Intermodal Logistics in the New Millennium

R. Dayal
Formerly Joint Secretary, Ministry of Commerce, Government of India
and
Former Managing Director, Container Corporation of India Ltd.
New Delhi.

“The trouble with our times is that the future is not what it used to be.”
Paul Valery

Prologue

The evolution of transport is closely linked to economic development. The Author who has extensive experience in multimodal logistics has given an overview of the intermodal scenario at the global level as also in the domestic sector. He points out that in view of global warming, security of energy supply for transport and reducing CO₂ emissions are the key challenges. And for this the railways have an opportunity to provide an efficient and cost-effective transport network.

‘The Salient Points to Ponder’ sets one thinking that unless effective steps are taken quickly, the absence of adequate transport infrastructure could well become a bottleneck in developing economies.

- Editor

A New Dynamics of Transport and Logistics

The evolution of transport has been linked to economic development. Transport is both a factor shaping economic activities, and is also shaped by them. Transport geography is a sub-discipline of geography concerned about movement of freight, people and information.

An economic factor of production of goods and services, transportation provides market accessibility by linking producers and consumers. Improvements in transportation and communication favour a process of geographical specialization that increases productivity and spatial interactions. Worldwide, transport growth has been consistently higher than the economic growth primarily due to specialization, sourcing of material on a wider scale, just-
in-time strategies, increase and dispersal of retail and wholesale activities, etc. Today, there is a whole new dynamics of transport and logistics. Transport has ceased to be a wholly independent function, to become an integral part of the production processes. Transport is fast becoming a high-technology industry, making research and innovation crucial to its further development.

Globalisation: A Catalyst as much as an Effect

Trade is becoming more and more globalised. Globalization means that the spatial frame for the entire economy has been expanded, implying the spatial expansion of the economy, more complex global economic integration, and an intricate network of global flows and hubs. With businesses bursting through geographic frontiers, product cycles have shrunk and supply chains rendered pan-global. Local supply chains need to synchronize seamlessly into global networks as businesses break out of geographic confines in search of efficiencies and economies of scale. To stay competitive in complex business ecosystems, enterprises need to grasp processes which enable different stakeholders to collaborate seamlessly across time horizons and functional and geographical barriers. There is hardly any other branch of industry that has been as profoundly affected by globalisation as the logistics sector: raw materials may be obtained from the cheapest supplier anywhere in the world; production can take place wherever the costs are the lowest.

With convergence of macro economic and structural trends creating new opportunities, barriers to global trade have tumbled. A new breed of transport software products recognizes that the industry is in the midst of a profound transition marked by channel blurring, price deflation, and fierce competition. There is thus a supremacy of the demand for precision, speed and coordination in anticipating customer needs. The most important issues in internationalization include: (i) lowering of some regulatory barriers that enhances market opportunities; (ii) development of new high speed infrastructure; and (iii) stringent competitive environment with emergence of new alternative operators. Internationalization helps meet the need for global transport as well as of global customers. It enables access to new markets, competencies and services.

Fundamental changes in the pattern of economic and industrial development and integration of national and international production systems – with a greater demand of a common web of integrated supply chain for speed efficiency and reliability signify an unstoppable wave of globalization. Challenges for logistics provider include internationalization, outsourcing, shorter production cycles, customer-oriented services, improved communication technologies, development of new niche markets, and e-commerce.

Logistics and Supply Chain Management: Evaluation and Trends

New whizz kids have evolved; integrated intermodal logistics is in demand. Logistics involves a wide set of activities dedicated to the transformation and distribution of goods, from raw material sourcing to final market distribution as well as the related information flows. Derived from Greek *logistikos* (to reason logically), the word is polysemic. In the 19th
century, the military referred to it as the art of combining all means of transport, revictualling and sheltering of troops. Today, it refers to the set of operations required for goods to be made available on markets or to specific destinations. Logistics plays a leading role in integrating and managing the supply chain, which means managing the link between each node, and managing across traditional functional areas both within the company and between companies.

“Supply-chain management is an evolution of logistics. Logistics tends to be tactical, supply-chain management is strategic”. The supply chain management is “bigger” than logistics, but logistics forms an important part of it. Certain key words closely associated with logistics appear in many definitions of the supply chain concept; they include integration, sequential flow, value added. The logistics business is no longer limited to basic transportation but encompasses a gamut of services such as warehousing, distribution, inventory management, order processing, packaging, labelling.


- Strive for perfection in delivering value to customers.
- Only produce what is pulled from the customer just-in-time and concentrate only on those actions that create value flow.
- Focus on the elimination of waste in all operational processes, internally and externally, that arise from over production, waiting, transportation, inappropriate processing, defects and unnecessary inventory and motion.
- Recognize that all participants in the supply chain are stakeholders and that we must add value for everyone in the business.
- Develop close, collaborative, reciprocal and trusting (win-win), rather than arms-length and adversarial (win-lose), relationships with suppliers.
intermodal logistics in the new millennium

- Work with suppliers to create a lean and demand-driven logistics process.
- Reduce the number of suppliers and work more intensively with those given a preferred long-term relationship.
- Create a network of suppliers to build common understanding and learning about waste reduction and operational efficiency in the delivery of existing products and services.

The dominant relationship of Toyota with its suppliers enabled the introduction of demand-pull and Just-In-Time (JIT) systems. Because Toyota operates within a relatively competitive market, it needs to achieve operating supply chain efficiencies through high quality logistical techniques.

Transport plays a key role in supply chain structure in contributing to time-compression, reliability, standardization, just-in-time delivery, information systems support, flexibility and customization.

The supply chain management approach assumes that each member of the supply chain influences the performance of others and the overall supply chain performance. Various factors can lead to greater integration among supply chain members. These include the planning required for just-in-time techniques based on “demand pull”, sharing transport information, and greater integration of information technology among members of the supply chain.

Evolution of the logistics management concept began during the 1960s to replace the fragmented management by physical distribution management. Logistics management experienced the second transition in 1980s when emphasis shifted from the minimization of the level of inventory to the speed of processing. The third evolution in early 1990s and beyond extended the concept beyond one firm to all firms involved in the whole supply chain, outsourcing the internally supplied materials and products to external suppliers. The fourth evolution has taken place in the form of the global logistics management, which has been applied by MNCs. With declining profit margin in the domestic market and in face of need of continued business expansion, these corporations seek new worldwide markets.

Michigan State University researchers have estimated the global logistics expenditure as approaching $3.5 trillion. Logistics is growing faster and delivering higher economic returns than the transportation sector. In the quest for sustainable and profitable growth, transportation companies will continue to migrate from pure transport to value added logistics services. Consolidation trends worldwide, for example, in the shipping industry, create economies of scale as much as improved negotiating power with users and suppliers, increased network to optimize routes and asset deployment, besides enabling dominance on a route for high utilization and better pricing. These trends continue to increase, for scale as well as capacity. Closer alliances are likely to emerge to build capabilities. Specific strategic choke points will attract increased investments.
Different related functions, i.e., warehousing, order processing, transport, customer service were originally fragmented and came to be treated in a more integrated way. Cost savings through integrating inbound (materials management) and outbound (physical distribution) functions were identified. This process was accelerated through greater transport deregulation, more international competition, and more overseas sourcing for raw materials or components. Integration within a company linked purchasing, manufacturing, warehousing, inventory management, sales order processing and transport.

The ratio of manufacturing and trade inventory-to-sales has been reduced substantially over the years as transportation facilities become more ubiquitous and as electronic communication technology facilitates the exchange of information among shippers and carriers, thus increasing the flow of deliveries. The ratio of inventory-to-sales per month was 1.58 in 1991, which declined to 1.35 in 1997, with a consequent reduction in overall logistics cost. There is a growing realization for technology-driven logistics and SCM (supply chain management) solutions to be adopted to re-engineer the processes and practices of business organizations for cutting costs, optimizing efficiencies, and improving deliveries. Companies need to build powerful SCM and logistics software into their technology backbones.

Partnerships were established between different members of the supply chain, not only suppliers and customers in the distribution or marketing channel, but also third party logistics providers (3PL). Influences from a number of disparate sources are likely to continue to exert pressure on companies to establish integrated supply chains. Such influences include: changing consumer market (greater focus on customer satisfaction); globalization of markets; increased power of retailers vis-à-vis manufacturers; improvements in information technology; deregulation by Government; acceptance of logistics concepts (e.g., time compression, JIT); emphasis on quality (e.g., TQM); asset productivity; and re-engineering, improving internal company processes, including transfer of services to third parties.

A 4PL or lead logistics “manager” is sometimes seen as a supply chain “manager”, a coordinating intermediary between the shipper 3PL. The term 4PL was registered as a
Intermodal Logistics in the New Millennium

trademark by Accenture, formerly Anderson, in 1996. The term is widely used in a generic sense. J. Bumstead and K. Cannons define a 4PL provider as an “integrator that assembles the resources, capabilities and technology of its own organization and other organizations to design, build and run comprehensive supply-chain solutions.” And as an “entity outside the organization that assembles and integrates capabilities from other third parties to achieve transformational efficiencies.” (Logistics and Transport Focus, Vol.5, No.1, pp. 19-25)

The worldwide 3PL revenues aggregated $10bn, $25 bn, $56bn, and $141 bn in 1992, 1996, 2000 and 2003 respectively. The current world 3PL market is estimated at $300 bn. The largest 3PL providers are located in Europe, although the US is the largest 3PL market, which was assessed to be $104 bn in 2005. The 3PL market is in India, so also in China, is fragmented and highly under-developed. Several MNCs have evinced interest in exploiting the market potential in India. Alliances mergers and acquisitions will steadily consolidate the 3PL industry.

The Cost Factor

MNCs deal only with national economies that minimize the “dead weight” cost of poor transport logistics performance. Total logistics costs (packaging, storage, transport, inventories, administration and management) are estimated to reach up to 20% of total production costs in OECD countries, while freight costs alone (transport and insurance) can make up to 40% of values of exports for several African landlocked countries. Transport usually accounts for a quarter of total logistics costs in OECD countries, storage for a fifth, and inventories for a sixth.

Among developed countries, trade logistics costs are typically 10% of GDP. For less developed economies, these costs frequently exceed 30%. Moreover, these differences appear to be widening. Transportation is thus considered a transaction cost factor and a critical variable in the corporate decision process. The inefficiency of transport infrastructure and services can be considered a barrier to trade. Transport and logistics costs most often pose a barrier at least as large, and frequently larger, than tariffs. In fact, trade is affected more
by the cost of transport than by the tariffs. In this context, developments in technology and changes in the prices of fuels become determining factors. Since World War II, a process of technological change coupled with deregulation has cut the cost of moving goods from one part of the world to another, contributing to the integration of the world economy. Technology keeps unfolding ever new possibilities. A WTO report (July 2008)：“Trade in a Globalising World” explains that spending on shipping for world imports in 2004 was three times higher than spending on tariffs. Recent spurt in fuel prices cast a huge burden on freight costs: aviation fuel nearly doubled from a year ago to $144/barrel, although off early July’s record $181.65, and bunker fuel, used for ships, almost doubled from year-ago levels to $713/tonne.

**Integrated Intermodal Linkages and Inland Growth Centres**

Most logistics services, if they can benefit from being carried out close enough to the port, do not need to take place physically in the port itself. The main criteria being easy connections with the different land transport modes. This consideration leads to the development of inland logistics centres, or dry ports, inland container depots (ICD), where all logistical operations not strictly requiring to be carried out in the port itself can take place. It is realized that hinterlands have not benefited from recent economic growth as much as coastal areas in different countries of the Asia-Pacific region. UNESCAP has in recent times laid special emphasis on intermodal interchange nodes to be established in areas remote from ports, along the Asian Highway and Trans-Asian Railway routes which would be conducive to a clustering of industries around these inland facilities.

An inland freight modal interchange facility stimulates growth of other economic activities in its vicinity. Modern intermodal facilities along specific transport corridors and associated clustering of economic activities transforms the transport corridors into economic corridors. The Tokyo-Osaka industrial corridor developed along Japan’s main rail and highway infrastructure has contributed two-thirds of the country’s GDP. India has likewise formulated an ambitious vision for the Mumbai-Delhi industrial corridor.

A dry port on an ICD is an inland terminal directly connected to seaport(s) where customers can leave/pick up their standardized units as if directly to a seaport. The ‘inland port’ concept refers to the idea that some seaport facilities could be duplicated or complemented at inland locations, thus reducing the need for scarce space at the seaport. Currently, such inland nodes and some others in proximity of ports offer variegated value-added services and are varyingly termed as logistics parks, freight villages, distriparks, et al.

Today, the world grapples with the twin factor of energy and environment, and clearly opts for an energy-efficient and environment-friendly intermodal transport let by rail. Transportation accounts for approximately 25% of world energy demand and for more than 55% of all the oil used each year. Maritime transportation accounts for 90% of cross-border world trade as measured by volume. The nature of water transport and its economies of scale make it the most energy efficient mode. This mode uses 7% of all the energy consumed by transport activities. Air transportation plays an integral part in the globalisation of transportation network. The aviation industry accounts for 8% of the energy consumed by transportation. Current debate about climate change and the environment has lent new,
higher priority to the topic of sustainability. The carbon footprint of a product is becoming an important criterion for evaluation of logistics chains and products.

Global warming is one of the most compelling challenges we face. Security of energy supply for transport and reducing CO\textsubscript{2} emissions from transport are new key challenges. The UK Department of Transport has established that the average CO\textsubscript{2} emissions per tkm of rail freight is 23 against 178 g for heavy goods vehicles. Again, rail is safer than road: An ADB-ASEAN road safety programme calculated the cost of road accidents at 2.23\% of GDP for the sub-region, i.e., $15 billion.

Railways have an opportunity to cater for an increasing demand for efficient and cost-effective long-distance transport feeder services/logistics between trade generating centres and gateway ports. The UNESCAP-promoted ambitious intermodal schemes revolving round the integration of the 140,000 km Asian Highway and 81,000 km Trans-Asian Railway networks together with connection to maritime transport network hold a huge potential and promise. Intermodal nodes developed inland will constitute important growth centres.

Intermodal transport industry is continuing to evolve, and in so doing, it is becoming increasingly integrated with supply chain management. Integration has been one of the dominant themes in the development of logistics management. Intermodalism originated in maritime space, with the development of the container in the late 1960s and has since spread to integrate other modes. In spite of numerous advantages in the usage of containers, some drawbacks are evident: (i) container handling infrastructures, such as gantry cranes, yard equipment, road and rail access, represent important investments for port authorities and load centres; (ii) the arrangement of containers, both on the ground and on modes (containerships and double-stack trains) is a complex problem; (iii) the management of containerized operations is very information intensive; (iv) many containers are moved empty, which do not generate any income but carry a cost. About 2.5 million TEUs of empty containers are stored in yards and depots around the world, underlining the issue of the movement and accumulation of empty containers. They represent about 20\% of the global container port throughput and of the volume carried by maritime shipping lines.

With the deregulation and privatization trends, begun in the 1980s in the US, containerization, which was already well established in the maritime sector, could spread inland. The shipping lines were among the first to exploit the intermodal opportunities that US deregulation permitted. They could offer door-to-door rates to customers by integrating rail services and local truck pick up and delivery in a seamless network. While rail intermodal transport has been relatively slow to develop in Europe, there are extensive interconnections between barge services and ocean shipping, particularly on the Rhine. A unique form of intermodal unit has been developed in the rail industry, particularly in the US. Roadrailer is essentially a road trailer that can also roll on rail tracks. It is unlike the TOFC (piggyback) system that requires the trailer be lifted on to rail flat car.

**Rail-driven Intermodal Prospects : Immense New Possibilities**

Intermodal transport is claimed as a viable alternative for managing the expected growth in traffic between Europe and Asia. There are several land routes of high promise...
being explored. For example, the land route between the Baltic and North-East Asia has the distance differential in its favour, about 1:2, with approximately 12,000 km by land (with Kazakhstan being roughly in the centre) vs 20,000 km by sea. The first Trans-Eurasia logistics train operated by a 50:50 jv company Trans Eurasia Logistics between DB (Deutsche Bahn – German Railways) and RZD (Russian Railways) with 100 TEU of 50,000 computer monitors manufactured by Fujitsu Siemens Computers and other high-tech goods departed from Xiangtan in China, some 700 km north of Hong Kong, on 19 September 2008 and arrived Hamburg in Germany on 6 October 2008. It completed the 10,000 km journey in 17 days. (All-sea voyage including customs clearance entails about 29 days). The cost to transport containerized goods from Asia to Europe via the landbridge is about 30% higher than sea freight, but about 50% lower than the sea-air combination.

Railways are being rediscovered; there is a veritable rail renaissance. Globally, rail transport is growing in all regions and businesses, rail passenger transport market increased at a CAGR of +4% and rail freight transport market at +7% during the period 2002-05. Change management is the most daunting challenge for Railway as the world’s oldest organized industry with its magnitude and sprawl that needs a big change in the mindset.

Railways is a classical case of increasing returns. Railways need to look for a role as wholesale carriers of bulk commodities in block trains and liner trains composed of sundry block loads of containers on flat cars. Railways need to look for an expanded future that of exclusive liner trains: like inter-city passenger services, with published timetables, fixed transits, advance reservation of wagon or container space as well as double stack container specials. Let railways look for an agenda of action: do only line haul, railways supplying wagons in train load formations and carrying out block-load operation end-to-end on specific corridors with guarantee of transit, entailing penalty for default. Let there be pre-fixed departure schedules. Let forwarders consolidate LWL (less than wagon load)/LTL (less than train load) traffic into full block trains, leaving all commercial operations at terminals to others on contract, ownership, franchise also overall tariff and marketing. In fact, railways need to innovatively evolve a strategy to handle and consolidate wagon load traffic.

There is a growing recognition across the globe that rail has an important role to play in the national and international movement of freight and passengers. The stack train and EDI systems developed in the US provide a technological basis for intermodal operations. The European model appears relevant to ASPA (Asia-Pacific) region. The transport chain is today fully integrated within the production system, and as far as international trade is concerned, within the trading pattern itself. It is now the integrated transportation chain that matters: production, transportation, storage, distribution, information, are all integrated into one unique network. This production-driven need for an integrated transport chain has fostered intermodalism.

With a view to enabling Europe to cope with growth, to lower the burden on the environment, and to enhance the competitiveness of the European Union, European Intermodal Research Advisory (EIRAC) Council composed of more than 50 key players from large intermodal businesses, launched in Brussels on 3 May 2005, defined its vision for
intermodal transport as “a high quality service – seamless, reliable, available, accessible, secure, sustainable, accountable, and affordable”.

Since trade is becoming more global, logistics chains are becoming more complex and need to be managed globally. The EU Commission propagates a shift of long-distance traffic from roads to railways and the promotion of intermodal traffic. Railfreight networks have been thrown wide open all across Europe since the beginning of 2007. The opening up of the market in the passenger sector has been set for 2010. EU has a plan for a rail transport network in which goods would have priority over passengers. The European Network 2020 will be a network of networks, each one centred on a hub, and connected among themselves by seamless railway links or deep-sea services. Large container carriers will connect the deep-sea hubs, the well endowed mega hub ports, whilst shuttle trains, new generation feeders, and barges will guarantee the transfer both from the sea to the inland network, and between the different land hubs.

Deregulation has activated competition between the railways. Today, over 500 railways offer freight services in the EU. A European railway network with separate tracks dedicated to freight, where long, double deck, heavy axle loaded, multi locomotive trains could be operated. New and efficient inland waterway services will work in tandem with road and rail. Tri-modal land-hubs will provide fast transshipment between rail, inland waterways and road services. Similar transshipment points will evolve at major international air hubs connecting air freight services to regional road and rail networks. A network size and reach will facilitate seamless transition of cargo between the backbone and regional networks.

The European Commission is trying to extend short sea shipping with its motorways of the sea programme it inaugurated in 2001, and which it supports with the EU’s Marco Polo programme of funding. This sustainable cargo movement will only be achieved with a combined approach for rail, road, water and air transport. Achieving sustainable cargo movement is indeed about changing the mindset, realizing the perils of increased road congestion, greater security problems, poorer safety records, and accelerated global warming. Europe today is intensely keen for a modal rebalance. In Europe, road makes up 44% of the freight transport market; 41% short sea shipping; 8% rail; and 4% inland waterways. Predominance of road is even more marked in passenger transport: 79% of the market; air 15%; rail 6%. “To overcome the current and future (transport) problems, Europe’s transport system needs to be optimized by means of advanced logistics solutions that can increase the efficiency of individual modes and their combinations…” Mid-term Review of the EU2006 White Paper.

Germany and France in particular are avidly promoting rail freight in Europe. Germany has an official freight transport and logistics master plan (16 July 2008). It wants to shift more freight from road to rail and inland waterway. It also realizes that the role of road cannot be wished away. Rail will need to look at better ways of integrating, if it is also to successfully compete. There is today a growing realisation in Europe to increase and support interoperability, to enable rail operators to use uninterrupted cross-border, cross-system traffic streams, which underscores a clear need for a higher level of standardisation for the rail industry.
Russia too has recently identified the task of developing logistics as one of the most urgent objectives for the country. Demand for efficient logistics solutions is burgeoning rapidly. Economic centres are separated from each other by as much as 10,000 km, making transport and logistics into a key element in developing the country. The volume of containerized freight represents less than 1% of all cargo that is transported in Russia. This percentage is 20% in Japan, the USA and South Korea. Deutsche Bahn (DB) Logistics is treating Russia as a strategic focus, the DB subsidiary Schenker is constructing a complete network for distribution of general cargo in Russia. There will be enormous opportunities for the railways on the transport route between Western Europe and Russia, as well as to the countries in Central Asia and China. Road transport to Russia has become more expensive. The roads to the Russian border are subject to toll. High convoy fees on the road and waiting times for trucks at the EU’s external border are additional factors that drive road haulage costs upwards.

Russia’s railways transported over 1.31 billion t of goods in 2006. The railway has already cornered an 80% share of the country’s overall goods movement (excluding pipeline transport). RZD’s corporate goal for 2007 is to raise the movement of goods on rail by 3.5%. A closer collaboration between RZD, Deutsche Bahn and the Chinese Railways has been emerging. Launch of through container trains between Western Europe and China have been jointly announced by Deutsche Bahn and RZD. More cooperation between China’s and Kazakhstan’s Railways could become significant in the future.

Deutsche Bahn itself has become one the world’s largest transport and logistics companies in recent years. Its subsidiaries Schenker and BAX Global, part of DB Logistics, the transport and logistics arm of Deutsche Bahn, earned half of the company’s turnover. The German state-owned railway Deutsche Bahn AG is making the most of the European rail liberalization. It has been gradually buying its way into the entire European railfreight market, usually through its freight subsidiary DB Logistics. Railion, which is also part of DB Logistics, working in Germany, the Netherlands, Italy, Denmark and Switzerland, operates 5,000 freight trains per day. In collaboration with Fret SNCF, DB Logistics’ Railion Nederland will operate Railion freight trains from the Netherlands through Belgium to France. The dynamic development of trade with Eastern Europe is lending wings to rail-freight traffic in that direction.

In Switzerland, Railion has a stake in BLS Cargo and purchased the private Swiss railway Burner Railway Services GmbH (BRS), renamed Railion Schweiz. Initial cooperation with the English, Welsh and Scottish Railway (EWS) and the Spanish logistics provider Transfesa has led to DB’s 100% takeover of EWA, giving DB a 70% share of the British rail market, as well as facilitating its access to the French railway network through the EWS subsidiary Euro Cargo Rail (ECR). In Sweden Railion cooperates closely with Green Cargo. In Italy work is being undertaken to expand Railion Italia and create additional railports.

Deutsche Bahn (DB) is to build a hub at the German inland port of Duisburg. It wants to use the platform to link the pan-European network of intermodal trains to the West ports of Rotterdam and Amsterdam as well as Antwerp. It wants to introduce its hub scheme,
with a direct connection to the German railway’s continental network. Shipments from short rail trips will be cross-loaded onto other trains operating longer routes to better exploit the railway’s competitive advantage for long distances. DB wants to open up new markets for intermodal traffic, where volumes are currently insufficient for direct train services. In 2006, DB Logistics also attempted to get a foothold in German ports, first trying for HHLA (Hamburger Hafen und Logistik AG) and then for Eurogate, which operates in the ports of Hamburg and Bremen.

Railfreight traffic in and through Switzerland has been increasing steadily. The state owned freight railway SBB Cargo also succeeded in substantially boosting its volumes. In Germany, its business jumped by 43% to 2 billion ntkm, and catapulted by 64% to 552 million ntkm in Italy. The company operated 435 trains per week in Germany and 405 per week in Italy in July 2007. Nearly 40% of its transport performance now occurs outside Switzerland.

Developments Nearer Home

The Indian logistics industry, currently believed to be around $90 billion, is likely to catapult to a $200 bn level by 2020 or about 10% of the country’s GDP. India’s emergence as an important manufacturing centre in sectors like auto and auto components, electronics and consumer durables has fuelled the demand for logistics in the country.

A report, Logistics Industry – Real Estate’s New Powerhouse, by Cushman and Wakefield predicts Indian logistics industry to grow 15-20% per annum, to hit a level of $385 bn of revenues by 2015. According to the report, 110 logistics parks spread over about 3,500 acres with 45 mn sft of warehousing space at an estimated cost of $1bn are expected to be operational by 2012. As the industry veers round an organized structure in the quest for competitiveness in the global framework, it is increasingly realized that infrastructural backbones at vantage locations by way of an entire range of facilities as envisaged in well developed logistics parks will need to be established in emerging economic corridors and

---

Drivers of Container Traffic Growth in India

- Growth and re-investment in sectors like textiles, automotive, and retail
- Growing domestic consumption
- Improving port infrastructure, connectivity
- Appropriate legislative mechanism
- Need for just-in-time competitiveness
- Easy access to credit finance
- Reforms towards trade facilitation

![Graph showing container traffic growth rate from 2007 to 2013]
industrial nodes. Conducive to high customer service at low cost, a nationwide logistics strategy would perforce encourage competition, involving diverse state and central government agencies, optimally coalescing their policies and programmes. Likewise, a regulatory mechanism will help bring about appropriate service standards and benchmark pricing.

Although tardy at the initial stages, multimodalism in India has steadily been developed both in terms of basic infrastructure by way of ICDs and CFSs as well as the essential component of institutional mechanism to sustain it CONCOR (Container Corporation of India) has spearheaded a comprehensive awareness programme and provision of wherewithal for its growth. No doubt, a great deal more needs to be done by the relevant agencies, especially in regard to the enhancement of capacity at ports, on rail corridors, integrated logistics terminals, and the “software” of EDI and facilitation. A huge potential that exists for intermodal logistics for the intra-country general cargoes demands, and deserves, a vigorous and innovative follow up.

Growth in containerisation in India accelerated in the 1990s in the wake of liberalisation of the economy, which brought about rapid growth in industry and trade. The increasing freight transport intensities, especially the volume of container traffic in EXIM trade between the hinterlands and the sea ports, has provided an impetus to multimodal
transportation in the country. The increase in containerisation in the future would further emanate from the pace of industrialization, sophistication of trade, advent of manufacturing clusters, Special Economic Zones, etc. The following two tables amply demonstrate a significant change that has quietly come about. The share of containerized cargoes in the overall general break-bulk cargo (other than liquid bulk and dry bulk) handled at India’s major ports has shown a rapid rise at a level of 79% in 2007-08.

### Total Cargo and Containerised Cargo at India’s Major Ports: 2007-08

<table>
<thead>
<tr>
<th>Ports</th>
<th>Total Cargo (million tonne)</th>
<th>General Cargo</th>
<th>Share of containerised cargo in general cargo:%</th>
<th>Share of general cargo vis-a-vis Total Cargo:%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(million tonne)</td>
<td>Break bulk</td>
<td>Containerised</td>
<td>Total</td>
</tr>
<tr>
<td>All major ports</td>
<td>519.31</td>
<td>24.19</td>
<td>92.27</td>
<td>116.46</td>
</tr>
<tr>
<td>Kolkata</td>
<td>13.74</td>
<td>2.77</td>
<td>5.14</td>
<td>7.91</td>
</tr>
<tr>
<td>Haldia</td>
<td>43.59</td>
<td>0.77</td>
<td>2.40</td>
<td>3.17</td>
</tr>
<tr>
<td>Visakhapatnam</td>
<td>64.60</td>
<td>1.71</td>
<td>1.13</td>
<td>2.84</td>
</tr>
<tr>
<td>Ennore</td>
<td>11.56</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Chennai</td>
<td>57.15</td>
<td>2.58</td>
<td>18.05</td>
<td>20.63</td>
</tr>
<tr>
<td>Tuticorin</td>
<td>21.48</td>
<td>2.60</td>
<td>5.63</td>
<td>8.23</td>
</tr>
<tr>
<td>Cochin</td>
<td>15.81</td>
<td>0.14</td>
<td>3.24</td>
<td>3.38</td>
</tr>
<tr>
<td>New Mumbai</td>
<td>36.02</td>
<td>0.26</td>
<td>0.32</td>
<td>0.58</td>
</tr>
<tr>
<td>Mangalore</td>
<td>35.13</td>
<td>0.35</td>
<td>0.14</td>
<td>0.49</td>
</tr>
<tr>
<td>Mumbai</td>
<td>57.04</td>
<td>7.14</td>
<td>1.63</td>
<td>8.77</td>
</tr>
<tr>
<td>JNPT</td>
<td>55.84</td>
<td>0.01</td>
<td>51.92</td>
<td>51.93</td>
</tr>
<tr>
<td>Kandla</td>
<td>64.92</td>
<td>5.59</td>
<td>2.62</td>
<td>8.21</td>
</tr>
<tr>
<td>Paradip</td>
<td>42.44</td>
<td>0.27</td>
<td>0.05</td>
<td>0.32</td>
</tr>
</tbody>
</table>

Source: Indian Ports Association: Major Ports of India, A Profile: 2007-08

Again, the traditionally high incidence of transshipment of India’s export and import containers at foreign international ports has recorded a steady decline: currently, two-thirds or more of these containers are directly received at, and dispatched from, the country’s gateways.

### Transshipment of Indian Exim Containers at Major Ports 2007-08:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Kolkata</td>
<td>1.26</td>
<td>0.42</td>
<td>-</td>
<td>0.97</td>
<td>0.05</td>
<td>0.16</td>
<td>0.11</td>
<td>-</td>
<td>2.97</td>
<td>-</td>
</tr>
<tr>
<td>Haldia</td>
<td>0.67</td>
<td>0.08</td>
<td>-</td>
<td>0.34</td>
<td>-</td>
<td>0.05</td>
<td>0.14</td>
<td>-</td>
<td>1.28</td>
<td>-</td>
</tr>
</tbody>
</table>

Table contd.
Right at the inception of multimodal transport development in the country, it was recognized that a legal framework for multimodal transport had to be in place. Following a protracted interaction with concerned agencies and interests, Government promulgated the MMTG Act, (Multimodal Transport of Goods Act), 1993, which has been amended in some respects, and needs further few amendments. In the early years, the Foreign Exchange Dealers Association of India (FEDAI), on the basis of International Chambers of Commerce (ICC) Rules, was accepting only Ocean Bill of Lading issued by carriers as a negotiable document, and did not recognize the Freight Forwarders or Multimodal Transport Operators (MTO) as carriers. With the enactment of Multimodal Transportation of Goods Act, MTOs can now issue their own document, viz., Multimodal Transport Document (MTD). In consonance with the prevailing international practices, Indian legislation on Multimodal Transport permits all transporters including Freight Forwarders to operate as MTOs subject to the conditions laid down in the MMTG Act.

A lot needs to be done for streamlining rules and practices across several sectors in order that the transaction costs are really reduced and speed as well as efficiency of transactions enhanced consistent with the best practices within the country as also outside. Reportedly, the tonne / km costs for rail in India are as high as three times those in China. While the cost of rail transportation in India was put at US cent 7.9 per km, it was 5.5 cent, 3.7 cent, 2.6 cent and 2 cent in France, Japan, China and Canada respectively. Equipment utilization rates for the Indian trucking fleet, which averages 60,000 km to 100,000 km per truck/year, are less than a quarter of those in developed economies. These low utilization rates are caused by long delays at checkpoints en route, excess trucking capacity which results in idle trucks, slow speeds on most roads, especially in congested areas, and lack of tractor trailer units that enable the tractor to keep operating while loading or unloading is carried out on trailers. Truck delays at checkpoints have been estimated to cost the economy between Rs. 9 billion and Rs. 23 billion per annum. Then, there is additional “facilitation payments” made at the

<table>
<thead>
<tr>
<th>Port</th>
<th>0.03</th>
<th>-</th>
<th>-</th>
<th>0.01</th>
<th>-</th>
<th>-</th>
<th>0.04</th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paradip</td>
<td>0.35</td>
<td>0.05</td>
<td>-</td>
<td>0.19</td>
<td>-</td>
<td>0.10</td>
<td>0.02</td>
<td>-</td>
</tr>
<tr>
<td>Visakhapatnam</td>
<td>2.74</td>
<td>0.85</td>
<td>-</td>
<td>1.72</td>
<td>-</td>
<td>0.77</td>
<td>0.50</td>
<td>4.70</td>
</tr>
<tr>
<td>Chennai</td>
<td>0.01</td>
<td>0.03</td>
<td>-</td>
<td>1.09</td>
<td>-</td>
<td>0.05</td>
<td>0.26</td>
<td>3.06</td>
</tr>
<tr>
<td>Tuticorin</td>
<td>0.05</td>
<td>0.02</td>
<td>0.01</td>
<td>1.43</td>
<td>-</td>
<td>0.40</td>
<td>0.53</td>
<td>0.10</td>
</tr>
<tr>
<td>Cochin</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.18</td>
<td>-</td>
<td>-</td>
<td>0.03</td>
<td>-</td>
</tr>
<tr>
<td>New Mangalore</td>
<td>-</td>
<td>-</td>
<td>0.14</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.14</td>
<td>-</td>
</tr>
<tr>
<td>Mumbai</td>
<td>-</td>
<td>-</td>
<td>0.04</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.97</td>
<td>0.17</td>
</tr>
<tr>
<td>JNPTC</td>
<td>-</td>
<td>0.04</td>
<td>0.01</td>
<td>0.02</td>
<td>-</td>
<td>0.64</td>
<td>0.67</td>
<td>11.2</td>
</tr>
<tr>
<td>NSICT</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.76</td>
<td>0.09</td>
<td>14.23</td>
<td>15.08</td>
</tr>
<tr>
<td>GTIPL</td>
<td>0.19</td>
<td>0.02</td>
<td>-</td>
<td>0.01</td>
<td>-</td>
<td>0.55</td>
<td>0.67</td>
<td>11.46</td>
</tr>
<tr>
<td>Kandla</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.17</td>
<td>0.43</td>
<td>0.36</td>
<td>0.24</td>
<td>0.45</td>
</tr>
<tr>
<td>Total</td>
<td>5.34</td>
<td>1.50</td>
<td>0.06</td>
<td>6.26</td>
<td>0.48</td>
<td>3.85</td>
<td>4.23</td>
<td>45.38</td>
</tr>
</tbody>
</table>

Source: Indian Ports Association: Major Ports of India, A Profile: 2007-08
checkpoints to circumvent various regulations. It is estimated that an increase of 10% in the market share of tractor-trailer units would yield a reduction in annual transport costs of the order of Rs. 5 billion. With improved fleet management enabling more intensive use of the tractor units, the potential savings could increase to Rs. 8 billion.

The need for various projects to be duly integrated and their completion expedited cannot be over emphasized – projects for capacity and efficiency enhancement, i.e., the National Maritime Development Programme, rail freight corridors, rail and road connectivity projects for ports. Further efforts are needed to ensure seamless flow of goods across the supply chain at each change of mode and jurisdiction for which the relevant rules, procedures and documentation need to be simplified and streamlined, besides putting in place a harmonized liability regime in line with the globally accepted regulations and practices. MTOs need to piece together a truly seamless service in a comprehensive manner for the shipper to get the benefits of a “one-stop-shop” operation, providing end-to-end supply chain logistics solutions. In turn, it calls for, *inter alia*, multiplicity of legislations to be duly reconciled and international conventions incorporated.

Multimodal transport is indeed the key to transform a large chunk of fragmented movement and handling of large volumes of containerable goods for trade and commerce within the country into an intermodal logistics framework for gains in efficiency, economy and sustainability. Although Railways have maintained for decades that they would encourage and facilitate conversion of large volumes of road-hauled sundry consumer goods over long distances into an efficient and economical intermodal system, little has been done by way of a clear strategy to develop the requisite infrastructure, review the pricing structure, and truly encourage private sector participation. A clearly lacklustre record in this regard is visible in the domestic container business handled by CONCOR.
The ports infrastructure on the east coast needs to be substantially revamped and developed in coordination with international shipping lines and other stakeholders for state-of-the-art facilities to come up for exponential growth of container trades. The country needs to think and plan big for modern dedicated container ports on the lines of JNPT or Mundra to be commissioned where the entire thrust will be on container related activities with affordable and reasonable port and marine charges. It will imply an integrated approach to be evolved for the development of capacities and capabilities at the major and non-major ports for fostering port specialisation and interport/intra-port complementarity to achieve overall optimization of the use of port facilities. Concomitant development of short sea shipping and inland waterways will indeed be a critical factor for achieving a healthy and sustainable intermodal framework conducive to rapid growth of the economy.

**Salient Points to Ponder**

The world recognizes the salience of Peter Drucker’s prescience and wisdom: “The last frontier of management to conquer is logistics and supply chain management”.

- Logistics promotes and facilitates the process of globalization. Transportation and logistics market is large. Logistics is growing faster and delivering higher economic returns than transportation.

---

**GROWING SIZE: ECONOMIES OF SCALE**

Driven by economies of scale
- Potential costs difference of upto 50% between a 4,000 TEU Panamax ship and a mega 10,000 TEU post-Panamax vessel
- 50% increase in vessel size (4000 - 6000 TEU) produces 21% reduction in operating and voyage costs
- 1% system cost savings for each $% rise in average vessel size

Carriers make decisions accordingly
- Larger ships can only call at deep - sea (15m+) ports
- Greater transhipment activity means greater urgency for carriers to control terminals - seeking control and efficiency - need to reduce missed connections, waiting times, poor handling
- Urgency to secure cargo

Implications for ports

To remain an MLO port of call, a port must be able to
- Handle larger ships
- Provide carriers with control over terminals, or at least guarantee high levels of efficiency
- Provide sufficient cargo to merit a call

A port’s role as a hub will be a function of its ability to service larger ships’ requirements
• Companies will continue to migrate from pure transport to value-added logistics services. Boundaries between segments are likely to get blurred.

• A search will continue for optimally sustainable and profitable growth. Consolidation trends will continue to increase for scale and capacity. Mergers, alliances and acquisitions will continue to help build capabilities.

• Demonstrating an increasing vertical integration across industry, ocean carriers integrate into ports, inland terminals and landside transport links; multimodal operators integrate into the reverse of this chain; railways combine with the port terminals; freight forwarders extend traditional service boundaries.

• Steady scaling up is seen in increase in ship size and port capacities; technology driven output and productivity; mega transshipment ports; landside infrastructure: mergers and acquisitions; global management footprints.

• Long term growth will be supported by deployment of emerging mega vessels. Parcel sizes will continue to enlarge, putting pressure on ports as well as hinterland infrastructure beside intermodal connectivity.

• Transformation of retailing: exponential growth of retail markets; supply chain management a critical component; seamless flow of goods by different modes of transport; management of goods and services in space and time.

• Developing countries account for 31% of total world imports, and 41% of freight payments. Freight costs for developing countries are much higher than for industrialized countries, i.e., 7.7% vs 4.8%.

• There is immense potential for India to cut its logistics cost from the current 13% of GDP to 8-9%. Savings of around $20 bn will imply 4.5% cut in prices of Indian goods globally.

• Resurgence of railways all over the world: extensive expansion of networks: capacity and speed enhancements; dedicated rail corridors; development of inter-country linkages; agreement on Trans-Asian Railway network; globally, railways staging a come back, even competing with air services. IR too has planned for big ticket projects like exclusive freight corridors and extensive modernization of tracks and rolling stocks to optimize capacity; IR contemplates high speed passenger trains as well as ‘world class’ stations and freight terminals.

• Road transport too comes of age: multi-axle larger and faster vehicles; unified markets facilitate transit: agreement on Asian Highway network; expansion of road network; express highways.

• Air transport picking up: 30% of world trade (by value) moves by air: over next 20 years, world air cargo will treble and freighter fleet will double. Asia will account highest growth rates; move towards open skies policy; larger and faster planes; dedicated freight services; development of cargo hubs.

• Container traffic growth needs to be anticipated at twice the rate of country’s GDP growth and adequately catered for by expeditiously modernizing and expanding port infrastructure as well as intermodal connectivity.
• Containerization in the country has a scope to expand to an optimal 60-70% level of non-bulk general cargo in international trade.

• The huge potential of containerization of domestic cargo offers opportunities for an exponential growth in the sector simultaneously with a challenge for Railways to put in place the requisite line haul capacity, terminal facilities, appropriate tariff structure and facilitating environment for integrated intermodal development.

• Massive investments are indicated for select strategic choke points.

• Rail assets are becoming strategic assets: US railroads find system capacity becoming severely strained, requiring extensive capital investment to clear current and emerging operational bottlenecks. The National Surface Transportation Policy and Revenue Study Commission set up in 2005 by the US Congress estimated a need for $225 bn to be spent annually over the next 50 years for the country to maintain and upgrade its infrastructure to the required level.

• The world’s second largest rail network that Russian Federation has is planned to be extensively upgraded and modernized. Investment levels projected are colossal.

• The European Union spending on transport infrastructure dropped from 1.5% of GDP in 1980 to 0.5%. For the successful completion of the Trans-European Transport Network (TEN), priority projects would require raising financial resources to 1% of GDP. European intermodal network is indeed designated for an unprecedented growth and reorientation.

• China has been constantly building its transport infrastructure with massive investments in expressways, high speed trains, rail route expansion, and intermodal logistics parks.

• India too has ambitious projects on the anvil by way of, among others, NHDP, NMDP, and dedicated rail freight corridors.

References


5. Indian Ports Association : Major Ports of India, A Profile, 2007-08.

*****