Logistics and Transportation in India

Present and Future
Index

1. Overview of Logistics and Transportation in India
2. Key trends in logistics and transportation
3. Major challenges for logistics and transportation in India
4. Way forward towards sustainable transportation
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1. Overview of Logistics and Transportation in India
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Overview of Logistics and Transportation in India

Logistics is the ‘lifeline’ of an economy; it drives the growth and efficiency of the nation as well as provides employment to millions and enables FDI influx.

Importance of logistics in economic and industrial growth

- Robust logistics infrastructure is a key requirement for development as it makes it possible to connect producers and consumers throughout the country.
- Major economies such as Germany, Japan, China and US are also leading in World Bank Logistics Performance Index whereas India is 44th.

Employment Generator

- Logistics sector has a multiplier effect across the economy, thus resulting in large scale employment generation.
- In India, more than 22 million people have jobs related to logistics activities.

Symbol of Efficiency

- Logistics efficiency is a strong determinant of the overall economic efficiency.
- India spends 13%-14% of GDP on logistics costs whereas US and European nations spend ~8% and ~9% respectively.

A strong logistics setup fuels economic growth and the state of the logistics sector determines a country’s competitiveness on world stage.

Source: World Bank, Make in India Website, MoRTH and UN Reports.
Indian logistics sector has grown rapidly, due to high economic growth, more spending on infrastructure, soaring domestic demand & impressive FDI inflow.

Economic Growth and Impact on Logistics Market

GDP Growth Rate (%)

<table>
<thead>
<tr>
<th>Year</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate</td>
<td>7.4</td>
<td>8.0</td>
<td>8.2</td>
<td>7.2</td>
<td>7.0</td>
</tr>
</tbody>
</table>

Consumer Spending Per Capita (INR)

<table>
<thead>
<tr>
<th>Year</th>
<th>FY14</th>
<th>FY15</th>
<th>FY16</th>
<th>FY17</th>
<th>FY18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spend</td>
<td>52,086</td>
<td>57,472</td>
<td>63,702</td>
<td>70,557</td>
<td>77,085</td>
</tr>
</tbody>
</table>

Budgeted Infra Spend ('000 Cr)

<table>
<thead>
<tr>
<th>Year</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spend</td>
<td>181</td>
<td>251</td>
<td>221</td>
<td>396</td>
<td>597</td>
</tr>
</tbody>
</table>

Logistics Market Size (bn USD)

<table>
<thead>
<tr>
<th>Year</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spend</td>
<td>110</td>
<td>195</td>
<td>12%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Logistics sectoral growth is strongly linked to the economic growth, investments made and consumer uptake of goods produced thereby.
Characteristics of different modes of transport

Road, rail and air operate in different ways, having unique operational feature, making multi-mode model more viable compared to single-mode model

<table>
<thead>
<tr>
<th>Operating Model</th>
<th>Road</th>
<th>Railways</th>
<th>Waterways</th>
<th>Air</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Fragmented &amp; competitive industry</td>
<td>• Rail is regulated by Govt. while water transport used mainly for import/export</td>
<td>• Used for both bulk and non-bulk material</td>
<td>• Used for cargo as well as courier delivery services by airlines</td>
<td>• High flexibility with ease of access</td>
</tr>
<tr>
<td>• Higher operating cost with lower margin</td>
<td>• Suitable for carrying bulk item</td>
<td>• Used for bulk good transport</td>
<td>• Consolidated industry, having mix of asset leasing and owning model</td>
<td>• Overall low cost of ownership</td>
</tr>
<tr>
<td>• Used for both bulk and non-bulk material</td>
<td>• Shipping containers with full load (FCL) are preferred with higher utilization, over less load (LCL)</td>
<td>• Used for export purpose of both</td>
<td>• High cost competitiveness</td>
<td></td>
</tr>
<tr>
<td>• Used across first mile, mid mile and last mile</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cost Structure</th>
<th>₹ 2.58/ton-km</th>
<th>₹ 1.41/ton-km Cheapest</th>
<th>₹ 1.06/ton-km</th>
<th>₹ 6-8/ton-km Costliest</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Preference by operation</th>
<th>Used for both bulk and non-bulk good transport</th>
<th>Used for bulk good transport</th>
<th>Used for export purpose of both</th>
<th>Used mainly for non-bulk goods</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Advantages</th>
<th>• Fast mid-mile delivery with low cost</th>
<th>• Low chance of damage, pilferage</th>
<th>Fastest mid-mile delivery, cost structure suitable for high value, low volume item</th>
</tr>
</thead>
<tbody>
<tr>
<td>• High flexibility with ease of access</td>
<td>• Overall low cost of ownership</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Disadvantages</th>
<th>• First mile and last mile are slow, leads to higher total cost of ownership</th>
<th></th>
<th>• Accessibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Low utilization &amp; inefficient operation</td>
<td>• High chance of damage, pilferage</td>
<td>• Overall cost of ownership is high</td>
<td></td>
</tr>
</tbody>
</table>

Key Takeaways

• The mode of transport is selected on the basis of cost, time & advantages.
• Rail & water despite being low cost modes have high transit time and are less reliable, making road one of the most used mode of transport.

Modal Share of Transport

- 59% Road
- 35% Railways
- 6% Waterways
- 1% Air

Source: Secondary research
Overview of Logistics and Transportation in India

Several steps undertaken by the Government in recent years have benefited the logistics and transportation sector

### Major Policy Initiatives by Govt. of India

<table>
<thead>
<tr>
<th>Mega infrastructure projects</th>
<th>National highways and dedicated freight corridors</th>
<th>Development of ports</th>
<th>GST and infrastructure status</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Bharatmala - India's largest road project (planned investment ~ ₹ 5 trillion) Phase-I to continue till 2022 and Phase-II till 2024</td>
<td>• Sagarmala - Flagship programme of the Ministry of Shipping to promote port-led development in the country by exploiting India's 7,500 km long coastline. It entails investment of ₹8.5 trillion</td>
<td>• There are 204 minor ports in the country but currently only 44 are functional</td>
<td>• GST has led to 20% reduction in turnaround time of trucks due to dismantling of border check posts</td>
</tr>
<tr>
<td>• NHAI has created a pipeline of projects worth $110bn that will be awarded over the next three years</td>
<td>• DFC project involves constructing 5 freight corridors across the country at a total cost of ₹81,000 crore</td>
<td>• India's ministry of shipping is working on a plan to develop a national grid for ports to improve connections between the minor and major ports in the country.</td>
<td>• E-way bill on consignment value &gt; INR 50,000 has freed transporters from state Government raid parties</td>
</tr>
<tr>
<td>• With the integration of FASTag, authorities will be able to track the goods vehicles are actually travelling to the specified destination. The supplier will also be able to track the vehicles by SMS alerts at toll plaza</td>
<td></td>
<td></td>
<td>• Infrastructure status has helped transportation sector in terms of insurance &amp; loan approvals and overall reduction in costs</td>
</tr>
</tbody>
</table>

Government of India is focusing on developing all modes of transportation and remove hurdles to growth

Source: Press releases, media reports and NRI analysis
Overview of Logistics and Transportation in India

National Integrated Logistics Policy (NILP) aims to streamline logistics operations in India and integrate Indian products into global supply chains.

Key Objectives of NILP

<table>
<thead>
<tr>
<th>Reducing Logistics Cost in India</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Aim of bringing it down from 14% of GDP to 10% of GDP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Integration of Transport Modes</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Creating common platforms for seamless and optimal transfer of goods across different modes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Generating Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Generating 10-15 million additional jobs in the logistics sector</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Improve India’s LPI Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Improve from current 44th place in the rankings to between 25-30</td>
</tr>
</tbody>
</table>

Major Initiatives

1. Integrated National Logistics Action Plan
   - Creating and managing an Integrated National Logistics Action Plan, a master plan for all logistics related developments

2. Multi Modal Logistics Parks
   - Logistics hubs in all key junctions countrywide interlinking various modes and functioning as one stop shop for several services

3. Center of Trade Facilitation & Logistics Excellence
   - CTFL to function as a single point of reference for all logistics & trade facilitation matters

4. Logistics Data and Analytics Center
   - Driving transparency through digitisation of processes, collection of transport data and analysis for meaningful insights

Industry Impact

One comprehensive policy to refer to instead of several from 10+ ministries

Integration of modes resulting in cost and time benefits

Quick and timely resolution of trade disputes

Higher visibility throughout supply chain

NILP is an all encompassing policy that aims to transform the logistics sector by addressing all the pain points.

Source: NILP Draft Feb 2019 and NRI Analysis
Overview of Logistics and Transportation in India

35 Multi Modal Logistics Parks (MMLP) will be setup in the country to interlink various modes of cargo transport & provide all services for freight transfer

Locations of Upcoming Multi Modal Logistics Parks

<table>
<thead>
<tr>
<th>West</th>
<th>North</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahmedabad</td>
<td>Delhi- NCR</td>
</tr>
<tr>
<td>Vadodara</td>
<td>Ludhiana</td>
</tr>
<tr>
<td>Mumbai</td>
<td>Sangrur</td>
</tr>
<tr>
<td>Surat</td>
<td>Patiala</td>
</tr>
<tr>
<td>Bharuch</td>
<td>Amritsar</td>
</tr>
<tr>
<td>Pune</td>
<td>Jalandhar</td>
</tr>
<tr>
<td>Nagpur</td>
<td>Gurdaspur</td>
</tr>
<tr>
<td>Indore</td>
<td>Jaipur</td>
</tr>
<tr>
<td>Coimbatore</td>
<td>Ambala</td>
</tr>
<tr>
<td>Chennai</td>
<td>Kota</td>
</tr>
<tr>
<td>Vijaywada</td>
<td>Hisar</td>
</tr>
<tr>
<td>Bangalore</td>
<td>Bhatinda</td>
</tr>
<tr>
<td>Nagpur</td>
<td>Solan</td>
</tr>
<tr>
<td>Indore</td>
<td>Jammu</td>
</tr>
</tbody>
</table>

Prioritized Locations

- Ahmedabad
- Valsad
- Vizag
- Hyderabad
- Nagpur
- Kandla
- Patna
- Patiala
- Bhatinda
- Solan
- Jammu

Key Benefits of MMLPs

1. **Freight Cost Reduction**
   - Large freight volumes to be aggregated for easy transfer between various modes and reduction in overall freight costs

2. **Faster Delivery of Goods**
   - By providing a variety of services in a single location, MMLPs will reduce processing time & assist in minimizing delivery time

3. **Warehouse Optimization**
   - Large, modern warehousing spaces satisfying special requirements of different commodity groups will help bring down per unit storage costs

Key Success Factors for MMLPs

- Roads, rails and other modes must be improved for smooth and uninterrupted linkages
- Involvement of private sector to invest in as well as commercially operate MMLP facilities
- Key learnings from each MMLP project to be incorporated in future projects

With timely planning and close coordination among all stakeholders, MMLP has the potential to transform India’s logistics landscape by reducing transport cost, transport time and storage cost

Source: MMLP Policy Document and NRI Analysis
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Key trends impacting logistics and transportation industry

Technology and sustainability have emerged as two key trends, enabling logistics and transportation to expand its scope in value chain offering.

Impact of technology and sustainability

1. **TECHNOLOGY ENABLED SUPPLY CHAIN**
   - By capturing real-time data and connecting all nodes of the supply chain, data analytics optimizes decision making.

2. **AUTOMATION AND INTERNET OF THINGS (IOT)**
   - Developing automated and inter-connected supply chain systems, to reduce dependency and errors.

3. **LOGISTICS-AS-A-SERVICE**
   - Provision of managing end-to-end supply chain including supplier, inventory, pick-up, transportation, storage, and delivery.

4. **GREEN LOGISTICS**
   - Focus on developing sustainable solution and application of alternative propulsion to power commercial fleets.

5. **HYPERLOCAL LOGISTICS**
   - Multiple start-ups are utilizing local delivery arms to provide flexible and fast delivery to customer’s place.

6. **IMPACT OF GST**
   - GST has resulted in reduced turnaround time and demand for long haul trucks, as well as increase in large multi-purpose warehouses.

Source: NRI analysis
Technology enabled supply chain

Data analytics has unlocked end-to-end supply chain visibility and enabled higher operational efficiency by optimizing usage of key resources.

Application of data analytics

Operating principle

- Determine optimized travel route is determined, using real-time operating condition
- Telematics database are used to change routes automatically according to traffic conditions
- Routing intelligence considers availability of recipients to avoid unsuccessful delivery attempts
- Considers historical data on capacity utilization of transit points, transportation routes, seasonal demand, and emerging freight flow trend
- Smart systems predict investment requirement in supply chain network, basis historical data
- Basis demand prediction, supply capacity can be built over phases or at one go

Key benefit

- Daily optimized tour planning
- Reduced travel time and increased delivery due to dynamic routing system
- Real-time information exchange
- Improved cost efficiency and emission reduction
- Elimination of over capacity investment
- Reduce capacity shortages
- Visibility of demand-supply matching across multiple time horizon
- Improved overall system reliability

Data analytics enabled supply chain can deliver more orders by up to 25%, while reducing travel distance and cost.
An automated dynamic warehousing system (DWS) can significantly reduce manual errors while picking, sorting, storing and retrieving of material.

Application of automation and internet of things (IoT)

- Dynamic allocation of space ensures higher space utilization
- Reduces space requirement
- Minimizes manual errors
- Improves operating cost

Minimum human intervention

- Material received at incoming
- Scan part code to register in DWS
- DWS suggests storage location
- Storage of material using AGVS

Retrieval done in same way

- Only required to scan part code
- No need to check and sort parts
- Automated storage and retrieval mechanism
  Operated from central terminal to control material movement

An automated dynamic warehousing system can eliminate manual error and reduce non-conformance by 10-20%

Source: NRI primary research and analysis
Logistics service providers (LSP) are moving up the value chain, offering end-to-end service from upstream to downstream.

Enhanced operations by logistics service providers

Before

LSP A – specialist in upstream  LSP B – specialist in plant  LSP C – specialist in downstream

Upstream Vendor  Manufacturing plant  Downstream storage

After

LSP D – specialist in end-to-end supply chain

Single LSP has end-to-end visibility of supply chain, hence able to better manage inventory, reducing safety stock. Also, can aggregate supplier material, even in small batches, reducing overall supply chain cost.

Source: Secondary research
Green logistics

Transport goods vehicles contribute to ~ 40% of diesel consumption for India, which can be significantly reduced using alternative propulsion

### Alternative propulsion to power commercial fleets

<table>
<thead>
<tr>
<th>LNG powered truck</th>
<th>Solar powered truck</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Application on commercial fleet</strong></td>
<td><strong>Key features and benefits</strong></td>
</tr>
<tr>
<td>• LNG is a <strong>cleaner fuel</strong> will less GHG emission</td>
<td>• LNG is cheaper than diesel</td>
</tr>
<tr>
<td>• LNG truck kits and standards are GoI approved</td>
<td>• LNG can be used as a fuel in buses also</td>
</tr>
<tr>
<td>• LNG being non-toxic and non-corrosive, can increase vehicle life</td>
<td>• Cost of conversion estimated to be ₹ 9 lac</td>
</tr>
<tr>
<td></td>
<td>• Lead time is 3 months (imported fuel tank)</td>
</tr>
<tr>
<td></td>
<td>• Estimated payback is 7 months, considering fuel saving and green entry tax</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LNG powered truck</th>
<th>Solar powered truck</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Solar can be used to power auxiliary system</td>
<td>• In US market, estimated payback is ~ 3.5 years, considering improved driver productivity and fuel savings</td>
</tr>
<tr>
<td>• Solar panel are mounted on top/side of vehicle</td>
<td>• Significantly reduces maintenance cost</td>
</tr>
<tr>
<td>• Cooling functionality can be extended to specialized services such as reefer truck</td>
<td>• Improves driver comfort</td>
</tr>
<tr>
<td>Additional functionality include <em>lowering of tail gate, indicator lamps etc.</em></td>
<td></td>
</tr>
</tbody>
</table>

By 2030, 10-15% of new fleet for medium and heavy commercial vehicle can run on LNG, while solar powered truck are still in an early development phase in India

Source: Secondary published reports, SIAM report
Hyperlocal logistics

Customers are expecting same day delivery, especially for food and grocery items, even by paying an additional service cost

Impact of hyperlocal transportation on last mile delivery

Key trends enabling fast delivery to customers

- Customers can request delivery to a secured locker as per convenient location
- Customer can operate locker using cell phone
- Delivery time: 3-4 hours

- Customers can order food and grocery item online which gets delivered at door-step
- Delivery time: within 2 hours

- Provides pick-up and drop facility for anything, irrespective of distance
- Automated 80% of task processing time

India’s hyperlocal delivery market is estimated to touch ~ ₹ 2,300 Cr. by 2020, largely driven by start-ups

Source: Secondary published reports
Impact of GST

Post-GST, dismantling of inter-state border check posts has resulted in reduced turnaround time, enhancing utilization & demand for long haul truck

<table>
<thead>
<tr>
<th>Changes in Transportation Sector due to GST</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-GST</strong></td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Average distance travelled by trucks</td>
</tr>
<tr>
<td>Time Spent at Inter-State Border Posts</td>
</tr>
<tr>
<td>Logistics cost as % of total value of goods</td>
</tr>
</tbody>
</table>

*Numbers for transit time between Chennai and Kolkata

Impact

• Reduction in truck turnaround time
• Enhanced utilization of long-haul trucks
• Rise in market demand for long haul trucks

GST has resulted in a revival in the logistics and transportation sector by improving asset utilization

Source: Ministry of Road Transport and Highways and NRI Analysis
Impact of GST

GST has also altered the warehousing landscape in Indian market in terms of location and size

**WH Leasing Transactions by Organized Players (mn. sq. ft.)**

<table>
<thead>
<tr>
<th>City</th>
<th>Pre-GST</th>
<th>Post-GST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahmedabad</td>
<td>1.7</td>
<td>3.3</td>
</tr>
<tr>
<td>Kolkata</td>
<td>1.4</td>
<td>1.6</td>
</tr>
<tr>
<td>Pune</td>
<td>2</td>
<td>2.5</td>
</tr>
<tr>
<td>Delhi-NCR</td>
<td>1.9</td>
<td>2.8</td>
</tr>
<tr>
<td>Chennai</td>
<td>2.4</td>
<td></td>
</tr>
<tr>
<td>Hyderabad</td>
<td>1.2</td>
<td>2.1</td>
</tr>
<tr>
<td>Mumbai</td>
<td>1.6</td>
<td></td>
</tr>
<tr>
<td>Bengaluru</td>
<td>1.3</td>
<td>2.5</td>
</tr>
</tbody>
</table>

**Key Takeaways**

- A large warehouse enables investments in technology & warehouse consolidation can improve overall inventory levels. Therefore, even with the investments in WH, overall SC cost can be optimized.

- Pre-GST, warehouses were majorly scattered small storage spaces across states to help companies get through state specific compliance permits.

- This was an inefficient system in which total inventory carrying costs as well as transportation times were high.

- Post-GST, bigger, modern & multi-purpose warehouses is the norm. Transport time has reduced by 20% and inventory turnover has gone up by 40%.

Post-GST, several companies are moving to larger multi-purpose warehouses, enabling investment in technology & realization of time and cost benefits.

Source: Ministry of Road Transport and Highways and NRI Analysis
Overview of Logistics and Transportation in India

Key trends in logistics and transportation

Major challenges for logistics and transportation in India

Way forward towards sustainable transportation
Major challenges for logistics and transportation in India

Numerous challenges underline the logistics and transportation operating model in India, including asset utilization, design and operating condition

Key Challenges faced by Logistics Industry

1. Vehicle Utilization
   - Low utilization requires more trips, increases cost and increases driver fatigue

2. Vehicle Design and Selection
   - Below par design and overloading of trucks reduces vehicle speed, increases lead time and increases maintenance

3. Industry Operational Challenge
   - Highly fragmented industry with low supply of quality drivers and high instance of theft, pilferage
Vehicle utilization

Poor operating condition, service incentive metric and product design impact overall efficiency of the logistics network

Key Challenges

<table>
<thead>
<tr>
<th>Efficiency Indicator</th>
<th>India</th>
<th>Global</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Truck Speed (kmph)</td>
<td>20 – 40</td>
<td>60 – 80 (developed countries)</td>
</tr>
<tr>
<td>Average Truck distance per year (km)</td>
<td>60,000 – 100,000</td>
<td>400,000 – 600,000</td>
</tr>
<tr>
<td>Total length of Expressways (km)</td>
<td>1,455</td>
<td>74,000 (China)</td>
</tr>
</tbody>
</table>

Loading / Unloading Time

- Labour Intensive: Involves more man-hours
- No incentive: No urgency as there is no benefit for the labour
- Internal delays: Simple loading takes up to 5-6 hours
- Cargo alignment: Takes time as no knowledge is available

Source: Secondary research
Vehicles utilization

Long working hours combined with challenging working environment increase driver fatigue and reduce efficiency of the supply chain

Key Challenges

### Driver Fatigue

- Lack of sleep
  - Driving in the condition of drowsiness
- Working while sick
  - No medication done in years
- Accidents
  - Effect similar to the alcohol consumption
- Long trips
  - Average trip for 50% drivers: 12+ hours

<table>
<thead>
<tr>
<th>Daily continuous driving for</th>
<th>%age of drivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 - 6 hours</td>
<td>33%</td>
</tr>
<tr>
<td>6 – 8 hours</td>
<td>31%</td>
</tr>
<tr>
<td>&gt; 8 hours</td>
<td>15%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Daily sleep on assignment days</th>
<th>%age of drivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 2 hours</td>
<td>25%</td>
</tr>
<tr>
<td>2 – 4 hours</td>
<td>35%</td>
</tr>
<tr>
<td>4 - 6 hours</td>
<td>31%</td>
</tr>
</tbody>
</table>

### Space Utilization of the Vehicle

- No Automation
  - Manual alignment is inefficient
- No incentives
  - No incentive for proper packing
- Time Consuming
  - Proper alignment utilises a lot of time
- Lack of space optimization
  - Algorithmic loading sequence (truck builder) optimizes space
- Damage due to stacking
  - Incorrectly loaded material results in damage

Source: Research survey conducted by Kantar and Castrol
Indian logistic industry falls behind developed countries in terms of vehicle designs while selection of proper vehicle of specific cargo is also neglected.

### Key Challenges

#### Vehicle Design
- **Lower power**: Indian trucks have lower power output and unable to haul larger load.
- **Low Tonnage**: Indian trucks: 9MT, Europe: 40MT.
- **Less Space**: Lack or no space for material handling.
- **Lack of Standardisation**: Difficult to maintain efficiency with different vehicles.
- **Truck mileage**: Premium trucks offer better mileage but have lower demand.
- **High Import Duty**: Difficult to buy specialised trucks.

#### Vehicle Selection
- **Efficiency**: Operators do not select vehicles on overall efficiency.
- **Overloading**: Smaller trucks are used, in overloaded condition.
- **No Evaluation**: Selection is done on availability & past usage.
- **Optimisation**: Truck mix is important on basis of size, load, volume.

Source: Secondary research
Fragmented nature of logistic industry creates a barrier difficult to breach to move towards development

**Key Challenges**

**Fragmented Industry**
- High Expenditure
  - India’s logistics spend as % of GDP is much higher than other countries
- No big player
  - More than 90% of LSPs own less than 2 trucks
  - 95% own less than 5 trucks
- Low Revenue and Quality
  - Smaller players work with low margin and poor quality
- Lack of information
  - Poor information flow restricts demand supply matching
- No Development
  - Due to low margins, LSPs are less inclined towards digitization
- High Price
  - High end price due to presence of middlemen

**Availability**
- On time availability
  - Very low as difficult to search in a fragmented market
- Shift to Ola/Uber
  - Drivers are shifting to Ola/Uber for better income
- Shortage of drivers
  - For every 1000 trucks only 600 drivers are present currently
- Lack of fixed income
  - Due to fragmentation, surety of fixed income is not present

Source: Secondary research
Industry operational challenges

Due to lack of technology and poor infrastructure, number of thefts and damage during transportation are very high

Key Challenges

<table>
<thead>
<tr>
<th>Damage &amp; Pilferage</th>
<th>Mode of Transportation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road Infrastructure</td>
<td>Cost vs Efficiency</td>
</tr>
<tr>
<td>Poor condition of roads and potholes result in more vibrations</td>
<td>Trade-off between cost and efficiency</td>
</tr>
<tr>
<td>Driving Skills</td>
<td>Trains</td>
</tr>
<tr>
<td>Driving skills; sudden brake application</td>
<td>Trains provide better transit but are very expensive at total cost level</td>
</tr>
<tr>
<td>Overloading</td>
<td>Fragmentation effect</td>
</tr>
<tr>
<td>Most common; might result in accidents too</td>
<td>A lot of cheap options are available in the market</td>
</tr>
<tr>
<td>No Security</td>
<td>Transporters’ mind-set</td>
</tr>
<tr>
<td>No GPS, No CCTV camera due to low investment</td>
<td>Inclined towards lower initial cost, without having view on total cost of ownership</td>
</tr>
<tr>
<td>Improper Packaging</td>
<td></td>
</tr>
<tr>
<td>Less importance to packaging</td>
<td></td>
</tr>
</tbody>
</table>

Source: Secondary research
Index

1. Overview of Logistics and Transportation in India
2. Key trends in logistics and transportation
3. Major challenges for logistics and transportation in India
4. Way forward towards sustainable transportation
Framework for Sustainable Logistics and Transportation Landscape

Ideal supply chain solution lies in the intersection of optimizing cost, time, visibility with enhanced product feature and reducing carbon footprint

- **Optimize supply chain cost**
  - Improved visibility of demand and supply
  - Higher utilization of trucks

- **Reduce asset turn-around time**
  - Optimized loading/unloading process
  - Ensure longer haul with less stops

- **Minimum cost**

- **Minimum time**

- **Maximum visibility**

- **Maximum utilization**

- **Maximum sustainability**

- **Minimum loss**

- **Minimize theft, damage and losses**
  - Minimize thefts and losses
  - Protect shipment from transit damage

- **IoT in supply chain**
  - Telematics to monitor fleet performance
  - Intelligent warehouse for fast order processing and reduced errors

- **Reducing carbon footprint**
  - Alternate propulsion powered fleets
  - Increase re-use and re-cycle of material

- **Improved design and standardization**
  - New product features to reduce driver fatigue
  - Standardized packaging to increase space utilization

Source: NRI analysis
Opportunity # 1: Relay-as-a-service

Relay-as-a-service operating model can help reduce turn-around time by 50-70% on long haul routes, reduce driver fatigue and increase revenue.

Key issues

Driver Fatigue

Trips per day

Relay-as-a-service (RaaS) model

Benefits

- Reduced turn-around time by 50-70% on long-haul routes, which earlier accounted to driver idling and resting
- Available time is used by truck operators to earn more revenue
- Driver attrition rate is reduced, leading to adequate demand-supply matching
- Increase in vehicle utilization helps achieve breakeven faster and improve operator’s cash flow

Factors behind improved efficiency:
- Same day e-filing of delivery documents
- Time saved by eliminating storage, security and sharing of physical piece of paper
- Gather trip data to optimize next trip, using IoT
- Optimize fuel efficiency, minimize transit damage

Business performance - Rivigo

<table>
<thead>
<tr>
<th>FY 17 Revenue</th>
<th>₹ 402 Cr</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY17 Loss</td>
<td>₹ 137 Cr</td>
</tr>
</tbody>
</table>

Source: Secondary research
Opportunity # 2: Freight aggregation

Aggregation of freight improves demand-supply visibility and reduces per unit transportation cost for customers

Key issues

- **Fragmented Industry**
- **Availability**

Freight aggregation model

- Online platform provides visibility between freight demand (customer) and supply (trucks)
- Allows customers to manage shipments on one smart and convenient platform
- Uses data analytics & machine learning algorithms to optimize travel routes, resulting in time and fuel savings

Benefits

- Freight aggregation reduces per unit cost for customer
- Reduces truck spot hiring rates
- Truck operators earn more with higher truck utilization
- Lower truck turn around time
- Improved inventory holding cost for customer

Business performance - Blackbuck

Key facts from Blackbuck, freight aggregator start-up

- 250,000+ Trucks
- 10,000+ Clients
- 2,000+ Locations
- 400+ Hubs
- 60,000+ Fleet Owners
- Instant Availability
- Fair & Transparent Pricing
- Seamless Experience

- FY 18 Revenue: ₹ 902 Cr (60% YoY Growth)
- FY18 Loss: ₹ 117 Cr (35% YoY Growth)

Source: Secondary research
Opportunity # 3: Truck builder optimizer

By using truck builder tool, logistics players can optimize vehicle freight, space, loading/unloading sequence and improve supply chain efficiency

Key issues

Loading / Unloading Time

Space Utilization of the Vehicle

Truck builder tool

1A 2B 3C

1: Material type and packaging dimension
A: Warehouse address

Check against availability of truck type and size

Type A

Type B

Optimization algorithm to choose truck and loading sequence

Type A

Most optimized loading sequence to maximize space and provide ease of unloading as per delivery destination

Benefits

- Optimization of full truck loads and delivery schedules on the basis of truck capacities and order sizes
- Prioritization of orders on the basis of service level requirements
- Most economical selection of truck size on the basis of total delivery cost
- Prepared load planning vis-a-vis delivery orders to minimize empty mileage and time between orders

Source: NRI analysis
Opportunity # 4: New products with advanced features

OEMs are launching products with advanced features to help operators carry higher load, with improved cost structure

Key issues

Launch of new products with advanced features

- Higher power
- Distinct interior styling
- Multi-axle offering
- Widest cabin space
- Mechanically suspended seats
- Range extends up to 49T

Benefits

- Telematics allow operators to track vehicle performance and optimize the same in next trip
- Improved design helps truck operators to carry higher load without damaging the truck
- Increased comfort reduces driver fatigue, making drivers more attentive and reducing chances of accidents or damage to cargo
- Time between halts also increase and drivers are able to cover longer distance
- LNG powered version in future can reduce CO\textsubscript{2} footprint significantly

Vehicle Design

Vehicle Selection

Tata Prima

Going GREEN: LNG powered version of Tata Prima is under testing, in collaboration with Petronet LNG and IOCL

Tata Fleetman with advanced telematics features assists operators in real-time vehicle tracking, engine idling, review trip performance, fuel consumption, truck maneuvering etc. for better driving performance

Tata DLT Trailer

- Trailer-EBS system reduces braking distance
- Add-on features such as tail-guard, bounce control
- Lower unladen weight
- Better tyre life

Source: Secondary research
Opportunity # 5: IoT in warehousing

Amazon has maximised the efficiency of warehousing system by embracing recent trends of automation within the warehouse to reduce the error.

Flow of Amazon fulfilment centre, Lakeland, Florida; Area: 59 football field

Amazon Warehouse Technology

Key parameter made effective

- **Box shuffling cyborgs:** Floor covered in tiny QR codes, the robot reads the codes and broadcasts the position
- **Packaging software:** To find the perfect size of packaging box for every product present in the warehouse
- **Supersonic conveyor software:** To regulate the line at steady pace during the rush hours
- **Automated SLAM system:** To scan, label, apply and manifest the order before shipping out

Source: Published secondary and online sources
Framework for Sustainable Logistics and Transportation Landscape

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Source: NRI analysis
## Way Forward Towards Sustainable Transportation

Successful application of these opportunities can solve few of the underlying issues, while Govt. & industry need to participate to scale up the solutions.

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- Govt. and industry stakeholders need to participate to make the most of these opportunities
- Adoption of key trends will strengthen the future of logistics and transportation
- Infrastructure and asset development will remain to be key towards continuous success

Source: NRI analysis
Our team

NRI Consulting is looking forward to working with the industry and together develop sustainable solutions for the future

Ashim Sharma
ashim.sharma@nri.com
Partner & Group Head
NRI Consulting & Solutions
Mobile +91 95991 87825

Aashutosh Sinha
aashutosh.sinha@nri.com
Senior Manager
NRI Consulting & Solutions
Mobile +91 84483 92470

Rajarshi Mukherjee
rajarshi.mukherjee@nri.com
Senior Consultant
NRI Consulting & Solutions
Mobile +91 84483 92476

Mukul Jain
mukul.jain@nri.com
Senior Consultant
NRI Consulting & Solutions
Mobile +91 95993 55775