across borders.

In order to ensure better integration of Indian participants into global-value-chains, logistics service providers would have to intensify their ability to innovate and lobby with governments to improve trade facilitation-related challenges in India. This would involve adapting examples and best practices from other parts of the world (Box 8, for one such example). The next section on policy tries to summarise some the trade facilitation themes and their solutions as they apply to the logistics sector in India and the over-arching theme of connectivity to global value-chains.

Box 8: Assuring Border Agencies through Innovation: Best Practices

Optimising multi-modal logistics connections require trucks to cross national borders. However trucks at the border have to undergo onerous checks due to concerns related to drug-trafficking, human trafficking, weapon smuggling not to mention cross-checking by customs to see that declared goods and actual consignment carried are the same product and not a case of false declaration. Understanding the need for efficient cross border movement by trucks that put an end to onerous physical inspections that created delays and huge queues at the border, some innovative solutions can be developed to assure border agencies that a sealed truck would remain secure throughout its movement. \

One such small innovation is to put simple technology enabled CCTV cameras inside the truck to start recording every time the truck door opened till the time it closed. The recording was kept in a secure black-box. A centralised control tower mapped the trucks movement on GPS, logging every stop it made. Such a system would help create assurance for border agencies as well as customers, and improve the quality of border crossing. The challenge of the India-Bangladesh border that imposes huge transaction costs on the development of India-Bangladesh value chains, specifically the integration of Indian textiles and yarn and Bangladeshi ready-made garments capacity can potentially see resolutions of concerns on the part of border regulators using similar solutions.

EFFICIENT PARTICIPATION IN VALUE CHAINS: ENABLING LOGISTICS THROUGH TRADE FACILITATION

The last four sections discussed how the combination of highly efficient physical, transactional, and regulatory connect can or could enable value-chains to prosper in the Indian context. The discussion in this section argues that the lack of such connect needs serious policy interventions. The impact of high transaction costs of connectivity imposed due to poor policies gets magnified in a global value chain defined by the non-linear exchange of goods within a production network across several nodes. A small increase in transaction costs can have a significant impact in the design of the global value-chain due to the cascading and non-linear impact of such transaction costs resulting in a particular location becoming unviable in the context of being part of the production network (Yi, 2003 discusses this in the context of tariffs, but the argument is identical for any transaction cost). High transaction costs of connectivity in a particular location can also impede moving up the value-chain since moving up the chain would require the integration of several stages of the production network, necessitating several movements and, therefore, a cascading impact of such costs.

In developing competitiveness in the global value-chain context, one has to look beyond just reducing transaction costs to manageable levels. Even cursory anecdotal analysis of the way global value-chains are organised tells us that it operates in a hub and spoke model. The hubs are represented by major international gateways such as Hong Kong, Singapore, Tokyo, Shanghai, Long Beach, Rotterdam, Dubai, New York to just cite a few examples. While some authors (Coe, et al. 2004) would like to distinguish these gateways are primarily production gateways (Hong Kong, Shanghai etc) and consumption gateways (Rotterdam, Long Beach, etc), the reality of global exchange in terms of value is more complicated with two-way exchange taking place between the ocean and air-hubs (in some cases road and rail network hubs). Linking these hubs are spokes that connect production network nodes.

The essence of competitiveness of each production network node lies in the cost and timeliness of connect with these international gateways and, therefore, to the entire value-chain. The cost and timeliness, in turn, is a function of the efficiency of the corridor (i.e., the spoke) that connects the node to the hub, i.e., international gateway. It stands to reason that regions can become more attractive in the value-chain sense if they develop efficient spokes to connect with the hub. Transformational change is possible if a region can develop into a hub since it will then be able to leverage the economies of scale it derives from all the other nodes (i.e., regions) that depend on and pass it on to the economic participants located within it. The success of a Shanghai in capturing increasing higher share of the value in the global value-chain derives from its ability to become a hub in the international logistics system that forms the skeleton of the global value-chain.

Historical evidence points to the fact that emergence of efficient logistics and connectivity explains a lot of the subsequent economic development. Policy initiatives to develop efficient spokes to the international hubs and looking beyond to develop a hub in its own right depend on three things, investing in transport infrastructure, trade facilitation, and an attractive investment environment for logistics firms. Such policies can help overcome the notorious chicken and egg problem, i.e., whether local demand for logistics services needs to exist before logistics firms start to invest. Examples of locations that have relatively poor hinterland demand but have developed into major gateways are plenty. Neither Dubai nor Colombo has large industries in its environs. Chengdu, rapidly emerging as the gateway for the East Asia to Europe rail network, has a relatively less developed hinterland compared to many other Chinese cities. Montevideo in Uruguay is a gateway for Argentina, Paraguay and Brazil. This does not mean that initiatives to develop and invest in logistics hubs or spokes have not failed. But all economic planning and investment activity carries some amount of risk of failure, and this probability of failure cannot be an excuse for pro-active strategy and policy.

TRADE AND LOGISTICS FACILITATION PRIORITIES FOR INDIAN PARTICIPATION IN GLOBAL VALUE-CHAINS

Policy priorities that will enable India to develop highly efficient logistics spokes to global gateways or hubs, would integrate cost effective means of physical, transactional, and regulatory connect. Thus such policies would have to address both hard infrastructure issues related to the development of transport infrastructure, as well as the soft infrastructure of enabling regulatory environment that would help improve operational efficiency, develop advanced logistical business models, and attract logistics-related investment.

Both hard and soft infrastructure issues can only be understood in their proper context at the operations level, i.e., on the micro issues that impact day to day business operations. Such micro-issue might be related to the long-tail of the land-route connecting a major port like JNPT where a narrow-road bridge that connects the port to the trunk road infrastructure, and often has to be closed due to repairs becomes a choke-point, adding up to two days in delays. Such uncertainty due to long-tails can have very significant impact on competitiveness (Arvis, et al. 2012). Such micro-level issues can also be related to poor regulations impeding investment in logistics in the domestic leg of transport, wholesale, and distribution services. Difficulties in domestic transport raise costs and time in the movement between the port of entry and the final consumer. Inefficiencies and restrictions in wholesaling and retailing have a comparable effect. Domestic leg of transportation, wholesaling and retailing contribute a considerable amount to the total mark-up between ex-farm or ex-factory prices in the exporting country and consumer prices in the importing country (Ferrantino, 2013). Restrictions on

FDI in retail, poor regulations related to agricultural marketing such as APMC Acts, multiple-point tax collection for various state and local taxes, insistence of physical inspection of trucks at multiple points are all examples of micro-level issues impacting logistical efficiency in India.

Box 9: Developing a Real Single-Window Environment in India

The development of an effective single-window system would require small baby steps. The first would be the development of a common declaration document in customs (one each for export and import) that would integrate the data requirements of customs, excise, RBI and other allied agencies involved in the customs clearance process^a.

The second would be the establishment of protocols in government that accept digital signatures. The third would investing in server capacity of Indian customs EDI to allow it accept scanned documents and images^b. Progress has been made on both these fronts, and customs notification dated 31st March 2015 has now initiated the acceptance of electronic copies of Bill of Entry/Shipping Bill, , Import General Manifest (IGM), Export General Manifest (EGM) and Consol General Manifest (CGM) with digital signature. However, whether this leads to actual procedural change at the ground level, i.e. substantially reduces demands of cross-verification of electronically filed documents with physical copies remains to be seen. Also, there needs to be process change leading to acceptance of electronic version of commercial invoice with digital signature to make the process nearly completely paper-less.

The fourth would be to integrate the most important allied agencies providing border-management services (such as Additional Drugs Controller (ADC), Textiles Committee, Food Safety and Standards Authority of India (FSSAI), Wildlife Registration Office (WLRO), and Plant Quarantine) into a single platform linking it to Customs EDI. This common platform would also integrate DGFT and excise functions in its ambit. While a project to integrate some of these agencies such FSSAI and WLRO has been initiated by Customs, it stops short of real process integration and focuses on a simple message exchange protocol. Ambitions need to be set much higher than such piece-meal reform if India is to truly emerge as a champion reformer in the Doing Business front.

The fifth step would be to develop risk management systems (RMS) for the allied agencies and develop their human resources that would allow RMS based clearances based on scanned documents submitted online with digital signatures minimising the need for physical inspection and expediting the process in case where this is unavoidable.

The sixth step would be to allow the first assessment by customs and allied agencies to be done online by a common pool of officers (of their respective departments) who can be physically located in any part of India allowing for greater flexibility in deployment of personnel and helping create a truly 24/7 environment. This is possible since the first assessment is done on the basis of documents. If any physical assessment is required, then the officer doing the assessment online can mark it for such and the system will automatically send an SMS to his colleague who is in the port of entry to do the follow-up physical inspection.

An associated reform would be to do away with multiple codes for commercial entities in India such as Importer-Exporter Code (DGFT and Customs), PAN (Income Tax), TIN (Excise), but roll out a single commercial number that would be used for all Customs, Excise, Income-Tax, and RBI related foreign exchange transactions to support the integration of Customs, Excise and DGFT.

Contd...

^aNotification No. 114 (RE-2013)/2009-2014 issued on 12th March 2014 has made some progress towards a single common document. By this notification, the government has integrated commercial invoice and packing list into a single document, reducing the number of documents needed for export and import to just three. The mandatory documents are bill of lading/airway bill, commercial invoice, and shipping bill (bill of entry for imports).

^bBased on Circular No. 10/2015-Customs, effective from April 1st 2014, Indian customs have been shall be given the facility to use Digital Signature Certificate for filing Customs process documents. The documents in which digital signature could be used include Bills of Entry, Shipping Bills, IGM (General Declaration and Cargo Declaration), EGM (General Declaration), and CGM. While stopping short of allowing digital copies with digital signatures such as commercial invoice and other supporting documents (for example those required for excise related clearance of exports such as ARE1, and those required by allied agencies) it is a big first step towards an eventual fully digital and paperless environment.

Other good examples of such micro-level issues include the lack of harmonisation of product market rules such as the state-level Food and Drug Administration (FDA) rules governing warehousing of pharmaceuticals prevent roll-out of modern solutions such as MCS warehouses. The lack of existence of an effective single-window platform connecting multiple agencies dealing with cross-border trade and their integration with central excise and customs imposes transaction costs on export and import process. The development of air-hubs in India is prevented by complicated trans-shipment procedures, FDI limits on domestic air-cargo, and lack of an open skies policy. An attempt is made to provide a comprehensive (but non-exhaustive) summary in Table 3. Some of the solutions to these challenges are relatively easy and represent low-hanging fruit (Box 9 for one such possible solution).

In order to deal with issues identified in Table 3, the governments (national, state as well as regional country governments) need to engage with private sector stakeholders and develop actionable road-maps to address these challenges. The private sector in India, especially logistics firms have themselves become quite pro-active. As Berenheim and Shakya (2011) point out, private sector stakeholders are increasingly engaging central and regional governments on the performance and availability of the “at the border and beyond the border” aspects of their supply chain notably on the issues related to logistics infrastructure, connectivity and regulatory environment. In the Indian context, such engagement has been ad-hoc and marked by lack of coordination among the various private sector stakeholders (user industries and different sections of the logistics industry).

A good alternative model for India is provided by the APEC Supply Chain Connectivity Framework Action Plan (SCCFAP). Under SCFAP, APEC adopted a

quantitative target of improving the performance of time, cost and uncertainty of supply chain performance by 10 per cent by 2015, a target APEC Leaders first committed to under the 2010 Yokohama Vision (Bayhaqi and Yuhua, 2013). Achievement of this quantitative target is backed by comprehensive identification and assessment of issues in collaboration with the private sector and action taken framework with firm deadlines. The action taken framework would have to distinguish between short-term, medium-term and longer-term strategic goals. The issue identification is also categorised under broad buckets for better inter-country and inter-departmental coordination. Table 3 that follows as a conclusion to this paper is a modified version of the SCCFAP approach adapted to the Indian context.

Table 3. Overview of Action Taken Framework Agenda for better Connectivity:
Enabling Efficient Logistics Services for Indian Value-Chains

Chokepoint	Definition	Indian Context
Transparency	Lack of awareness and coordination among government agencies on policies affecting logistics sector; absence of single contact point or champion agency on logistics matters.	<ul style="list-style-type: none"> -Development of single public private platform on the lines of SCCFAP -Publishing all regulations online -Invitation to consultations on new regulations and procedures to be put on public website and comments can be submitted online
Infrastructure	Inefficient or inadequate transport infrastructure	<ul style="list-style-type: none"> -Identification of last-mile linkage issues with trunk infrastructure -Involving local urban bodies in planning and restructuring for airport and ports -Revenue sharing models for port and airport operators designed for efficiency and attractive investment and not revenue maximisation of government exchequer -Airport operators directed to give adequate importance to cargo as opposed to just passengers -Ensure design of economic and transport corridors being undertaken have logistics sector inputs and priorities in place. Involve state governments in the design process.

Chokepoint	Definition	Indian Context
Logistics Capacity	Lack of capacity of local/regional logistics sub-providers	<ul style="list-style-type: none"> -Implement GST to rationalise investment in logistical capacity and efforts Development of industry standards (trucking, rail-road container freight) -Liberalise investment regime (FDI) in domestic air-freight movement, allow foreign lines to provide coastal shipping (cabotage) -Move towards an open skies regime to maximise available belly-space for cargo in passenger airliners -Encourage leading institutes like IITs and NITs to develop logistics research facilities in collaboration with industry. -Identify at least 200 industrial training institutes to roll out logistics-related training programmes in collaboration with industry.
Clearance and Procedural Issues	Inefficient clearance of goods at the border; lack of coordination among border agencies, especially relating to clearance of regulated goods "at the border".	<ul style="list-style-type: none"> -Effective single-window system (Box 9 above) -Integrate multiple payment points of intra-state movement related tax payment by trucks in a single payment point, preferably the first road toll booth after trucks enters a state -Implement electronic payment of road toll using RFID tags -Implement a protocol that allows container sealed trucks having advanced electronic seals on containers and GPS and CCTV-secure containers to move across borders (intra-Indian and South Asian) without physical inspection.
Documentation	Burdensome procedures for customs documentation and other procedures (including for preferential trade).	<ul style="list-style-type: none"> -Audit the number of documents and procedures and consult with industry to remove all duplication -Work towards a single-window, almost paperless environment (Box 9) -Implement GST to reduce multiplicity of documentation for intra-state goods movement -Ensure that GST not only integrates taxes, but also results in procedural simplification in terms of a) documentation, b) much reduced inspection regimes and use of risk management system, c) integration of border check points, d) green channel for trusted operators and express shipments, e) use of e-documents (min need for paper work being carried by transporter in transit).

Checkpoint	Definition	Indian Context
Connectivity	Under-developed multi-modal transport capabilities; inefficient air, land, and multimodal connectivity	<ul style="list-style-type: none"> -Increase choice and remove all restrictions on logistics modes. For example, express is restricted by weight in what it can carry and also restricted from carrying certain types of products -Reform customs trans-shipment rules conducive to the development of air and ocean hubs in India -Improve liner-shipping connectivity to Indian ports through active engagement, -Offer incentives to large Indian and foreign logistics players to develop existing public infrastructure into multi-modal hubs like Chengdu has done with its railway infrastructure.
Regulations and standards	Variations in cross-border standards and regulations for movements of goods, services and business travelers	<ul style="list-style-type: none"> -Identification and resolution of product market regulations (e.g. warehousing regulations or APMC governing agro-produce) to attract investment (local and FDI) -Harmonisation of rules governing logistics functions related to transport, production, and distribution across states in India -Removing requirement for supply-chain managing firms to have physical presence in India. -Removing the requirement that suppliers can hold inventory only if they are resident companies, as there are no provisions for non-resident importers.
Transit	Lack of regional cross-border customs and transit arrangements.	<ul style="list-style-type: none"> -Expedite implementation of India-Bangladesh and SAARC Motor Vehicles agreements. Make sure private sector is part of the agreement implementation design -Expedite India-ASEAN Transit Agreement. Ensure private sector is part of the agreement design right from the start. -Development of harmonised protocols and message exchange between Indian and SAARC member country customs as a priority project -Development of transit corridors (and enabling agreements) via Bangladesh to NE India, via Pakistan to Central Asia, and multi-modal (sea-road and sea-rail) transit linkage to Central Asia and Europe via Chabahar port in Iran

Developed by the author

REFERENCES

1. Accetturo, A., Giunta, A., and Rossi, S. (2011) *"Italian Firms Between Crisis and New Globalization"*, Occasional Papers No. 86, BancaD'Italia
2. Arndt, S and Kierzkowski, H. (2001) *"Fragmentation: New Production Patterns in World Economy"*, Oxford University Press
3. Arvis, J., Raballand, G., Marteau, J.(2012) *"The Cost of Being Landlocked: Logistics Costs and Supply Chain Reliability"*, World Bank
4. Bayhaqi, A., and Yuhua, B. (2013) *"Interim Assessment for Supply Chain Connectivity Framework Action Plan"* APEC Policy Support Unit
5. Banerjee, P, (2009) *"Sub-regional Co-operation in Eastern India and Bangladesh: Prospects, Problems and Policies"*, *Review of Market Integration* 1:1, 11-35
6. Banerjee, P. (2009) *"Importance of Trade Facilitation in International Trade"*, *Focus WTO*, 11:4
7. Berenbeim, R., and Shakya, M. (2011) *"Integration of Developing Countries in the Global Supply Chain: A Global Buyers' and Producers' Perspective"*, The Conference Board, New York.
8. Bhatnagar, R., and Teo, C. (2009) "Role of Logistics in Enhancing Competitive Advantage: A Value Chain Framework for Global Supply Chains", *International Journal of Physical Distribution & Logistics Management*, 39:3, 202 - 226
9. Chatterjee, L., and Tsai, C. (2002) *"Transportation Logistics in Global Value and Supply Chains"* Center for Transportation Studies Working Paper, Boston University
10. Coe, N., Hess, M., Yeung, H., Dicken, P. and Henderson, J. (2004) *"Globalizing Regional Development: A Global Production Networks Perspective"*, *Transactions of the Institute of British Geographers*, 29:4, 468–484
11. Department of Commerce (2011) *"Taskforce on Transaction Costs of Exports: A Report"*, Ministry of Commerce, Government of India
12. Elms, D. (2013) *"Views of GVC Operators"* in D.Elms and P.Low (eds) *Global Value Chains in a Changing World*, World Trade Organization, Fung Global Institute, and Temasek Foundation Centre for Trade and Negotiation Publication
13. Escaith, H., and Inomata, S. (2013) *"Geometry of Global Value Chains in East Asia: The Role of Industrial Networks and Trade Policies"*, in D.Elms and P.Low (eds)

Global Value Chains in a Changing World, World Trade Organization, Fung Global Institute, and Temasek Foundation Centre for Trade and Negotiation Publication

14. Ferrantino, M (2013) "Policies to Improve the Supply Chain: What Needs to be Done?", in D.Elms and P.Low (eds) *Global Value Chains in a Changing World*, World Trade Organization, Fung Global Institute, and Temasek Foundation Centre for Trade and Negotiation Publication
15. Fine, C., Vardan, R., Pethick, R., and El-Hout, J. (2002) "Rapid-Response Capability in Value Chain Design," *MIT Sloan Management Review*, 69–75
16. Fung, V. (2013) "Preface to the Edited Volume" in D.Elms and P.Low (eds) *Global Value Chains in a Changing World*, World Trade Organization, Fung Global Institute, and Temasek Foundation Centre for Trade and Negotiation Publication
17. Goh, M (2013) "Supply Chain Connectivity and Trade in Asia", in D.Elms and P.Low (eds) *Global Value Chains in a Changing World*, World Trade Organization, Fung Global Institute, and Temasek Foundation Centre for Trade and Negotiation Publication
18. Helpman, E., Melitz, M., and Yeaple, S. (2004) "Export versus FDI with Heterogeneous Firms", *American Economic Review*, 94:1, 300–316.
19. Hesse, M., and Rodrigue, J.(2004) "The Transport Geography of Logistics and Freight Distribution", *Journal of Transport Geography*, 12, 171–184.
20. Jones, R. and Kierzkowski, H. (1990) "The Role of Services in Production and International Trade: A Theoretical Framework", in R. Jones and A. Krueger (eds) *The Political Economy of International Trade: Essays in Honor of R.E. Baldwin*, Basil Blackwell
21. Lessard, D. (2013) "Uncertainty and Risk in Global Supply Chains", in D.Elms and P.Low (eds) *Global Value Chains in a Changing World*, World Trade Organization, Fung Global Institute, and Temasek Foundation Centre for Trade and Negotiation Publication
22. Lodefalk, M., (2013) "Servicification of Manufacturing - Evidence from Sweden", *International Journal of Economics and Business Research*, 6:1, 87–113
23. Low, P. (2013) "The Role of Services", in D.Elms and P.Low (eds) *Global Value Chains in a Changing World*, World Trade Organization, Fung Global Institute, and Temasek Foundation Centre for Trade and Negotiation Publication

24. Markusen, J., Venables, A., Konan, D., and Zhang, K.(1996) "A Unified Treatment of Horizontal Direct Investment, Vertical Direct Investment, and the Pattern of Trade in Goods and Services" NBER Working Papers 5696, National Bureau of Economic Research
25. Melitz, M. (2003) "The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity", *Econometrica*, 17:6, 1695–1725.
26. Memodevic, Ojala, L., Rodrigue, J., and Naula, T. (2008) "Fuelling the Global Value Chains: What Role for Logistics Capabilities?", *International Journal of Technological Learning, Innovation and Development*, 1:3, 353-374.
27. Mitra, S (2009) "Impact of Government Investments in National Highways on the Operational Efficiency of Freight Transportation by Road in India", Transport Corporation of India Report
28. Ojala, L., Andersson, D. and Naula, T. (2006) "Logistics Value Chain", UNIDO Background Paper
29. Roy, J., and Banerjee, P. (2010) "Connecting South Asia: The Centrality of Trade Facilitation for Regional Economic Integration", in S. Ahmed, S. Kelegama and E. Ghani (eds), *Promoting Economic Cooperation in South Asia: Beyond SAFTA*, World Bank and Sage.
30. Roy, J and Banerjee, P. (2013) "Why Isn't India a Major Global Player? The Political Economy of Trade Liberalization", European University Institute Working Paper RSCAS 2013/84
31. Samel, H. (2012). "Upgrading Under Volatility in a Global Economy", MIT Sloan School Working Paper
32. World Economic Forum (2012) "The Shifting Geography of Global Value Chains: Implications for Developing Countries and Trade Policy", Working Paper of the Global Agenda Council on the Global Trade System of the World Economic Forum
33. Weil, H. (2013) "The Dynamics of Global Supply Chains: The Imperatives for Success in a New Market Ecology", in D.Elms and P.Low (eds) *Global Value Chains in a Changing World*, World Trade Organization, Fung Global Institute, and Temasek Foundation Centre for Trade and Negotiation Publication
34. Yi, M. (2003) "Can Vertical Specialization Explain the Growth in World Trade?" *Journal of Political Economy*, 111, 52–102.

The Promise of Dry Ports for Regional Development and Integration

Raghu Dayal *

INTRODUCTION

Geography adds dramatically to the development challenges. Inland sites economically linked to the coastal networks, ICDs (inland container depots) and CFSs (container freight stations), as dry ports in generic terms, in reality, "ports without water" serve as nodes for consolidation and distribution of goods with functions analogous to those of a gateway port. Primarily as an extension of a gateway as a clearing point, providing last mile connectivity from an inland location, an ICD is as a rule located in proximity of industrial and commercial centres, whereas a CFS is typically closer to a port. The shippers are not only enabled to get the benefit of speed, and reliable door-to-door services, but also for a complete logistics solution, which generally involves multimodal integration.

UNCTAD provides a comprehensive definition of a dry port: "A common user facility with public authority status, equipped with fixed installations and offering services for handling and temporary storage of any kind of goods (including containers) carried under customs transit by any applicable mode of transport, placed under customs control and with customs and other agencies competent to clear goods for home use, warehousing, temporary admissions, re-export, temporary storage for onward transit and outright export".

Inland-based shippers typically have an opportunity to undertake international trade through local facilities; essential functions such as customs clearance and documentation for export can be undertaken locally; smaller shippers can benefit from consolidation of their consignments to form full unit loads; inland-based shippers have direct access to international transport equipment such as containers or roll-on/roll-off vehicles, besides domestic-only shippers being able to have access to a wider range of local logistics resources. Especially since the advent of containerisation, the freight transport industry has been transformed towards a total system approach, becoming an integral component of broader logistics operations, from the traditional port-to-port transit.

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SPATIAL INEQUALITIES IN NATIONAL ECONOMIES

Economic growth and trade in most countries has historically centred around seaports with a focus on the development of port terminals and maritime shipping networks. Coastal areas worldwide have generally been richer than inland sites and have also seen faster growth, exacerbating spatial inequalities in national economies. In India, industry and commerce grew largely near and around gateway ports, old port cities emerging as mega metros such as Mumbai, Kolkata and Chennai.

Accordingly, in Asia and the Pacific, it is mainly coastal regions that have benefited from the current phase of globalisation by becoming important nodes in the regional production projects. The ASPA region's characteristic geography and its export-oriented economies lend importance to the concept of satellite terminals and inland load centres in relative close proximity. United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) examined the potential of intermodal transport and freight modal interchanges and inland ports for alleviating the trade and transit cost disadvantages, particularly of land-locked countries and remote hinterlands of littoral states. Extending the developmental impulses to the hinterlands linked to gateways, Asian Highway and Trans Asian Railway projects are envisaged to serve as catalysts for infrastructural nodes in the region which may take different names, dry ports, ICDs, CFSs, logistics zones or parks, freight villages, distriparks, et al. They all essentially perform the function of facilitating seamless and cost effective transportation of goods, although they may differ in their size, structure and scope.

ENHANCING VAUE AND BURGEONING VOLUMES

The volume of containerised trade is likely to continue to grow faster than the world economy. With seaport capacities overstretched, more and more inland container terminals are being developed and augmented. Inland terminals become the desired hinterland platform solution and enable the seaport to increase its terminal capacity. To avoid serious congestion, port operators are increasingly channeling the incoming container flows to satellite terminals or intermodal transfer points in the hinterland. The growing focus on inland freight terminals signifies transport development strategies shifting inland to cope with capacity and efficiency issues in the context of global supply chains.

In the early 1990s, trade grew faster than world GDP, but it rose twice as fast as the world economy in 2003-06. For the past two years, 2013-2014, world GDP has grown faster than trade. A strong US dollar and plunging commodity prices worldwide have impacted the value of global trade. In volume terms, though, trade is still growing - by 1.7 per cent year-on-year in the first half of 2015, which, of course, is far below the long term average, of about 5 per cent a year. A recent IMF working paper argues that trade

elasticity - the amount of trade generated as incomes rise - has fallen significantly in both China and America.

The change in the composition of international trade, with a shift away from basic commodities towards processed primary products and manufactured goods, favours growth in container volumes. The dynamic growth in the container trade has mainly resulted from:

- increasing exchange of goods in the course of the growing integration of national economies and stronger international division of labour;
- increasing share of manufacturing, and value-added products in trade;
- movement of production facilities to overseas locations;
- reduction in transportation costs for containers and consequent increase in the suitability of containerisation for lower value exports; and
- continuing increase in cargo deliveries to the large seaports by means of feeder vessels.

Projections for container port handling worldwide estimate 1 billion TEU by 2020, doubling the volume of 506 million TEU in 2008 (UNCTAD). Seaport throughput and efficiency may be jeopardised by bottlenecks in the landside transport system serving the ports. These volumes will stretch the limits of seaside infrastructure as much as land for inland intermodal installations. Today some of the factors impacting port development dynamics include shortage of industrial premises, scarcity of land as well as its high prices, inland location of markets, congestion problems and environmental considerations. Lack of land for expansion is indeed emerging as an acute problem further impacted by deeper water requirements for handling larger vessels.

ASIA MOVES AHEAD

Among the three major trade routes related to Asia, namely, the Asia-Europe, trans-Pacific and intra-Asian routes, intra-Asian trade is projected to show the strongest growth rate. The Maritime Policy Planning Model (UNESCAP) expected that the total volume of international container handling in the Asia and Pacific region ports would increase from 142.7 million TEU in 2002 to 427.0 million TEU in 2015, an annual average growth rate of 8.8 per cent. A clear indication of a new geography of trade, the trade triangle comprising India-China, India-ASEAN and ASEAN-China corridors is projected to account for about 80 per cent of Asia's container trade by 2025.

- Cumulative container traffic flows within Asia and between Asia and Europe are expected to register a quantum jump, from an annual existing 32 million TEU level to 98 million TEU, estimated in 2025.

- Intra-Asia trade itself is slated to increase significantly, from 16 million TEU per annum now to over 57 million TEU in 2025.
- Logistics costs in the region are among the world's highest. Multimodal logistics solutions will help significantly improve efficiency, thus bringing down transaction costs.
 - It will become possible through
 - reliable and efficient internal logistics infrastructure
 - efficient port handling systems with appropriate hinterland linkages for optimising costs and facilitating unhindered transfers across modes.
 - improved transportation and communication linkages and greater connectivity between railway systems and other modes.
 - simplification of documentation and other facilitation measures.

A DRY PORT-POTENTIAL HUB OF PROSPERITY

As succinctly put by Paul Garnwa, Anthony Beresford and Stephen Pettit, dry ports have become an integral part of logistics by extending the gateway functions inland. An ICD or a CFS, in effect a potential hub of prosperity, an inland freight modal interchange facility as a rule stimulates growth of economic activities in the vicinity. Integrated transport services have brought advantages of containerisation to the shippers' doorsteps – with reduced handling, free from damage and pilferage, facility of customs intervention, close supervision of stuffing/de-stuffing of cargoes, leading also to better stowage and consequent gains in ocean freight payments.

With the terminals working as one-stop, single-window facilities and an optimal mix of road-cum-rail services from factory to port, involving first-mile pick-up and last-mile delivery, a complete service package has materialised. For example, some of the centrally located countries in Europe such as the Netherlands and Belgium attract many a continent-wide distribution centre, forming important logistics nodes in the supply chain. In Europe, there are now large concentrations of logistics sites in and around the port of Liège, along the Geel-Hasselt-Genk axis and the Antwerp-Brussels axis, and in the Kortrijk/Lille border region. The existing geographical concentration of logistics sites has stimulated the development of inland terminals in these areas.

Dry ports: *raison d'être*: A dry port/ ICD/CFS/distripark/freight village as a rule may be viewed in generic terms, implying facilities in close vicinity of production/consumption centres for speedy evacuation of import/export containers from/to a gateway port, for

- unitisation, stuffing/de-stuffing of cargo, and mandatory clearances

- warehousing for safety and security of cargo during in-transit storage
- storage, cleaning, repair and transport of empty containers
- integrated logistics and value-added services.

It is learnt from Theo Notteboom and Jean-Paul Rodrigue that logistics zones comprising intermodal terminals and logistics sites are often referred to as freight villages. Europlatforms, the European Association of Freight Villages defines a freight village as “a defined area within which all activities relating to transport, logistics and the distribution of goods, both for national and international transit, are carried out by various operators...In order to encourage intermodal transport for the handling of goods, a freight village must preferably be served by a multiplicity of transport modes (road, rail, deep-sea, inland waterway, air). Finally, it is imperative that a freight village be run by a single body, either public or private”.

In North America, planned logistics zones came later. The development of planned logistics zones was characterised by its own cluster dynamics: (i) near gateways where logistics clusters are strongly conditioned by warehousing parks in the vicinity of container port terminals as well as in suburban settings near ring roads; (ii) around the inland rail terminals; and (iii) along major highway corridors that can service a large metropolitan area or a group of metropolitan areas. Kansas City may well be viewed as the most advanced inland port initiative in the continent, combining as it does intermodal rail facilities from four different rail operators, free trade zones and logistics parks, besides the world’s largest underground warehousing facility.

DRY PORT-AN EXTENSION OF THE SEA PORT

A CFS, as in India, is generally an off-dock facility close to the servicing port, helping decongest the port by shifting cargo and customs-related activities. It is also set up inland, as, in fact, several of them in India, for linkage to a regional rail-linked ICD by road. Those near the ports serve a dual purpose: as an extended arm of the port, and for handling export-import cargo for port towns many of which are important industrial and commercial hubs. Viewed by some as close-by dry ports, such CFSs, situated in the immediate vicinity of a seaport, provide a buffer to the port by enlarging its terminal capacity. In some cases, rail shuttle services link the CFSs with the seaport. The mid-range dry ports, usually with road-based connectivity, act as consolidation points for block train services.

Dry ports, as a rule, potentially nurture manufacturing and service clusters, for example, special economic zones, and export processing zones. A dry port is generally located close to an existing or potential production or consumption centre. The number of dry ports would depend on geography as well as diversity and extent of economic activity. There were in the mid-1980s about 150 ICDs in North America, 130 in Europe

and around 400 worldwide (Lloyds Maritime Atlas of World Ports and Shipping Places: 16th edition). In the context of Asian Highway and Trans-Asian Railway networks, UNESCAP estimated the requirement of an additional 200 dry ports in the Asia-Pacific region by 2015.

Ports, especially large gateways, today face an array of constraints, impairing their growth and efficiency: scarce availability of land for expansion, deepwater requirements for handling larger ships, diseconomies of ports as local road and rail systems are seriously strained. Environmental constraints and local opposition to port development exacerbate the problem. For minimising economic disparities between coastal and inland areas, environment conservation, energy efficiency and reduction in congestion on roads, the European Union has been keenly promoting and facilitating penetration of seaborne containers from gateway ports to inland centres. The Marco Polo programme addressed the lack of adequate links between sea, inland waterways, road and rail within the EU, and sought to overcome it through community aid until intermodal initiatives became commercially viable. Earlier, there was a similar programme termed Pilot Actions for Combined Transport (PACT), 1997-2001 which funded a number of inland terminal projects.

FALLING COMMUNICATION/TRANSPORTATION COSTS

During the last forty years from the mid-1970s, when containerisation was gradually introduced in international commercial trade, the cost of transportation has declined, in real USD terms, in some cases, to less than a quarter of what it used to be. Air transport has seen similar substantial reductions in the cost and availability of new integrated cargo concepts and products. As shipping lines procured large vessels specially designed to handle containers, currently, up to over 18,000 TEU per vessel, and still emerging larger on the drawing board, ocean freight rates plummeted. And as container shipping became intermodal, with a seamless movement of containers among ships and trucks and trains, goods could move from Asian factories, for example, directly to the shelves and stockrooms of retail stores in America or Europe.

INTERMODAL SUPPORT SYSTEM

According to Notteboom and Rodrigue, the door-to-door concept has transformed a number of terminal operators into logistics providers and operators of inland services. For example, Maersk Line has evolved strategies to push containers into the hinterland supported by its terminal branch APM Terminals and its rail links; HPH-owned ECT in Rotterdam has been acquiring key inland terminals to function as extended gates to its deep-sea terminals as the rail terminal at Venlo in the Netherlands, DeCeTe terminal in Duisburg, Germany, and TCT Belgium at Willebroek in Belgium. DP World partners

with CMA CGM for intermodal operations on the Seine and Rhône axes; the terminals of Antwerp Gateway and London Gateway are linked to inland centres in the hinterland.

Several rail operators together make up the supply of hub-based networks. Hamburg's rail connections, more than 160 international and national shuttle and block train services per week. Likewise, Rotterdam and Antwerp each operate 150-200 intermodal rail departures per week.

Intermodal rail in the US accounts for some 40 per cent of all the ton-miles transported, while, in Europe, this share is just 8 per cent. Rail carriers and shipping companies jointly improve the intermodal interface at major gateways or interlining points between major networks. With a handling of around 10 million TEU annually, Chicago is the largest interlining centre in North America. The main North American land-bridge links two major gateway systems: southern California and New York/New Jersey via Chicago.

EARLY START BY IR IN INDIA- THE FIRST INFANT STEPS

In India, ICDs and CFSs came about at the instance and initiative of Indian Railways (IR), central and state warehousing corporations, shipping lines, logistics and road operators. It goes to IR's credit to have realised as early as in the 1960s the immense potential as well as benefits of high value cargo transported door-to-door through intermodal arrangement. IR had in earlier years launched a rudimentary multimodal service for "smalls" or less than wagon load traffic through street collection and delivery services. The gradual decline of railroads in most of the industrialised countries had a lesson for IR, to think and act afresh for fast falling general goods traffic, other than bulk commodities. Containerised multi-modal transport, indeed as a transformational initiative, was started in India as far back as 1966-67 by IR with containerised transport of piecemeal intra-country cargo, when it inducted 4.5 tonne and 5 tonne containers of its own design and standards.

Transportation of ISO containers for international trade from gateway ports to the hinterland was started by IR in 1981-82. As a sequel to the recommendations of different working groups set up by Government, IR was required, in consultation with Ministries of Commerce, Finance, and of Transport and Shipping, to set up and manage ICDs and develop intermodal transport of ISO containers between gateway ports and ICDs. Commencing with an improvised ICD at Bangalore (now termed Bengaluru) within the rail freight handling siding at the station in August 1981, IR improvised a few other similar ICDs at the railway freight depots at Coimbatore, Guntur, Anaparti, Amingaon (Guwahati), Ludhiana and Pragati Maidan (New Delhi). The first three among them provided the linkage for movement of containers to and from Madras (Chennai) and Cochin ports (the two depots at Guntur and Anaparti largely for tobacco shipments); ICD

at Guwahati mostly for tea exports was linked to Calcutta (Kolkata) and Haldia ports; ICD at Delhi had its connectivity to Bombay (Mumbai) port. India's first inland CFS for stripping/consolidation, stuffing/de-stuffing of LCL (less than container load) cargo was commissioned at the Central Warehousing Corporation (CWC)'s facility at Patparganj, New Delhi, in 1985.

END-TO-END MULTIMODAL TRANSPORT

Share of container traffic in IR's total freight traffic in 1988-89 was miniscule: of a total IR's freight loading of 302 million tonne, containerised traffic accounted for less than 0.5 million tonne. International trade required more transit-time sensitivity and 'small-volume customer' care than what IR with its focus on large volumes of bulk commodities could provide. Trade facilitation may well be cited as the very *raison d'être* of containerisation of India's export-import cargo. Both for ease of handling and safe and speedy transit, besides economies in transport and transaction costs, overseas importers insisted on receiving their shipments in containers, which provided the facility also of door-to-door transit backed by a through, unified liability regime, a composite contract with the forwarder involving multimodal transport end-to-end. This impelled the establishment of inland terminals nearest the sources of cargo. Customs clearance facility, in turn, was a critical element.

CRITICAL INSTITUTIONAL FRAMEWORK, BEYOND BRICK AND MORTAR

Government of India realised the importance of appropriate institutional infrastructure for quickly catching up on the multimodal containerised transport of its exports and imports. To duly coordinate various interests and considerations of relevant government departments for expeditious decisions in this regard, and for enlisting active participation of public and private sectors for a healthy growth of multimodal transport in the country, an Inter-Ministerial Committee (IMC) framed guidelines for approval of all applications for the setting up of ICDs and CFSs, serving as a single window clearance mechanism, involving all stakeholders, including trade and industry, customs, ports and shipping, railways, roads and other interests.

Legal, liability and facilitation aspects: For legal, financial and liability issues, Government enacted the Multimodal Transport of Goods Act, which, *inter alia*, served as the basis for legal support for international banking and liability aspects to be addressed. Customs brought about extensive enabling provisions in the laws, rules and procedures conducive to the development of containerisation and multimodal transport.

The multimodal transport document serves as an instrument to enforce the provisions of the law by assigning liabilities and responsibilities to multimodal transport operator (MTO), consignor, consignee, insurer and banker. Until the enactment of this

Act, the Foreign Exchange Dealers Association of India (FEDAI) evolved its own rules, laying down responsibilities and liabilities of the combined transport operators. The FEDAI did not confer negotiability title to the goods. Further, such documents were required to be exchanged for regular on-board Ocean Bill of Lading (OBL) at the port, unless the Letter of Credit (LC) specifically permitted the production of the Combined Transport Document (CTD) evolved by FEDAI in relation to the Bill of Lading. Insurance by way of the liability cover for MTOs could be extended by the TT (Through Transport) Club.

IMC: All applications for the setting up of ICDs and CFSs are analysed and approved by IMC. Thirty ICDs and CFSs, 28 of which in public sector, had come into being prior to the constitution of the IMC.

MITES: a consulting company was engaged to survey and study the present and potential nodes and clusters of industrial and commercial activities together with their optimal linkages with gateway ports. These nodes and clusters would be considered for inland container handling and processing facilities after due diligence and examination of relevant ancillary considerations, especially operational and economic viability of the locations for dry ports. A feasibility study precedes the proposal for an ICD/CFS. A copy of a techno-economic feasibility study accompanies the application which, inter alia, requires the facility to be economically viable for management, and attractive to users, and to have a minimum critical mass. ICDs/CFSs are expected to provide for all trade-related facilities; single-window for mandatory clearances, payments, and incentives certification, as well as presence of customs, banks, shipping lines and agents, NVOCCs (non-vessel owning common carriers), CHAs (customs house agents), and transport operators.

THE CHALLENGE OF EVOLVING TECHNOLOGIES

Evolving technologies in maritime hardware unleash their own challenge, for example, the constantly increasing size and capacity of vessels. These changes in ship technology make it necessary to cater to:

- larger, faster, and more sophisticated cargo handling transfer and storage technology,
- commensurate capacity build-up of landside facilities, container and feeder routing, scheduling and sequencing systems,
- real time systems information management and cargo-vehicle tracing system,
- new integrated paperless electronic operations management, marketing, finance, accounting, procurement and collection systems,
- changes in management systems which automatically adjust hard and soft components of the system and their operations to changes in requirements.

BIRTH OF CONCOR – A SEMINAL STEP

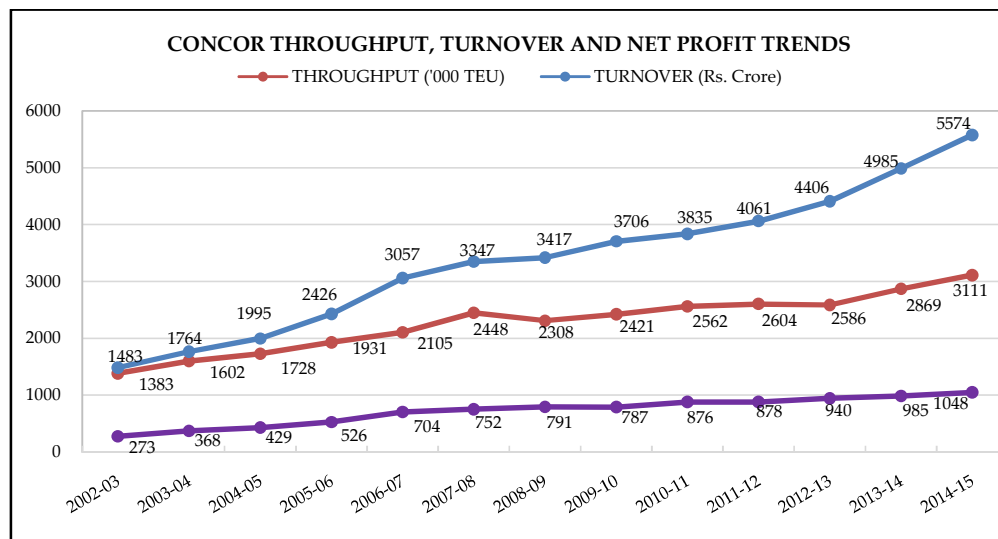
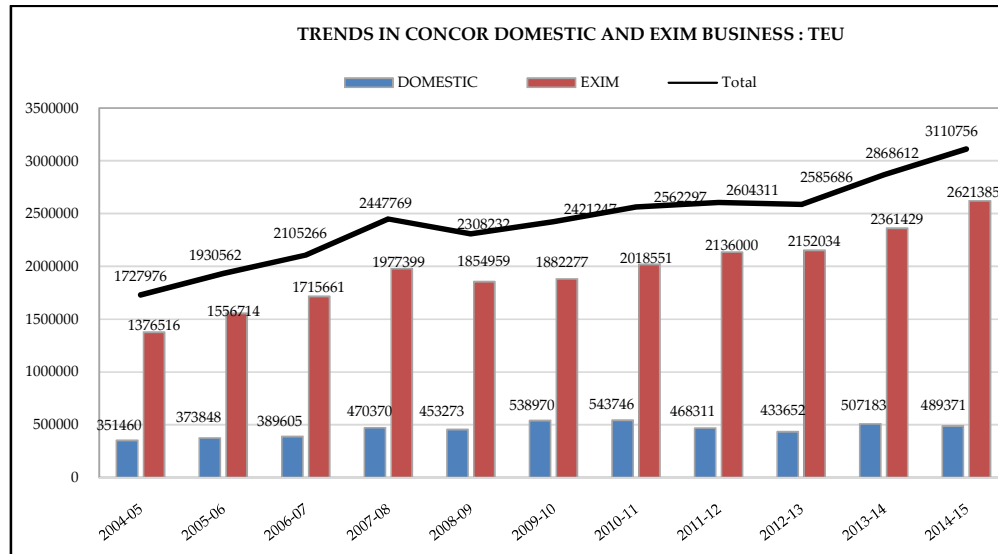
For a focussed thrust and requisite impetus to the concept of integrated multimodal development in the country along with intermodal interchange nodes, Government opted for a dedicated institutional mechanism of a public sector company (Container Corporation of India) to take up the task. As if to follow what the celebrated astrophysicist Stephen W. Hawking succinctly summed up, “Time is not completely separate from, and independent of, space, but is combined with it to form an object called space – time, in relation to motion”, CONCOR devised its business strategy to be in harmony in the trinity of time, space and motion. It pursued the essence and purport of inter-modalism with the primacy of rail transit with road services utilised as supplementary services (with involvement of private sector) to provide door-to-door linkages. A simplified tariff system that CONCOR introduced, as reflected in the ingenious Inland Way Bill (IWB), was a composite charge for most of the common services, including terminal handling charges at the ICD and at the gateway together with rail haulage cost of containers. The composite freight charge on the basis of per TEU km formed a virtual FAK (freight all kind) irrespective of the commodity in the box.

Cost awareness was a crucial factor in the development of dry port facilities. This aspect had two elements: one, to build in modules, developing the facility as per the emerging need and demand, of course, ensuring that the facility did not unduly become a constraint for want of required capacity; secondly, the dry port development as a rule followed the maxim of appropriate module for a location, thereby tailoring the capacity at a facility reasonably to the foreseeable demand. That is how CONCOR has a couple of mega ICDs capable of handling up to a million TEU/year; a few large ICDs each of them able to deal with an annual throughput of up to 250,000 TEU; some others with capacity of up to 50,000-70,000 TEU; and a few smaller, satellite installations to handle, say, about 25,000 TEU/year.

INVOLVING AIRLINES

Generally, ICDs and CFSs have traditionally been linked to only maritime services, shipping and ports. Uncharacteristically, some of the ICDs in India have brought within their ambit air cargo as well - joining hands with selected airlines for handling air cargo, for customs-cleared ULDs being carted between the ICDs and gateway airports in customs-bonded trucks. To start with, CONCOR joined hands with Hindustan Aeronautics Ltd at Bangalore through a revenue sharing model, to develop facilities for airfreight of export cargo. It now has a fully owned subsidiary company, CONCOR Air Limited that manages the existing domestic air cargo MIAL (Mumbai International Airport Limited) facility at Marol. As the subsidiary company has taken over MIAL's

international cargo operations also at Sahar, it would design, develop and operate the air cargo terminal at Santa Cruz airport.



SYNERGISING PUBLIC AND PRIVATE STRENGTHS - GAZING BEYOND THE FAMILIAR HORIZON

CONCOR has been expanding its business horizons by diversifying in several areas and activities by way of alliances and joint ventures with diverse private sector entities, including shipping lines, port terminal operators, freight forwarding, logistics and supply chain management companies, competing warehousing and material

handling companies, with the objective of deriving optimal advantage, cost reduction, and efficiency enhancement. In its initial stage itself, private entrepreneurs were invited and encouraged by CONCOR to join hands in different activities on mutually beneficial terms, for instance, in providing capital and trained manpower for handling equipment (cranes, trucks, forklifts, etc.), at its ICDs and



Gantry Crane in operation at Inland Container Depot Northern Region Tughlakabad

CFSs, maintenance facilities, and terminal operations. It also let the private operators handle on contract/under franchise transport of containers and cargo by road between (i) the satellite CFSs and the rail-fed ICDs and (ii) between ICDs/CFSs and shippers' premises. Nevertheless, at selected large facilities such as its flagship ICD at Tughlakabad, CONCOR opted to own, operate and maintain an array of its own equipment.

At Dadri, near Greater Noida, in the vicinity of Delhi, CONCOR forged joint ventures to develop CFSs with four shipping lines: Maersk, APL (later switched to Albatros), CMA CGM, Transworld and All Cargo - with 49 per cent equity participation. It also entered into a JV with Maersk, with 26 per cent equity contribution for the development and operation of the third maritime container terminal at JN Port. The 1.3 million TEU terminal became operational in March 2006. Another JV was entered into with Dubai Port World with 15 per cent equity contribution to develop a container transshipment port at Vallarpadam in Kochi. Yet another joint venture has been forged between CONCOR and Gateway Rail Freight Pvt. Ltd., a subsidiary of Gateway Distriparks, to construct and operate a rail-linked container terminal at Garhi Harsaru near Gurgaon in proximity of Delhi. CONCOR started short sea shipping operations in association with Seaways Ltd.

CONCOR has two wholly owned subsidiaries: (i) Fresh and Healthy Enterprises Ltd. (to provide complete cold chain logistics infrastructure) and (ii) CONCOR Air Ltd., besides two other subsidiaries - (a) SCICL (SIDCULCONCOR Infra Company Ltd.) and

(b) PLIL (Punjab Logistics Infrastructure Ltd.) set up in strategic partnership with the respective State Government entities. The former aims at developing a multimodal logistics park in the State of Uttarakhand, and the latter another such park near Kila Raipur in Punjab. Exploring newer business forays, CONCOR opted in 2015 for a 26 per cent stake in Angul Sukinda Railway Ltd., an SPV mandated to construct a 104 km freight rail line in Odisha's mineral belt. The line will also help connect two multimodal logistics parks contemplated to come up in the region.

As a deliberate policy initiative by Government, there has been an emphasis on public private partnership to be promoted. IR opened container train operation to private sector. Private sector has indeed been active in the construction and operation of ICDs and CFSs.

INNOVATIVE FEATURES AND INITIATIVES

Intermodal transport infrastructure development fostered in the country has helped bring about qualitative changes in the internationalisation of production and fruition of integrated logistics infrastructure. Around some of the ICDs/CFSs, regional production networks have expanded; spatial dispersal of economic activity has followed; hub-and-spoke format of primary ICDs and satellite CFSs has generated typical multimodal gains. With full flexibility permitted for modal choice for transit of customs-cleared cargo and simplified tariff system reflected in a unified and composite charge for services through the logistics chain, emphasis was to minimise costs and delays. Rules and procedures were so devised that, in addition to a large number of production units being enabled to do stuffing/de-stuffing of containers at their own sites under supervision of customs/excise inspectors, several goods trucked into the dry port premises could be directly stuffed in containers without first being unloaded in a warehouse and inspected by customs.

Port side container terminals: The concept of Port Side Container Terminal (PSCT), akin to a near-dock facility, complemented the facilities offered by some of the premier container handling ports and facilitated quick dispersal of import containers from ports as well as efficient aggregation of export containers for timely loading on to vessels, relieving ports of congestion and helping optimise port capacity utilisation.

CONCOR has since expanded the network; at end-March 2015, it operated 63 container terminals - 35 combined (exim + domestic), 14 pure exim, and another 14 pure domestic. Its state-of-the-art, high speed BLC/BLL wagon fleet designed to run at 100 km/h has been its mainstay. Each rake has 45 BLCs and carry 90 TEUs. It owns around 300 train sets of its own. It also owns over 15,000 ISO containers used primarily for domestic business.

Adding value: Bestowed by Government the coveted distinction of navaratna (a new jewel in the cherished hierarchy of country's public sector companies), the company adds value to the logistics chain by offering value added services such as (i) transit warehousing for import and export cargo, (ii) bonded warehousing, enabling importers to store cargo and take partial deliveries, thereby deferring customs duty payment, (iii) Less than Container Load (LCL) consolidation, and reworking of LCL cargo at nominated hubs, and (iv) air cargo clearance using bonded trucking. Recent developments have been marked by the introduction of double-stack container services between Kanakpura (Jaipur) and Pipavav port as well as Kankakpura and Mundra port.

Performing as the lead player in the country's intermodal business, CONCOR carried 36.18 million tonne of containerised cargo during 2014-15, involving a 3.11 million TEU throughput, yielding an income of Rs 5,574 crore (55.74 billion), and a net profit of Rs 1,048 crore (10.48 billion). With a further divestment of 1.30 per cent of its shareholding during the year and in April 2015, Government's share of ownership in CONCOR is now left at 61.79 per cent.



ADEQUATE LANDSIDE CONNECTIVITY CRITICAL

Landside connectivity is indeed a critical factor. A report Landside Access to US Ports by the US Department of Transportation in 1993 lucidly brought out “the weakest link in the transport chain is often at the port’s own back door” where congested roads or inadequate rail linkages to marine terminals, and sometimes both, cause delays and raise transportation costs. The quantum of traffic especially in a country like India, call for high capacity road and rail corridors, especially long, double-deck, heavy axle-loaded, multi-locomotive trains.

Seaports rely heavily on inland ports to preserve their attractiveness. Their performance is closely entwined with the development and performance of associated inland networks that provide access to cargo bases in the hinterland. Distances from the prominent container ports on west coast linking important ICDs in the hinterland, especially in the north and north western parts of the country, are indeed large, in the range of 1,500-2,000 km.

IMPERATIVE OF INTERMODAL CAPACITY DEVELOPMENT

There is a clear imperative of developing adequate railway infrastructure in the context of EXIM (export-import) container trade to provide connectivity between hinterland demand-production centres and key gateway ports as an efficient means of clearing landside port areas and transporting containers over long distances on land. Inland movement of containers by rail over long distances inherently offers economies of scale and associated benefits of potentially lower transportation costs. (McKinsey & Company: Transforming the nation's logistics infrastructure).

India needs to substantially increase the use of rail transportation for inland movement of containers. Over 50 per cent of trucking hauls on the country's national highways are reported to be in excess of 500 km and 30 per cent in excess of 1,000 km (RITES). A large proportion of this traffic should rightfully move by rail in containers. It calls for a concerted strategy to provide for adequate capacity on busy rail corridors as also at terminals catering to both international and domestic requirements.

A PANOPLY OF LOGISTICS INFRASTRUCTURE

Indian logistics industry is expected to grow annually at a rate of 15-20 per cent, reaching revenues of approximately \$385 bn by 2015 (Cushman Wakefield: Logistics Industry Real Estate's New Powerhouse). High concentration of retail, special economic zones, and the emerging manufacturing hubs/clusters are triggering unprecedented levels of logistics infrastructure to be installed across the country. Some 110 logistics parks spread over about 3,500 acre at an estimated cost of \$1bn are expected to be operational and an estimated 45 million sft of warehousing space with an investment of \$500 million was expected to be developed by now. Most of these developments are expected to be concentrated in 14 locations, including several tier-2 and tier-3 cities and peripheral locations such as Bhiwadi on the outskirts of Mumbai, Panvel in proximity of JNP, Haldia, Falta, Dankuni, Kharagpur and Durgapur in West Bengal, besides those near Hyderabad, Chennai, Visakhapatnam, Nagpur, Gurgaon and Kochi.

Large common user ICDs: For container train operations, the hub-spoke model appears optimal. There is need for about 10-12 large hub terminals on a pan-India network, supported by 30-40 spoke terminals. The size of the ICD will need scaling up so as to provide choices that are currently available in a port, and not at small sized ICDs in the hinterland. All shipping lines will be available at the large ICD and, therefore, container choices can be made by the customer. The spokes normally located near large consumption or production centres, generating multi-destination single commodity or single customer cargoes, may well be constructed either by end users or container train operators (CTOs). The spokes will be comparatively smaller facilities admitting of low handling costs, and even a significant component of chassis stuffing. The hubs will be

large and multi-purpose facilities developed more as common facilities with assistance from IR and/or respective state governments, essentially for acquisition of land.

With more competition coming into container train business, there appears a greater need for the hub and spoke model in the hinterland. Multiplicity of medium-sized ICDs with competing ownership and management will only make for suboptimal utilisation, and hence unsustainable. The terminals to be built by CTOs will be multi-purpose facilities where both containers and rail wagons can be dealt with at mutually agreed terms, for EXIM as well as domestic traffic to be handled.

There is need for many small-sized terminals spread far and wide on the IR network which will be used for tapping on-demand train load domestic container business or for consolidating piecemeal traffic even in half train loads. Some of the existing rail freight depots with space available for viable operations can well serve the cause. A substantial part of the huge potential that exists for tapping less than wagon load/less than train load (LWL/LTL) traffic lends itself to rail carriage by suitably re-orienting the policy regime and operational systems in close concert with multimodal operators who may assume responsibilities for aggregation, collection and distribution of cargoes, door-to-door, also all ancillary commercial transactions and procedural formalities being their responsibility, leaving only line haul to IR with guaranteed transit and train schedules.

It is essential for the country's freight handling community, especially IR, to think afresh of the parcel business with its traditional nomenclature; instead, it may be pursued as an LCL/LWL freight the way it is dealt with by the integrators. It will necessitate close cooperation and joint management by involving established courier services, integrated transporters, India Post, etc., adopting a single document with unified liability and information flow end-to-end.

New ways of doing business: To be able to cope effectively with ever emerging challenges of competition and customer aspirations, the dry port operators as much as the policy-makers need to move in tandem, grasping new techniques and technologies, and what is really important, new ways of doing business in an environment of simple, equitable and productive framework of rules and procedures and practices. In the Indian context, the multimodal dry port operational regime must have in place a robust and resilient regulatory mechanism, particularly for the traditionally insulated public behemoths like railways and government-administered ports to play an increasingly dynamic role in the furtherance of integrated multimodal culture and consciousness in the country. Likewise, there is this urgent need to interlink all stakeholders in the multimodal chain through a state-of-the-art EDI system.

Rail is best suited to be the main freight carrier: in comparison to road transport, it consumes less energy and causes far less environmental damage. CONCOR has plans for 15 multimodal logistics parks (MMLPs), five of them along the dedicated freight corridor (DFC) West. IR may well revamp and develop its terminal facilities at selected goods sheds to let the CTOs make use of them at appropriate tariffs, terms and conditions, with a view to letting them win over additional traffic for carriage by rail. Some of the existing private sidings with spare capacity could likewise be suitably adapted and optimally utilised for third party container traffic.

REGIONAL OUTREACH

Amidst an exponential need for robust wherewithal in the region for integrated multimodal logistics services, there is already a dynamic and progressive intermodal infrastructure of appropriate facilities and installations along with required software of institutional mechanism developed in different countries conducive to intra-regional cooperation. For example, CONCOR Global has geared itself to participate in the development of a pan-Asian multimodal network, together with service partners in respective countries, for planning, designing, constructing, maintaining and operating inter-modal terminals and associated assets in countries of the region.

There appears adequate expertise and experience available within the region for myriad technical and managerial services, including for setting up multimodal infrastructure, designing of ICDs and CFSs and port side container terminals, procuring, operating and maintaining container as well as cargo handling equipment, rail-cum-road-water transportation of containers and cargoes, and supporting facilitation issues for optimal financial involvement, besides minimising transaction costs.

Twelve of the LDCs in Asia and the Pacific region, among the world's thirty such countries, include Afghanistan, Bhutan, the Lao People's Democratic Republic and Nepal as among the least developed landlocked countries (LLDCs), while Armenia, Azerbaijan, Kazakhstan, Kyrgyzstan, Mongolia, Tajikistan, Turkmenistan and Uzbekistan are among the economies in transition. Suffering serious disadvantages owing to their lack of territorial access to seaports and prohibitive cost of airfreight, landlocked countries share problems of geographical remoteness and dependence on trade and transport systems of neighbouring and coastal countries.

Just to get verily a bird's eye-view of existing infrastructure of dry ports in South Asian and South-east Asian countries, a very brief narrative for multimodal infrastructure in each of these countries in the Annexure may be of some help.

Annexure**A BIRD'S EYE-VIEW OF MULTIMODAL INFRASTRUCTURE IN SOUTH ASIA AND SOUTH-EAST ASIA****(i) SOUTH ASIA****AFGHANISTAN**

Afghanistan provides facilities for cross-border truck movement across Torkham and Spin Boldak (border with Pakistan), Islam Qala and Zaranj (border with Iran), Aqina and Torghundi (border with Turkmenistan), and Ai Khanum and Shirkhan Bandar (border with Tajikistan).

- For the two dry ports at Hairatan and Torghundi, road is the main mode of transport.
- The only existing rail connectivity is by two short cross-border links with the rail networks of neighbouring countries: (i) 2 km of the 10-km section from Gushgy (Turkmenistan) to Torghundi, and (ii) 10 km of the 15-km section from Termez (Uzbekistan) to Khairatan across the Amu Darya river.
- There is an ongoing plan of constructing a 130 km rail line connecting Iran with Herat.

Long standing proposals have been discussed to extend the route from Khairatan southward to Mazar-e Sharif, Pol-e Komri, Kabul, through to Pakistan.

The Iran Railways (RAI)'s 191-km standard gauge single track line from Khaf in the eastern part of Iran to Herat, the main city in Afghanistan's western region, is made up of a 77-km section and a 114-km section in Iranian and Afghan territories, respectively. The new line was expected to give access to the Port of Bandar Abbas on the Persian Gulf via the Bafq-Mashhad line that was inaugurated in May 2005.

BANGLADESH

Containerisation having started in 1976 with the first arrival of containers at the port of Chittagong, Bangladesh Railways (BR) introduced dedicated container services in 1987 between the port of Chittagong and the ICD in Dhaka.

- The ICD is operated by the Chittagong Port Authority (CPA), and train operations carried out by BR. Revenues are shared between CPA and BR.

Adjacent to the main railway station at Dhaka, the main and lone public sector ICD at Kamalapur covers an area of 100,000 sq m, including a Container Freight Station of 8,182 sq m and four warehouses with the largest covering an area of 54,000 sq m.

In 1998, the National Board of Revenue issued guidelines for the construction of private sector container yards (CY), as a result of which 11 CYs became operational. All these CYs are located within a 20-km radius from the port of Chittagong.

A new ICD, proposed to be built at Dhirasram, north of Dhaka on the main Dhaka-Mymensingh rail line, will shorten the distance from Chittagong and also serve bilateral trade with India due to the extension of dual gauge track to Dhirasram.

- The ICD will be close to the garment factories cluster at Mirpur. It will serve current container traffic from Dhaka Export Processing Zone and Tongi as well as the future industrial development around Tangail and Mymensingh.

Several initiatives have lately been made bilaterally by Bangladesh authorities and CONCOR management, including cross border transportation of containers to Bangladesh through Petrapole/Benapole, short sea shipping arrangements to Bangladesh in partnership with steamer operators, barge movement between Kolkata port and Narayanganj.

CONCOR has been studying the feasibility of cooperation with Bangladesh authorities to operate and manage the upcoming riverine ports of Pangaon and Ashuganj.

In pursuit of a decision by an India-Bangladesh Intergovernmental Railway Meeting, a joint team recommended Ishurdi depot to be made an intermodal exchange yard for transshipment of containers from broad gauge to metre gauge rail network or to road transport.

- The team also recommended the establishment of a container handling terminal at Sigia station located on the Khulna-Jessore BG rail section in Bangladesh, about 15 km by rail from Jessore, 11 km from Nawapara and 40 km from Khulna. By road, Sigia rail station is located 22 km from Jessore and 48 km from Khulna.

BHUTAN

A 167-km-long highway (AH 48), which is now being upgraded to 2-lane standard, connects the capital Thimphu with the border town at Phuentsholing, which passes over 80 per cent of the country's international trade.

- Containerised cargo is moved in small capacity trucks or in 20-ft containers.
- Phuentsholing is the main gateway for international trade; containerised cargo potential of about 2000 TEU (in 2006).
- Other gateways are Samtse, Samdrupjongkhar, and Gelephu

- There is recognition that the country needs an ICD in or around Phuentsholing. A feasibility study, completed in 2004, determined the cost of an ICD at US\$ 3.1 million and up to US\$ 19 million for the parallel development of an industrial estate.
- The extension of the rail link from Hashimara (India) to the Phuentsholing dry port would provide direct rail connection from the ports of Haldia/Kolkata.

INDIA

By mid-June 2015, the Inter-Ministerial Committee had approved 296 ICD/CFS projects (about 70 per cent of them CFSs), while 30 facilities, including many of them improvised and adapted freight handling depots at railway stations, had already been commissioned as ICDs supported by appropriate customs notification, prior to the formation of IMC in 1992.

- Thirty five of the IMC approvals have been withdrawn for various reasons.
- Coastal hinterlands in proximity of container handling gateway ports have attracted a large number of CFSs. It is evident from the largest number of the ICDs/CFSs having been approved for the state of Tamil Nadu (67), followed by Maharashtra (55) and Gujarat (38). The share of other states has been: Uttar Pradesh (18), Haryana and Kerala (14 each), Andhra Pradesh (13), West Bengal (12), Karnataka and Rajasthan (10 each), Punjab (8), Madhya Pradesh (7), Telangana (6), Uttarakhand, Puducherry, Odisha, Jammu and Kashmir (2 each), Bihar, Chattisgarh, Chandigarh, Goa, Jharkhand and Himachal Pradesh (1 each).
- During the year April 2014-March 2015, India's major (Central Government sector) ports handled 8.0 million TEU of containerised export-import cargo, and non-major (private sector) ports - namely, Mundra and Pipavav on the Gujarat coast and Krishnapatnam on the Andhra Pradesh coast dealt with 3.5 million TEU. Of a total of about 11.5 million TEU throughput at country's all major and non-major ports, JN Port had the largest share (4.47m TEU), followed by Mundra (2.69m TEU), Chennai (1.55m TEU), Pipavav (0.79m TEU), Tuticorin (0.56m TEU), Kolkata (0.53m TEU), Cochin (0.37m TEU), Vishakhapatnam (0.25m TEU), Haldia (0.10m TEU), Krishnapatnam (0.09m TEU), Mangalore (0.06m TEU), Mumbai (0.05m TEU), Mormugao (0.03m TEU), Paradip (0.004m TEU).
- Whereas the share of rail-borne container traffic at the largest container handling port (JN Port) was below 19 per cent, it was much higher at Pipavav and Mundra ports - around 70 per cent in the case of Pipavav and 45 per cent for Mundra.

Main container handling ports of India: 2014-15



Port	JNP	Mundra	Chennai	Pipavav	Tuticorin	Kolkata	Cochin	Vishakhapatnam	Krishnapatnam	Mumbai
TEU '000	4162	2252	1468	687	508	449	347	262	56	40
CONCOR share of containers moved by Rail : %	16.6	16	8.2	46.3	3.6	5.5	2.4	10	0.1	0

Containers handled at all Central Government ports in 2014-15: 7,960m

Containers handled by private sector at state ports: 3.53m

Share of rail-borne containers in and out of ports in India has steadily fallen – from a level of 32 per cent of the total containers handled at Indian ports in 2000-2001 to 15 per cent in 2014-15.

A 10 per cent share or more is only in respect of containers at Pipavav, Mundra, JNP and Visakhapatnam, all other ports recording less than 10 per cent.

NEPAL

With only two neighbouring countries - China in the north and India in the west, east and south, land-locked Nepal currently has four ICDs: one, rail-served facility at Birgunj, and the other road-served ICDs at Biratnagar, Bhairahawa and Kakarbitta, the last in the eastern part, particularly to facilitate trade with Bangladesh and Bhutan, besides India.

- The ICD at Birgunj is connected to Indian Railways' network extending from Raxaul by a 5.4 km broad gauge rail link. A 3.65 km road link also connects the ICD to the road to Kathmandu.
- Nepal's flagship ICD at Birgunj (Sirseya, operational since July 2004) depends on rail transport of containers between Kolkata port and Birgunj. It has been operated as a Joint Venture (Himalayan Terminals Pvt. Ltd.) since its inception.
- Since 1976, Chittagong and Mongla ports in Bangladesh have also been identified for routing Nepal's trade for Bangladesh and back.
- India and Nepal have signed a separate agreement for the transit traffic between Nepal (Kakarbitta) and Bangladesh. India has also provided Nepal a rail route through Radhikapur for its trade with Bangladesh.

PAKISTAN

The development of intermodal transport in Pakistan dates back to 1974 with the establishment of the Lahore dry port at Mughalpura, 1,240 km from Karachi.

- Pakistan's other ICDs are located at Peshawar and Islamabad 1,763 km and 1,620 km from the port of Karachi, respectively.
- All three ICDs are owned and operated by Pakistan Railways.
- Two private sector dry ports also exist at Sambrial (25 km from Sialkot) and Faisalabad: the former is exclusively served by road and caters for export of the manufacturing sector in the area; the latter is served by both road and rail and caters for export from the local textile industry and import of machinery.
- A dry port at Sust on the Karakoram highway has been constructed to facilitate trade with China.
- National Logistics Cell (NLC) has established a Dry Port at Jia Bagga station.
- The Prem Nagar Inland Container Terminal, a Rs. 1.7 billion public private sector project co-financed by Pakistan Railways and two private companies.
- A number of other projects being developed in this genre are mostly taking place in the Lahore area such as the ICT established by the Bulley Shah Paper Mills at Kot Radha Kishen railway station, 60 km south of Lahore, with an

annual capacity of 20,000 TEU; a terminal being established by Mega Rail with an annual capacity of 12,000 TEU; and an ICD planned to be developed by the Sheikhpura Dry Port Trust at Chichoki Mallian railway station, north of Lahore.

SRI LANKA

Albeit the Colombo port is connected to the national rail network, virtually all cargo in and out of the port is moved by road transport.

- Transshipment accounts for 70 per cent of the total port container traffic.
- The country aims to boost the country's intermodal capability through a specific strategy driven by a Strategic Enterprise Management Agency (SEMA), involving the development of
 - an Integrated Multimodal Cargo and Logistics Centre (IMCLC),
 - four ICDs at Veyangoda, Ratmalana, Sapugaskanda and Hambantota, and
 - six inland container yards at Ragama, Polgahawela, Anuradhapura, Colombo City, Kalutara South and Koggala.
- There have been discussions with CONCOR to run container train services between Colombo and Trincomalee – 283 km long section, with projected initial volumes of 600-800 TEU/month.
- There are plans contemplated for setting up ICDs/MMLPs at a few strategic locations.

(ii) SOUTH-EAST ASIA

BRUNEI DARUSSALAM

Its major Muara port along with the Muara Container Terminal, having a 5-hectare open storage area and 12,950 sq m of warehousing, relies heavily on exports of oil and gas.

CAMBODIA

Cambodia's foreign trade is handled through its coastal port of Sihanoukville and through the river port of Phnom Penh. The port of Sihanoukville owns and operates a dry port on National Road in the west of Phnom Penh.

- The role of the dry port (its throughput estimated at around 6,000 TEU/year) is currently limited to the storage of empty containers. In the longer term, it is planned to be so located as to serve as a rail-to-road transfer facility for traffic moved between Cambodia and Viet Nam.

- Consignments of garments, accounting for 80 per cent of containerised exports, are factory-stuffed on road chassis and moved directly to the port.
- Currently, all container trade consignments are transported to and from the port of Sihanoukville by road, the present depleted condition of the Cambodian railway and the lack of intermodal transfer facilities preventing container carriage by rail.

INDONESIA

The country's main rail-served inland container handling facility, and the only one of any note, is the ICD at Gedebage, near Bandung in West Java. It mainly serves export industries based in and around Bandung which dispatch containers for shipment through the Port of Tanjung Priok, near Jakarta.

- The container volumes moved by rail over a distance of 185 km have been under threat from road transport which has benefited from the completion of the Jakarta-Bandung toll road.
- Other smaller ICDs include Surakarta, Rambipuji (in Jember, East Java), Kertapati (in Sumatera) and Tebing Tinggi (in Sumatera) serving Semarang, Surabaya, Panjang and Belawan ports, respectively.

Access by rail to Tanjung Priok port was sub-optimal because train linkages existed only up to Pasoso station, 2.5 km short of the port's container terminal.

Additional dry port development projects in Indonesia include

- Cikarang in West Java Province, and
- Panjang in Lampung Province.

Lao PDR

A warehouse complex covering an area of 3.5 hectare for the handling and storage of bilateral and transit cargoes exists at the private logistics centre at Thanaleng near the approaches to the Friendship Bridge, about 20 km south-east of Vientiane. Its main function is customs clearance as well as consolidation/deconsolidation of trade consignments.

- In 2008, work was completed on the construction of a 3.5km metre gauge railway link between Nongkhai station and Thanaleng, across the Friendship Bridge. Containers are envisaged to be loaded on rail flat cars at Thanaleng and transported directly for shipment through Laem Chabang port or to the Lat Krabang ICD in Thailand for further consolidation and processing before shipment.

- The construction of a railway line to Thanaleng is proposed to be undertaken in conjunction with a logistics park at Vientiane (VLP), south of Thanaleng station.

Malaysia

The share of containers, accounting for 55 per cent of the total throughput of Malaysian ports, is expected to exceed 60 per cent by 2020.

- Although the terminals process container volumes at five ports in Peninsula: Malaysia-Butterworth (Penang), Westport and Northport (Port Klang), Pasir Gudang and Tanjung Pelepas for inland distribution, more than 90 per cent of the volumes are handled at Westport, Northport and Tanjung Pelepas.
- Currently, KTMB, the Malaysian Railways, provides rail services to:
 - four port container terminals - at Butterworth, Port Klang, Pasir Gudang and Tanjung Pelepas;
 - four inland ports – at Padang Besar, Ipoh, Nilai and Segamat;
 - four inland container depots – three at Prai and one at Seri Setia;
 - four freight terminals – at Butterworth, Ipoh, Kajang and Singapore;
 - Bangkok (a landbridge service between Port Klang/Port of Tanjung Pelepas and the Lat Krabang ICD of the State Railway of Thailand).

Commencing in 1980 as a conventional rail freight depot, the Padang Besar Terminal changed to containerised cargo terminal with linkage to Penang port, also to freight depots in Butterworth (by rail) and to South Thailand (by road).

- Two of the facilities at the Padang Besar and Segamat inland ports are jointly owned and operated by KTMB and its associate company, Multimodal Freight Service Sdn Bhd, while the Nilai Inland Port is a joint venture between a private partner, i.e., Syabinas Holdings, and the Negeri Sembilan State Government. The Ipoh Container Terminal was developed as a joint venture between KTMB and the Port Klang Authority.
- Of these inland ports, Padang Besar handles the largest container volumes, about 80,000 TEU per year, mostly generated by the rubber exporting industry of southern Thailand and shipped through Penang port, 90 per cent of the traffic transported by road to Padang Besar.
- The ARX (ASEAN Rail Express) service between Port Klang, Ipoh and Penang in Malaysia and the Lat Krabang ICD in Bangkok offered four weekly fixed-day services each way. Until 2004, the container volume carried

on land bridge services grew rapidly year-by-year, in fact, almost trebling in four years, 2000-2004. The throughput, beginning in 2005, has been impacted by operational problems on the corridor.

MYANMAR

Yangon is the country's major gateway port.

- Of the three ICDs in Myanmar, none accessible by rail, two of them, ICD-1 and ICD-2, located at Botahtaung, about 10 km from the Asia World Port terminal in Yangon, are owned by Myanmar Port Authority in joint venture with Allied Container Services Pvt. Ltd.
- The third - Myanmar Industrial Port Inland Container Depot operates as a BOT project.
- China and Myanmar are due to develop a rail line through the Ruili/Muse border crossing down to a new deep-sea container port at Kyaukphyu.
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- India is building the Jiribam-Tupul-Imphal rail line with a view to connecting its rail network with that of Myanmar.
- A multimodal transport network being developed would link the port of Sittwe (Akyab in Rakhine) in Myanmar through the Kaladan River which would be made navigable for a length of 225 km up to Kaletwa; thence on shifting to the land route a 62km highway on the India-Myanmar border in Mizoram, before finally proceeding to Aizawl.
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PHILIPPINES

The country's major port for international cargo is the Port of Manila. The Manila International Container Terminal (MICT) is the country's largest, with a terminal area of 677,000 sq m and an annual capacity of 1.5 million TEU.

- In view of increasing cargo volumes at the Manila port, a private sector terminal operator - the Laguna Gateway Inland Container Depot has been set up in 2015 at Calamba, Laguna. It is expected to add 400,000 TEU to MICT's annual capacity.

- In 1997, the International Container Terminal Services (ICTSI) introduced short-range railway cargo transport service over the 50-km distance between MICT and the Calamba ICD, south of Manila.
- In 2003, ICTSI discontinued services and closed down the 20-hectare facility due to poor infrastructure, i.e., tracks and bridges.
- The Department of Transportation and Communications has proposed seven potential sites for ICD to be listed in Annex 1 of the Intergovernmental Agreement on Dry Ports.

SINGAPORE

Due to its geographical character, Singapore's prime mode of transport is by sea.

The port of Singapore with its terminals - Brani, Cosco-PSA, Jurong, Keppel, Pasir Panjang - (operated by PSA) handles almost a quarter of world's shipping container volumes, and ranks as world's second largest maritime container terminal, China's Shanghai being at the top.

THAILAND

Nearly all of Thailand's container trade is handled by its two gateway ports: Laem Chabang International Port on the eastern seaboard, about 130 km southeast of Bangkok, and Bangkok Port on the Chao Phraya river, near the city centre.

Thailand's cargo handling facilities at inland locations can be categorised into four different types:

- Truck terminals - three of them - all located close to Bangkok at Khlong Luang, Rom Klao and Phuta Mon Thon - provide service for conventional goods such as cross docking and warehousing.
- Off-dock container freight stations - 16 of them, located close to industrial estates provide loading area for cargo and cargo inspection.
- Container yards (CY) - 21 in service - typically handle empty and loaded containers and provide services such as the storage of containers and intermodal transfer-bonded cargo.
 - As part of its effort to promote rail transport, the State Railways of Thailand (SRT) is implementing a number of CY construction projects in several provinces.
- Inland Container Depots (ICDs) - four in operation, include: the Ekachai Container Co. Ltd., the N.H. Properties Co. Ltd., the Kerry Siam Container Transport and Terminal Co. Ltd. and the Lat Krabang ICD.

- The last two ICDs serve Laem Chabang International Port. Kerry Siam ICD, close to the port and wholly owned and operated by Kerry Siam, the Thai subsidiary of Kerry EAS, an international logistics company is a road-served facility.
- The Lat Krabang ICD is a road and rail-served facility located about 30 km east of Bangkok and 118 km north of Laem Chabang Port, with a capacity of 400,000 - 600,000 TEU, sprawling over an area of 104 ha.
- Developed and managed by the State Railway of Thailand (SRT), the Lat Krabang ICD terminal operations, opened in 1996, are contracted out to six operating concessionaires from the private sector (most of them offshoots of the shipping lines).
- Road transport dominates the movement of containers to and from the ICD.

In an effort to attract more container business to rail, SRT has been establishing small CYs at strategic locations: four of these small CYs have been constructed at Ban Tung Pho near Surat Thani in Southern Thailand; Sila At, near Denchai in Northern Thailand; Tha Phra in Northeastern Thailand; and Kut Chik at the approach to the eastern seaboard.

- At the Sadao border crossing on Asian Highway route AH2, the KPB Sadao ICD with an annual capacity of 300,000 TEU has been in operation since 1996 as a joint venture between Thai and Malaysian logistics companies.

Two additional inland facilities have been planned:

- Chiang Khong Intermodal Facility in Chiang Rai Province for connectivity with western China and Lao PDR, and
- Natha Container Freight Station along Asian Highway 12, with linkages to China and Laos.

VIET NAM

With major ports at Hai Phong, Da Nang, Saigon (Ho Chi Minh), Cai Lan, Quy Nhon, Vietnam has nine ICDs - three in the northern part and six in the southern.

- The Phuoc Long and Transimax in the south are the largest two in terms of cargo volumes.
- Of the three ICDs in the north, only one is rail-connected, i.e., the Thuy Van ICD in Phu Tho, from where the distance to the nearest seaport is 200 km.
- Given the country's geographical structure and short distances for container haulage between the ports and major trade generating locations in the

interior, road transport is generally a suitable mode. - 95 per cent of cargo coming through the ports of Haiphong and Cai Lan in the north is transported by road, only 5 per cent by rail.

- In the south, 65 per cent of cargo coming through the port of Ho Chi Minh is transported by road, 35 per cent by river transport.

In 1997, a rail-served container yard was established at Yen Vien (on the eastern outskirts of Hanoi) where the standard gauge railway from China and the indigenous metre gauge converge.

- With the projection that container cargo will increase to 7.5 million TEUs in 2020, Viet Nam plans to increase country's intermodal capabilities by developing a series of new ICDs.
- In addition to four ICDs in the north and another four in the south, with an aggregate capacity of 1.8 million TEU projected for materialisation by now, another 13 facilities have been envisaged to come up by 2020, with a throughput capacity of 3.2 million TEU.