



Public Symposium on Environmentally Sustainable Transport (EST) in Asia

EST and Resilience in Emerging Economies

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Date:

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Venue:

The Lecture Hall, Graduate School of Environmental Studies Building, Nagoya University

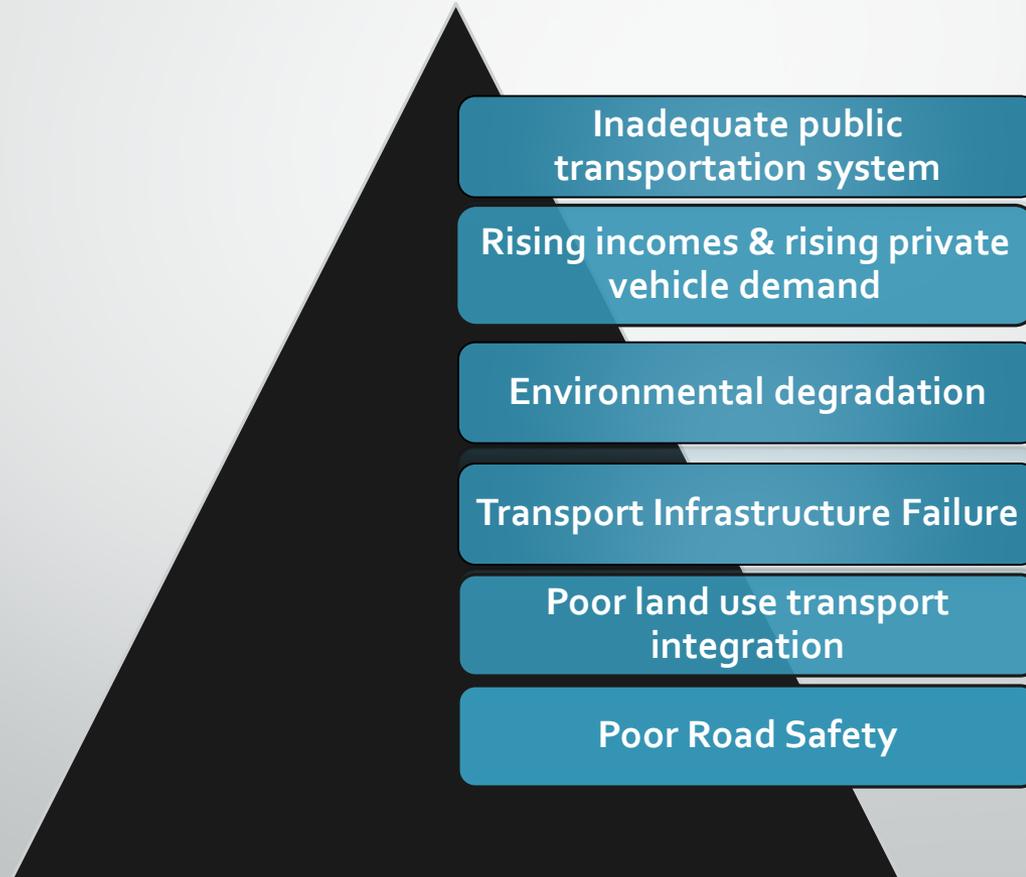
Integrated EST Policy & Resilience

Building

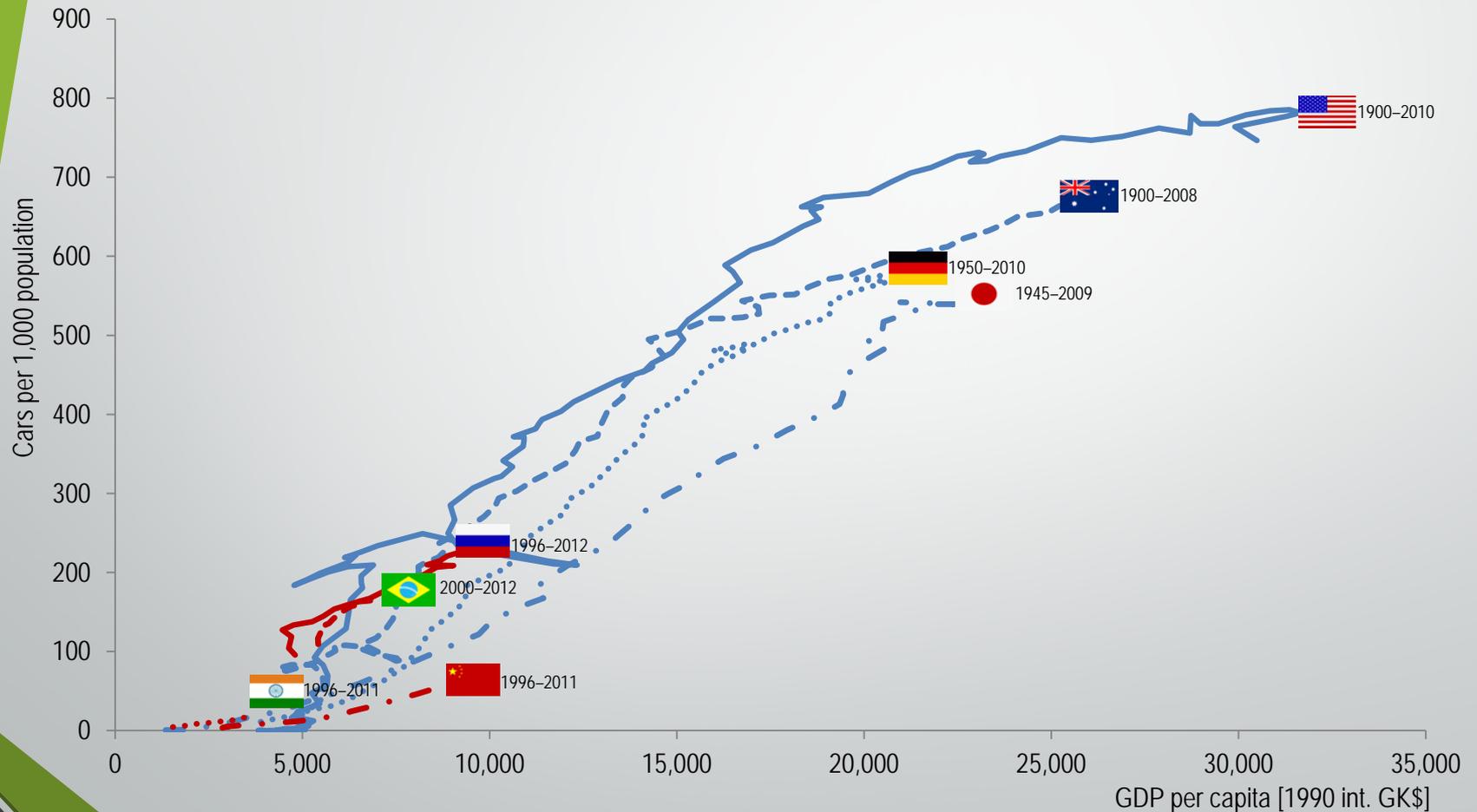


Cities

Present Challenges for Emerging economies

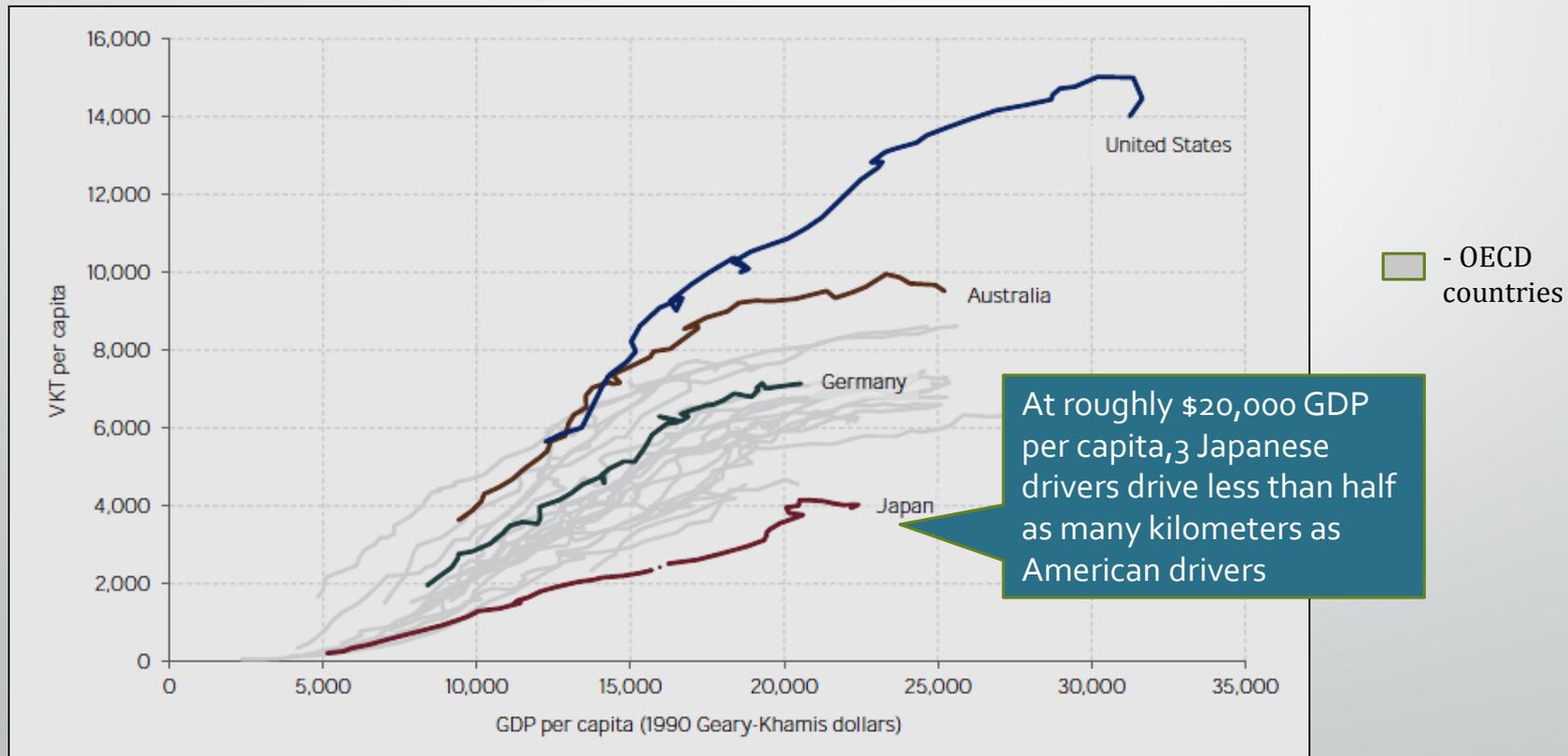


Future of Mobility: Developing (BRIC) Vs Developed(OECD)



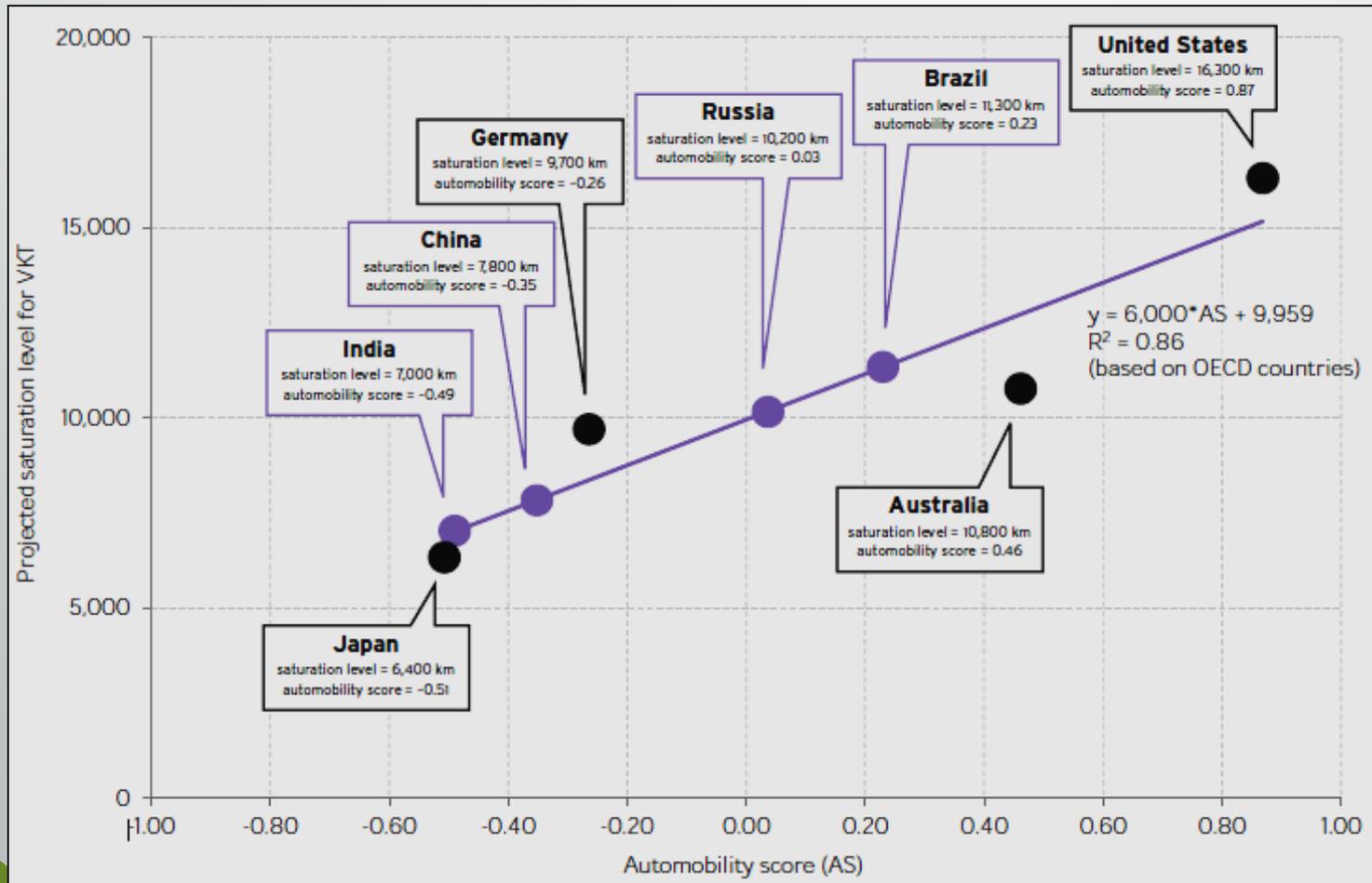
(Source: The Future of driving in Developing Countries, ifmo 2014)

Economic growth not the sole measure of increasing Automobility



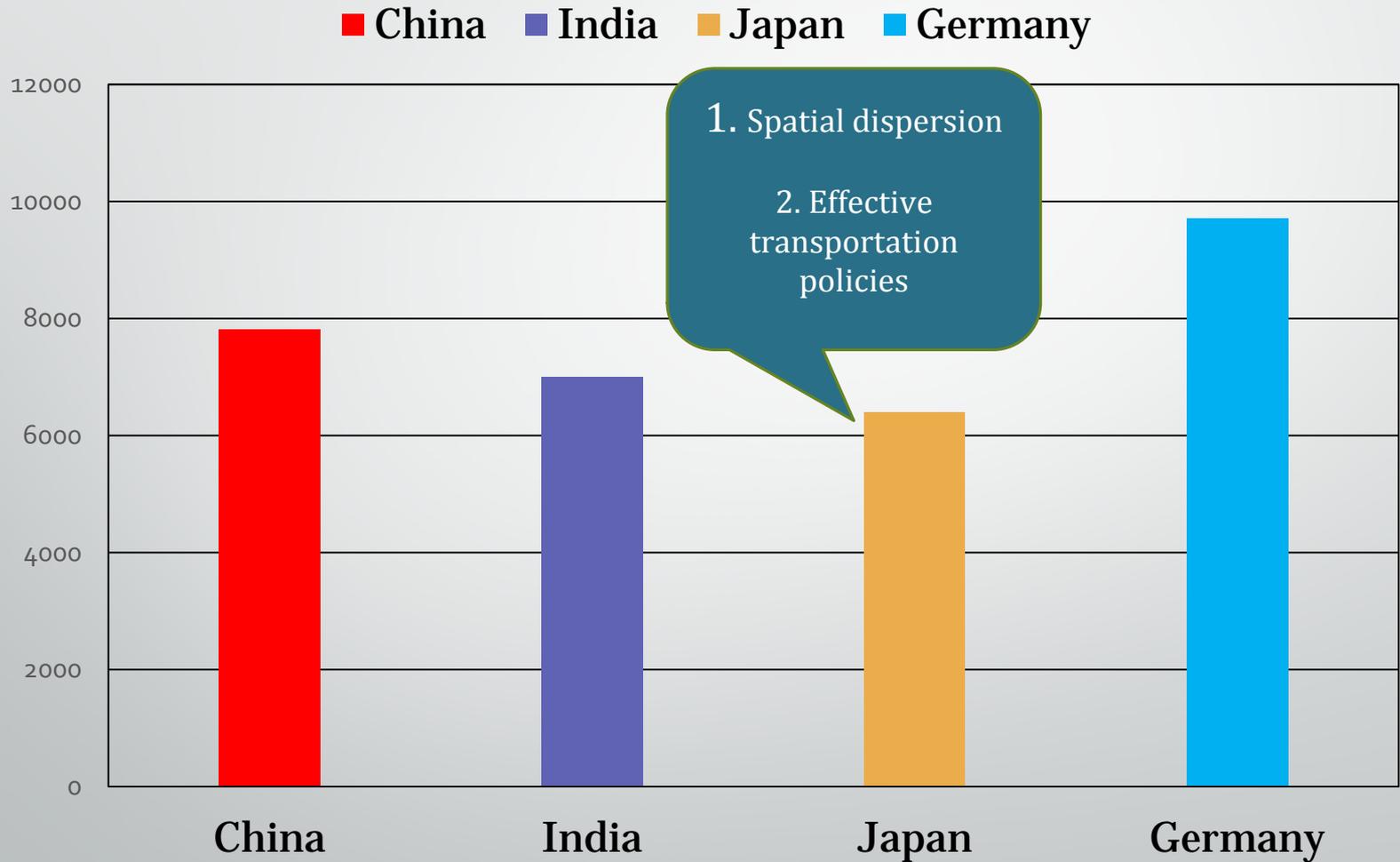
(Source: The Future of driving in Developing Countries, ifmo 2014)

Future of Mobility: Forecasted Saturation level for VKT_(personal vehicle)



(Source: The Future of driving in Developing Countries, ifmo 2014)

Future of Mobility: Forecasted Saturation level for VKT(personal vehicle)

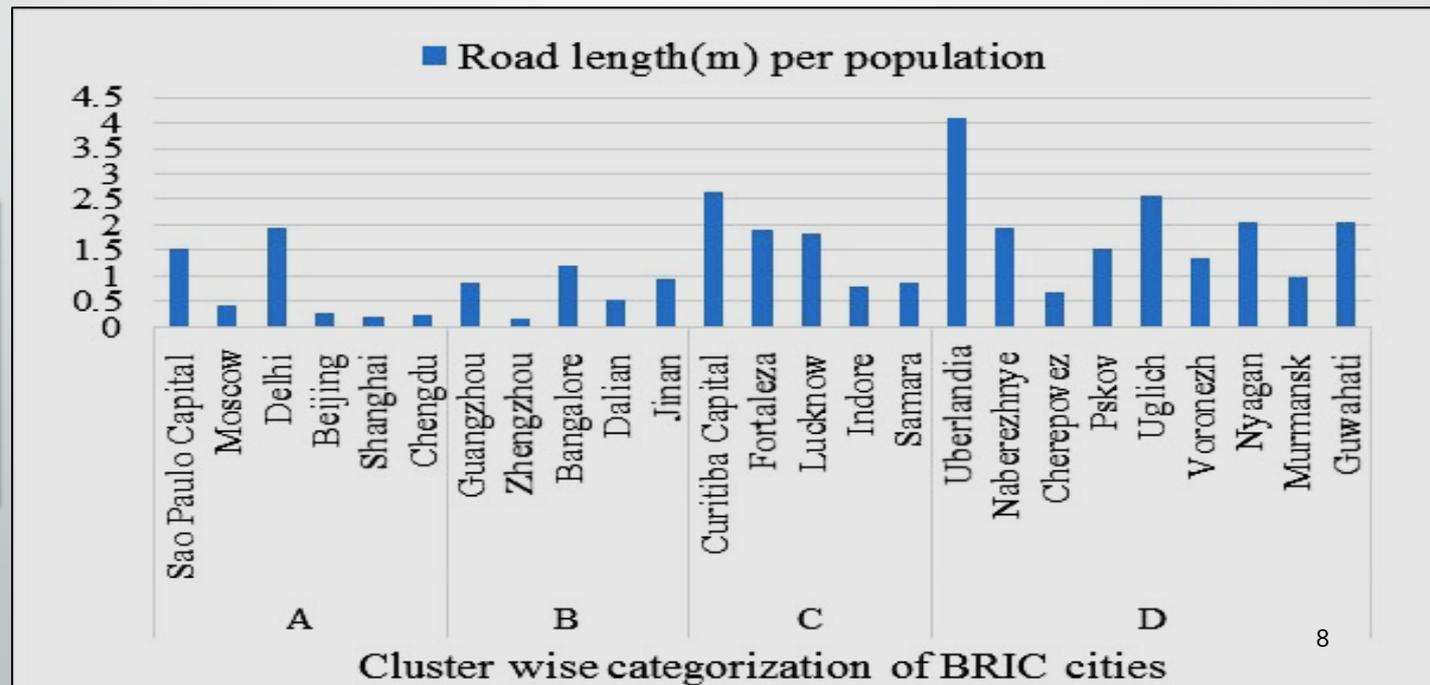


(Source: The Future of driving in Developing Countries, ifmo 2014)

India Vs other BRIC cities

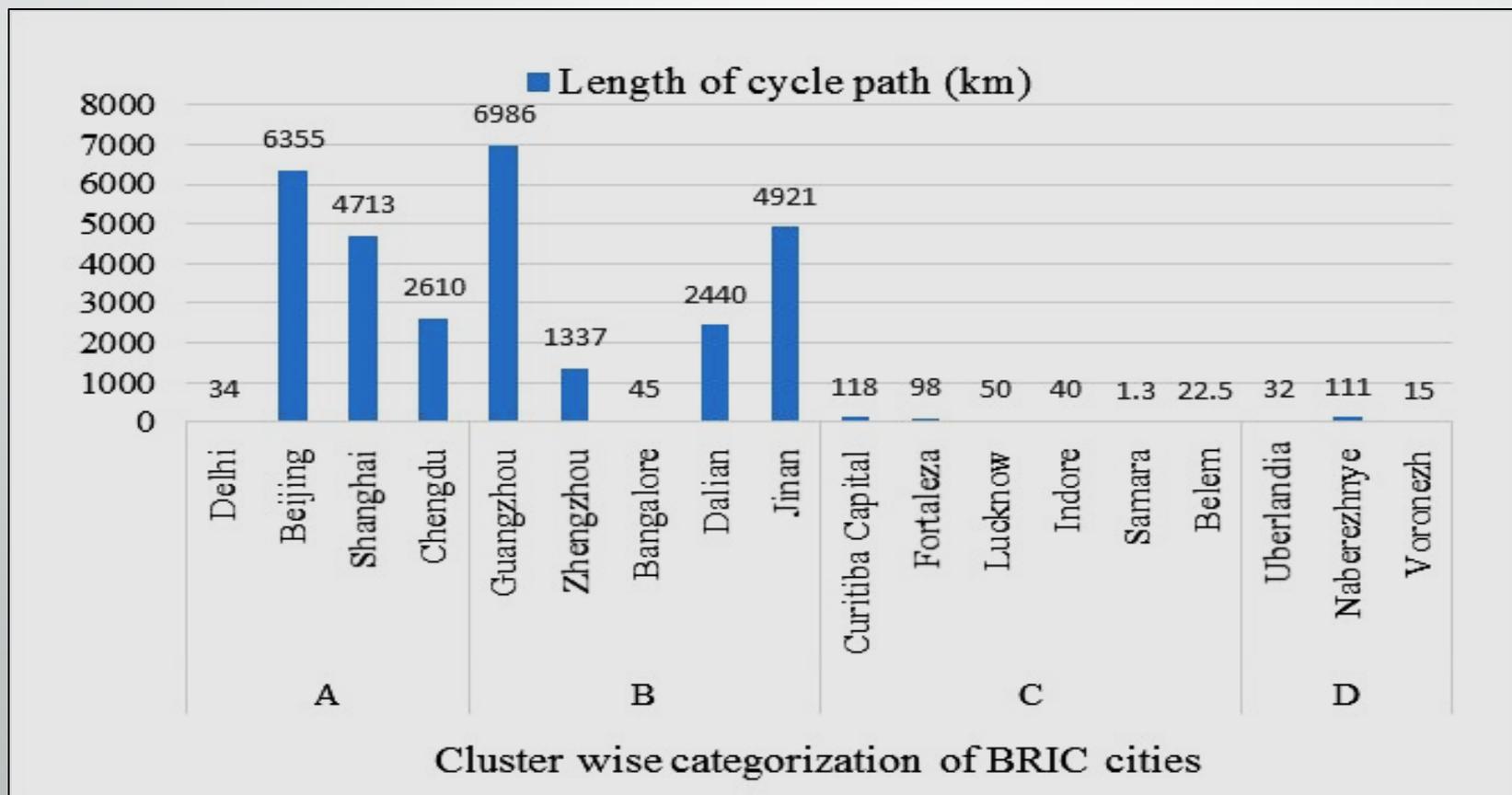
Country	Road Length Km
Brazil	1,581,181
China	4,106,387
India	4,690,342
Russia	1,094,000

Cluster	Population range
A	> 10 million
B	5-10 million
C	1-5 million
D	< 1 million



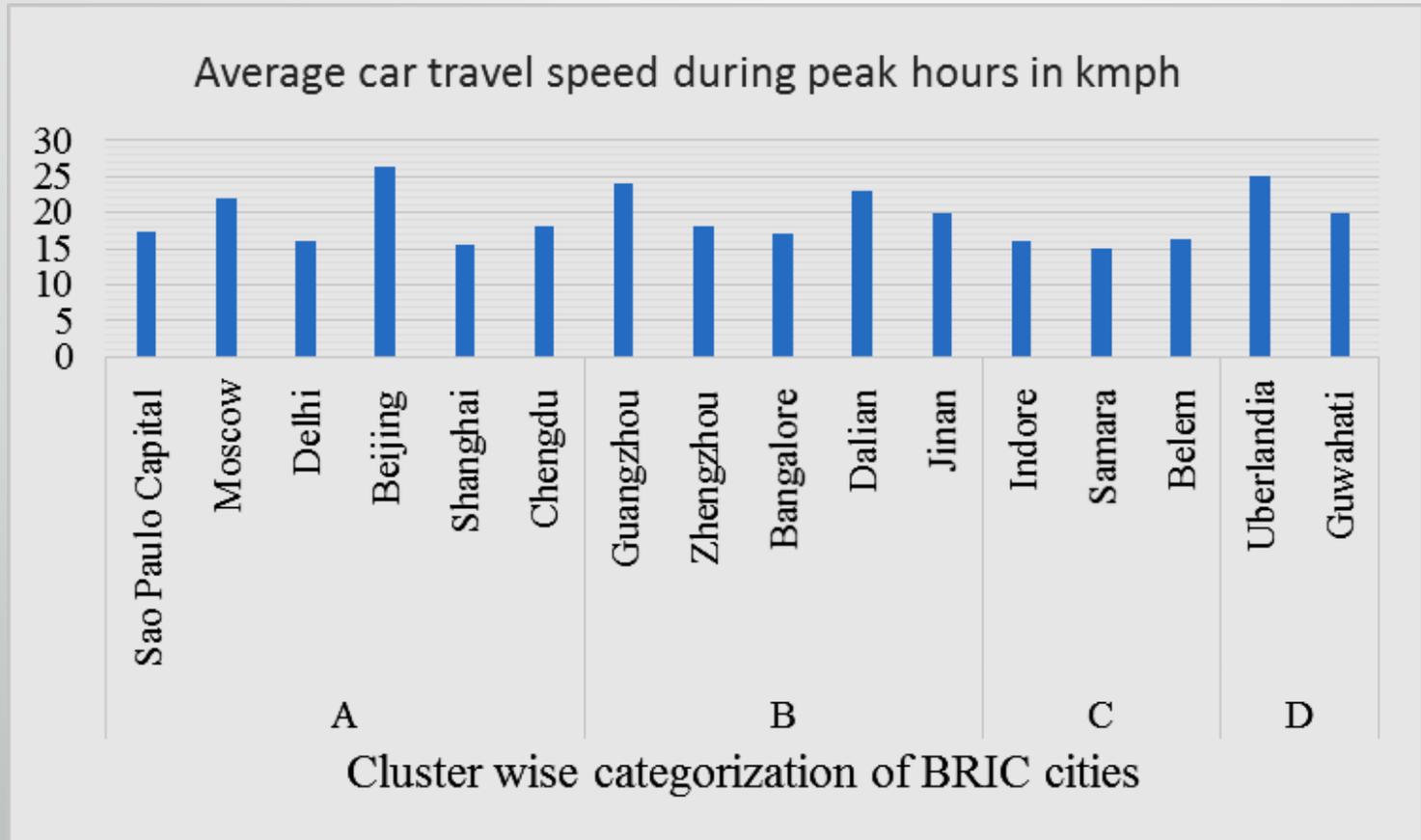
(Source: Verma et al.,2015.Urban mobility trends in BRIC)

Provision of NMT Infrastructure



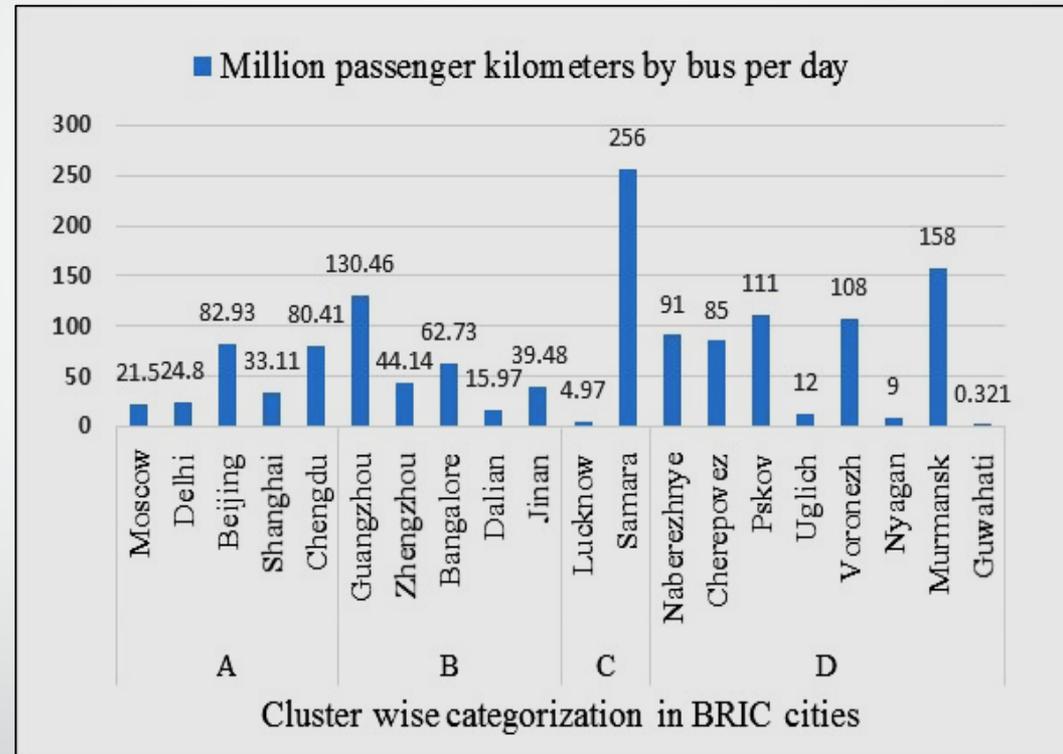
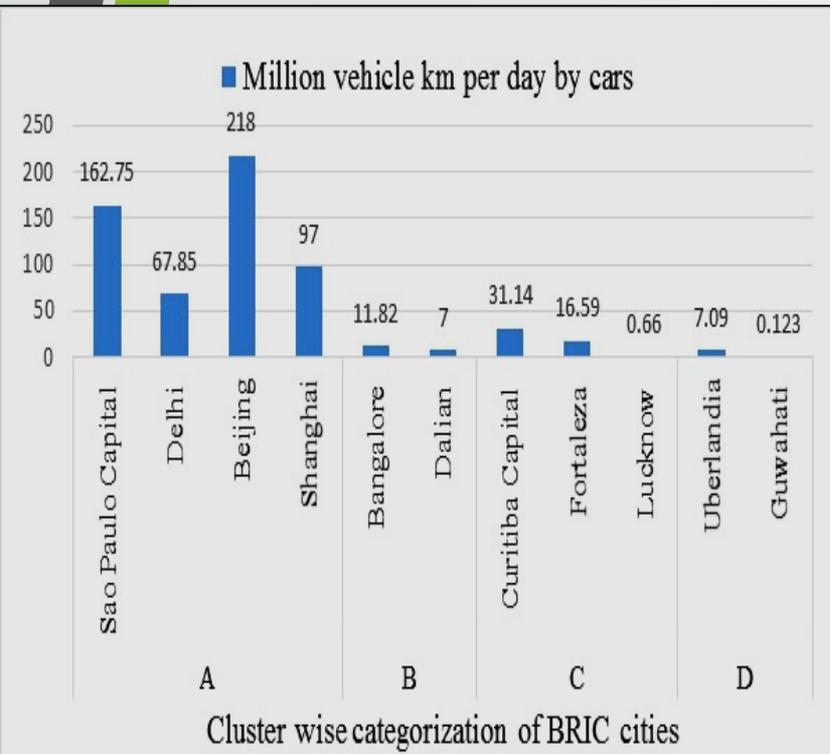
(Source: Verma et al.,2015.Urban mobility trends in BRIC.)

Congestion



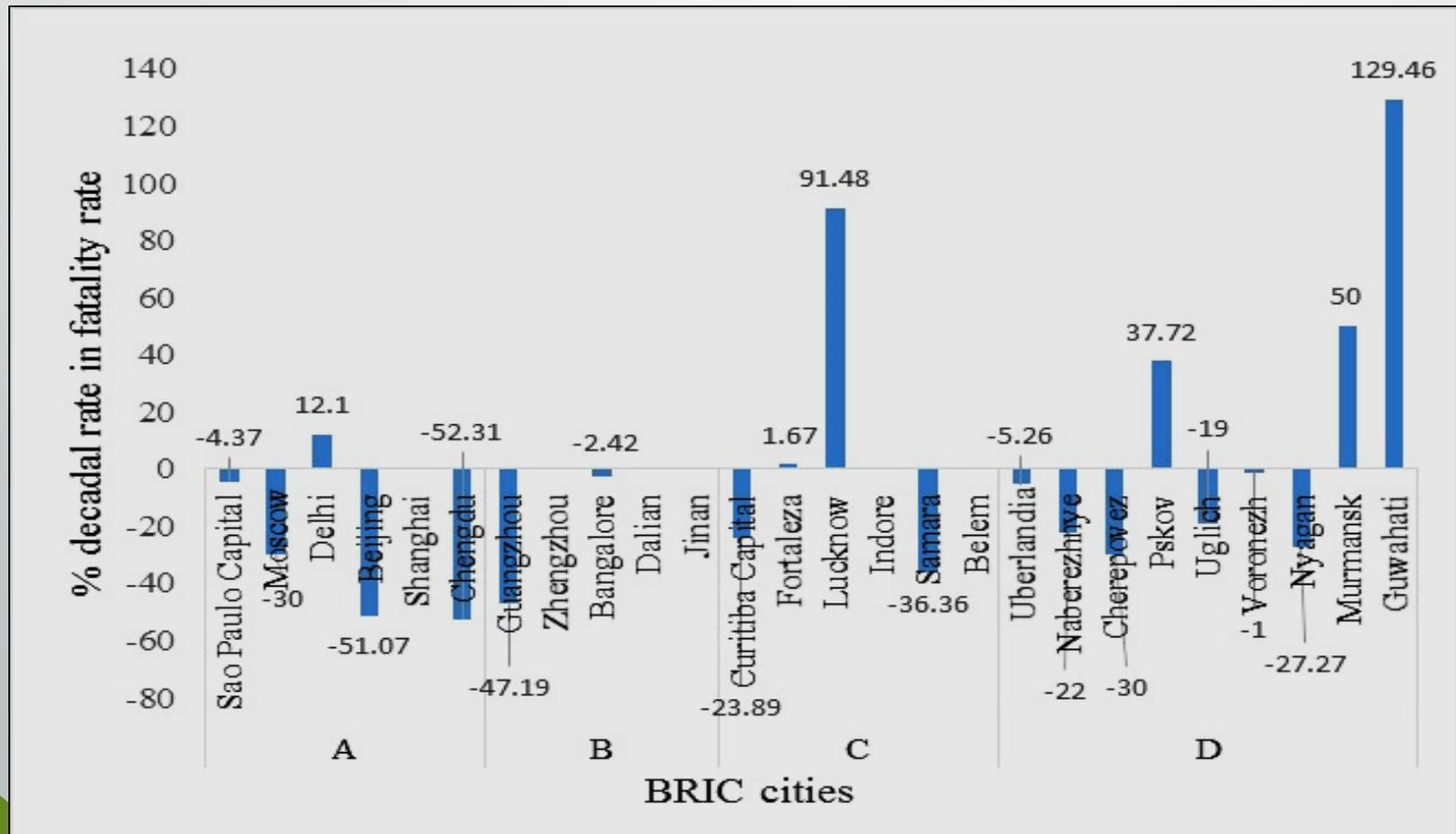
(Source: Verma et al.,2015.Urban mobility trends in BRIC)

Transport Demand



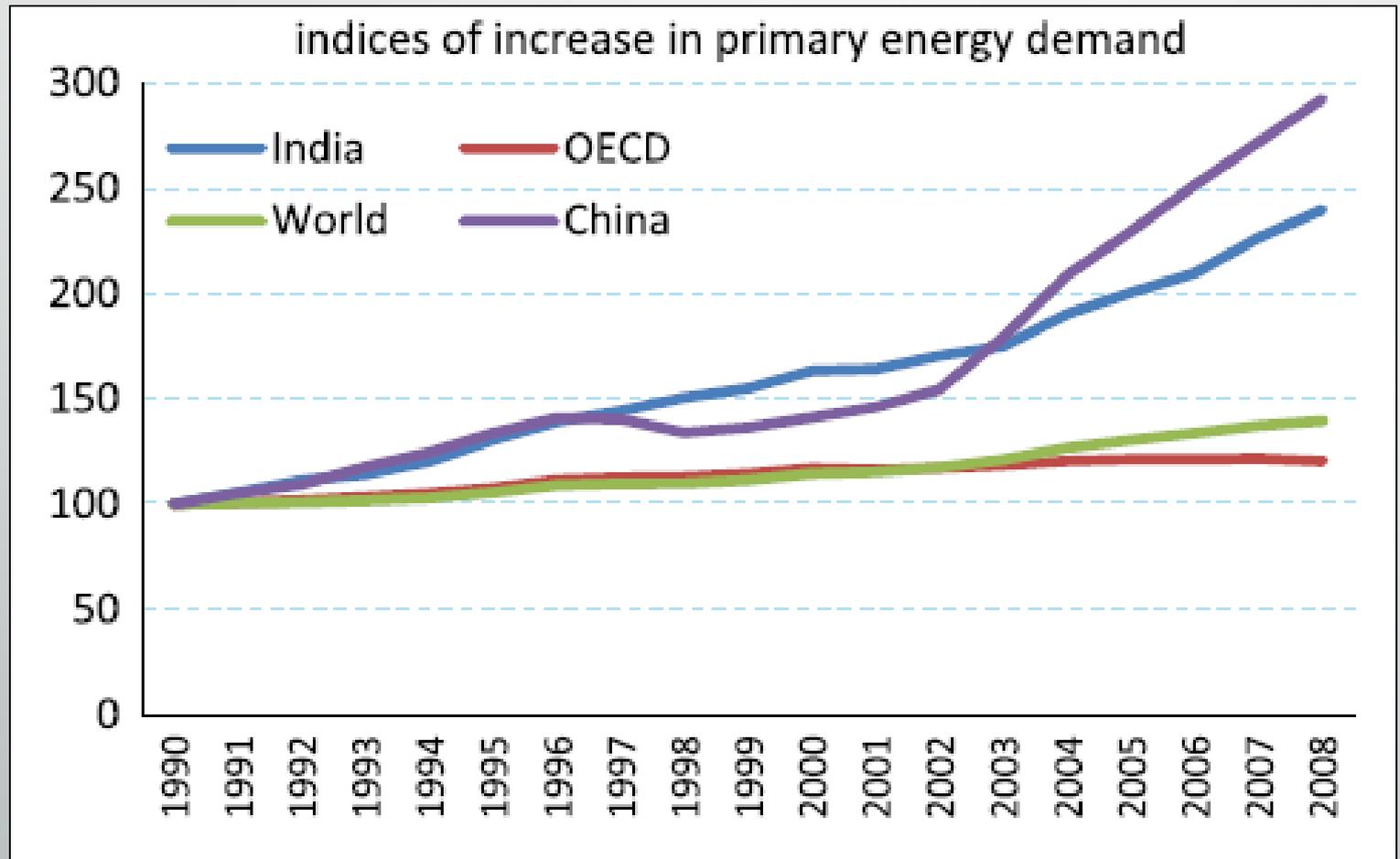
(Source: Verma et al.,2015.Urban mobility trends in BRIC.)

Road Fatality



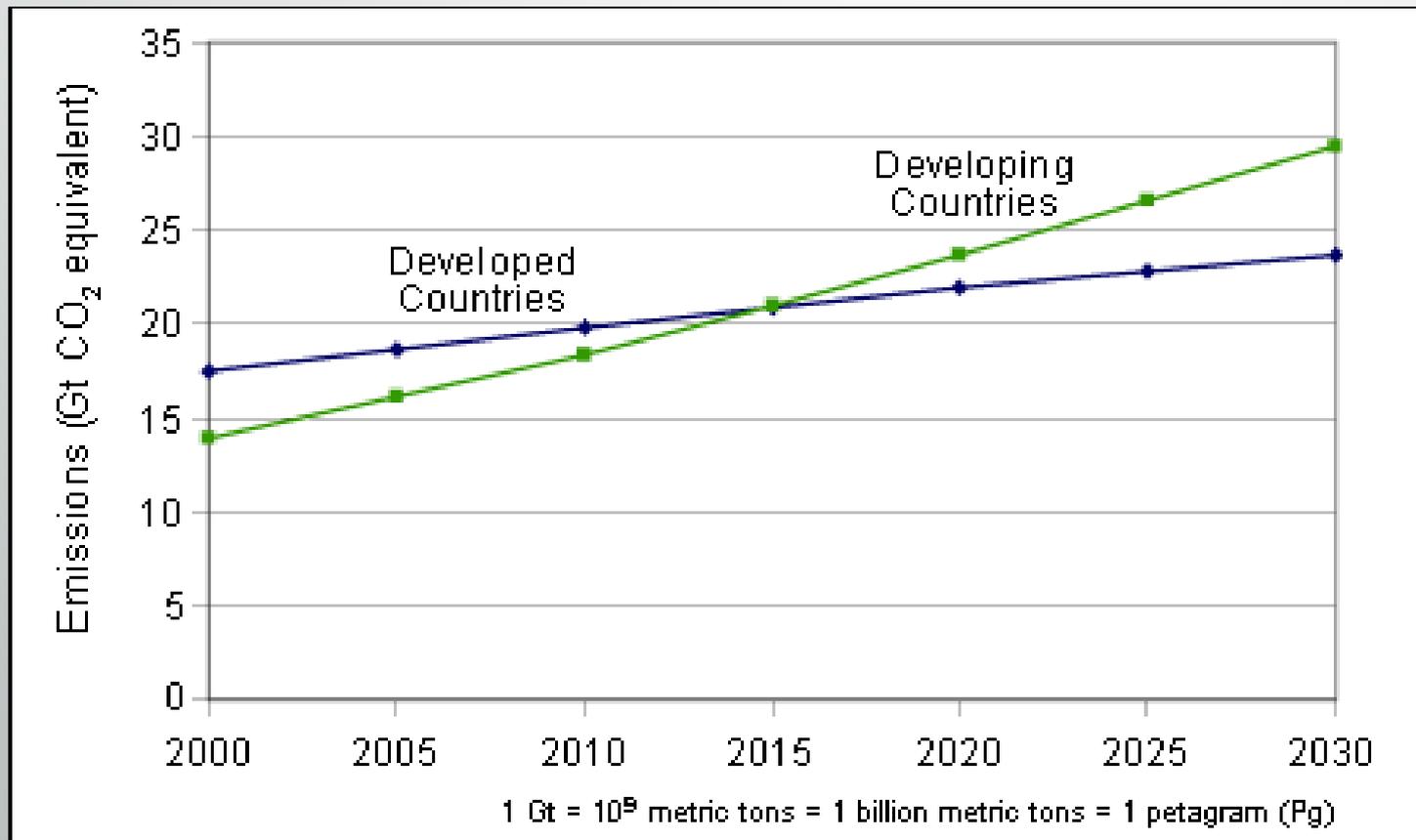
(Source: Verma et al., 2015. Urban mobility trends in BRIC.)

Fossil fuel consumption

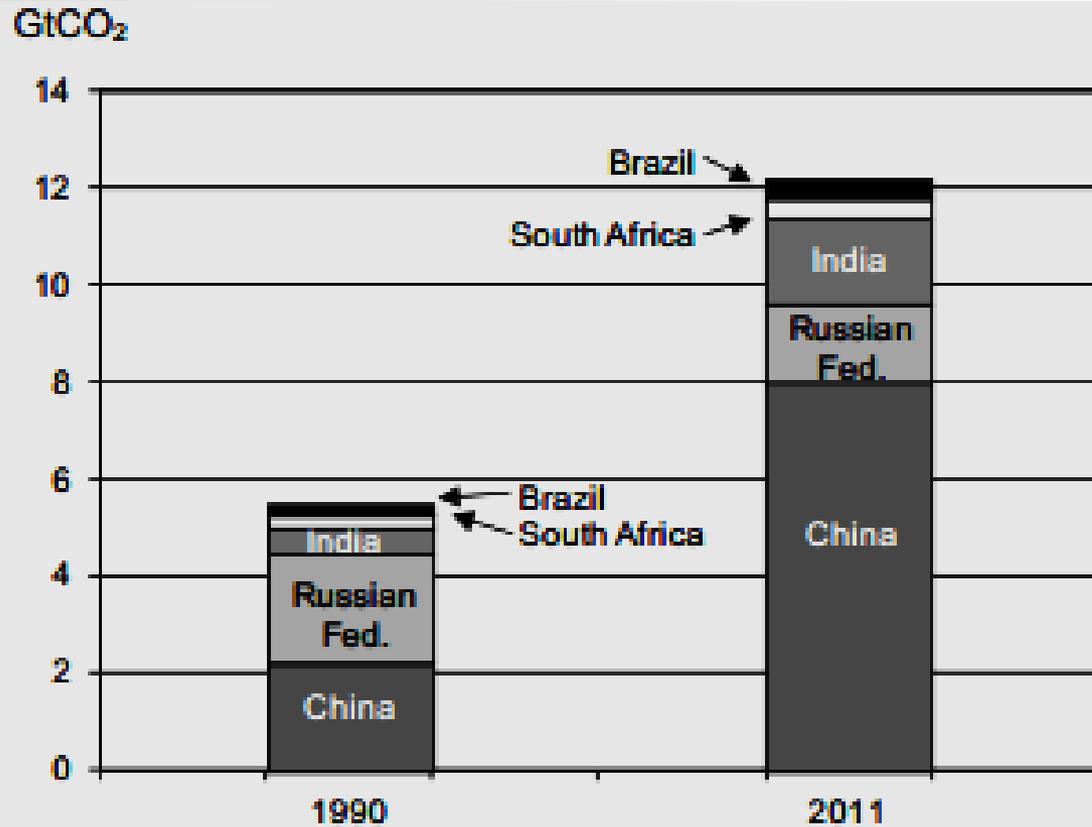


(Source: Li Jun, 2011. Decoupling urban transport from GHG emissions in Indian cities—A critical review and perspectives)

Carbon Dioxide Emissions For Developed And Developing Countries



Carbon Dioxide Emissions BRICS



With the exception of the Russian Federation, CO₂ emissions from the BRICS countries are increasing at a very fast pace.

(Source: IEA statistics, 2013)

Emissions

Country	Per capita CO ₂ emissions (Mt)
United states	17.6
Japan	19.2
Australia	16.9
UK	7.9
China	6.2
India	1.7
Bangladesh	0.4
Myanmar	0.2

(Source: World Bank, 2013
www.worldbank.org/en/news/feature/2013/08/19/coastal-cities-at-highest-risk-floods)

Vulnerability to Climate change

➤ In terms of the overall cost of damage, the cities at the greatest risk are:

- 1) Guangzhou,
- 2) Miami,
- 3) New York,
- 4) New Orleans,
- 5) Mumbai,
- 6) Nagoya,
- 7) Tampa,
- 8) Boston,
- 9) Shenzhen, and
- 10) Osaka

➤ Damage cost When measured as percentage of GDP :

- 1) Guangzhou
- 2) New Orleans;
- 3) Guayaquil, Ecuador;
- 4) Ho Chi Minh City;
- 5) Abidjan;
- 6) Zhanjing;
- 7) Mumbai;
- 8) Khulna, Bangladesh;
- 9) Palembang, Indonesia; and
- 10) Shenzhen.

Developing -
country cities
move up the list

Implications for Developing nation like India

- 53 million plus cities
- By 2030, around 40% of India's population will be living in urban areas.
- Number of personal vehicles per 1000 population projected to be 230 vehicles in 2020 which is a 90 % increase from what it was in 2012.
- 32 % of motor vehicles are in metropolitan cities alone, which constitute just around 11% of the total population.
- Estimated 5-fold increase in energy demand and carbon emissions in transport by 2020 relative to 2000 under the current trend.
- Increasing car mobility & decreasing mobility for pedestrians, cyclists, Public transport.



**Policy Interventions:
To build & learn from**

BEIJING: Area Differential Parking Pricing Policy

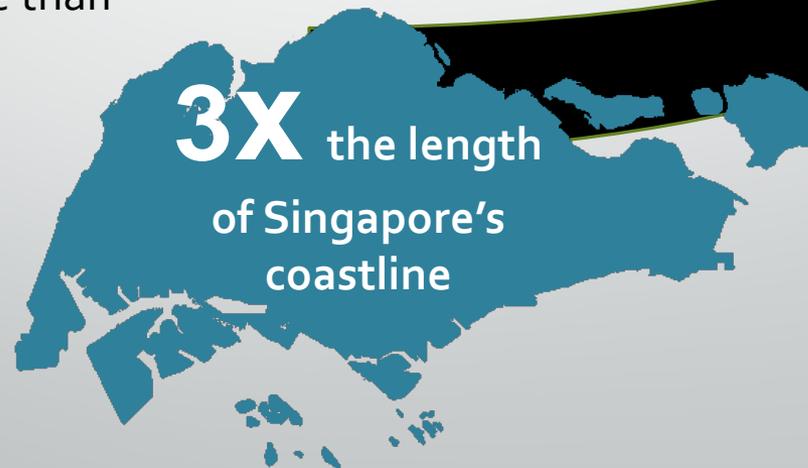
- 2% less vehicles parking in on-road parking spots and 19% less in off-road parking which helped free up spaces and reduce VKT as well as vehicle trips.
- This led to a 12% decrease in the monitored traffic flow around parking areas
- A survey of drivers found that 27% drove less or switched to another mode of transport.

- Revised Carbon Emissions-Based Vehicle Scheme (CEVS) to further encourage vehicle buyers to go for low carbon emission models.
- Cars with high carbon emissions equal to or more than 186g CO₂/km will incur a registration surcharge of between \$5,000 and \$30,000.
- Limited number of Certificate of Entitlement (COE) that are required for purchasing cars and are costly.
- At present 65% of commuters use public transport due to successful congestion charging system.

SINGAPORE :The future

More than **700 kms** of cycling paths by 2030

That's more than



- Environmental legislation passed in the mid-1990s emphasizing a preference for public transport and bicycles.
- Policy instruments:
 - Paid parking
 - Congestion charging
 - Bicycle infrastructure-transfer facilities
 - Road Safety Strategic Plan 2008-2020
- As of today 70% journeys made by bicycles.



CALIFORNIA

- In the 1960s, California had the worst air pollution in the world.
- Between 1968 to 2008, California reduced vehicular emissions of GHG by 75 - 90 per cent while its population increased by 100 per cent, the number of vehicles increased by 175 per cent and its diesel consumption as well as miles travelled increased by 225 per cent.
- Achieved through:
 - Fuel quality improvements & Refining
 - Stringent emission standards
 - Installation of fuel efficient devices in heavy duty vehicles.
 - CARB (California Air Resources Board) works with public, scientific institutions, local governments to find solutions to vehicular pollution problems.

The Road Ahead

Development choices to decouple economic growth from private motorization growth

A Multi-tier approach that includes comprehensive urban planning, improved policy making, effective economic instruments among others

Creating opportunities for cities to use existing transport infrastructure wisely, while generating funds to improve sustainable transport options

Developing cities such as India have a challenging opportunity to build a system in which public transport & NMT become the first choice for mobility.

Long run endeavor of 'Avoid-Shift-Improve' Approach to build resilient & sustainable cities.

Potential Role of Research & Scientific Community

- Collaborations on both technology front and policy solutions.
- Bringing researchers together to help reduce global problems of climate change, air pollution among others.

➤ **CLIMATRANS** (Indo-Norway Project on assessing policies for Climate change mitigation & adaptation for transport sector in Indian cities).

Joint Initiative by Institute of Transport Economics(Toi) Norway, Meteorological Institute Norway (MET), Indian Institute Of Science(IISc) Bangalore, Indian Institute Of Technology(IIT) Bombay, School of Planning & Architecture(SPA)Delhi, The Energy and Resources Institute(TERI), New Delhi. Ongoing since August 2014

Potential Role of Research & Scientific Community

➤ **Promoting Low Carbon Transport in India.**

Initiative by United Nations Environment Project (UNEP). Indian Institute of Management, Ahmedabad (IIM-A), Centre for Environmental Planning and Technology University (Cept) and Indian Institute of Technology Delhi (IIT-D) , Ministry of Environment ,Ministry of Urban Development, Govt.Of India to envision a carbon free transportation for the country in the year 2050

➤ **ICAMP (India-California Air Pollution Mitigation Program), 2014.**

Joint Initiative by The Energy and Resources Institute (TERI) India , University of California at San Diego (UCSD) & California Air Resources Board(CARB)



How most traffic engineers see your city



How cities should be designed



THANK YOU