Outlook on Road Logistics for Finished Vehicles

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A. Global trends in Automotive Road Logistics Market

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Logistics is a dynamic market impacted by a number of key trends

Megatrends and impact on logistics

Trend	Relevance	Impact on Logistics	Example/cases
1 New Technologies		> Growth in new technology investments (e.g. RFID, inventory, automation) > Integrated logistics networks and real-time tracking of transportation value chains > New business models based on data mining/analytics	PASSUR AEROSPACE
2 Outsourcing/ Cost Pressure		> Continued cost pressure on supply chain operations > Forward/backward integration of players in the supply chain > Reshaping of logistics hubs, less complex than of manufacturing footprint	EDEKA
3 E-Commerce & Digitalization		> New structures in the supply chain (e.g. bypassing of hubs, direct ordering, transparency) > Demand for value added services on B2B and B2C level (e.g. packaging, return deliveries) > Refinement of service levels (e.g. same day delivery, utmost flexibility)	amazon
4 Demographic Change/ Urbanization		> New logistical requirements in inner-city transportation and long-distance transportation (e.g. innovative approaches to first and last mile transportation) > Need for better utilization of both infrastructures and fleets (e.g. pooling, use of non-logistics infrastructure)	DHL
5 Globalization of Operations		> Increasing logistics process complexity of global supply chains > New approaches of supply chain risk management > Greater exposure to unusual interruptions and disruptions of business processes	RheinChemie
6 Regulatory developments		> Traffic gridlocks result in stricter regulations for urban transportation (e.g. tolls, bans) > Understanding and management of tariff and tax regulations becomes increasingly decisive, particularly in Russia, India, Argentina (e.g. local content)	Nestlé Good Food, Good Life P&G
7 Sustainability		> Establishment of green standards across the entire supply chain (mainly driven by industry players) > Use of more efficient vehicles, hybrids and alternative fuels	gnewt cargo love the last mile

 Low relevance  High relevance

Source: Roland Berger

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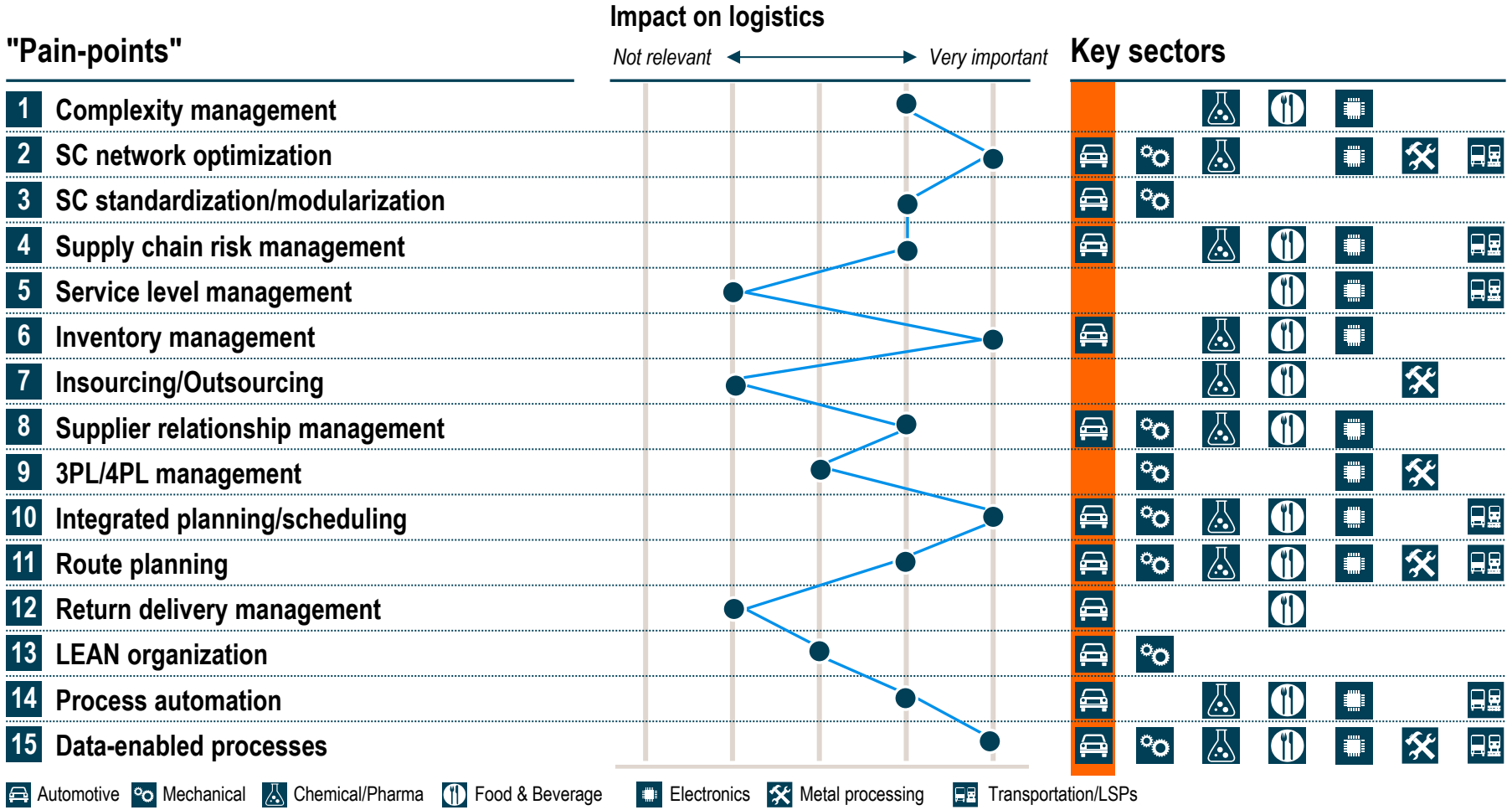
Customer requirements across industry sectors show that current pain points are driven by cost aspects or operational performance

Impact assessment across industry sectors



Source: Roland Berger; Interviews; Analysis

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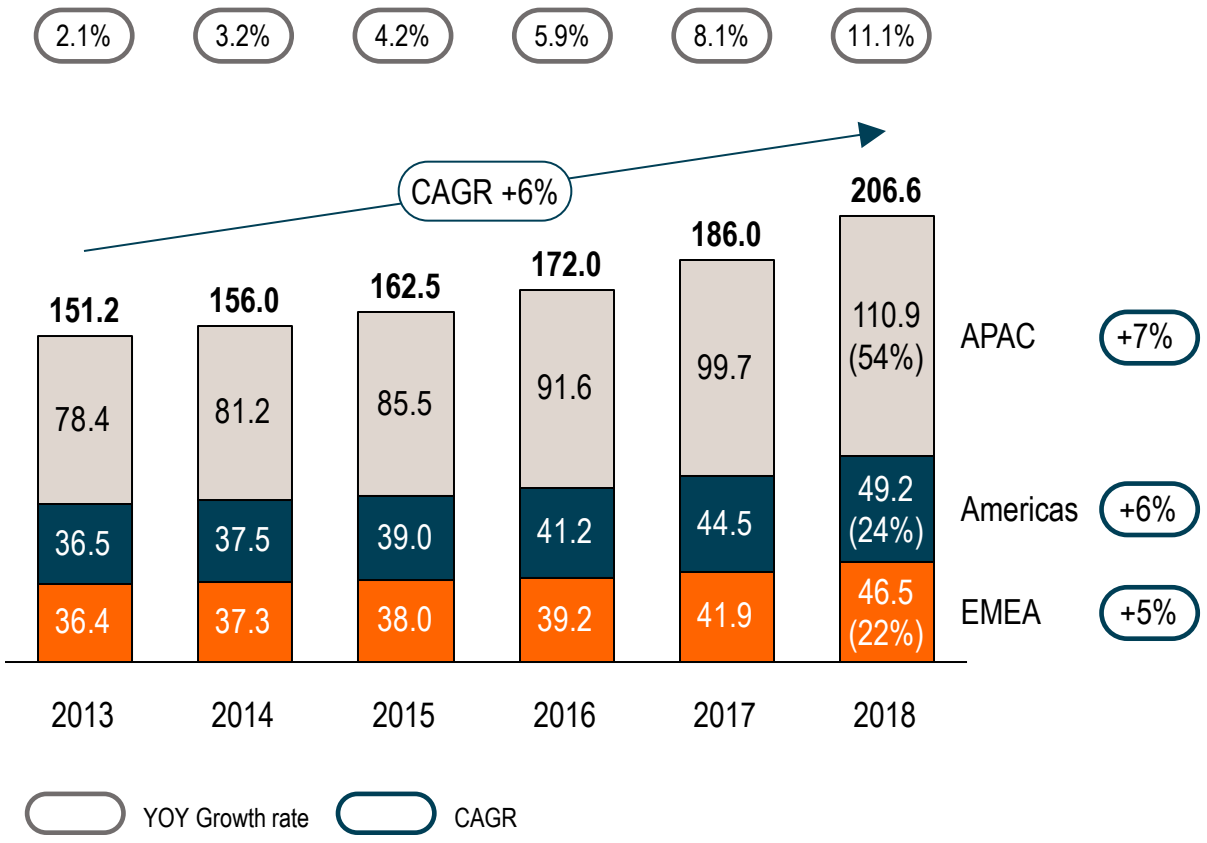
APAC dominates the key automotive logistics markets with over 50% share, total market is expected to reach ~USD 206 bn in 2018

Region wise split of global automotive logistics market (USD billion)



Comments

> The automotive logistics market in these key regions is expected to have a steady growth of 6% and the market size is expected to reach USD 206.6 billion by 2018

> The APAC market has the highest growth rate (7%) and is expected to reach USD 110.9 billion by 2018

> APAC is expected to increase its share during the forecast period because of a rise in the number of vehicles being produced in China, Japan, India, Thailand and Korea

> It is also supported by a higher export demand from these countries

Source: EMIS, Secondary Research

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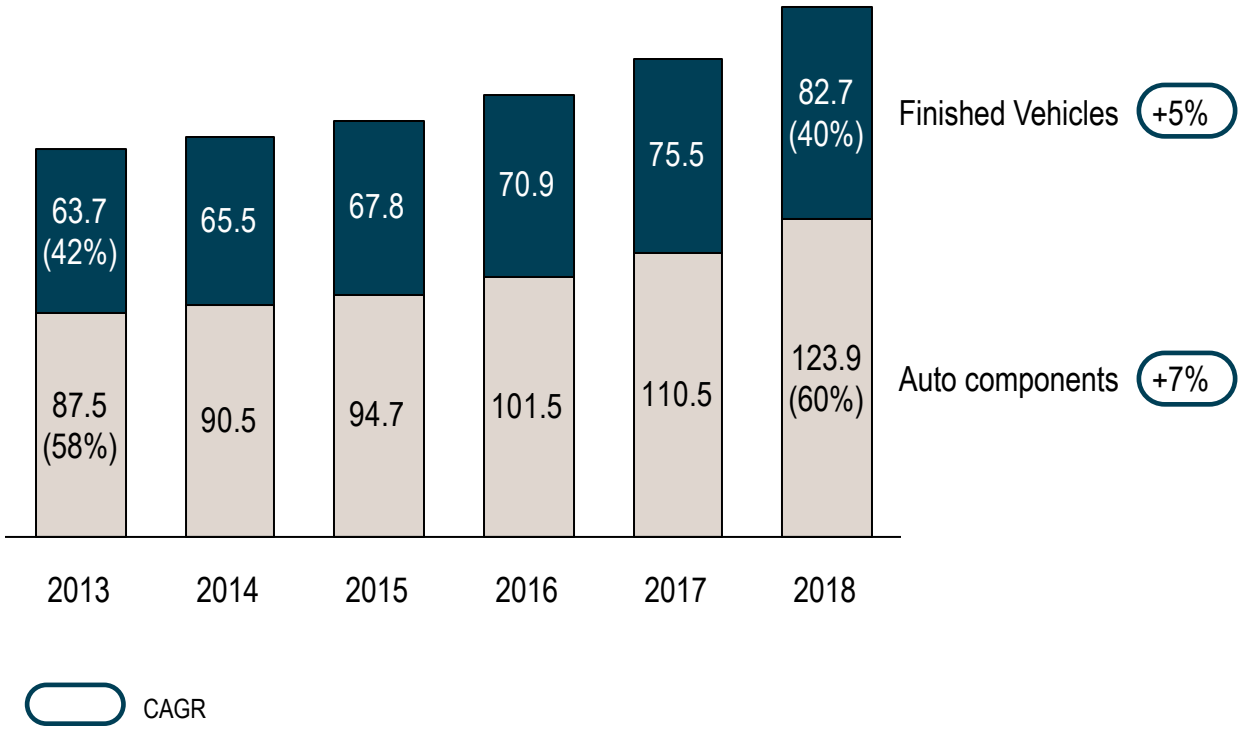
Finished vehicles logistics constitutes ~42% of the total Automotive logistics market & is expected to grow at 5% CAGR to USD 82.7 bn

Market type split of global automotive logistics market (USD billion)



Comments

> The share of finished vehicles in the overall market is expected to marginally compress as the trend for smaller cars increases

> Finished vehicles logistics market was approximately USD 65.5 billion in 2014 and is expected to reach USD 82.7 billion in 2018

> Auto components logistics market was approximately USD 90.5 billion in 2014 and is expected to reach USD 123.9 billion by 2018

Source: EMIS, Secondary Research

B. Europe: A Benchmark in Logistics Competitiveness

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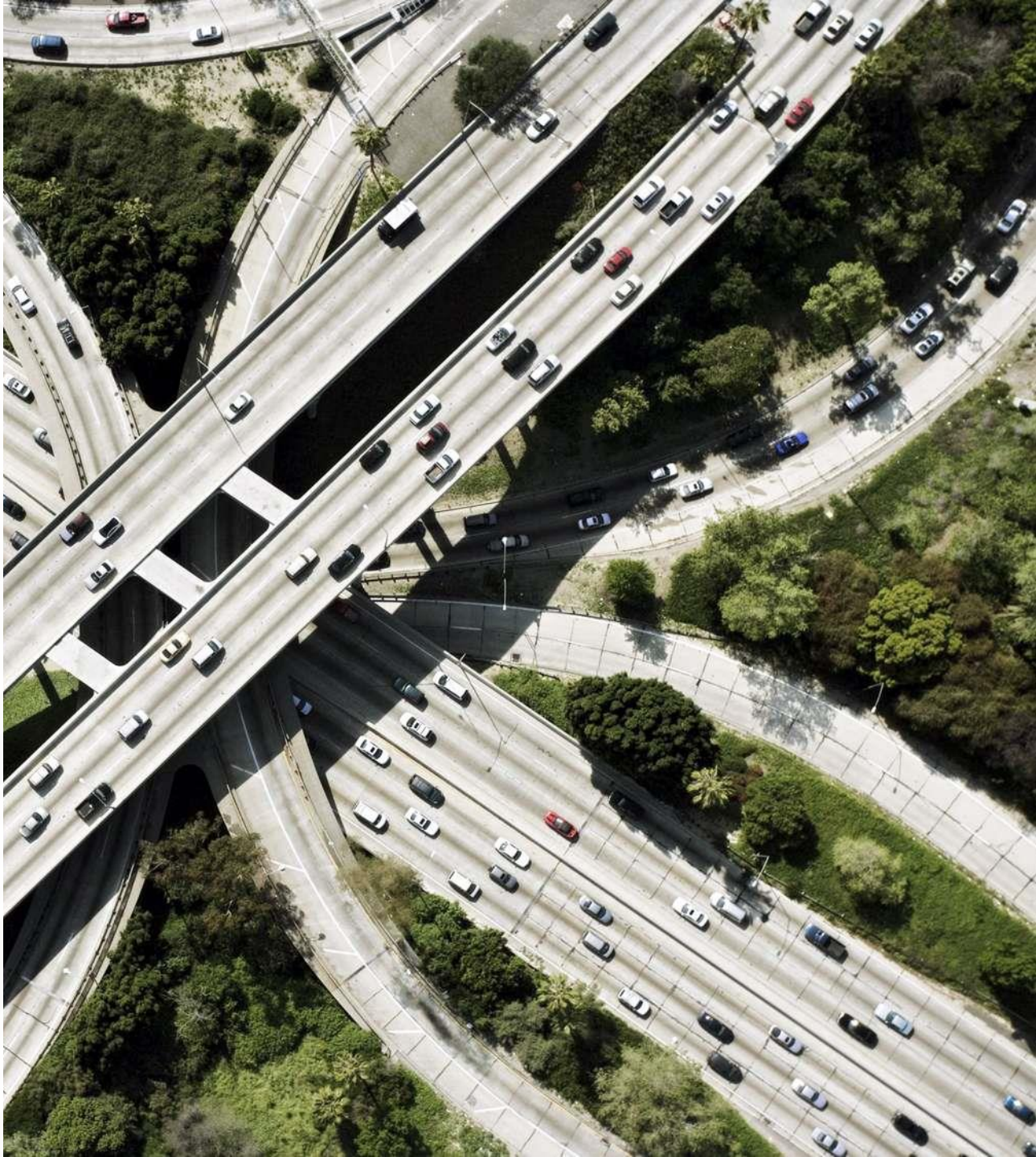

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10 of 20 best global economies regarding logistics capabilities are European, making Europe a benchmark in logistics

SIX MAJOR COMPONENTS OF THE LPI's SCORE

1. The efficiency of the clearance process (speed, simplicity, and predictability of formalities) by border control agencies, including customs
2. The quality of trade- and transport-related infrastructure (ports, railroads, roads, information technology)
3. The ease of arranging competitively priced shipments
4. The competence and quality of logistics services (transport operators, customs brokers)
5. The ability to track and trace consignments
6. The frequency with which shipments reach the consignee within the scheduled or expected delivery time

ECONOMY	RANK	SCORE	% OF HIGHEST PERFORMER
Germany	1	4.12	100.0
Netherlands	2	4.05	97.6
Belgium	3	4.04	97.5
UK	4	4.01	96.6
Singapore	5	4.00	96.2
Sweden	6	3.96	94.9
Norway	7	3.96	94.8
Luxembourg	8	3.95	94.4
US	9	3.92	93.5
Japan	10	3.91	93.4
Ireland	11	3.87	91.9
Canada	12	3.86	91.5
France	13	3.85	91.2
Switzerland	15	3.84	91.1
HongKong	16	3.83	90.5
Australia	20	3.81	90.0

Source: 'Logistics Performance Index - The World Bank

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Investments in logistics in Europe are well developing – Major share of investment in the UK and Germany, 110% YoY increase overall

Investment In Logistics Infrastructure 2012/Q 2013

Country	FY 2012	Q1 2012	Q1 2013	YoY [%]	YoY [EUR m]
Belgium	180	6	15	-15	+9
Czech Republic	17	0	0	-	-
Finland	29	23	35	+52	+12
France	1,320	145	240	+65	+95
Germany	**1,600**	**395**	**540**	**+37**	**+145**
Italy	40	28	24	-14	-4
Netherlands	345	53	33	-38	-20
Norway	165	10	0	-	-10
Poland	495	104	13	-88	-91
Russia	335	0	0	-	-
Spain	85	0	0	-	-
Sweden	805	92	138	+50	+46
UK	**3,200**	**540**	**790**	**+46**	**+250**
TOTAL EUROPE	**8,800**	**1,400**	**3,000**	**+110**	**+1,600**

Source: Jones Lang LaSalle, April 2013

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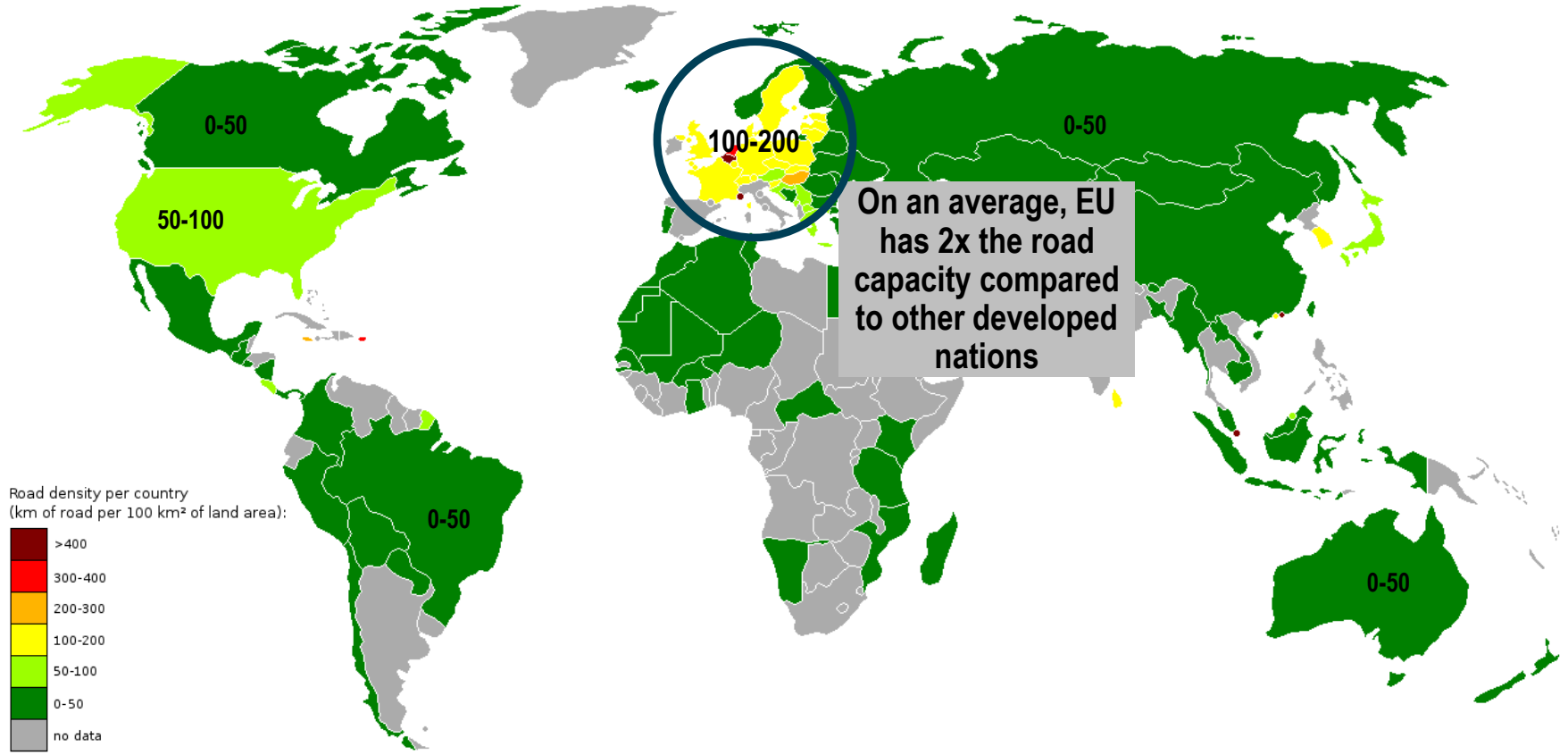
Europe is a bright spot in the world for road infrastructure based on the continued focus on ensuring investments and execution

Country wise road density [km of road per 100 km^2 of land]



Source: Eurostat; Roland Berger

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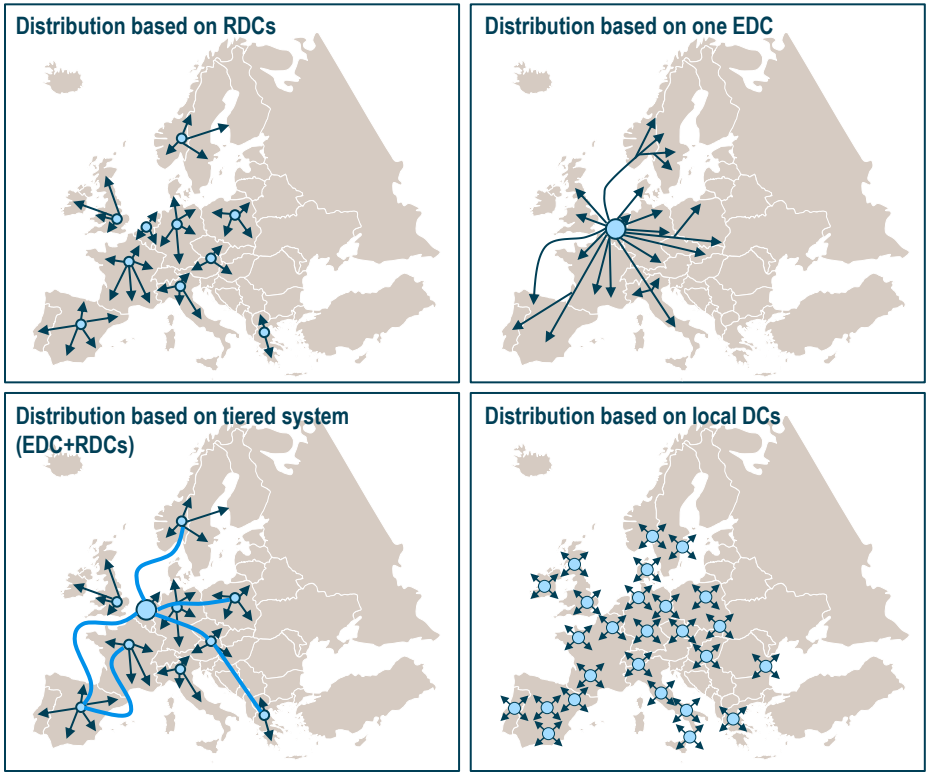
Distribution within Europe/CEE the is done via European, regional or national distribution centers; a model India can deploy post GST

DISTRIBUTION NETWORK CONFIGURATIONS FOR CONTAINERIZED IMPORT CARGO (RETAIL) IN EUROPE



TYPES OF DISTRIBUTION CENTERS

> **European distribution centers** (EDC) distribute to all European customers and supply regional and/or national distribution centers. An EDC is a distribution center which has outbound flows to customers or subsidiary national distribution centers located in multiple European countries

> **Regional distribution centers** (RDC) typically distribute to a group of adjacent countries (e.g. Spain, Portugal and southern France)

> **National distribution centers** cover local markets in a country

Source: Notteboom

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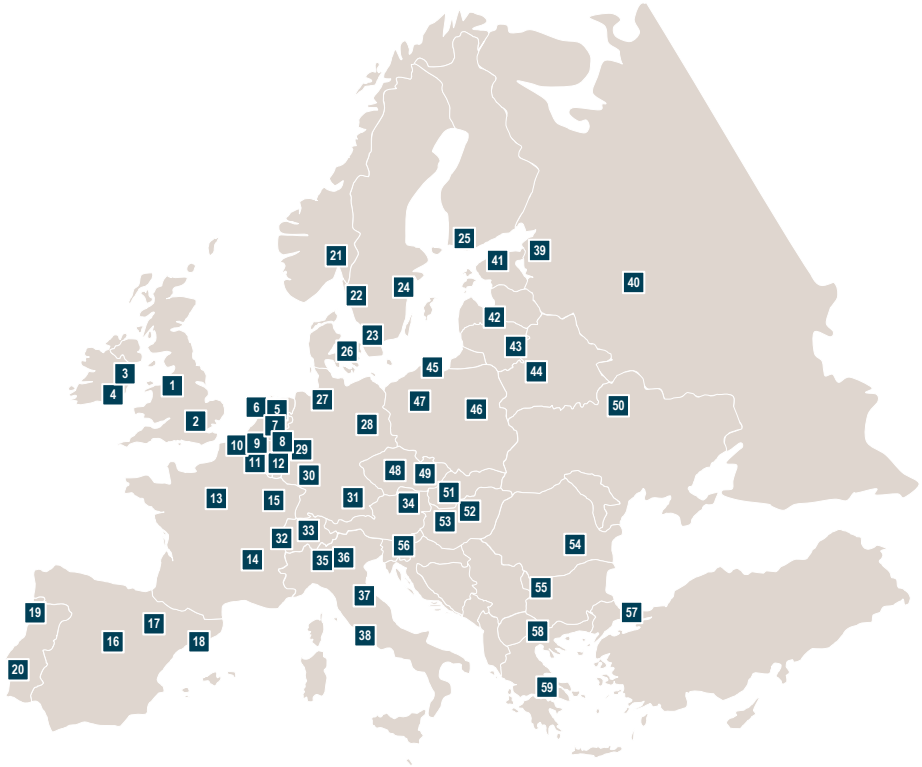
Logistics hotspots are well distributed all over Western Europe and CEE – excellent coverage of all markets and countries…

Logistics Hotspots Across Europe

1	Birmingham, UK	21	Oslo, Norway	41	Tallinn, Estonia
2	London, UK	22	Gothenburg, Sweden	42	Riga, Latvia
3	Dublin, Ireland	23	Malmo, Sweden	43	Vilnius, Lithuania
4	Cork, Ireland	24	Stockholm, Sweden	44	Minsk, Belorussia
5	Amsterdam/Schiphol, Netherland	25	Helsinki, Finland	45	Gdansk, Poland
6	Rotterdam, Netherland	26	Copenhagen, Denmark	46	Warsaw, Poland
7	Breda/Tilburg, Netherland	27	Hamburg, Germany	47	Poznan, Poland
8	Venlo, Netherland	28	Berlin, Germany	48	Prague, Czech Republic
9	Antwerp, Belgium	29	Düsseldorf/Köln, Germany	49	Brno, Czech Republic
10	Gent, Belgium	30	Frankfurt, Germany	50	Kiev, Ukraine
11	Brussels, Belgium	31	Munich, Germany	51	Bratislava, Slovakia
12	Liège, Belgium	32	Geneva, Switzerland	52	Budapest, Hungary
13	Paris, France	33	Bern, Switzerland	53	Székesfehérvár, Hungary
14	Lyon, France	34	Vienna, Austria	54	Bucharest, Romania
15	Lorraine, France	35	Turin, Italy	55	Sofia, Romania
16	Madrid, Spain	36	Milan, Italy	56	Ljubljana, Slovenia
17	Zaragoza, Spain	37	Bologna, Italy	57	Istanbul, Turkey
18	Barcelona, Spain	38	Rome, Italy	58	Thessaloniki, Greece
19	Porto, Portugal	39	Saint-Petersburg, Russia	59	Athens, Greece
20	Lisbon, Portugal	40	Moscow, Russia		



Source: Roland Berger

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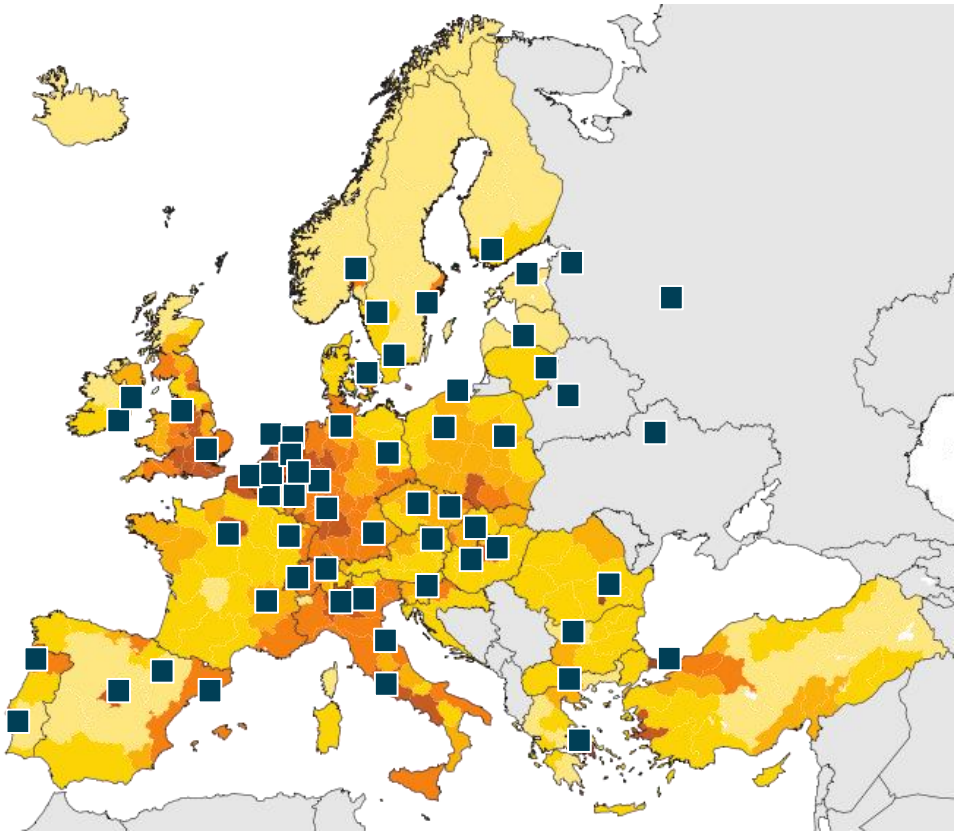
…the logistics hotspots are designed to cater to the centers of European populations and …

Logistics Hotspots Mapped to Population Density

POPULATION DENSITY [inhabitants/sqkm]



POPULATION

Inhabitants / Sqkm

- Below 20
- 20-50
- 50-100
- 100-200
- 200-500
- 500-1,000
- 1,000-2,000
- 2,000-5,000
- 5,000-10,000
- 10,000-20,000
- 20,000-40,000
- Logistics Hotspot

Source: Eurostat; Roland Berger

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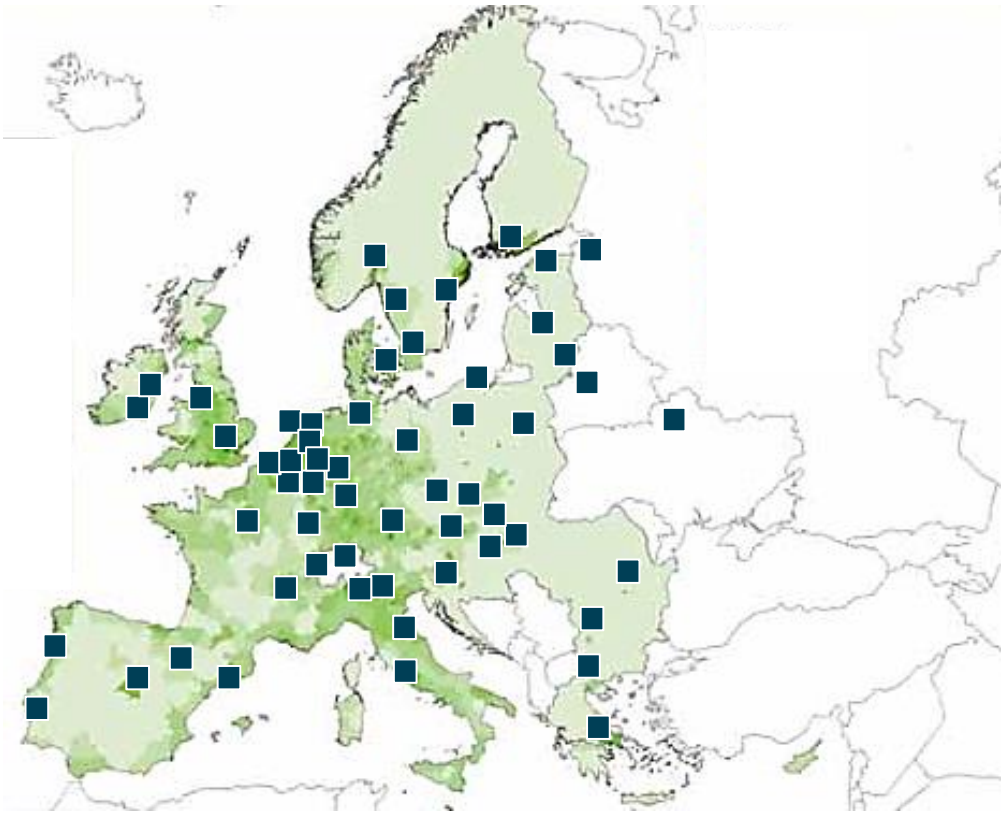
… GDP concentrations to ensure the most economic coverage

Logistics Hotspots Mapped to GDP concentration

EUROPEAN GDP [EUR m/sqkm]



GDP

m EUR / Sqkm

- Below 20
- 20-50
- 50-100
- 100-200
- 200-500
- 500-1,000
- 1,000-2,000
- 2,000-5,000
- 5,000-10,000
- 10,000-20,000
- 20,000-40,000
- No data
- Logistics Hotspot

Source: Eurostat; Roland Berger

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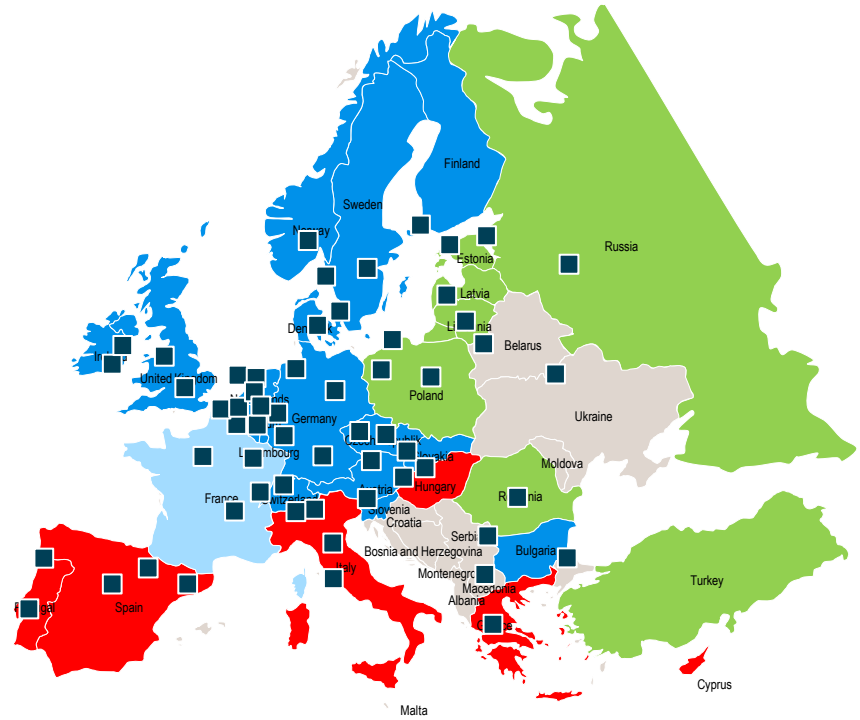
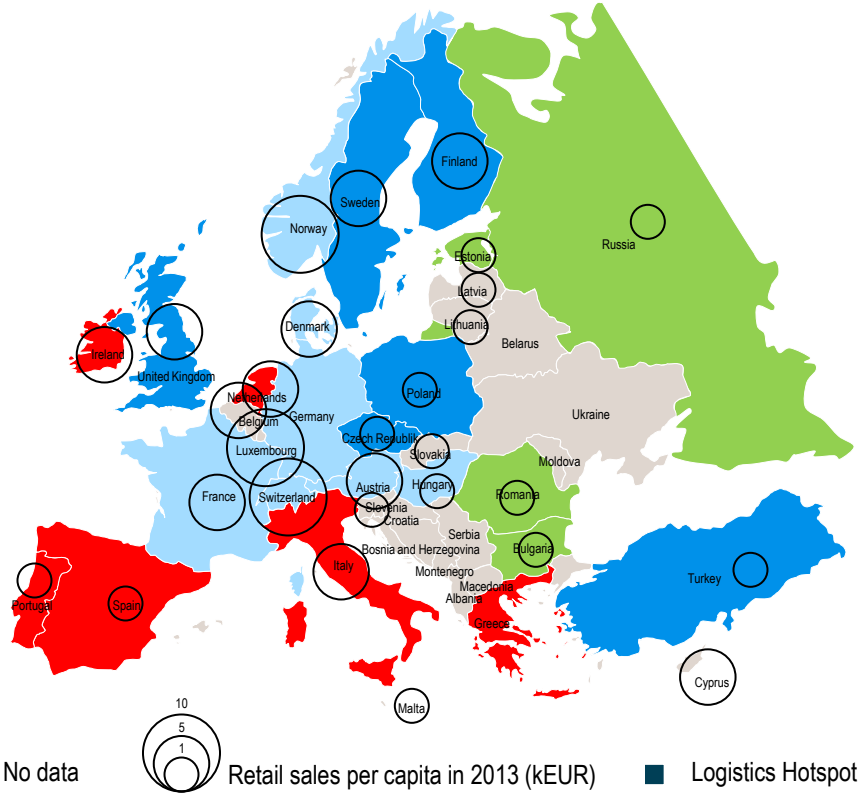
Looking at the latest GDP and retail sales forecasts per capita, the current set-up already fits to future developments

GDP GROWTH [%]



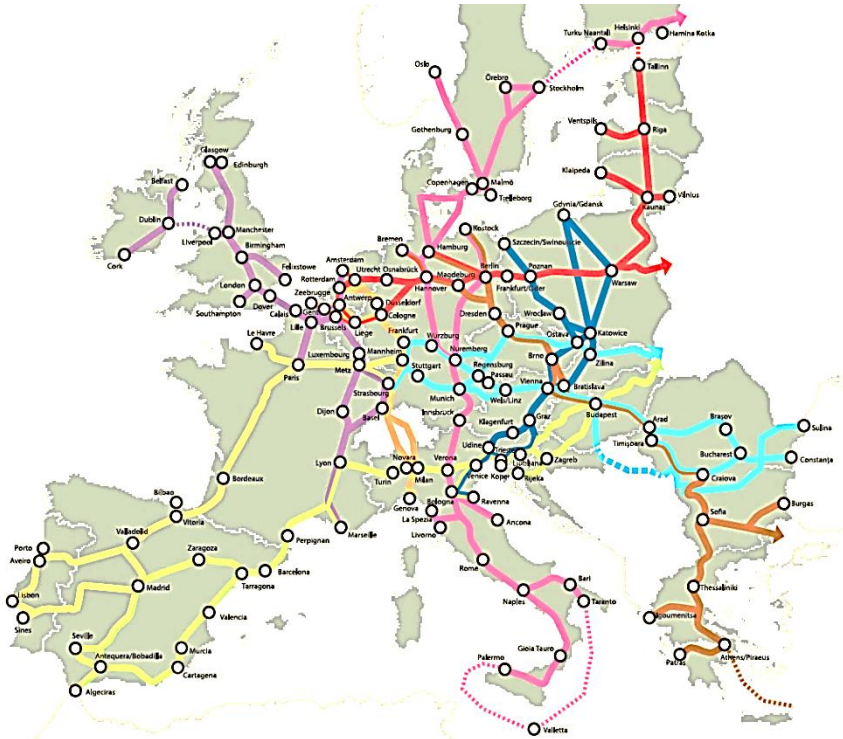
RETAIL SALES PER CAPITA ANNUAL FORECAST GROWTH 2013-2018 [%]



Source: DTZ Research; Roland Berger

EU is already taking the next step…
The "Zero to Ten" Strategy of EU for Transportation

The Trans- European Transport Network

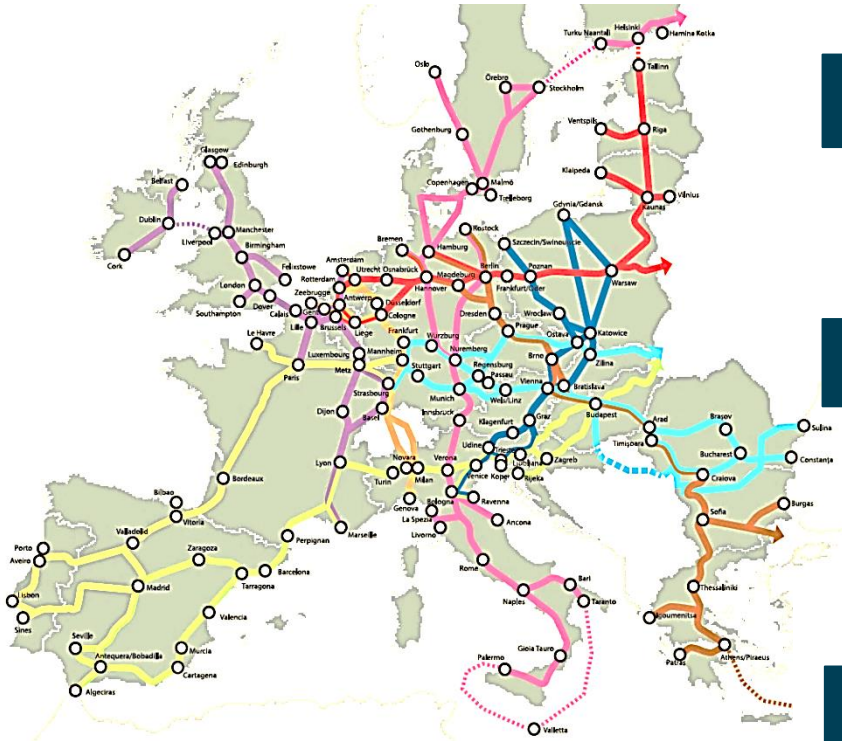


0%	Setting a new target for CO2 emissions in major urban centres by 2030
Defining 1	Defining one single European Transport Area
2+	Accelerating the Single European Sky 2+
3x	Three times more funding for transport infrastructure investment
4th	The Fourth Railway Package
5	Cutting red tape for shipping across five key areas
€6bn	Six billion euros investment in transport research and innovation
7%	Seven percent annual cut in road deaths in the last five years
8	Eight aviation agreements signed to better connect Europe to the outside world
9	Nine major transport corridors to act as the backbone for transportation
10	Ten passenger rights however you travel

Source: European Commission – Transport

Let's take a deeper look at 3 key strategies, relevant for this forum…

The Trans- European Transport Network



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Source: European Commission – Transport

Strategy "x3" focusses on three times the funding for transport infrastructure in EU between 2014 and 2020

Strategy "x3"

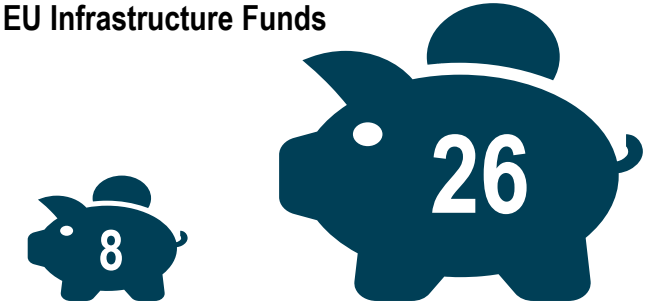
> The Connecting Europe Facility, agreed by the EU in 2013, is a dedicated infrastructure fund for transport, energy and telecommunications in the EU's seven-year budget programme up to 2020

> EU is increasing its financing for transport infrastructure by 3x to to €26 billion as a complement to the national investments for developing the TEN-T

> This funding will focus on building the network's nine major transport corridors, filling in missing cross-border links and removing barriers

> The national investments of EUR ~250 bn are committed by member states toward the intra country completion of the TEN-T network

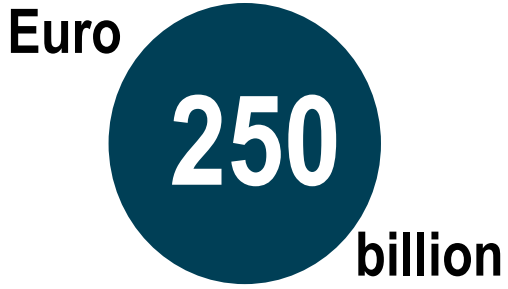
EU Infrastructure Funds



Euro billion (2007-2013)

Euro billion (2014-2020)

National investments committed to Infrastructure by member states till 2020



Source: European Commission – Transport

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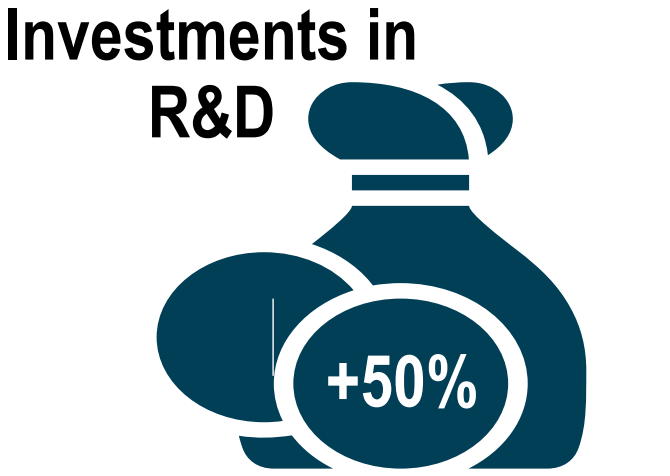
Strategy "€6bn" focuses on the need for investment in transport research and innovation for the next 7 years

Strategy "€6bn"

> The seven-year Horizon 2020 programme, from 2014 -2020, spending on transport research has increased by ~50% to €6.4 billion from previous budgetary period

> This will enable the EU to reach its objective of cutting carbon emissions in transport by 60% by 2050, by funding public-private partnership projects such as Clean Sky 2, SESAR 2020, Shift2Rail, and the Fuel Cell and Hydrogen Joint Undertaking 2

> It will also help transport to tackle several challenges that threaten its wider competitiveness: to lessen dependence on imported oil, cut greenhouse gas and other emissions, and reduce congestion and raise competitiveness, drive economic growth and create jobs



focused on 60% reduction in CO^2

Source: European Commission – Transport

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Strategy "9" stresses on building nine major transport corridors which will act as a backbone for transportation in EU

Strategy 9

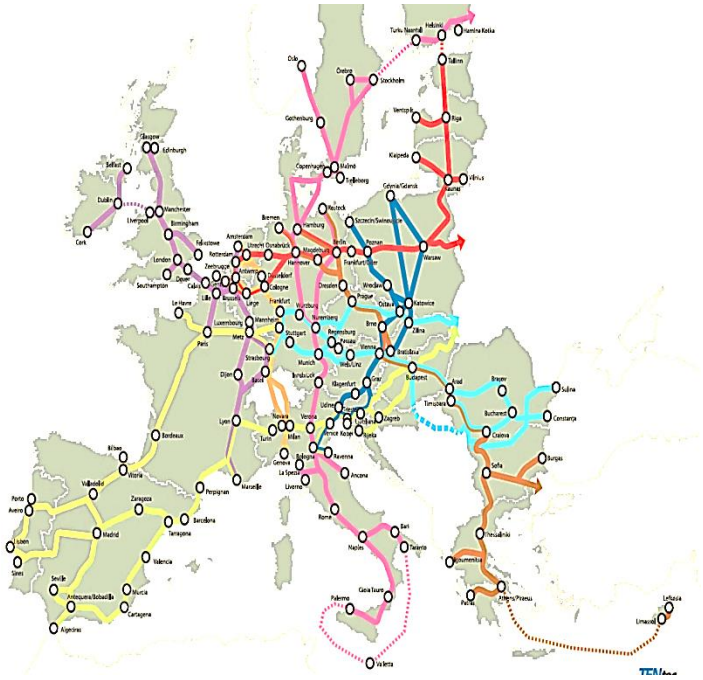
> In 2013, the EU revised the rules governing the **Trans-European Transport Network (TEN-T)** (designed to build by 2030), a core network of national railways, roads, airports, rivers and canals into an efficient network to connect all corners of Europe

> Nine corridors, each one spanning several thousand kilometres, will form the backbone of the planned core network

> Each corridor will include at least three different forms of transport, three EU countries and two cross-border sections

> Ports will also be fully integrated into the corridors with proper onward rail and river connections to the wider network

> **15,000 km of railway line** will be upgraded to high speed ; **38 key airports** with rail connections into major cities; **104 main European ports** with rail and road links ; **35 cross border projects** to reduce bottlenecks



Source: European Commission – Transport

C. India Landscape for Automotive Logistics

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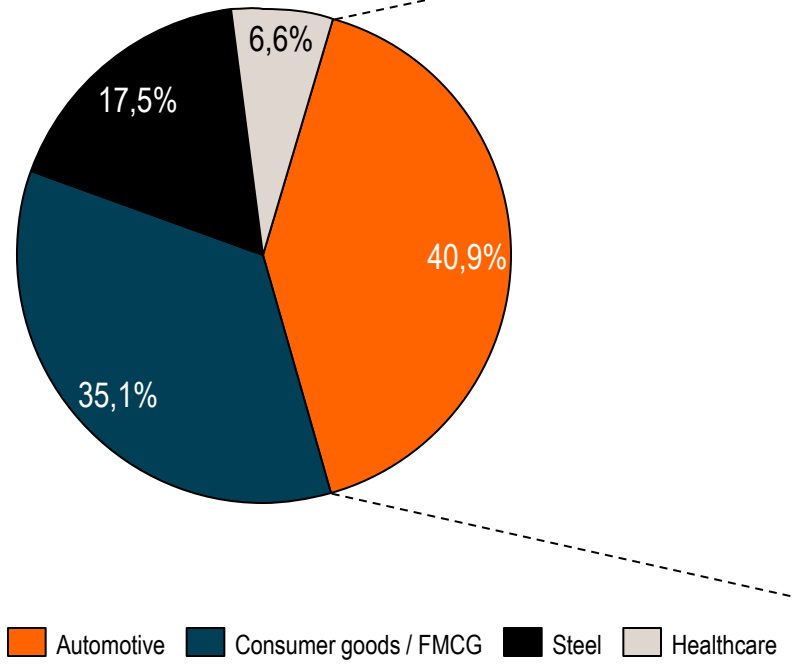
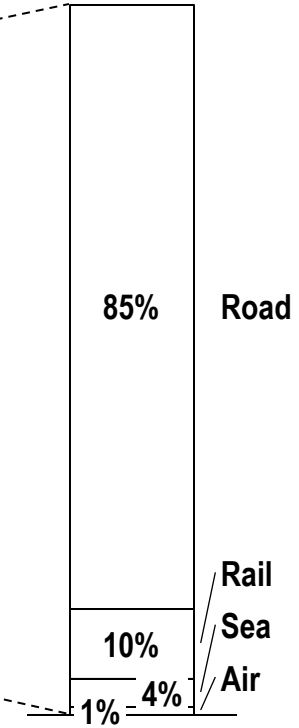
40% of Indian logistics market is automotive related, of which 85% is based on road transportation

Industry Wise Split of Indian Logistics Market



Mode wise split of Indian Auto Logistics Market



Comments

> Out of the total India logistics market amounting to USD 107.11 billion in 2013, the automotive sector comprises of almost 41% of the market

> In 2013, Indian automotive logistics market was USD 43.81 billion

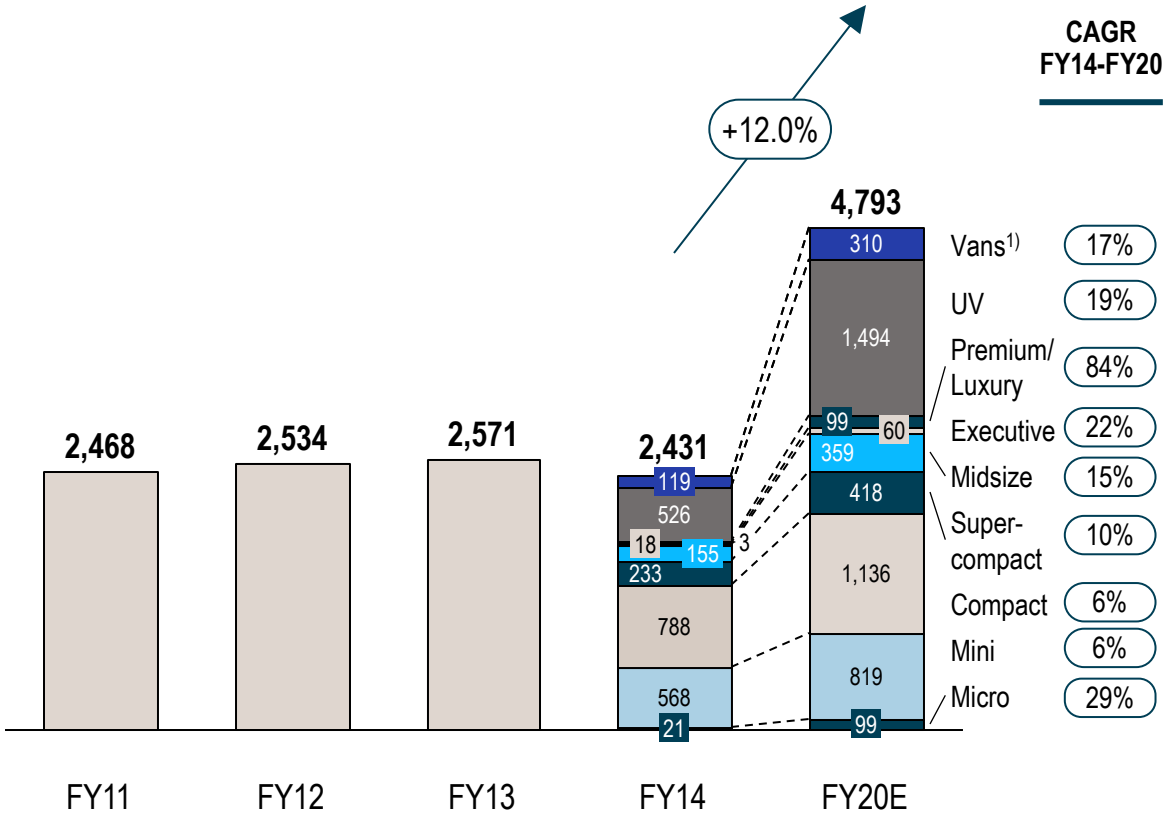
> Out of this, automotive road logistics for India was 85% of the overall market

Source: EMIS, Roland Berger

PV sales are expected to grow at CAGR of 12% to reach ~ 4.8 m units by 2020; driven by a strong expected growth in luxury segment

Passenger Vehicles market – forecast

PV sales forecast ['000 units]



1) Vans segment includes Maruti Omni/Eeco and does not include Tata Magic/IRIS

Comments

> India is one of the biggest passenger vehicle markets in the world with annual sales of ~2.4 m units in FY14

> Mini, compact and utility vehicle segments constituted more than two-third of India's PV sales in FY14

> The PV industry shrank from FY13 to FY 14 owing to the slowdown in Indian and global economy

> However, the PV industry in India is expected to grow at a CAGR of 12% till FY 2020; driven by growing middle class and increasing motorisation rate

Source: SIAM, LMC, IHS, Roland Berger Analysis

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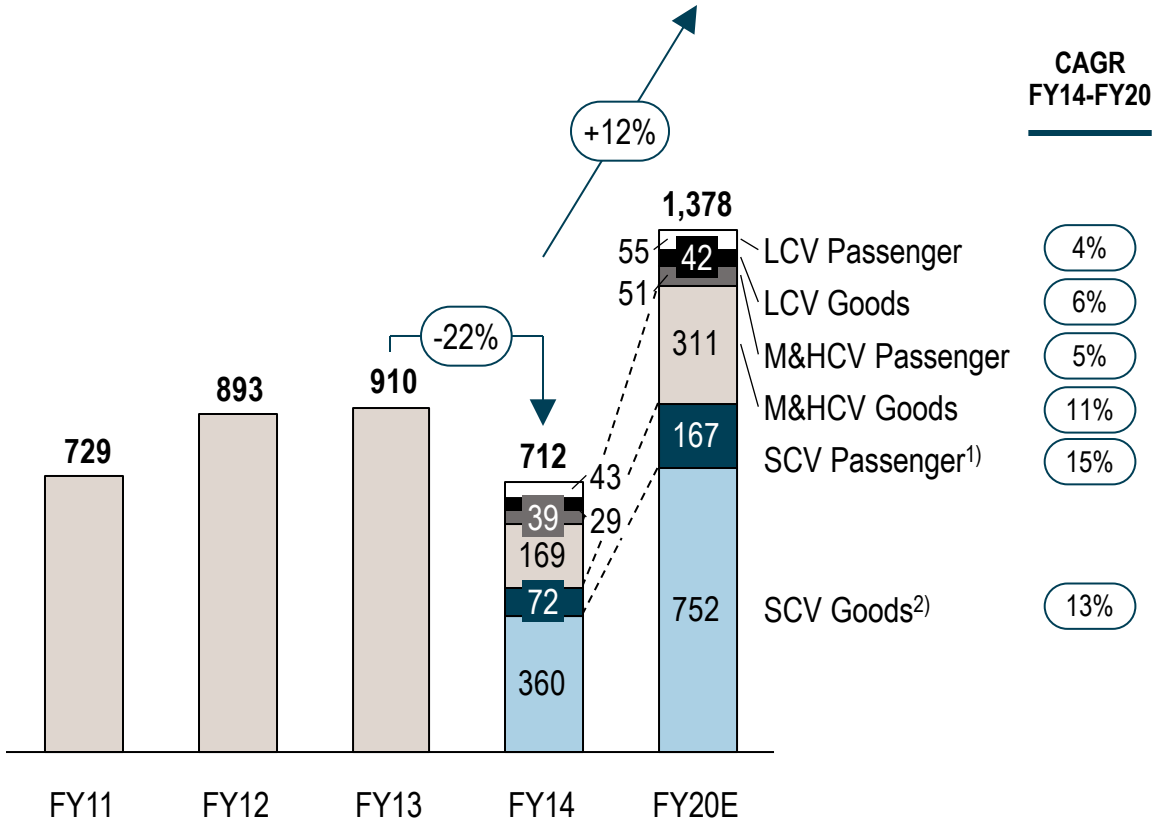
CV sales are expected to grow at a CAGR of 12%, driven by revival in industrial activity & strong economic growth expectations

Commercial Vehicles market – forecast

CV sales forecast ['000 units]



Comments

> India's CV market shrank by over 22% in FY 14 owing to the slowdown in Indian economy

> However, overall CV market is expected to grow at a CAGR of 12% till FY 2020 led by the SCV and M&HCV segments.

> SCV segment is expected to grow by 13%; primarily driven by better connectivity, increasing urbanisation and rising rural incomes

> M&HCV segment is expected to grow at 10 % mainly due to the improving infrastructure and increasing adoption of higher tonnage trucks

1) SCV Passenger segment includes Tata Magic/IRIS and does not include Maruti Omni and Eeco 2) SCV Goods segment includes <3.5 ton cargo vehicles such as ACE, Dost, Super Ace, etc.

Source: SIAM, LMC, IHS, Roland Berger Analysis

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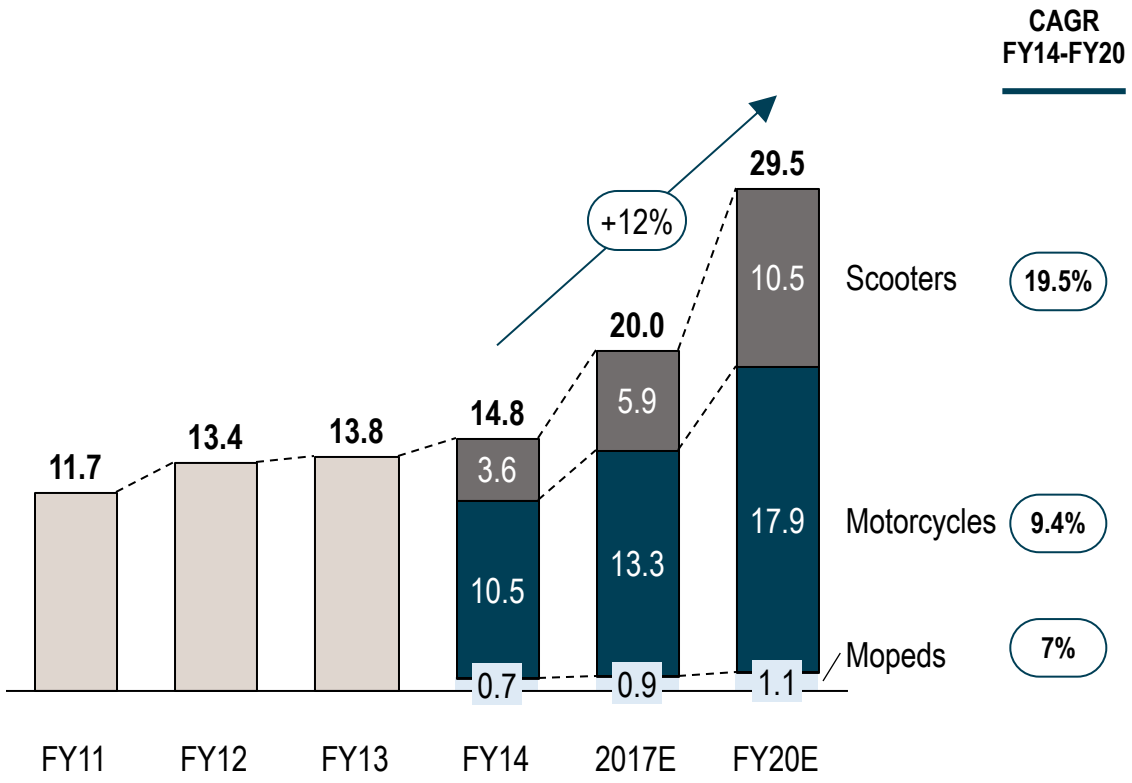
Two-wheeler vehicle sales in India is expected to continue growing at a CAGR of 12% to reach over ~30m units by 2020

Two-wheeler market – forecast

2W sales forecast [million units]



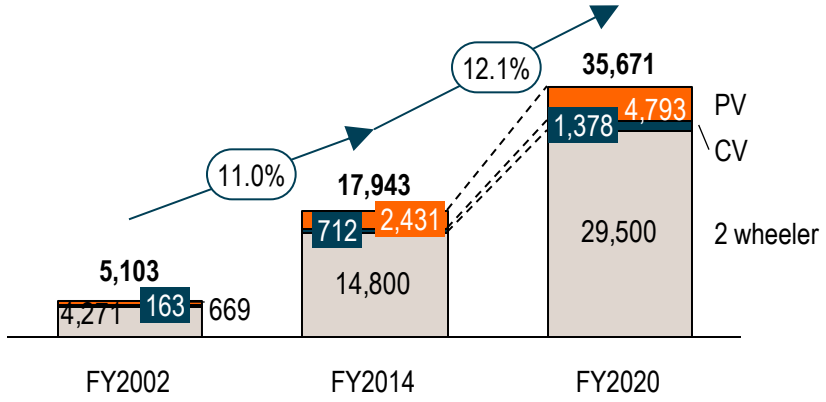
Comments

- The 2W industry is expected grow at a CAGR of 12%, reaching a total sales of 29.5 mn units by 2020
- Key factors driving 2W sales growth are India are
  - growing proporation of young population,
  - moderate 2W penetration levels and increasing per capita income
  - under developed public transport system
  - over congested roads in Indian cities
- Scooter segment is expected to lead the volume growth on back of shifting customer preferences

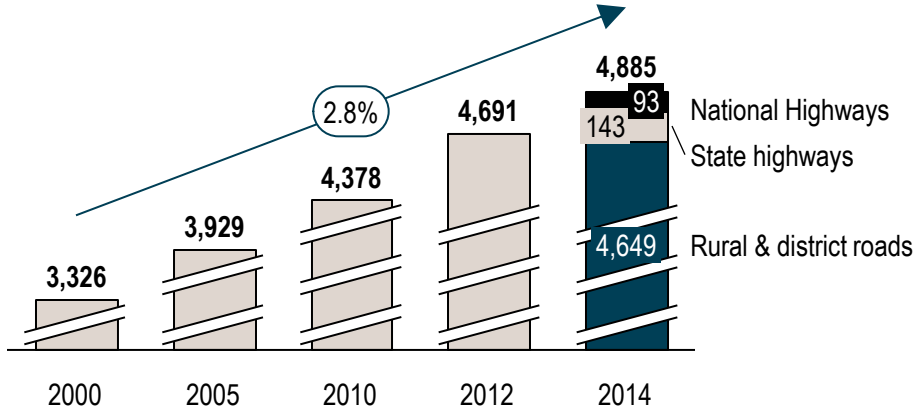
Source: SIAM, Roland Berger Analysis

The demand for road logistics for finished vehicles and the growth rate in road development are mismatched

Sales figures ('000 units)



Road network in India (length in '000 km)



Comments

> The combined growth in volumes for automotive sales has been growing at a CAGR of 11% since FY02 and is expected to be ~12.1% by FY20

> The volumes will be primarily transported through the road networks which are already inadequate to handle the current freight tonnage

> In the past 14 years the road networks have grown at a marginal 2.8% and as a result the road freight industry has been behind global competitive levels

> Of the current road networks, a miniscule 0.02% of the roads are capable of high speed transport. This is significantly behind global benchmarks

> Going forward the expected mismatch between the growth rate of sales of vehicles and the roads needed for transporting them is going to become a major issue

Source: SIAM, IHS, Ministry of Road Transport and Highways, Roland Berger Analysis

It is estimated that India needs to spend ~USD 1 Trillion to improve its infrastructure competitive, with strong public-private partnerships

Quality of Logistics Infrastructure[1)]

Road

Country	Rank
UAE	1
Japan	10
Germany	13
USA	16
Korea	18
China	49
Thailand	50
India	**76**
Brazil	122
Russia	124

> In India, quality of road transportation lags behind most of the countries compared
> Majority of the roads are rural roads which are unpaved
> Pot holes in city roads is another reason for bad quality of roads in India

Rail

Country	Rank
Japan	1
Germany	8
Korea	10
USA	15
China	17
Russia	26
India	**27**
Thailand	74
Brazil	95

> In Rail transportation, India has an improved performance yet it is out performed by most of its competitors
> The improvement in ranking could be attributed to the good connectivity across the length and breadth of the country

Port

Country	Rank
Netherlands	1
USA	12
Germany	14
Japan	26
Korea	27
China	53
Thailand	54
India	**76**
Russia	81
Brazil	122

> Port infrastructure in India, critical for enabling export of vehicles, is weak and technologically inadequate especially for Automotive Industry
> India ranks below most of its competitors

Air

Country	Rank
Singapore	1
USA	9
Germany	13
Japan	27
Korea	31
Thailand	37
China	58
India	**71**
Russia	79
Brazil	113

> Air transport in India has recently improved, but yet is plagued by issues of last mile connectivity and high cost of operation

Source: WEC -The Global Competitiveness Report 14-15

Roland Berger Strategy Consultants

India faces significant gaps in timeliness and ease of tracking; govt. should take steps to eliminate roadblocks and implement GST

Comparison of Logistics Capability and Performance[1)]

Service Providers

Country	Rank
Netherlands	1
Germany	3
Japan	5
USA	14
Korea	22
China	27
Thailand	29
India	**31**
Brazil	49
Russia	83

> Indian logistics service providers are significantly behind their peers in terms of performance

On-time Performance

Country	Rank
Singapore	1
Japan	6
Germany	8
USA	18
Thailand	28
Korea	30
China	36
India	**47**
Brazil	71
Russia	86

> India fares poorly among its peers and competitors regarding frequency of delays in delivery

Ability to Track

Country	Rank
Singapore	1
Germany	5
Japan	7
USA	10
Korea	25
China	31
Thailand	36
India	**42**
Brazil	65
Russia	119

> Ability to track shipment is a critical function of the supply chain and even with one of the highest cellular penetration, India is behind its peers

Source: World Bank – Logistics Performance Index

India's road transport efficiency is significantly behind the global average

Road Transport Efficiency Indicators

Indicator	India Average	Global Average	Comments
Average truck speed (in km/ph)	30	70	India's average truck speed is ~50% lower than the global average
Average truck distance covered in a year (kms)	80,000	500,000	Trucks in India cover only about 16% of the average global mileage
Average truck distance per day (kms)	325	500 (BRIC) 750 (US & EU)	In India, a truck can only cover ~50% of the distance compared to US & EU daily
Total length of expressways (kms)	~1,000	74,000[1)]	India has a negligible %(<0.01) of roads capable of supporting high speed transportation
Share of paved roads (%)	54%	68% (BRIC) 90% (US & EU)	In the remaining roads, India is also substantially behind in the % of paved road coverage also

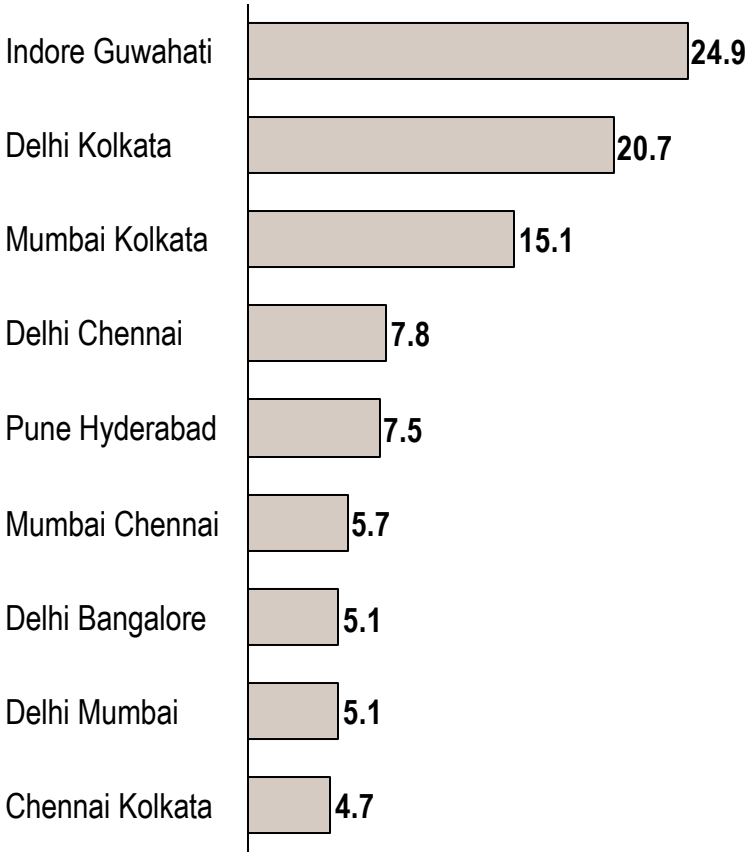
1) Data for China

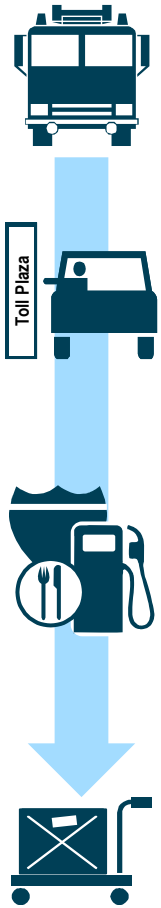
Source: Annual Reports, NHAI, Ministry of Transportation, EU Transport Commission

Roland Berger Strategy Consultants

Current structure of toll collection, state border crossing procedures and driver harassment are key issues that lead to delays

Stoppage delay [as% of trip time]





Case Example – Delhi – Bangalore route

Distance	kms	2,156
Journey time	hrs	102
Vehicle speed	km/hr	22
No. of stops – toll	nos	15
No. of stops – others	nos	10
Stoppage delay	% of trip time	5
Stoppage expenses	% of trip expenses	15
Toll expenses	% of stoppage expenses	47

Source: Ministry Of Road Transport & Highways, Transport Corporation of India, Roland Berger

Delays have been witnessed in NHDP and NHAI projects in the recent past; There are high expectations from the new government

Status of NHDP Projects

NHDP Phase / Year of approval	Project	Length (km) / Scheduled completion date	Status as on Mar 31, 2013 Length (km) already covered
Ph I / Dec 2000	Golden Quadrilateral (GQ), North South- East West (NSEW) Corridor, Ports & others	7616 km / Dec 2005	Not completed / 7284 km
Ph 2 / Dec 2003	NS-EW Corridor & others	7300 km / Dec 2007	Not completed / 6134 km
Ph 3 / Apr 2007	Strengthening / Up Gradation Of 2-Lane into 4-Lane	12109 km / Dec 2012	Not completed / 5296 km
Ph 4 / Feb 2012	Strengthening of 2-lane with paved shoulders	20,000 km / Dec 2017-18	Not completed / 172 km
Ph 5 / Feb 2012	Existing 4-lane into 6-lane	6500 km / Dec 2012	Not completed / 1492 km
Ph 6 / Nov 2006	Expressways	1000 km / Dec 2015	Not completed / NIL
Ph 7 / Dec 2007	Flyovers / grade separators	700 km / Dec 2014	Not completed / 21 km

Other NHAI projects delayed

Section	Appointed Date	Scheduled completion date	Status as on Mar 31, 2014
Vijayawada – Chilakaluripet	May 1 2009	10/31/2011 rescheduled to 31/01/2014	Not completed
Hazipur–Muzaffarpur	Aug 12, 2010	Feb 8 2013	Not completed
Chapra-Hajipur	Jan 27 2011	Jul 25 2013	Not completed
Hazaribagh-Ranchi	Aug 1 2010	Jan 27 2013	Not completed
Varanasi-Aurangabad	Sep 12 2011	Mar 9 2014	Not completed
Pune-Solapur-II	Sep 28 2011	Jan 14 2014	Not completed
Patna-Bhaktiyarpur	Sep 26 2011	Mar 25 2014	Not completed
Barhi-Hazaribagh	Feb 11 2012	Feb 10 2014	Not completed
Krishnagiri-Walajhapet	Jun 7 2011	Dec 4 2013	Not completed

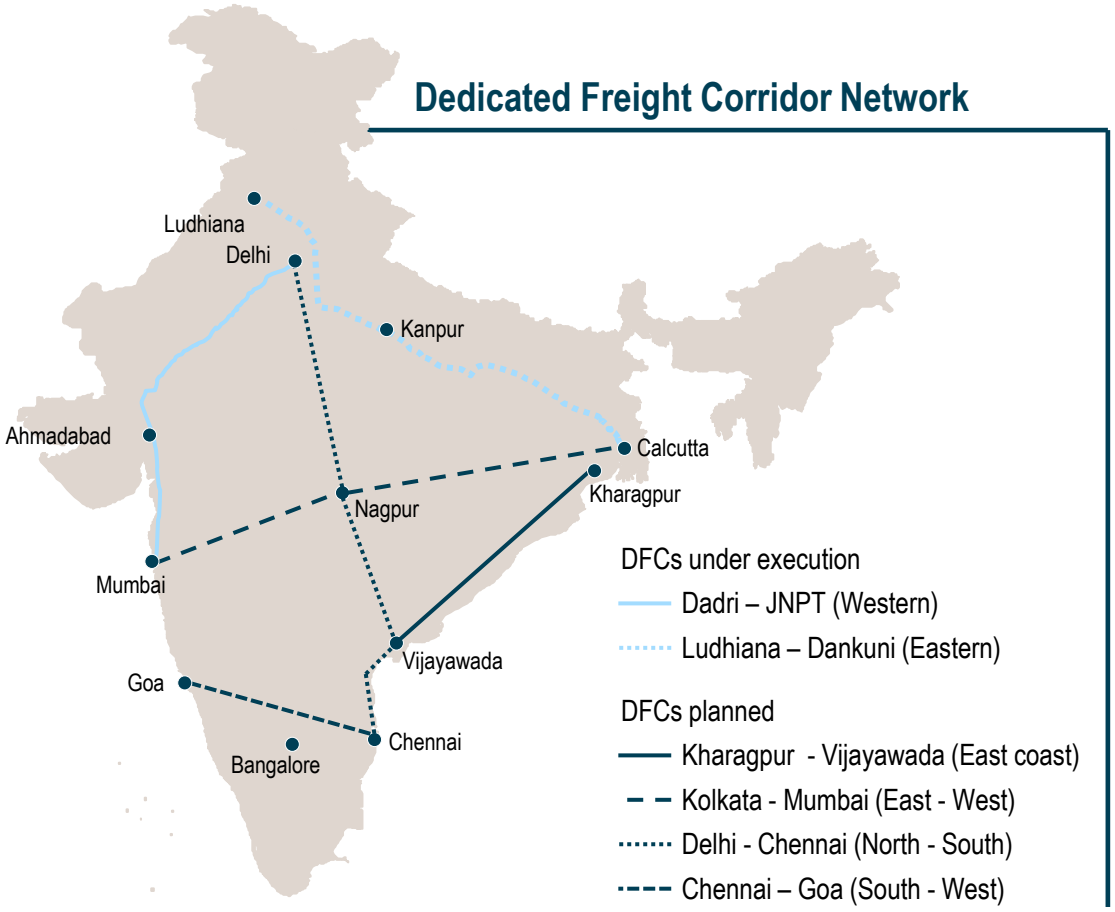
COMMENTS

> Delays can be attributed to policy inaction, inefficient methods of environmental and other clearances, among others
> However, it will be a key area of performance for the new government, with need for rapid and quantifiable progress on these key projects
> Consistent government action at the centre and state level is required to overcome such bottlenecks

Source: Ministry Of Road Transport & Highways, Transport Corporation of India, Roland Berger

Procedural bottlenecks, land acquisition and funding issues are also attributable to the delays in the Dedicated Freight Corridor Network

Dedicated Freight Corridor Network



Route map for the proposed DFCs are approximate

Project timelines

Western Corridor – 1,490 km DELAYS

Phases	Length	Last year status	Expected completion
Phase I	920 kms	2009-2016	2011-2017
Phase II	430 kms	2010-2017	2012-2018
Phase III	140 kms	2010-2017	2013-2018

Eastern Corridor – 1,805 km

Phases	Length	Last year status	Expected completion
Phase I	343 kms	2010- 2016	2011-2017
Phase II	390 kms	2010-2016	2013-2018
Phase III	397 kms	2011-2016	2014-2019
Phase IV	550 kms	2011-2016	2014-2019
Phase V	125 kms	2010-2016	2010-2016

Source: DFCCI, DFC concept plan, Secondary sources, Roland Berger

D. Models for Indian OEMs to Improve Outbound Logistics

Roland Berger
Strategy Consultants

Roland Berger Strategy Consultants

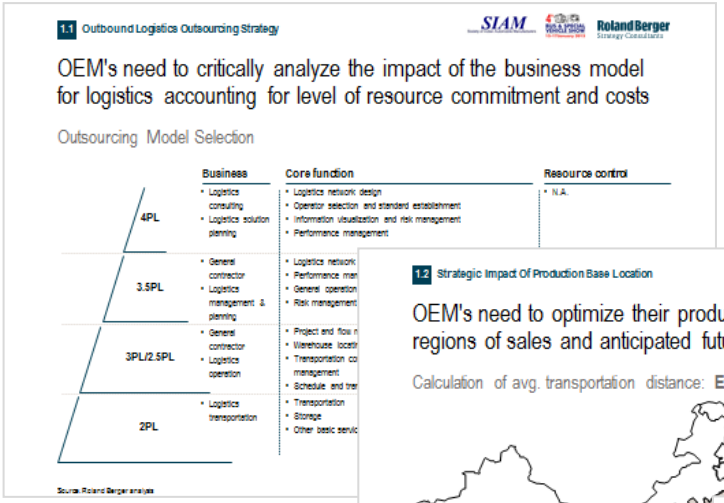
Strategic, Operational and Efficiency improvement are the key areas for Indian OEMs to improve performance within the current infra.

Business model of logistics operators

	Impact area		Key component
1 Strategic setup	1.1	• Outbound logistics outsource strategy	• Outsource mode: General contractor vs. subcontractor • Business model of contractors (2PL, 3PL, 4PL)
	1.2	• Strategic impact of production base location	• Car model sales and distribution spread for each production base • Average transportation distance
2 Operational setup	2.1	• Logistics model selection	• Hub-to-hub/door-to-door/hybrid model selection based on cost, complexity and agility
	2.2	• Transportation method and logistics network	• Percentage of major transportation (highway, waterway, railway) in volume and future trend and logistics network and route design
3 Operational efficiency	3.1	• Logistics cost management	• Key cost factors • Pricing and settlement structures • Transportation cost management: Loading and unload ratio
	3.2	• Quality control system	• Major KPIs of passenger vehicle outbound logistics

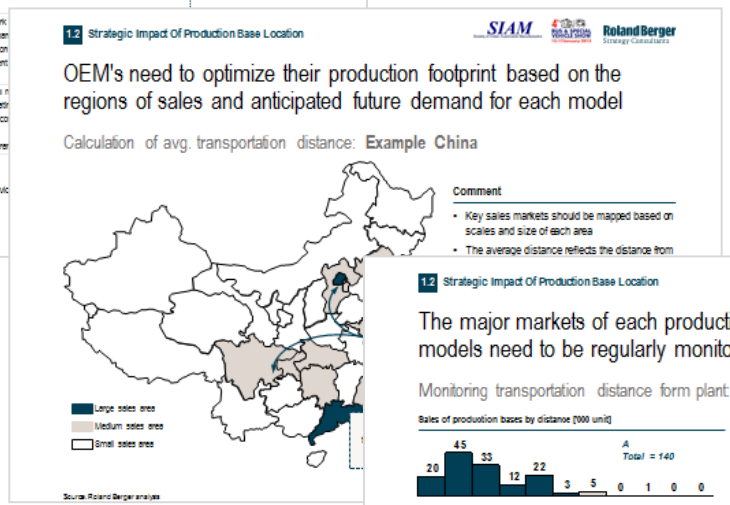
Source: Roland Berger analysis

OEMs need to consider the outsourcing model and their production footprint in relation to sales footprint as a part of their strategic setup



> Logistics model selection critical

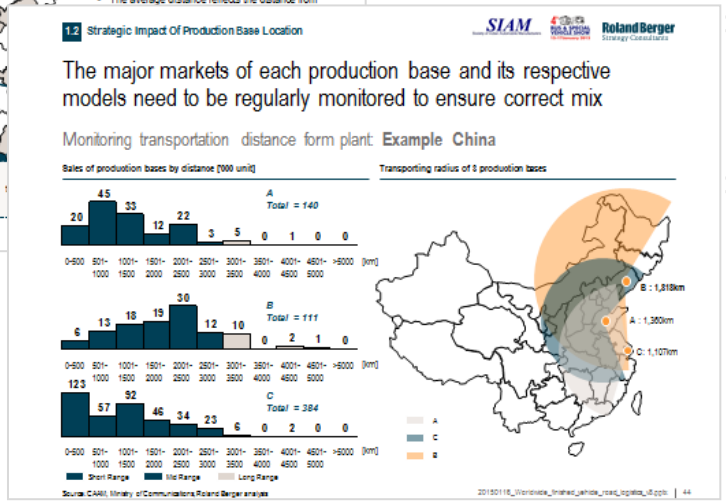
> Indian OEMs mostly choose 3PL models



> Footprint must take into account anticipated sales

> hotspots

> Critical in dynamic markets

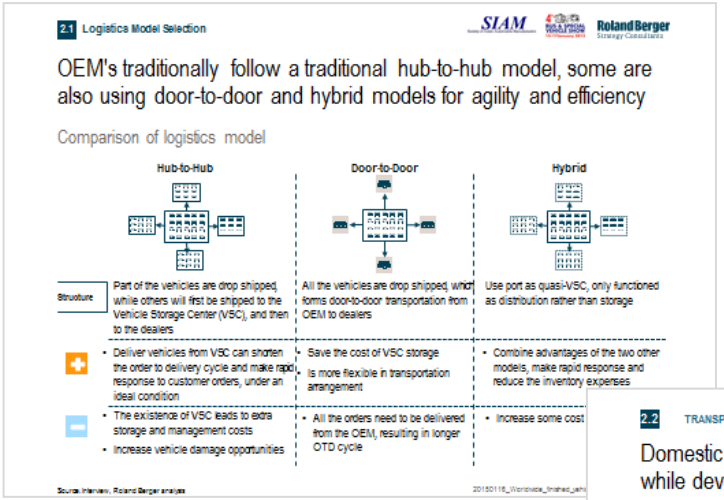


> Regular review of average transportation distance for each facility and model

> Continuously optimize footprint for the OEM

Source: Roland Berger

Operational setup of the OEMs in terms of logistics model and modes employed, drive the flexibility and costs of logistics network



2.1 Logistics Model Selection

OEM's traditionally follow a traditional hub-to-hub model, some are also using door-to-door and hybrid models for agility and efficiency

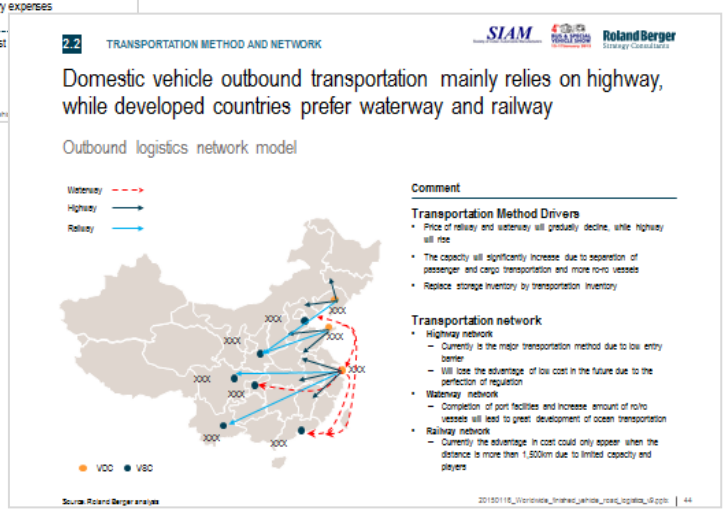
Comparison of logistics model

	Hub-to-Hub	Door-to-Door	Hybrid
Structure	Part of the vehicles are drop shipped, while others will first be shipped to the Vehicle Storage Center (VSC), and then to the dealers	All the vehicles are drop shipped, which forms door-to-door transportation from OEM to dealers	Use port as quasi-VSC, only functioned as distribution rather than storage
+	• Deliver vehicles from VSC can shorten the order to delivery cycle and make rapid response to customer orders, under an ideal condition	• Save the cost of VSC storage • Is more flexible in transportation arrangement	• Combine advantages of the two other models, make rapid response and reduce the inventory expenses
−	• The existence of VSC leads to extra storage and management costs • Increase vehicle damage opportunities	• All the orders need to be delivered from the OEM, resulting in longer OTD cycle	• Increase some cost

Source: Interview, Roland Berger analysis

> Traditional hub-to-hub model, sometimes door-to-door and hybrid models

> Hybrid model to combine s rapid response and reduced inventory expenses by making dynamic decision on model usage based on lot size, distance and demand pattern



2.2 TRANSPORTATION METHOD AND NETWORK

Domestic vehicle outbound transportation mainly relies on highway, while developed countries prefer waterway and railway

Outbound logistics network model

Waterway
Highway
Railway

VDC VSC

Comment

Transportation Method Drivers
- Price of railway and waterway will gradually decline, while highway will rise
- The capacity will significantly increase due to seperation of passenger and cargo transportation and more ro-ro vessels
- Replace storage inventory by transportation inventory

Transportation network
- Highway network
  - Currently is the major transportation method due to low entry barrier
  - Will lose the advantage of low cost in the future due to the perfection of regulation
- Waterway network
  - Completion of port facilities and increase amount of ro/ro vessels will lead to great development of ocean transportation
- Railway network
  - Currently the advantage in cost could only appear when the distance is more than 1,500km due to limited capacity and players

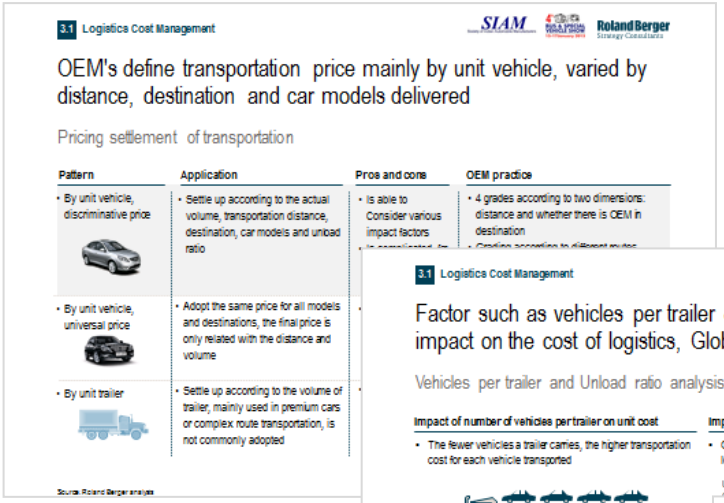
Source: Roland Berger analysis

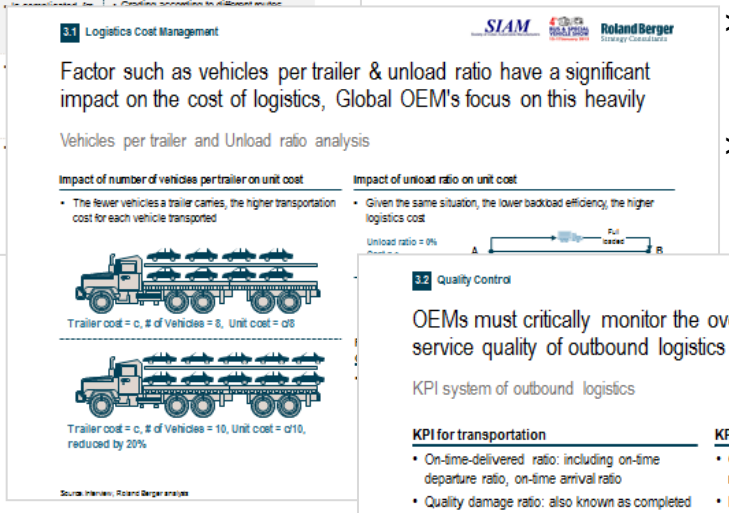
> Critical: multimodal mix and dedicated mode for major hubs

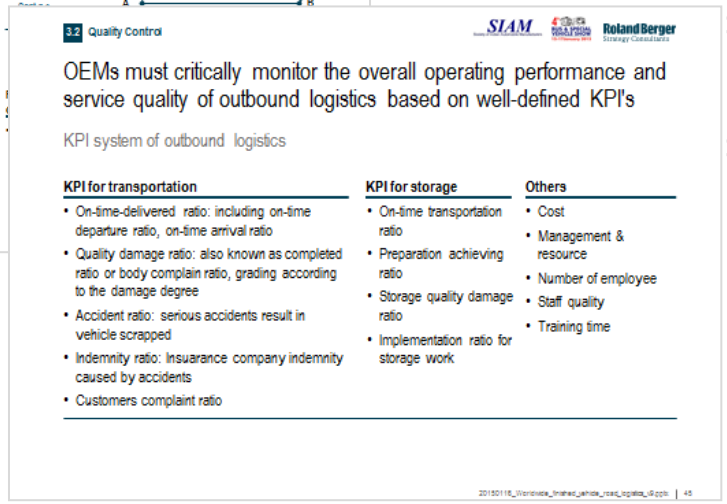
> Regular evaluation of changes and upgrades in infrastructure

Source: Roland Berger

The strategic and operational setup will impact logistics efficiency and determine the market competitiveness of the OEMs







> Transportation pricing strategy, must enable flexibility to ensure optimization during volatile sales periods

> OEMs prefer a per unit vehicle price based on model, distance, destination, vehicles per trailer and unload ratio

> Quality considerations and model variety drive the number of vehicles per trailer & the trailer technology used

> Unload ratio is significantly affected by location of manufacturing bases and logistics model (hub-to-hub etc.)

> Quality control system necessary to drive efficient outsourcing

> With the increase in model types and fluctuating demand in the market, monitoring the performance is critical

Source: Roland Berger

E. Key Trends and Recommendations for India

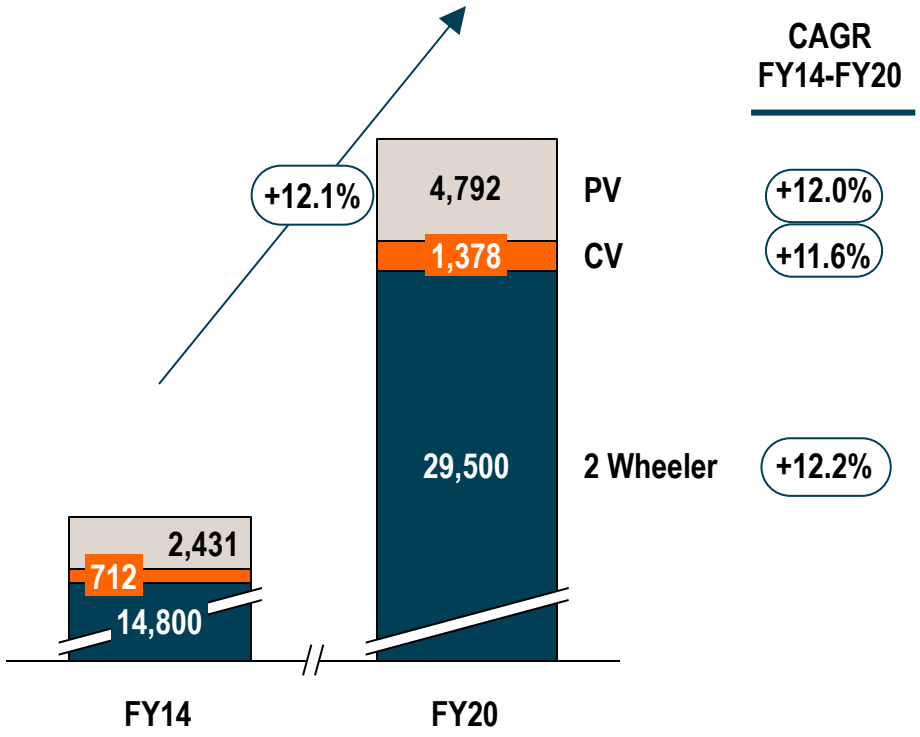
Roland Berger
Strategy Consultants

Roland Berger Strategy Consultants

Trend 1 : Robust growth expected in the Indian automotive sector will increase demand for and complexity in the logistics market

Rising automotive demand

Sales figures ('000 units)



Impact

- Improve access to key logistics suppliers and enhance cooperation
- Cooperatively plan capacities for effective utilization of capacities
- Lobby with the Government to implement GST
- Optimize own logistics and production footprints
- Invest in driver capability building and make the profession more lucrative
- Focus on Multimodal transportation to increase efficiency and reduce dependence on Road

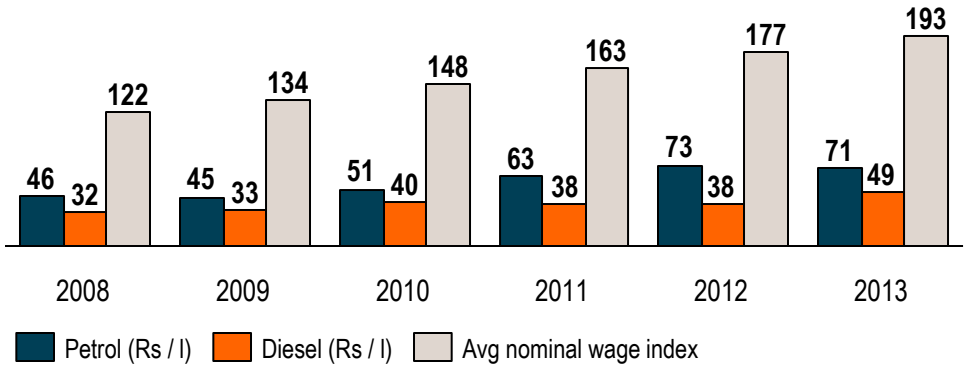
Source: SIAM, LMC, IHS, Roland Berger Analysis

Roland Berger Strategy Consultants

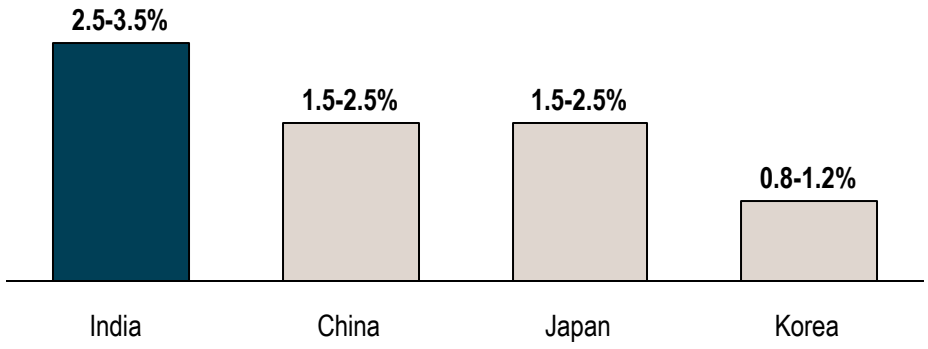
Trend 2 : Rising logistics costs as a percent of sales, increasing fuel prices and wages directly resulting in ~2% higher cost in India

Increasing logistics costs , fuel prices and wages

Fuel prices and wages



Logistics costs as % of sales



Impact

> OEMs in India are heavily dependent on road transport and older transport technology

> To recover the 2% additional costs, key actions for OEMs are:

- Increase efficiency and use multimodal transport solutions to achieve the benchmark multimodal mix
- Work with specialized car-carrier manufacturers to develop India specific solutions to the enhance efficiency
- Optimize network design and focus on collaborative logistics to reduce return load factors

Source: Secondary Research, Roland Berger Analysis

Roland Berger Strategy Consultants

Other trends like increasing types of car models, regulatory challenges and growing aftermarket affect auto logistics market

Increasing car models, regulatory issues and growing aftermarket

Trends	Impact
> **Increasing number of car models in India in the near future**– Due to changing consumer preferences, rising competition, it is expected that there would be an increasing number of car models in the near future, directly affecting the Indian automotive logistics market	– Tie-up with specialized trailer manufacturers to design efficient technologies best suited for Indian conditions – Trailers of different flexible sizes to accommodate different types of cars are needed for effective management – Due to increasing complexity, OEMs and suppliers need better and far more accurate forecasting than in the past – Both the OEMs and suppliers need better technology for real-time data for production planning in a far efficient manner
> **Regulatory issues** – Increasing regulations with respect to environmental and safety standards is increasing the cost and complexity of automotive logistics in India	– Lobby for faster implementation of GST – Focus on multiple modes of transportation instead of one to increase efficiency – Work co-operatively with suppliers to plan capacities

Source: Secondary Research, Roland Berger analysis

Roland Berger
Strategy Consultants

To build a competitive auto road logistics capability, India should follow the European example

1. **Improving infrastructure** –With rising demand for vehicles and bulk of the road network being poorly paved, there is a pressing demand to improve infrastructure to support intermodal services

2. **Continuous investment** – Continuous investments to improve the infrastructure is the need of the hour to increase capacity and service speeds significantly

3. **Removing Red tape**– Increasing regulations, high interest rates, complexities with respect to environmental and safety standards, complications in obtaining permits, use of inter-state permits, complex and opaque tax regime need to be done away with

4. **Faster implementation of GST** – Implementation of Goods and Services Tax (GST), which is meant to centralise certain taxes and help make India a common market across its state borders, will go a long way in building a competitive automotive road logistics capability

5. **Completing pending projects** – With sales of passenger and commercial vehicles expected to increase by over 11% in the coming years, pending projects such as the Eastern and Western corridors, NHDP and other NHAI projects in the southern part of the country need to be completed

Source: Roland Berger Analysis

Roland Berger Strategy Consultants

Additional focus on increasing investment in research and innovation and improving safety on roads is required

6 **Integrated Logistics Plan for India –** Implementation of an integrated logistics plan for India is key for building a competitive automotive road logistics capability for India. Long term plan for 2030 instead of a shorter term plan for 2020 is required incorporating future projections of population growth, migration patterns, GDP and industrial production

7 **Improving rail connectivity to reduce burden on roads** – While only 2-3% of automotive freight currently moves by rail, initiatives should be taken to increase this level to reduce burden on the road network. Initiatives such as rail network through the AFTO and the dedicated rail freight corridor need to be expedited

8 **Newer targets for CO_2 norms in Urban cities –** Following the Europe example, India should aim for an ambitious plan of CO_2 free urban cities for cleaner cities and for reducing dependence on scarce fossil fuels

9 **More investment in research and innovation required** – Investment in research and innovation for the next generation of cutting edge cleaner, cost effective technologies leading to lesser dependence on natural resources

10 **Improving safety on roads –** Better road safety policies need to be implemented through the use of safety devices and modern technology, tougher rules on vehicle testing and enforcing stricter penalties

Source: Roland Berger Analysis