Optimise Supply Chains to Manage Freight Transport Emissions

For

Low Carbon & Sustainable Mobility in India
(Decarbonisation of Indian Transport Sector)

Lead

FICCI

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PREFACE

To move down the path of reduced emissions from the Indian transport sector and provide direction to low carbon and sustainable mobility for India, FICCI embarked on the initiative for Developing an **India Roadmap** for Low Carbon and Sustainable Mobility with thrust on decarbonisation of the Indian transport sector. FICCI is supported in this initiative by knowledge partners, WWF-India, Paris Process on Mobility and Climate (PPMC) and Shakti Sustainable Energy Foundation (SSEF). The India Roadmap has eight distinct components outlined below.

1. Urban transformation for healthier, inclusive lifestyles and efficient, resilient, prosperous cities
2. Low-carbon energy supply strategy
3. Improve intermodal and mode-wise system efficiencies
4. Optimise supply chains to manage freight transport emissions
5. Avoid vehicle kilometres for commuting, shopping and accessing services
6. Provide low-carbon solutions for the rural (non-urban) populations
7. Accelerate action on adaptation in the transport sector
8. Large scale deployment of economic instruments and leveraging finance

Each of these components is covered in detail under individual reports, available separately as Theme Reports. The India Roadmap provides summaries of each component and actionable recommendations for short-term (2020-22), medium-term (2022-30) and long-term (2030-50). For detailed narrative of each component, the reader may refer to the individual theme reports of the respective component. For getting an overview of all components, the India Roadmap provides the complete context for low carbon and sustainable mobility for India.

This report covers the fourth component on "Optimise Supply Chains to Manage Freight Transport Emissions".

The work on the India Roadmap has been guided by the FICCI Core Group on Sustainable Mobility consisting of eight working groups, each of which has worked on the eight components. The components are based on the Global Macro-Roadmap developed by PPMC. This methodological approach developed by PPMC is at the heart of the India Roadmap, with components of the India Roadmap being customised to Indian context and circumstances.

INTRODUCTION

When it comes to achieving sustainable middle-income status in India, the current challenge that lies before the country is to evolve a strategy which lists out necessary steps towards it beyond and over the next two decades. To achieve results, economic growth over the next 20 years has to be at a sustained rate so that it at least matches the growth rates achieved in the preceding two decades. The growth rates have to be even higher if we aim to meet the growing aspirations of our people. Interestingly, this also links forward to creating adequate transport provision in terms of quality, quantity, and resource-efficiency as an essential step. If the required transport investment is not made, and in time, to satisfy the burgeoning transport demands, the aspirational growth envisaged cannot be achieved.

Deep diving further into the transport connection, much of the thinking in India so far has been project-centric, done within single mode silos. A key requirement, instead, is to evolve a transport strategy, which is system-based, addressing sectoral issues with a focus on cross-cutting themes: both for assessing the transport capacity requirements as well as on working out the investment strategies to deliver to these requirements.

To secure a significant improvement in overall productivity and efficiency of the system, future development of the network should aim to secure a better integration of the various modes of transport. This will help facilitate the development of multimodal transport within the country for both domestic as well as EXIM (export-import) trade. The objective must be to create an efficient and cost-effective system while minimising the adverse impact on the environment. Freight-transport, for one, is a large contributor to emissions of CO_2 (carbon dioxide) and mitigating its environmental impact is essential to strive for a sustainable future. Of the total transport sector, road transport accounts for more than two-thirds of the CO_2 emissions, shipping accounts for 14% and aviation 11%.[1] Sustainable supply chain management has been at the forefront of reducing emission due to freight transportation. Activities such as reducing packaging, using more fuel-efficient transportation or requiring suppliers and forwarders to adopt environmental and social programmes can reduce costs as well as environmental impact, and improve corporate social reputation too. This report aims towards the reduction of GHG (greenhouse gas) emissions by addressing the existing gaps and challenges related to the supply chain to manage freight transport emissions.

[1] Global Average

CHAPTER 1

HEART OF THE PROBLEM

Every time a problem is seen simply, the solution becomes easier.

1.1 Inclusion of Multimodality Approach to Optimise Supply Chain

The logistics cost in India is 14% of GDP (gross domestic product) as against the international benchmark of 8%. The bigger economies of the world have achieved competitiveness by cutting down the unit cost of operations and ensuring an efficient multimodal approach. In India, railways and inland transport which can be called as 'green transport' has 30% of transport share, while 70% of the transport need is being met by road. Railways are the main carrier of coal, steel food grains, fertilisers and other heavy raw materials needed for industrial consumption. But with consumable goods assuming a bigger share of logistics, and railway transportation being inflexible, road transport has taken over the supply chain of consumer goods. Suffice it to say that supply chain management in India is highly skewed.

Railways have been a traditional transporter, but have not been able to provide complete transport solutions.

The monopolistic approach, higher logistics cost, lack of innovative solutions, line capacity constraints, and rigidity of wagon profile have further compounded this problem. The parcel business of Railways which was operating on the back of passenger services did not grow despite passenger services getting doubled from the year 2000 to 2015. No alternative services by rail were available for white goods, perishable goods, small parcels express cargo, and the entire growth was taken over by road carriers resulting in a massive setback to multimodal options.

Another option of multimodality was Container Corporation and private container train operators, but domestic cargo never became multimodal. It needs deeper analysis to understand why domestic container business has been 0.9% of the total traffic carried by rail. The situation is alarming as poor growth of domestic cargo by rail not only adds to a high percentage of GDP, but also has a high environmental cost. However, there is more to multimodality than just this.

1.2 Road Blocks in Multimodality

Railways are six times fuel-efficient and also considered to be a green transport, and hence would be serving the public interest to go multimodal. However, the challenge in being multimodal is twofold - reduce railways cost as the way road transport has been able to achieve, and secondly to develop a hub and spoke system with efficiency.

Railways have so far remained insulated from the competition; but with changing contours of economy, like the air and road development that have also started exploring a cost-plus model. Alarms are ringing with a 102% operating ratio and line capacity constraints receding with a Dedicated Freight Corridor (DFC) coming up. It is clear that railways should brace for hard competition and take up a non-bulk segment in a significant manner.

The first challenge of cost reduction can be addressed by inducting higher volume parcel wagons such as an auto car wagon design.

The basic idea will be to maximise volume per tonne, the way road operators have been able to achieve and thus reducing the unit cost of operation. White goods, pharma, food products as well as perishables which need low tonnage with high volume call for new disruptive wagon design. On the road, the truck design has changed to high cube and longer containers from 24 feet length to 38 feet length. While railway parcel vans presently have 6 cub. meter volume compared to 10 cub. meter volume achieved in road containers. An optimal size can be achieved by introducing wider and longer wagons.

The second major step could be taken with commissioning of the DFCs or Dedicated Freight Corridors (such as EDFC—Eastern Dedicated Freight Corridor & WDFC—Western Dedicated Freight Corridor). After that, the moving dimensions can be further improved by 80 cms in height and 40 cms in width, which will help to reduce unit cost for lighter goods and introduce time assurance for trains. Further on freight corridor, the concept of tariffs on new traffic or privately owned trains can to be changed to track access charge as levied on private container train operators. In effect, with planned and steady changes, the fabric of freight has the potential to change.

CHAPTER 2

IN RESPONSE

The response to a problem often determines the outcome.

2.1 Defining New Policies for Multimodal Express Parcel Services

The road share of white goods, pharma, automobile traffic, food products, milk products and other perishable items is 99 % because of:
- time assurance
- door to door service
- cheaper price.

It is strange that a system running 12000 trains a day is unable to offer efficient services at competitive price for time-sensitive and high-value cargo. There are three new options which need to be defined afresh for offering multimodal option and reducing overall logistics cost as below:

- **Provision of Round trip parcel vans on patronised sectors of golden Quadrilateral of Indian Railway (IR)**
  Usually there is reluctance on part of Railways to offer capacity for parcel vans on pretext of high passenger demand and line capacity constraints. It has to be appreciated now that with 102% operating ratio steps are required to be taken to improve yield of passenger trains by adding parcel vans on selective basis. IR runs about 3000 mail express trains on a daily basis and 1000 parcel vans can be attached daily with a potential of generating about INR 100 billion annually. Long distances over 1000 kilometres have good potential to be multimodal giving time advantage as well.

  The sectors on which additional parcel vans can be attached are four arms and two diagonals of golden quadrilateral. However there is need of caution on pricing which has to be competitive with road. A separate terminal outside passenger stations also needs to be earmarked to avoid parcel passenger conflict.

- **Introduction of private parcel trains with high cube ultralight parcel vans**
  The present parcel van design is not market-competitive and a new disruptive design is necessary for voluminous goods. A beginning has been made by railways in introducing automobile wagon which is 23 m long and 4.3 m high with low wheel diameter enabling high volume with carrying capacity of 15 tonnes. This wagon profile is almost same as available on trucks.

  The new rating principle adopted for automobile wagon is also very competitive and instead of parcel tariff the concept of haulage charges has been introduced. For an automobile wagon, the charge in empty direction is 20% of the loaded direction. This has been very market oriented policy and needs to be expanded in attracting light and high value cargo.

- **Introduction of new design flat wagon and high cube container**
  The present container wagon is only suitable for an IRS container. The poor performance of IRS container is also corroborated by the fact that out of 60 mil. t. of container cargo the domestic share despite last 30 years of operation. If we analyse the reason it is clear that for light cargo up to 20 tonnes IRS container provides only 47 c.m. of volume vs. 90 c.m. of road equivalent truck. The low volume availability and lack of time assurance for container trains has been the main reason of lack of demand for domestic container cargo.

For achieving better results, 22 m. long BLC wagons with high cube containers of 30 feet length and 9.5 feet height are needed. One such container will enable the volume of about 80 c.m. per 10 tonnes of cargo, competitive with road.

Further to improve frequency of container trains there is need to reduce the composition of 30 flats as against 45 flats in present trains. To compensate railways a higher haulage rates can be fixed but it will fulfil the market need of higher frequency and economically viable in terms of volume per c.m. per tonne.

2.2 Re-Localising and Optimising Purchasing Choices, Simplifying Distribution Circuits

Calculating and reporting CO_2 emissions in a structured way not only helps in making the emissions visible within an organisation but also leads to management and reduction of emissions. The calculations must be performed on a regular basis to be able to track the organisation's performance and to evaluate the effect of different measures to lower emissions. This is an important fact that can throw light into how emissions can be reduced in freight transport and show a clear picture of the situation today.

Measuring and evaluating CO_2 involves:
1) Analysing and monitoring of present transport activity and the CO_2 emissions.
2) Projecting future transport activity and the resulting CO_2 emission levels.
3) Evaluating the impact of policies aimed at reducing both the transport activities and CO_2 emissions.

Many effective strategies can be designed to have an impact on freight transport emission such as modal split, supply chain structure, sales distribution, and technological development.

Modal split, i.e. knowing which transport modes are used and to what extent, is one of the factors with the greatest impact because of the significant difference between the emission factors for air, sea, and road freight.

The Supply Chain Impact

In freight transport, the supply chain plays a crucial role. Its structure has a great impact on the distances in the supply chain. Both a centralised and a decentralised supply chain structure may reduce distances on one end, but increase them on the other. Supplier locations, production locations, and customer locations all determine the locations and numbers of warehouses and DCs (distribution centres). This, in turn, affects the distances and lead times between the different links in the supply chain and total emission as well.

Similarly, technology development has an impact on vehicle efficiency and hence on how much lower the emissions from different transport modes will be. The number and the location of DCs in relation to the customer base also play a significant role in the total emissions in the end. More customers at longer distances from the DC supplied with road/rail/air freight means a heavy increase in the emissions. With a more decentralised customer base, a decentralised supply chain structure is the best option to reduce emissions. Thus, regional DCs with regional inventory is one way of shortening the distances to customers. Decentralising production sites is the next step towards lower emissions. This step is more sensitive since it might affect product quality, IPR (intellectual property rights), and the direct control of the production. Implementation of new DCs and opening of new production facilities are long-term investments and need to be a deeply rooted business decision. It is associated with big investments and a risk of higher costs in the transition period.

All timings and parameters in the supply chain needs to be changed and adjusted to fit the new setup and this might take some time to get in place. It has a financial impact on the business as well, since longer lead times and higher inventory means more capital employed.

2.3 Warehousing and Distribution Strategies for Low Emission Freight Transport

Logistics centres also contribute to CO_2 emissions in the building and logistics sector, and therefore share an equal responsibility to decarbonise. Synergy effects in both building and implementing intra-logistics should be considered as suitable levers to lower energy demand and related CO_2 emissions. Some illustrations are as follows:

Intra-Logistics
Design options for different types of industrial trucks and conveying systems should be investigated as along with picking/sorting at the warehouses. The share of the total energy demand for industrial trucks depends on the number of trucks within the system. If a proper design for loading docks is implemented, there can be an improvement in the throughput of trucks. As such, fewer trucks would be required to serve the same area, resulting in a reduction in emission.

Warehouse Design
Insulation material reducing energy consumption has a tremendous impact on the emission levels. Also, efficiency in the number of sorting stations has a positive impact on the energy consumption. For example, the storage area of the shelf warehouse can be divided into different zones according to the turnover of the goods and therefore their access frequency.

Technology
Technology has a tremendous impact on scalability without a commensurate increase in resources. Data can help warehouse structure different factors in a more efficient manner so that better productivity can be assured for the same energy consumption or emission factor. For example, lighting systems of all the building can be automatically controlled in accordance with available daylight.

All in all, all timings and parameters in the supply chain need to be changed and adjusted to fit the new setup and this might take some time to get in place. It has a financial impact on the business as well, since longer lead times and higher inventory means more capital employed, calling for deeper thought and prudent decision-making.

CHAPTER 3

CHALLENGES ALONG THE WAY

Challenges are only an excuse to improve.

3.1 Integrated Transport Approach to be Followed to Redesign Supply Chains

While the Indian transport network comprises all modes of transport as per the National Transport Development Policy Committee (NTDPC) report, in 2007-08, rail and road dominated the system carrying about 87% of the total freight traffic. Unfortunately, the rail-road mix in freight movement has always developed sub-optimally - rail share was 89% in 1951 dropping to 65% in 1978-79, to 53% in 1986-87, and 30% in 2007-08. This happened despite the established fact that the rail mode has superior characteristics vis-à-vis the road mode in the areas of energy-efficiency leading to lower unit costs, reliability as well as in environmental and safety parameters.

A big contributing factor to this was the development of roads with the launch of the National Highway Development Project (NHDP) and Pradhan Mantri Gram Sadak Yojana (PMGSY). The key was an institutional arrangement of building a diesel cess on fuel sales across the country, which provided the sector with a steady revenue stream for investments in national highways. Increased allocations were also made for investments in state highways as well as PMGSY.

Besides the above trends, in regard to land-based transport segment, about 95% of India's EXIM trade volume is moved by sea. India's maritime sector which comprises ports, shipping lines, ship building, and ship repair facilities, as well as IWT (inland water transport) systems, handled 914 million tonnes during 2011-12.

The 12 major ports alone handled about 61% of the total tonnage during 2011-12 with an overall CAGR (compound annual growth rate) of 8.6% between 1990-91 and 2011-12.

While the cargo handling capacity of major ports has steadily increased, traffic demand has clearly outpaced capacity additions resulting in port congestion.

This is so because the capacity utilisation of these ports has been about 80% against the international benchmark of 70% capacity utilisation globally. As a result, the performance of Indian ports has generally deteriorated in terms of both pre-berthing detentions as well as the average turnaround time.

India has the largest merchant shipping fleet among developing countries (India's ranking being 16th globally), but the share of coastal shipping in India's domestic transport movement is miniscule, despite the established benefits of very low unit costs as compared to other land-based modes of transport. Inland waterways in India are also underdeveloped as a mode of transportation despite their inherent advantages of fuel-efficiency, deeper hinterland connectivity, and capacity to divert large volumes of cargo from congested roads and saturated rail routes.

3.2 Challenges

In face of the above trends in respect of the development of various modes of transport within the total national transport infrastructural scenario, developmental planners have to take note of some basic challenges while devising a sustainable national transport strategy. Some of the more important challenges are:

The overarching challenge is to reduce the carbon footprint of the transport and mobility sector of the national economy, which contributes to over 23% of carbon emissions in the country today.

In the face of depleting energy resources based on fossil fuels, diversion to renewable sources of energy would be an obvious imperative. Simultaneously, overall energy consumption has to be minimised by evolving an optimal intermodal mix, which ensures the minimisation of overall energy requirements for the mobility sector as a whole. The aim has to be to minimise the overall consumption of energy at the least resource cost to the national economy.

Transport pricing: Within this overall matrix, transport pricing is another policy area which can contribute towards influencing modal choices of consumers. It can bring efficiency in the functioning of the transport market scenario today, vitiated by distorted cost signals due to several factors. This includes the failure to internalise the cost of externalities like environmental pollution, road congestion, safety parameters and relative energy intensities of various modes of transport and failing to provide a level playing field for the various modes of transport.

Improvement in productivity: Yet another challenge, that can make a major impact on the efficiency of the transport sector, is to secure productivity improvements. This would include both asset management as well as operations management in alignment with international benchmarks. Induction of appropriate technology including upgradation of design specifications of rolling stock and other assets would also be imperative. It should be borne in mind that technology today is a key enabler for cutting costs, improving reliability, and enhancing the productivity of assets. Artificial intelligence, IoT (Internet of things) and use of big data analytics as a means to streamline processes and information sharing systems will also have tremendous potential in securing the above objectives.

Infrastructure gaps: However, The biggest challenge of all would be to find massive resources for plugging the serious gaps in the transport infrastructure of almost all modes of transport as well in the overall transport infrastructure nationally. In order to make up for lost time due to sustained under-investments in this vital area, resources would be needed immediately so that the capacity increments become available ahead of demand as achieved in neighbouring countries.

Some figures are as follows: NTDPC had estimated transport demand on the basis of GDP growth rates of 6.9% during the 12th Plan, 8.0% during the 13th Plan, 8.5% during the 14th Plan and 9.0% during the 15th Plan period. These projections, pegged at a very conservative level, would translate into aggregate freight movement requirement of 13000 BTKMs (billion net tonne kilometres) by 2031-32 against 2000 BTKMs in 2011-12, which works out to an average annual growth rate of 9.7%. Additionally, to correct the current skewed inter-modal share amongst the various land-based modes of transport, the NTDPC had recommended a progressive correction in the ratio of rail/road share from 35:65 in the 12th Plan to 39:61 in the 13th Plan and further to 45:55 in the 14th Plan, ultimately culminating at 50:50 in the 15th Plan.

3.3 Strategic Goalposts for a Credible Integrated National Transport Policy

The significance of the transport sector in the national economy towards fuelling sustainable economic growth has been underscored by a number of in-depth studies undertaken at the instance of the Government of India (GoI) over more than five decades in the past. Starting with the Committee on Transport Policy and Coordination (CTPC) in 1961, the National Transport Policy Committee (NTPC) of 1980 and the latest NTDPC, which submitted its report in 2013, there has been a remarkable convergence in their basic recommendations for evolving an integrated and sustainable national transport policy framework. The main building blocks of the policy framework suggested by these Committees included:

(i) Social costs should be factored in addition to financial costs in devising an optimal inter-modal mix which facilitates meeting the aggregate demand of transport of the national economy at minimum resource cost to the nation.

(ii) Energy conservation and environmental concerns have to override considerations.

(iii) Short-haul traffic up to around 300 kilometres based on factoring resource costs for each mode should get allocated to road mode, whereas the long-haul traffic should be the preserve of less energy intensity modes like rail and waterway sectors.

(iv) A hub-and-spoke concept should be built in to maximise the benefits of multimodalism wherein the first and last mile connectivity should be the responsibility of road mode and rail/water modes should provide the long-haul land bridge.

Despite the convergence in the recommendations, implementation strategies of the government have singularly failed to take cognisance of these eminent guidelines. The time is ripe to articulate a strategy which enables the creation of a robust integrated transport infrastructure that is safe, reliable, and adequate to meet the needs of the economy while minimising the adverse impact on the environment at minimum cost.

CHAPTER 4

ROUTES TO CHANGE

Change is sometimes the matter of a moment.

The emerging demand for transport needs to be met through planning and investment. But even more importantly, it has also to be acknowledged that such a transport network itself would also be a key driver of economic growth as well. Thus, transport planning and provision must be seen as central to the economic planning process itself. This exercise must also focus clearly on the global awareness of environmental issues and that the sharp depletion of scarce energy resources should lead to sanity in the allocation of scarce resources.

4.1 Integrated Transport Infrastructure

The principles of integrated transport planning have to be incorporated in the model for resource allocation amongst different modes so as to provide a total transport infrastructure at the least cost to society.

Conceptually speaking, integration of the different transport modes of transport need to be secured at three different levels, namely,
(i) within and between different modes of transport at the physical level,
(ii) through an integrated approach to evolving a regulatory and fiscal policy framework, and
(iii) through the design of public policies relating to other sectors of government which have the potential to influence demand for transport such as land-use area and various social and cultural concerns.

The first level of integration can be attempted through both linking of operations of different modes as well as through the commercial promotion of coordinated transport packages by complementary modes. The second level can be attempted through transport regulation by concerned public authorities in the area of transport and fiscal policies directed to internalise all costs due to externalities like environmental pollution, congestion issues, energy intensities of different modes, safety considerations, and others. The third level of integration can be pursued through public policies relating to other associated sectors of the national economy which have the potential for influencing the demand for transport such as land-use planning as well as policies relating to the social and cultural sectors.

In this context, the significant policy areas which can impact transport planning are correlation between land-use and transport demand in the development of urban residential and industrial estates. This has the potential to dramatically alter the life patterns and scale of movements without regard to the capacity of the infrastructure to deal with it.

Transport, or the lack of it, plays a very important part in determining the kind of society in which we live. Issues of city centre dereliction, rural isolation, loss of community identity are the problems of modern life, that relate in part with the way in which our transport systems have developed. The challenge is for governments to preserve the benefits while mitigating the harmful effects.

Transport Pricing: Any exercise for the formulation of integrated transport policy has to factor in issues relating to pricing of transport services. While transport services are an essential component of economic and social development, non-availability of a level playing field is resulting in sub-optimal operation of markets. Since environmental costs and other externalities are systematically neglected or underestimated in transport pricing of transport services, the individual transport user is receiving distorted price signals. Failure to respect fundamental economic principles in the transport pricing leads to distortions in making modal choices because the user perceives them only indirectly.

Minimisation of Carbon Emissions

Any exercise for formulation of integrated transport policy has to factor in issues relating to pricing of transport services. While transport services are an essential component of economic and social development, non-availability of a level playing field is resulting in sub-optimal operation of markets. Since environmental costs and other externalities are systematically neglected or underestimated in the pricing of transport services, the individual transport user is receiving distorted price signals. Failure to respect fundamental economic principles in the transport pricing leads to distortions in making modal choices because the user perceives them only indirectly.

Certain approximations of the cost to society of the above externalities like environmental and noise pollution, accidents, and traffic congestion are as follows:

(i) Cost of air pollution was considered to be of the order of .25% to 2.65% of GDP.
(ii) Cost of noise pollution had been estimated at 0.06 –0.075% of GDP.
(iii) Social cost on account of environment on a per-tonne-km basis for different modes of transport estimated in Rupees at 0.030 (coastal shipping), 0.051 (rail-diesel), 0.150 (rail-electric), 0.202 (road), and 0.690 (air).
(iv) Estimated cost of accidents in rupees for road 0.062/tkm (tonne-kilometre) and for rail 0.001/tkm.

RITES had used these estimates to determine the optimal inter-modal mix for road, rail, and coastal modes. It had also determined break-even distances for different freight commodities based on the ratio of difference of fixed costs to the difference of variable costs for the rail and road modes.

Based on these break-even distances, RITES also used an econometric model named Transport Allocation and Route-mode Mix Optimisation (TAROP) model to determine optimal commodity flows by different surface modes. These numbers were compared with the actual flows during the base year 2007-08 and the gap between actual and optimal mix was computed in terms of flows, costs and throughput.
The significant findings indicate that total throughput increased by 44.3 million tonne kilometres (around 3%). Cost decreased by INR 38.47 billion, which constitutes about 16% of the total cost incurred on transportation in the year. What emerges from the above is that internalisation of the above externalities is one of the very important tools for addressing the imbalances in the transport market. It is also vital for optimising both costs and transport throughput at the least resource cost to the community.

In light of the foregoing, for regulating investment there is a need for an independent apex body to consider proposals from different modes. It then needs to coordinate the development plans of different modes of transport to the extent possible, by allocating resources to ensure an optimal inter-modal mix.

4.2 Implementation Strategies through a Multimodal Approach

The most effective strategy to bring sanity in the planning and implementation of an integrated transport policy framework in the country would be to focus on multimodalism as the underlying philosophy.

This has become imperative with the Indian economy being on the cusp of an explosive growth path. This comes at a time when the logistical needs of the economy have to be met by developing a Collaborative Approach instead of the historical Competitive Approach between different modes of transport. The collaborative approach will entail adding further value to multimodal logistics including providing competitive pricing, assured transit time, and door-to-door service. These components can be incorporated if professional logistics companies and railways jointly partner the services and quality customer services are offered. The multimodal services needed for efficient supply chain management have to be based on: competitive pricing, assured transit time with timetabled services, and customer focus.

Multimodal services involve reducing the unit cost of logistics and usage of different modes of transport (including rail and road transportation) within a hub and spoke system. However, the present progress on multimodal logistics has been dismal. The road sector has been the most progressive in this area and road operators have been working as per market needs and adopting innovative steps to provide competitive pricing and assured transit time. Railways have been a laggard in this area. It is ironical that a system running 12,000 trains a day is unable to offer efficient services at a competitive price for time-sensitive and high-value cargo. This can be seen from the fact that railways transport share of domestic cargo is only 0.9% of the total cargo carried by it and 0.5% of the total market share.

The reasons for this low market share have been multi-dimensional and include:

(i) Inadequate capacity due to sustained underinvestment in the infrastructure over the past decades.

(ii) Inability to provide assurance for timely delivery of goods which are increasingly becoming time-sensitive.

(iii) Lack of adequate response to the customer needs in regards to wagon design to meet high volume and lighter characteristics of the general goods cargo.

The scope of domestic cargo is very high, but for full train movement in the present system, there is an urgent need for innovative and out of box thinking.

4.3 Key Building Blocks

Infrastructure: Contours of an Integrated Multimodal Transport Policy

For an integrated transport policy to evolve, several factors must be considered while sub-serving the needs and aspirations of the society in general:

(i) Transport infrastructure in thinly populated, remote, and backward regions has to be planned so as to meet the present and future needs adequately. Such areas cannot sustain a high cost, high speed, and high capacity transport infrastructure in the early stages of the development process. In such areas, the road can be the precursor to rail mode. This is so because the development of the capital-intensive rail mode infrastructure can become a millstone that may throttle growth by diversion of scarce resources prematurely.

(ii) The traditional production-oriented transport business has to graduate into customer-friendly service providers. This would require not only structural changes in the organisation, but also, more importantly, attitudinal changes.

(iii) Sublimating the present competitive approach between rail and road modes into a complementary approach will result in multimodal transportation of goods which will have great relevance since it secures seamless rail-cum-road and door-to-door service. This can be achieved if the trucking companies voluntarily convert themselves into multimodal operators by utilising the cost advantage of rail mode to provide the rail bridge between two long-distance nodal rail terminals; and perform the aggregation and dispersal functions at these two ends by road vehicles.

(iv) Similarly, if railways provide warehouses at railheads to serve as distributor godowns for companies dealing in processed foods, detergents, pharma products, FMCG (fast moving consumer goods) and other consumer goods, movement of such goods from the manufacturing facilities to the rail side warehouses at the consumption nodes could be rail-based and in containers. Future dispersal to the retail outlets in the cities could remain road-based with overall savings in distribution costs.

(v) Development of multimodal logistics results in lowering of overall freight costs, reduction in vehicular pollution and congestion, and cutting-down of warehousing costs.

As far as freight traffic is concerned, integrated multimodal transport is achievable if the trucking companies convert themselves into multimodal operators utilising the cost advantage.

They also need to consider safer and environment favourable characteristics of rail mode to provide a ‘rail bridge’ between two long-distance nodals rail terminals. The aggregation of goods at one end of the rail terminal and dispersal at the other end could be continued by the road service providers. Provision of warehouses at these nodal rail terminals could be utilised as distributors’ godowns for companies dealing in processed FMCG and similar goods, thereby ensuring direct movement of such goods from the manufacturing facilities to the distributors’ godowns and eliminating secondary road movements under normal circumstances. The key to this arrangement is total transportation package providing door-to-door service through a single-window counter at minimum overall logistics cost.

Similar road-fed collection centres for parcels and running advertised scheduled parcel rail services between identified pairs of nodal points could provide reliable, fast, and cost- effective transportation for parcels. In respect of international cargo movements, coordinated shipping-cum-rail/road services could be offered in coordination with port and customs authorities so that delays and damages due to handling and procedural problems could be minimised. Use of IT (information technology) in operating such coordinated packages is now possible and can help in smoothening interface issues dramatically in any multimodal transportation package.

A paradigm shift is necessary to usher in a multimodal approach and evolving an integrated and sustainable strategy for building up state-of-art transport infrastructure in the country. All modes of transport—railways, roadways, airlines, and shipping—have to come out with coordinated multimodal transport packages in order to play their legitimate role in the social, economic, and political life of the sub-continent. In order to do so successfully, each one of them has to manage the process of change with foresight and commitment.

One of the key elements of the multimodal strategy is the concept of hub-and-spoke arrangement which involves setting up MMLPs (multimodal logistics parks) at the two ends as well as at intermediate locations along the artery linking these intermodal terminal facilities.

These MMLPs are the interchange points where modal transfers are organised. These MMLPs have to be developed at appropriate intermediate locations serving industrial and business hubs which generate inward as well as outward freight traffic for the transport arteries.

Identification of the appropriate location for developing these MMLPs is of critical importance and need to be strategically decided where inter-modal transfers are conveniently done at minimum cost.

In the case of EXIM traffic, the MMLP has to be obviously in the immediate vicinity of the port itself. To ensure that the inward containerised cargo is transferred to the MMLP linked to the port with minimum delay, and in the interest of ensuring efficiency in port operations, a rail-based merry-go-round system should be developed between the wharf area and the rail terminal, where ever feasible. While planning for a new greenfield port facility this should be an inbuilt arrangement. This would also discourage mushrooming of CFSs (container freight stations) around port area indiscriminately as has happened in ports like Jawaharlal Nehru Port Trust (JNPT) and Ennore.

In case of inward freight traffic destined for major urban conglomerations and metropolises, distribution centres(MMLP's) should be developed in areas closest to the consumption areas subject to availability of land. This is already being done to some extent. For instance, in metropolitan Delhi, major MMLPs have come up in Azadpur and Tughlakabad and Bhiwandi in Mumbai.

In cities having 360 degree development concentric ring road networks would be required and MMLP's should be developed in future on these peripheral roads at appropriate locations.

In Mumbai metropolitan area where urban growth has been in longitudinal direction MMLP's have developed in the northern part of the island where land could be made available. However, fortunately, with the Mumbai Port operations declining sharply, there are substantial land and warehousing assets that are idling. These can be ideally utilised for developing an MMLP which could service the consumer needs of southern and middle Mumbai residents at least cost.

Standardisation

In any exercise for introducing multimodalism, standardisation of equipment, processes and procedures including containers as also of handling and packaging equipment and rolling stock for movement of the containers on different modes of transport is imperative.

Our experience in development of the ISO containers for EXIM Traffic is an excellent model. In the Indian context, the ISO container revolution has bypassed the field of movement of domestic cargo and only some ad hoc steps have been taken by the road sector over which the bulk of break-bulk cargo moves today. However, no standardisation in related sectors has taken place.

According to the NTDPC, 2014, the freight traffic in India is expected to increase from around 2000 BTKMs in 2011-12 to 13,000 BTKMs by 2032. A very large percentage of this increase in freight traffic will be in the area of domestic cargo for which the ISO containers are not suitable particularly because it offers inadequate volume for movement of high-value, high-volume domestic break-bulk cargo, including parcels, white goods, FMCG and other consumer goods.

Domestic container design: Domestic container design specifications need to be developed on priority in consultation with captains of the logistics industry as well as transport operators of all modes of transport so that end-to-end solutions are provided from the production centres to the ultimate consumers' premises. Manufacturers of handling equipment and packaging specialists would also need to be associated in this exercise. The container has to be customer friendly, easy to handle and have the flexibility for the various type of cargo including perishable. Care should be taken to study the international specifications evolved in the developed world so that their experience is also factored in.

Specialised domestic containers for perishable goods should be part of the developmental exercise and should have the same overall dimensions with add-on equipment fixtures for ventilating as well as insulating/ air-conditioning of the contents wherever necessary, as has been done for ISO reefer containers.
The benefits of containerisation of domestic cargo would be significant in terms of bringing down unit costs of movement, handling costs, and costs on account of wastage/ pilferage.

Global Supply Chain and Multimodalism

Global supply chains do not originate or terminate at gateway ports any longer. Customers expect door delivery with consistent and high-level service quality—time efficiencies, safety and security of cargo, and all of it at a reduced cost. Further, logistics chains are not only about cargo flows, but there is also equal emphasis on corresponding information, document, and fund flow. Logistics functions need to be integrated at three different, but intrinsically linked, platforms—infrastructure (Multimodalism), digital (EDI—electronic data interchange, for instance) and services (service Integrators—LSPs: logistic service providers).

Participating stakeholders of the global chain have their own vertically-integrated profit-maximisation models, which need to integrate horizontally to create the requisite logistics chain, an activity they all would have to invest in and ultimately benefit from.

Stakeholders may choose to invest in a common digital platform for which they need to invest in technology and skilled manpower. Governments may also choose to get into this either as an investor in the basic architecture of the platform or just facilitate it. Such a global platform will lead to outcomes of on-line shipment tracking, improved cargo and container visibility, and reliability/predictability of cargo delivery, all of which are important ingredients of enhanced logistics performance.

On the services front, more integrated service providers need to be available, and their skill sets would require upgrading. Currently the third-party LSPs are few, under-trained, and inefficient. They also do not offer full range of services and solutions. Integration of logistics would not be possible if service providers fail, even as all other platforms come together.

Multimodalism has to be the basic infrastructure platform that logistics integration needs:

Multimodality involves not just the physical inter-modality between modes of transport, but also all the softer aspects of documentation, liability regimes, insurance issues relating to cargo and liability, international commercial laws and their practice, and of course, national laws.

The big-ticket infrastructure investment of the two DFCs will result in capacity creation of a high magnitude. It is also expected to introduce a paradigm shift in how rail traffic will be moved.

DFCs, if efficiently operated, may solve the rail transport problem, but the logistics chains don't begin and end at rail trip commencement and termination. The infrastructure platform at the two ends is equally important if DFC benefits have to be even partially reaped. ICDs (inland container depots), PFTs (private freight terminals), Rail sidings or, now common folklore, MMLPs assume great significance in the entire chain. It does not still end with efficient terminals but continues beyond into the extensions of the first and the last mile.

Important outcomes expected from DFC operation are summarised as under:

- Higher freight speeds no level crossings, no passenger traffic, better quality rail, and other infrastructure.
- Enhanced throughput per train—higher axle load, longer trains, higher envelope for rolling stock, double stacking of containers on the WDFC.
- Time-tabled freight services—at least scheduled services and therefore consistency, predictability, and reliability of rail transport.
- Improved on-line track and trace, as also cargo, wagon and container visibility.
- Safety and security of cargo and containers.
- Lower price for the customer on NTKM (net tonne-kilometres) basis—better rolling stock utilisation and other efficiencies on account of state-of-the-art technology leading to lower cost of haulage.

Some more crucial factors here are:

Governance Regimes and Structuring:
Large lumpy investment in logistics infrastructure, with high gestation periods (for instance in rail track, port sub-structure etc.), is expected to remain a State responsibility given that the private sector has little appetite for it. A possible model could be that Government and National Highway Authority of India—NHAI) provides unencumbered land rail/road connectivity to the network, and ancillary infrastructure by way of access to water, electricity and fuel, and the private sector provides O&M (operations & maintenance), along with investment in handling equipment and necessary superstructure.

In another theme, the Government may grant a concession to a developer who creates basic infrastructure and leases for O&M. In effect, the baton should shift through the penumbral area between the public and the private towards more private investment, through a variety of appropriately structured models including PPP (public private partnership). Quantum of investment and the risk-sharing mechanism will determine the depth of private participation.

As investment requirement shifts more towards smaller and service-focused infrastructure, the private sector will step in.

The State must then take proactive steps to facilitate such initiatives.

Role of state: Logistics service provision mainly requires working capital funding and therefore no State support or interference is possible. The State must on its own, though, provide the necessary operating environment for such businesses to compete and thrive. The Concession Authority may specify standards of construction mainly through the certification process, regulate construction through the institution of an independent engineer, and commercial operation through the independent regulator. The authority may also be interested in more comprehensive service provision or higher cargo volumes or just in revenue share. This can be addressed through the specification of appropriate bid parameters in a suitably structured concession agreement.

Potential partners could be LSPs (terminal operators, shipping lines, multimodal transport operators, freight forwarders, or strategic investors). Whatever be the case, the emphasis would have to be on the quality of management and domain experience and expertise.

Commercial Operations

Essential Features of Multimodal Logistics Parks (MMLPs)
MMLPs typically are operated as container terminals ICDs/CFSs/or combined), or PFTs or much larger all-encompassing MMLPs or just as intermodal hubs. They could be established with any intermodal arrangement—rail/road/water in any combination of some or all. They could deal with EXIM or domestic trade or both. They could have warehouses or CFSs or Bonded Warehouses or no such facility. Terminals could be huge DPs (Distribution Parks) or just storage centres for cargo and containers. A large MMLP could just be limited to a Double-Stacking hub point or have a strong cargo handling base. The infrastructure created and handling equipment used depends on the specific requirement of a terminal.

Terminal operations have evolved from a point-to-point to a hub and spoke model with centralised load centres having linkages to their own networks. Spokes get connected to hubs by road, and when volumes grow even by multi-destination rail connection over 200-400 km distances. An example could be that trains from multiple spoke connection bring in multi-destination containers which are then sorted and loaded for long-distance hubs where again dispersal is similarly organised. The entire purpose of strengthening feeder routes along the DFCs is to build on the hub and spoke logic.

Terminal Functions

Terminal functions can be broadly categorised as:
• loading/unloading of containers on/from trains,
• hubbing/double-stacking,0
• stacking them in nominated yards,
• providing storage for empty and loaded containers,
• warehousing cargo for in-transit storage,
• customs clearance,
• consolidation/dispersal of cargo,
• issuance of documentation,
• inventory management,
• deferment of duty payment (Bonded warehousing),
• value-addition to cargo—palletisation, barcoding, fumigation, repacking, postponement of form and size etc., and
• facilitate the first and last-mile connectivity.
Terminals also can provide for container repair, fuelling provision, weighment, parking of vehicles and several such attendant facilities.

Regulation and Facilitation

Government governs best when it does less of it.

While direct Government intervention may be required in provision and management of land, modal connectivity, ancillary infrastructure, etc., but for all else, it can at best play the role of a facilitator.

However, if markets don't self-regulate effectively, then some soft regulation may be in order. If the Government has a stake, say, through a PPP kind of structure, it may wish to regulate critical elements like the quality of infrastructure built, services offered, and even pricing if the entity is likely to assume monopolistic status. Regulation by Government tends to stifle business, but if it carefully structured, it may help reap laudable economic benefits. Facilitation, on the other hand, is an important state activity. Logistics infrastructure needs plenty of it in all shades. Access to funds for longer durations, tax considerations, focused monetary and other incentives, preferential treatment in project clearance, grievance redress mechanism etc. can be some common facilitation measures, apart from some specific cargo or industry-based initiatives.

ALONG *THE ROAD*



A possible strategy for multimodal development of the transport and logistics sector could be built around a detailed bottom's up analysis of the current and future traffic flows across the various modes of transport. This was undertaken by McKinsey Consultancy Group in 2007 on the Indian logistics sector. It revealed that nearly two-thirds of the total freight traffic is being carried across three significant components of the transport network, namely: Seven long-haul corridors that link 15 high growth clusters generating freight traffic that is growing at 1 to 2% higher than the average GDP growth rate. These high-density corridors carry 50% of the overall freight traffic computed in tkm. Of these, five are high-density routes for both rail and road modes whereas the other two are basically coastal routes even though flows over sub-sections are significant by both rail and road modes. The five land corridors are Delhi-Kolkata, Delhi Mumbai, Delhi-Chennai, Mumbai-Kolkata, and Mumbai-Chennai. The coastal routes are Kolkata-Chennai along the East coast and KandlaKochi on the West coast. The 15 high growth clusters include 8 ports, namely, JNPT, Kandla/Mundhra, Mangalore, Kochi, Kolkata/Haldia, Chennai/Ennore, Vizag/ Kakinada and Paradeep. The 7 land clusters are NCR, Surat/Ahmedabad, Hyderabad/Bangalore, Mumbai/Pune/Nasik Coimbatore/Salem, Bilaspur/ Raipur and Jharkhand. The 150 medium distance connectors that link with the seven long-distance corridors with lengths range between 100 and 300 kilometres which provide connectivity to state and district headquarters. These carry nearly 10% of the total freight traffic in terms of tkm.There exist 750 last-mile links of up to 100 kilometres leading to ports, mines, and industry clusters which have poor quality infrastructure and do not lie on either national or state highways.

In the present scenario, there is an urgent need to develop 15-20 MMLPs to enable trans-shipment between different modes as well as a consolidation of freight at critical locations.

An illustrative list could be: Mumbai, Bangalore, Cochin, Hyderabad, Kolkata, NCR of Delhi, Ahmadabad, Nagpur, Vishakhapatnam and Siliguri. This exercise could be a starting point for evolving a multimodal logistics solution for the country because multimodal transportation of goods and people can become the transportation solution for operationalising the integrated transport strategy. The need for the economy is to provide transportation packages that provide door-to-door services for freight at a reasonable cost. This will help them remain competitive in a global scenario.

4.4. Mode-wise Strategies

Many mode-wise multimodal transport strategies can play a crucial role in changing the dynamics of how the industry unfolds, These are:

Railways: Railways have the chance today to level the transport playing field by restricting itself to building basic infrastructure and offering private players the chance to own rolling stock that meets their specific needs. Privately owned trains can continue to be run by IR (Indian Railways) for which an appropriate 'access' charge may be levied. However, the rates need to be competitive vis-a-vis other modes of transport.

This model should be experimented on DFCs where unit costs can be dramatically lower due to the following reasons:

(i) Average speeds of freight trains can at least double because there would be no capacity constraints on new arteries; the speed potential would be 100 kmph as well. Also, transit time can be brought down by 50%.

(ii) Higher throughput per rail wagon would be possible because of the increased axle load of 25 tonnes.

(iii) Higher throughput per train would be possible because of longer train-lengths and feasibility of running double-stack containers.

(iv) Increasing the dimensions of the wagon/container envelope to increase the volume of the wagon for high-value, lighter white goods traffic would enable rail mode to compete with road mode effectively particularly over long hauls.

(v) Running time-tabled rail services because the constraint of capacity saturation on arterial rail routes would not apply.

This strategy could facilitate diversion of a large basket of freight including parcel traffic which today moves by road at a much higher cost to the national economy. This is primarily because railways have been unable to level the playing field due to many historical compulsions. This would also enable implementation of a series of high-powered committees for facilitating integrated transport systems not only to achieve an optimal inter-modal mix, but also at least resource cost to the national economy. Thus the basket of freight commodities which could gravitate to the more energy-efficient, reliable, safer and environmentally friendlier rail mode would include:

(i) Parcel traffic—95% of which today moves by the more costly road mode.
(ii) White goods which are high-value, low-weight and in high-volume, are also move majorly by road.
(iii) Automobile traffic.
(iv) Containerised cargo by double stack timetabled rail flat wagons.

Road Sector: Over the past two decades, there has been a significant expansion in the road network, under the NHDP with focus on improving connectivity and capacity upgradation.

Rural areas have benefited enormously from the PMGSY scheme which emphasised new connectivity and upgradation of rural roads to meet the growth in traffic demand. However, there has been no fundamental stimulus for the state highways and district roads. As a result, the junction points with the improved national highways have become choke points across the industry network. The biggest challenge, however, is to address the various processes and problem of coordination due to multiple overlapping authorities that lead to delayed clearances and project delays.

It is imperative that road development is not seen in isolation. To enable the planning processes and integrate roads into a multimodal system of transport, certain gaps in this process need to be plugged:

- Detailed regional traffic and transport surveys need to be conducted: To begin with, this should be done on a regular basis every five years. There is an urgent need to set up a dedicated road data centre as well.

- Absence of skilled manpower in the field of construction and maintenance of road: There is a huge deficit in the availability of skilled construction workers which needs to be managed.

- Technology for maintenance: This needs a quantum jump particularly with respect to primary and secondary roads Even one recognised technique for developing long-lasting pavements can help in increasing the current 4/5 years renewal cycle to 12/15 years cycle.

- The mandate given to Indian Roads Congress (IRC) needs to be updated: There is a need to evolve standards, specification manuals, and guidelines for planning design and construction of different categories of roads urgently. The role of IRC should be enhanced, where the RDSO's model on IR could be considered ideal.

- Role of NHAI in construction of national highways needs replication: At the state level, this can help in securing upgradation of state highways and district roads by—creating regional/state level institutions in line with NHAI model.

- Securing adequate revenues for the upgradation and expansion of the road network: This is a massive challenge particularly at the state level. Adequate public financing and evolving private financing initiatives would have to be an integral part of the strategy as well.

To achieve a sustainable and integrated multimodal system of transport, roads are an important component. The focus should be on overcoming the silos mentality by not looking at roads in isolation, but in terms of integrating them with other sectors also.

Important pointers to be borne in mind are:

- The planning and development of the primary road network must tie-up with the planning of DFC on the railway. This must be replicated in the doubling/ tripling plans of their arterial routes along the sides and diagonals of the golden quadrille.

- Connectivity with ports, SEZs (special economic zones) logistics hubs and linkages with neighbouring countries should be key.

- To augment the capacity of state highways, every state should formulate and implement programmes by replicating the NHDP.

- For implementing projects, the structure and processes of NHAI should be replicated as a model. Alternatively, NHAI could develop regional units on the lines of the zonal railway structures on Indian railways.

- A dedicated road design institute under the umbrella of the Ministry of Road Transport and Highways (MoRTH) should be set up to develop specifications and standards which that then be applied across India. All state Public Works Department (PWD) should enforce these standards and specifications.

- Setting up a road safety and traffic management board is an urgent necessity (The National Road Safety and Traffic Management Board Bill, 2010 has already been introduced in the Parliament on 4 May 2010). A National Road Safety Fund should also be created to give teeth to this proposed legislation. Both the structures have been suggested by the Sundar Committee on Road Safety.

Ports and Shipping: In 2011-12, port usage was on an average of 80% despite a slowdown following the global recession. 4 out of the 12 major ports even had utilisation rates above 100%. Now the expected growth of the traffic is projected at a CAGR of more than 6% to reach 3,068 MT by 2031-32 from the current level of around 1,000 MT. It is worth noting that EXIM traffic, 95% of which is handled through the ports, has had healthy growth rates, notwithstanding stagnation in the past 5 years. The growth projections to be encouraging.

To cope with this level of traffic, a capacity requirement of about 4,000 MT between the major and minor ports would be needed. Indian ports have remained highly constrained for capacity and are expected to remain so in the near future unless urgent policy reforms are undertaken to address the various challenges confronting this sector. These major concerns and policy gaps include:

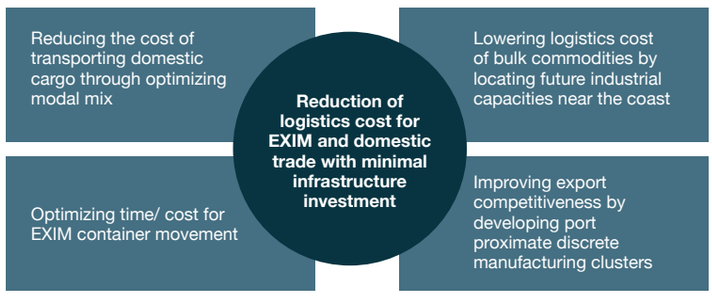
- No comprehensive and coherent strategy for the location of ports in the country: Even the recent initiative of the 'Sagarmala' vision is a belated exercise to give a fillip to this important policy area.

- Need for a state-of-the-art mega port to serve as transhipment hubs: On the lines of Colombo or Singapore, such hubs give an impetus to the development of a reliable coastal shipping network also. Two such mega ports—one on the east coast and the other on the west coast—have to be planned to take care of the growth visualised.

- Land bridge by road/rail between these two trans-shipment hubs: This could also be planned to reduce transit times as also provide connectivity with the vast hinterland served by them.

- Finding sources of finance for the massive investment: This challenge exists not only in the development of ports but also for securing efficient multimodal hinterland connectivity and a higher draft of at least 17 years at the major ports.

Vision of the Sagarmala Programme



Source: http://sagarmala.gov.in/about-sagarmala/vision-objectives

The key focus for the government would be to upgrade at least four existing major ports along with planning for two new mega ports. Alternatively, they could combine some existing major and minor ports which could serve the trans-shipment hubs—one on each coast. These mega ports would have integrated facilities for handling varieties of commodities including containers as well as bulk cargo.

Identifying port locations would be critical and would require setting up an expert group to undertake detailed studies to identify the potential location for such ventures. Critical determinants to consider would need to include adequate draft to accommodate larger vessels, enough berthing and terminal capacity, and necessary handling equipment. Space and superstructure to handle large hinterland connectivity would be another critical infrastructure by all surface modes. Feeder connections to smaller ports in its neighbourhood would also be required to serve as transhipment hubs.

The governance structure of major ports would also require an in-depth study.
The most successful model evolved globally is the 'landlord' model under which the ownership of the land is generally vested in a public authority or government. Provision of services is formed out to different agencies—both public as well as private—which are generally administered as corporate undertakings. The route for transformation is through corporatisation and decentralisation. All terminal operations are unbundled at the major ports as public sector corporation and possibly penalised at a later stage. Management of such mega ports gradually shifts from the current centralised form to a decentralised format where the port authorities are given autonomous power within the policy frameworks of the central and state governments. The role of the Ministry of Shipping should be only to facilitate rather than control. The governance model also needs to be implemented urgently, and the global benchmarks in this area need to be replicated while adapting as necessary

Inland Waterways: While IWT is one of the most environment-friendly modes with its excellent fuel efficiency and lowered emission level, it has not been developed to its full potential and needs focussed attention for its development.

IWT has the potential to serve as an important economic lifeline for an integral socio-economic development of the region.

Subject to adequate investment in the existing five National Waterways, the cargo potential is projected to increase to about 22 MT buy 2031-32. Currently, the cargo moving through IWT is largely confined to Goa, and fertilisers and raw materials in the West Coast region. Certain initiatives have been taken to activate the movement of food grain and fertiliser on the Varanasi and Kolkata/Haldia as well as in the North East region. NTDPC has estimated that to secure the projected movements by IWT, an estimated INR 640 billion would be required up to 2031-32, of which about INR 300 billion would be needed to be contributed by the government. This level of investment would be estimated LAD across critical sectors would have to be at least 2.5 meters if not 3.0 meters for round the year navigation. Private sector investment could come in for developing terminals and cargo handling facilities, provided concessional terms are offered to kick start the process. Acquiring vessels could also be encouraged by the private operators provided sufficient connectivity with road and rail is ensured.

Develop a Collaborative Approach Instead of a Competitive Approach in Logistics

With faster economic growth the logistical needs in the consumer goods segment has multiplied. To meet the public demand this space has been occupied mainly by Road transport while Railways not making innovative approach to meet needs of this segment. The present status of Railways share of domestic cargo is 11.89 m.t. in total volume of 1223.29 m.t. in 2018-19 which is only 0.9%. In this background the scope of domestic cargo is very high but in present system of full train movement there will be need of innovative and out of box thinking needed to enter in this segment.

The collaborative approach will entail adding further value to multimodal logistics including competitive price, assured time service and door to door service. These components can be incorporated if professional logistics companies and railways jointly partner the services and quality customer services are offered. The multimodal services needed for efficient supply chain management have to be based on following parameters as under:

- Competitive Price
- Assured time

Multimodal services involves reducing unit cost of logistics and usage of both rail and road transportation with hub and spoke system. The present situation on multimodal logistics has been dismal and we may assume that there is no concrete scheme to promote multimodal logistics. Road operators have been working as per market needs and adopting innovative steps to provide competitive price and assured price. However Railways have not made any concrete plans to be significant multimodal player in efficient supply chain management.

Railways transport share of domestic cargo is only 0.9% of its railways total cargo and 0.5% of total market share. The reasons for low share are lack of time assurance by Railways and high tariff for voluminous goods.

The consumable products are time sensitive and some of them are of high value and therefore their handling has to be efficient. Further consumable products in the economy are largely voluminous and lighter products. Railways to be significant partner in consumable products have to have mechanism of time guarantee and also customise wagons with high volume per tonne as has been innovated by road.

Issue of Competitive Pricing

There are two aspects of pricing in Railways firstly parcel tariff and secondly haulage rates which are available for private trains. The parcel tariffs have been muddled up by railways which have lost relevance as parcel traffic on Railways has seen a steep fall considering economic growth. Despite being six times fuel efficient the parcel tariff is prohibitive considering costs involved additional handling of cargo at both ends. Railways have two basic tariff one normal Parcel rate and another Rajdhani rate. **The Rajdhani rate for bulk parcel space has proved to be prohibitive and has driven away professional parcel operators away from parcel van leasing.**

The situation has been further aggravated as Railways have tied itself with rigidity of its moving dimensions and volume of parcel vans vis a vis road has become disadvantaged. The present design of parcel van has 6 cub.m. per tonne volume compared to 10 cub.m. per tonne of road containers. Railways have to reengineer parcel vans to stay competitive. Despite having RDSO the alternative wagon designs are not available to develop business of Railways. **The higher volume wagons/parcel vans will automatically bring down the customer price keeping the tonnage same.**

The domestic container cargo has also suffered as domestic business has been entirely dependent on ISO container which is 20 feet and 8 feet high with 47 cub.m. volume. With 10 tonne cargo in each container the volume per tonne is 4.7 cub.m. per tonne which is very adverse compared to road apart from additional time needed for container handling. The domestic container logistics has to be taken off from present design BLC wagon which is 12m. long. The need for domestic light weight cargo is BLC wagon of 22-23m length and high cube containers with 30 feet length to be competitive with road. Composition of domestic container trains should not be more than 30 BLCs so that frequency can also be increased on popular sectors and this approach will transfer traffic from road to rail. There can be different haulage charges for different type of wagon design.

Issue of Time Guarantee or Time Assurance

Provision of Round trip parcel vans on patronised sectors of golden quadrilateral of IR

Round trip parcel van is a strong product which Railways can offer for express parcel logistics. IR runs about 3000 mail express trains on daily basis and 1000 parcel vans can be attached daily with potential of generating about INR 10000 cr. annually. Long distances over 1000 kilometres have good potential to be multimodal giving time advantage as well. The parcel vans attached to passenger/mail express trains will provide time guarantee and also opportunity to handle cargo enroute. Usually there is reluctance on part of Railways to offer capacity for parcel vans on pretext of high passenger demand and line capacity constraints. It has to be appreciated now that with 102% operating ratio steps are required to be taken to improve yield of passenger trains by adding parcel vans on selective basis.

Introduction of Private Parcel Trains having high cube ultra-light design

With line capacity works getting completed on golden quadrilateral and commissioning of Dedicated Freight Corridor there will be option with Railways of introducing time assured trains which can address the need of market of transit guarantee.

The existing parcel vans are not suitable economically due to high tariff for train operations and a new customised wagon is necessary to be inducted. **A new wagon can give competitive edge as it can incorporate the features of high volume per tonne and can be brought haulage concept which has been adopted for automobile trains.**

Introduction of longer container flat wagon with high cube container

The existing container flat runs with ISO container and it is suitable only for heavy cargo. The 45 wagon composition market is not friendly to attract consumer goods to container trains. To get market orientation the volume per tonne has to be improved and for this longer and high cube containers are needed. The ISO container gives only 4.7 cub.m. volume per tonne for light weight cargo whereas need is about 10 cub.m. per tonne to be competitive. There is also need of regular frequency and for this 30 wagon composition trains need to be introduced. A midway scheme of new version of 30 flats container trains with 25-30 feet long high cube containers can only will improve penetration in domestic cargo and enable multimodality of logistics.

Scope of Standardisation in the Freight Businesses to Reduce Costs and Improve Assets

Standardisation of cargo is needed as a strategy to make cargo flow more connected, efficient, cost effective and energy efficient. There is definite advantage which has been experienced in international trade after containerisation.

This is missing the most when it comes to domestic cargo, especially when we take into account rural markets and semi urban areas. Without standardisation, there are too many platforms for vehicles/vessels, equipment, facilities which make it highly inefficient and increase the unit cost and effects the energy consumption per unit of cargo.

With standardisation, automation can be taken on hand easily, becomes simple and easy to implement. The developments in EXIM sector after containerization, removing bottle necks and further development of Block chains to improve overall international logistics proves the advantages of standardisation.

Basic procedures and processes can be standardised which can be integrated with the developments of uniform IT support for networking and data sharing.

Standardisation would require development of industry friendly Container for domestic as of approved standard and specifications. Break bulk freight in ISO container is about 20 times less expensive than conventional means, according to study conducted by Transport geography.

NTDPC 2014, has projected that freight traffic in India may increase from around 2000 BTKM in 2011-12 to 13000 BTKM by 2032, an increase of five to six times. A very large percentage of this freight traffic will be domestic, not moving in ISO, which needs to be catered, including agricultural and industrial produce besides raw material.

Domestic container has to be so developed in consultation with the industry producing cargo, both agricultural and industrial, besides transporters who will be carrying the containers from the point of produce to the market. The manufacturers of such trucks/vans/lorry also manufacture equipment to handle such low volume containers using portable fork lifters etc. The container has to be customer-friendly, easy-to-handle and have flexibility for various type of cargo including perishable ones.

The domestic container to be developed must have standard specification, design and type of cargo including capacity in tonnage and volume.

This is although more urgent in view of the Committee's finding, referred above, that freight traffic will increase in the country by 5-6 times in the next 15 years.

For perishable cargo such container can be insulated, ventilated and even air cooled or refrigerated for which extra facilities would be needed at terminals. Such development would facilitate the multi model transport system, emergence of logistic park and hubs to support logistics. This would be ideal for handling and transport of break bulk cargo. Such containerisation of domestic cargo would bring down the fuel requirement especially when more than 60% of cargo in the country moves by road. This also will provide safe and secure options to the customers as contents are not known, besides reducing spillages and losses. Such standardisation of domestic cargo will have far reaching impact on the national logistics platform.

The need for the economy is to provide transportation packages that provide door-to-door services with respect to time and freight, at a reasonable cost. This will help the economy remain competitive in a global scenario.

CHAPTER 5

DESTINATION OPTIMISED SUPPLY CHAINS

Optimisation is a sure-fire way to a better future.

ACTIONABLE RECOMMENDATIONS

Recommendations by experts can make a difference in how a situation is viewed and how it can be transformed. For more optimal supply chains, recommendations have been categorised under a time frame— short-term (2022), mid-term (2030) and long-term (2050):

- Short-term 2022: These relate to low-hanging fruits and includes action points that are being implemented and will materialise within the timeline. It also includes action points on which decisions are under process and their gestation period is expected to be within the timeline of 2022.

- Medium-term 2030: These relate to recommendations on which policy guidelines would have been issued within the short-term and the implementation process would have started, but is likely to get completed within the mid-term timeline (2030). It would also include certain institutional frameworks which would need to be set up so that the long-term process reengineering and consequential results would be possible beyond 2030.

- Long-term 2050: These would be the residual items which are those having a long gestation period and operationalisation would be possible only beyond 2030.

The classification further focusses on sector-wise issues for which sectoral recommendations have been categorised under each time frame.

5.1 Short-term 2022

Railways

1. The big ticket development in Indian Railways in the short-term would be the commissioning of the WDFC and EDFC during 2020-21. This game-changer will lead to dramatic changes in the processes, procedures, and marketing strategies on the one hand, and important altitudinal charges in handling the rail customer interface on the other. It would also impact the adjusting of operational and commercial strategies in a fundamental way This would be critical because, with the commissioning of the DFCs, there would be a possibility of reducing the unit cost of operations. This could be accompanied by an improved response to customer concerns in terms of speedier transits and reduced response time to demand, in terms of prompt wagon supply. The underlying changes would be possible because of the significant quantum jump in track capacity along with segregation of freight and passenger services.

2. Arising from the above, IR would have to undertake an urgent marketing survey to ensure that additional freight traffic gets attracted to rail mode from the other modes of transport. This would primarily need to be on account of improved quality of service at highly competitive pricing. It would have to evolve transport packages which meet the genuine needs and aspirations of rail freight users in the areas of:

i. Offering timetabled freight services between nodal collection and dispersal hubs/Private Freight Terminals.

ii. Ensuring coordinated multimodal services where the road and inland waterways provide the first and last mile connectivity—a pre-requisite for offering multimodal seamless end-to-end services for the rail customer.

iii. Developing jointly with the other modes of transport, MMLPs at selected locations, primarily through private capital. The role of Dedicated Freight Corridor Corporation of India Limited (DFCCIL) would be critical in performing the coordinating role vis-a-vis other modes of transport.

iv. Certain re-engineering of operational and commercial processes and systems would be extremely important including, the land leasing policies of railways which would need to align with current trends in other modes of transport and would require to be transparent, equitable, and business-friendly.

v. Rolling stock availability would have to be improved dramatically so that the supply is assured within 24 hours after a demand is registered.

vi. Rolling stock design would also need to be a priority to meet the requirement of big-ticket customers like steel, fertiliser, cement, automobile, and FMCG/consumer goods/white goods segments as well as parcels.

vii. The initiative to design a standardised domestic container—dwarf container is a good example which enables availability of higher volume capacity over the ISO containers—must continue. Mini-containers which could fit into the standard containers for piece goods/parcels should also be developed and standardised.

viii. Commercial processes should be tweaked to enhance ‘ease of doing business’ vis-a-vis its customers.

ix. Demand for railway siding should be met within an advertised ‘ceiling’ time frame of not more than 6-12 months. Similar time frames should be set for requests from the port, SEZs, and mines authorities to sanction rail connectivity works.

Highways

1. In view of the fact that bulk of truck movements are largely in the hands of truck owners having fleet sizes of less than five trucks, there is no centralised data bank regarding traffic flows unlike in the case of railways. A centralised data centre should be set up to create a proper data bank.

While GST invoices have provided some reliable data, it needs to be done on an institutional basis in order to ensure that planning is done based on reliable data and not on an ad-hoc basis as at present.

2. At the policy level, the experience of NHDP in securing significant expansion in the network along with developing improved standards of construction and maintenance needs to be replicated in respect of State Highways and the district roads. Interchange points between the National and the State Highways have become bottlenecks with congestion repercussions across the entire network. A policy framework to address this needs to be developed within the short-term timeline.

3. Special needs of connectivity to ports, airports, mining areas and industrial estates/SEZs should be accorded the highest priority at the policy level as well as in implementation.

4. A standardised signage system should be introduced across all highways (National as well as State), for inter-city roads, as well as in urban areas.

5. The integration and standardisation of toll collections across the country is another imperative to secure faster and smoother traffic flows. RFID (Radio-frequency Identification) technology is available to facilitate this and should be implemented with utmost speed.

6. In order to attract private capital for highway development, there has been undue haste in award of such projects without ensuring pre-construction activities like land acquisition, rehabilitation and resettlement of people affected, environment clearances, and shifting of utilities. This has become a major bottleneck leading to time and cost overruns and even stalling of projects. Award of projects should await the provision of these essential pre-requisite clearances.

7. Setting up of a Road Safety and Traffic Management Board together with a National Road Safety Fund as recommended by the Sundar Committee needs to be accorded the highest priority in the short term.

8. The mandate given to IRC to evolve standard, specifications manuals, and guidelines for planning, design construction and maintenance of the road network needs to be accorded the highest priority and the Ministry of Road Transport and Highways (MoRTH) should insist on time-bound updation of various construction & maintenance standards, design standards in alignment with international benchmarks.

Shipping

1. Policy changes to provide a level playing field for the Indian Shipping industry is needed to enable it to grow and compete globally with vessels under other flags. Rationalisation of restrictive policies particularly related to the imposition of a variety of direct/indirect taxes needs urgency, and timelines need to be fixed within the short-term.

2. Policy for providing a stimulus for coastal shipping is another imperative. Some of the areas which need urgent directions include:

i. Setting up coastal terminals at major ports and also developing a few non-major ports as designated coastal ports based on an in-depth traffic study on both.
ii. Ensuring adequate road and rail connectivity wherever not available with the coastal terminals.
iii. Adjustments in cabotage policy to give fillip to growth in coastal movements.

Ports

1. The policy should focus on the following key areas:

i. Development of two mega ports—one each on the east and west coast—with transhipment facility to cope with the mega-ships which is the way forward to reduce unit costs of operations.

ii. Development of a rail-land bridge between these two mega ports to secure segregation of the Pacific and the Atlantic fleets for speeder turn-round.

iii. Unbundle terminal operations by the corporatisation of port managements and adopting the 'landlord model' as the overall governance strategy.

iv. Road and rail connectivity wherever needed should be a priority area for improving the productivity of ports

2. Growth in port capacities of existing major ports to cope with the growth projection in oceanic freight volumes should remain the primary goal for allocation of funds for investments.

Logistics Division, Ministry of Commerce & Industry

1. The draft National Logistics & Transport Policy would require to be finalised and an administrative mechanism to operationalise the policy would have to be set up at the apex level.

2. An integrated financing mechanism would also have to be developed for the different modes of transport so that the development of infrastructure is in alignment with the overall policy.

3. Public investments between modes should be determined in alignment with the National Transport Policy and clearance given at the apex level of the GoI for each mode.

A coordinated administrative structure would need to be created by the Logistics Division to ensure that the various policy initiatives indicated under the National Transport Policy are actually formulated through a regular inter-ministerial forum.

5.2 Medium-term 2030

Railways

1. The operationalisation of two additional DFCs along the diagonals of the Golden Quadrilateral (Delhi-Bangalore-Chennai and Howrah to Mumbai via Nagpur) would be a critical requirement. Railways may determine the priority and change the corridor against the two suggested above if necessary, but the allocation of funds must be tied up in advance so that the project management can be held accountable to ensure that no time or cost overruns of these projects is allowed.

2. Development of specialised rolling stock design to meet the specific needs of customers in order to adequately meet the demand projected should be a priority. The procurement of rolling stock could be optional by IR or the customer or through third party leasing companies like GATX. These options should be available to the user.

3. Firming up the design of a standard domestic container should be another priority area, and procurement of railway rolling stock should also be ensured in time in the medium-term.

4. IR should continue evolving appropriate marketing strategies for diverting long haul traffic to rail from other modes of transport which are more energy-intensive with a view to raise its market share.

5. A transparent PPP model for investments in MMLPs along the DFCs already under construction as well as for the next two DFCs which would be operationalised within the medium-term. Care has to be taken that the mechanism is transparent and provides for an equitable sharing of risks.

6. Public investments in railways should be based on the optimal inter-modal mix developed under the National Transport Policy of GoI.

7. Raising rail share by 10% during the medium-term should be the overriding philosophy of the railways and it should be non-negotiable.

Highways

1. Replicate the policies, implementation strategies and financing instruments used in the National Highway Development Programme for State Highways and District Roads.

2. Implementation machinery could be through an organisation modelled on NHAI at a regional or state level. Alternatively, NHAI could create its own Regional organisations for executing the development plans in a group of states in each region.

3. Connectivity with ports, SEZs or MMLPs within a state/region should be prioritised so that the integrated infrastructure contributes towards the overall reduction of logistics costs.

4. Updated standards and specifications firmed up by IRC should be enforced so that both quality of construction and maintenance cycles are upgraded. One recognised technique is to develop long-lasting pavements which can triple the current renewal cycle.

5. Safety regulations developed during the short-term would require implementation and their impact on road safety would need quantification by the Road Safety Board.

6. The apex Government of India body set up under the National Transport Policy framework to allocate public funds amongst the different modes on an equitable basis should provide public funds for the Highway development—National as well as State—over a 5-year horizon to enable a perspective plan to be developed for each mode including highways.

7. Area for private funding or through PPP mechanism should be identified. An inventory of projects over a 5-year time horizon should also be made so that there is clarity and a realistic plan is available for execution.

8. While executing projects, there should be clear accountability on the project management teams to ensure that there are no time or cost overruns.

9. There should be coordinated development of roads and railways in the national interest and the GoI should have an appropriate administrative mechanism to achieve this objective.

Shipping

1. Increasing national tonnage to cope with the growth in demand should be a key policy objective. To achieve this, it would be important to provide a level playing field for the Indian shipping industry so that it is enabled to compete on equal terms with vessels under other flags. The necessary policy changes should be ensured in time to achieve this basic objective.

2. Coastal shipping would need to be a major growth area. A necessary policy framework to set up separate coastal terminals at existing major ports or developing some neighbouring smaller port for coastal shipping should be implemented in the medium-term.

3. Coastal shipping should also have a level playing field in respect of importing bunker fuel diesel as well as spare parts vis-à-vis concessions available to ocean-going vessels.

4. In order to attract cargo to coastal shipping in view of its extremely low energy intensity vis-à-vis other modes, should be a prerequisite which should be accompanied by a major drive to cut costs due to inefficiencies in the existing systems. Lower manning scales vis-à-vis ocean-going vessels should also be considered.

5. For securing adequate financing for their projects, coastal shipping should have an exclusive window in the various financial institutions to consider their investment needs.

6. Relaxation of cabotage policy to encourage coastal shipping should also be examined.

Ports

1. A comprehensive and coherent strategy for location of additional ports as well as augmentation of the capacity of existing ports should be drawn up by the newly launched 'Sagarmala' mission for implementation by them.

2. Development of at least one Mega Transhipment Port should be firmed up on the West Coast/East Coast based on a realistic assessment of oceanic cargo flows during the medium-term.

3. In the development of Greenfield ports, a merry-go-round rail system should be planned between the jetty area and the terminal rail yard inside the port so that continuous evacuation of containerised and other cargo is ensured- reducing dramatically berthing delays to ships. This aspect should be kept in mind while undertaking expansion/remodelling of existing ports also wherever land availability can be ensured.

4. The governance structure of major ports should be examined critically and also consider the globally successful 'landlord' model for unbundling of the terminal operations through the corporatisation or privatisation route.

5. An appropriate regulatory authority should be created in time to ensure that maximum autonomy is available for port management under a transparent regulatory mechanism.

Logistics Division, Ministry of Commerce & Industry

1. An administrative mechanism for determining financing infrastructure projects that would build adequate logistics capacity would be imperative to give a thrust to implementation of the National Transport Policy covering all modes of transport.

2. A mechanism would also be necessary to update estimates at regular time intervals of social as well as financial costs in order to internalise the cost of externalities such as energy intensities, congestion, accidents, environmental pollution, etc. This would be essential to develop an optimal intermodal mix to cater to the overall demand for logistics and transport at least cost to the country on the basis of which the infrastructural inadequacies of different modes of transport would be identified.

3. Inter-modal allocation of public funding on an equitable basis would be needed for which the appropriate administrative structure would have to be in place.

4. Monitoring of the implementation of the development plans in alignment with the overall transport infrastructure developments plans would be a critical factor in order to make mid-course corrections where necessary.

5.3 Long-term 2050

Railways

1. Planning and execution of the two remaining DFCs along the sides and diagonals of the Golden Quadrilateral should be completed and any other line capacity works, if necessary, should also be planned and executed so that the New Freight Railway becomes a reality.

2. Segregation of freight and passenger streams along all arterial routes should be ensured to upgrade speeds of passenger services to at least 160 kmph. New High-Speed Passenger Corridors could also be planned to meet the need and aspiration of the rail passengers.

3. Rail share in freight business should be raised beyond 40% in the medium-term to 50% for the long term in the overall freight business.

4. Development of MMLPs should be continued to secure connectivity of all SEZs, industry clusters, ports, and mines with DFCs.

5. A rail-land bridge should be commissioned between the two mega transhipment ports on the west and east coast in order to improve the turnaround and productivity of the Atlantic and the Pacific shipping fleets

6. Development of rolling stock designs to meet customer needs should remain a continuing exercise so that the rail share is maintained at 50% on a sustained basis.

7. RDSO should be reinvented to become a globally acclaimed R&D Centre.

Highways

1. National and State Highways should be developed in alignment with global standards in term of construction, maintenance practices, signage, and speed parameters.

2. Connectivity with highways network of ports, SEZs, industry clusters, mines and DFCs should be ensured to enable multimodal transportation strategy to become a reality.

3. On high-density inter-city routes, expressways should be developed continually.

4. Highways toll collections should be digitised nationally in order to avoid any detention of traffic across toll-plazas.

5. Implementation process of safety legislation in terms of recommendations made by the Sundar Committee should be in place and monitoring system should be world-class.

Shipping

1. Market share of Indian shipping companies should be progressively raised to at least 25% and should be able to meet international standard in terms of speed, quality of service, and cost.

2. Market share of coastal shipping should also be progressively built up to 10% along the coastlines, thereby providing relief to both rail and road. Adequate port capacities should be developed to achieve this target.

3. Connectivity with the hinterland should be ensured for the ocean as well as coastal cargo.

Ports

1. The two mega transhipment ports should be operational and all productivity-related parameters should be better than the existing mega ports in order to divert traffic from the neighbouring mega ports.

2. Governance structure which ensures autonomy in decision making, marketing, and fixation of charges should be in place so that productivity parameters are globally relevant.

3. Port capacities should be augmented ahead of demand, and expansion projects should be planned in time and be world-class in all respects.

Logistics Division of Ministry of Commerce & Industry

1. Implementation of the National Transport Policy and integrated multimodal strategy should be operationalised in all respects.

2. Governance structures mentioned in the Short-Term and Medium-Term should be in place to ensure that intermodal infrastructure capacities and the necessary financial support is secured.

3. Optimal inter-modal mix should be the guiding criterion for the development of the infrastructure

4. Overall logistics costs should be in alignment with the international benchmarks so that Indian business and industry are globally competitive.

As Morash and Clinton (1997)[3] suggested: “to minimise total costs and maximise customer value, transportation integration is essential within the supply chain.” Integrating different modes of transport and managing them jointly with relevant supply chain segments can yield many advantages: eventually translating into economic and social benefits for the country, and the planet at large.

[3] Morash, E.A. and S.R. Clinton (1997).” The role of transportation capabilities in international supply chain management”, Transport. J. 36(3).

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The formation of working groups was preceded by a brainstorming session of experts in May 2018, thereafter the working groups after being formed met numerous times in the 20 months that followed. A joint workshop of the working groups took place in May 2019 to assess the development of the theme reports and Roadmap halfway through the project. Thereafter, extensive deliberations of the working groups were held alongside stakeholder consultations until the culmination of the final eight theme reports and the India Roadmap. The 8 Leads of the working groups met numerous times through the project period. The joint meetings of the working groups and frequent meetings of the Leads ensured there was no silo in the deliberations or formulation of the eight components of the Roadmap. We are thankful to all of them for devoting their time and energy in this manner.

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WORKING GROUP

Working Group on "Optimise Supply Chains to Manage Freight Transport Emissions"



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ACRONYMS

BTKMs: billion net tonne kilometres
CAGR: compound annual growth rate
CFS: container freight station
CTPC: Committee on Transport Policy and Coordination
DCs: distribution centres
DFC: Dedicated Freight Corridor
DFCCIL: Dedicated Freight Corridor Corporation of India Limited
EDFC: Eastern Dedicated Freight Corridor
EDI: electronic data interchange
EXIM: export-import
FICCI: Federation of Indian Chamber of Commerce & Industry
FMCG: fast moving consumer goods
GDP: gross domestic product
GHG: greenhouse gas
GoI: Government of India
IR: Indian Railway
ICDs: inland container depots
IoT: Internet of things
IPR: intellectual property rights
IRS: Indian Railway Specification
IT: information technology
JNPT: Jawaharlal Nehru Port Trust
LSPs: Logistic Service Providers
MMLP: multimodal logistics park
MoRTH: Ministry of Road Transport and Highways
NCR: National Capital Region
NHDP: National Highway Development Project
NTDPC: National Transport Development Policy Committee
NTKM: net tonne-kilometres
NTPC: National Transport Policy Committee
PFTs: private freight terminals
PMGSY: Pradhan Mantri Gram Sadak Yojana
PWD: Public Works Department
RDSO: Research Designs & Standards Organisation
RFID: Radio-frequency Identification
SEZ: Special Economic Zone
TAROP: Transport Allocation and Route-mode Mix Optimisation
WDFC: Western Dedicated Freight Corridor
WG: Working Group

SOURCES/ REFERENCES

Golden quadrilateral is a national highway network connecting the four major metro cities of India, viz., Delhi (north), Kolkata (east), Mumbai (west), and Chennai (south).

Morash, E.A. and S.R. Clinton (1997).” The role of transportation capabilities in international supply chain management”, Transport. J. 36(3).

ABOUT PARTNERS

FICCI

Established in 1927, FICCI is the largest and oldest apex business organisation in India. Its history is closely interwoven with India's struggle for independence, its industrialisation, and its emergence as one of the most rapidly growing global economies.

A non-government, not-for-profit organisation, FICCI is the voice of India's business and industry. From influencing policy to encouraging debate, engaging with policy makers and civil society, FICCI articulates the views and concerns of industry. It serves its members from the Indian Private and public corporate sectors and multinational companies, drawing its strength from diverse regional chambers of commerce and industry across states, reaching out to over 2,50,000 companies.

FICCI provides a platform for networking and consensus building within and across sectors and is the first port of call for Indian industry, policy makers and the international business community.

PPMC

The PPMC is an open and inclusive platform that actively invites all organisations and initiatives that support effective action on transport and climate change to join in the process. The PPMC is created to strengthen the voice of the sustainable transport community in the UNFCCC process, especially with a view to the upcoming Conference of Parties (COP21) in December 2015 in Paris. COP21 is expected to result in a new global agreement on climate change, which will shape climate policy in the years to come at a global, regional and national level. By bringing together different actors and stakeholders in the sustainable transport community it will be possible for the transport sector to have its voice heard and speak with one voice on the important contribution that sustainable mobility can make to the mitigation of, and adaptation to climate change.

The PPMC contributes to realising a Global Agreement on Climate Change that empowers transport sector to take action on climate change. The realisation of this objective requires an active engagement of the PPMC before, during and after COP21. It will be equally important to advocate for an agreement that incentivises the transport sector as well as work with the transport and climate community on the implementation of a new global agreement on climate change at the global, regional, national and local levels.

WWF-India

WWF-India is one of the leading conservation organizations in the country. It is a science-based organization that addresses issues such as the conservation of species and its habitats, climate change, water, and environmental education, among many others. Over the years, its perspective has broadened to reflect a more holistic understanding of the various conservation issues facing the country and seeks to proactively encourage environmental conservation by working with different stakeholders- Governments, NGOs, schools and colleges, corporates, students and other individuals.

Shakti Sustainable Energy Foundation

Shakti Sustainable Energy Foundation (Shakti) seeks to facilitate India's transition to a sustainable energy future by aiding the design and implementation of policies in the following areas: clean power, energy efficiency, sustainable urban transport, climate change mitigation and clean energy finance.

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