Climate Change due to Globalisation through Urban Land Use and Transport Interactions

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How to utilise Merits for Developing Countries?

Population Growth by Urbanisation

If Passengers can (not) use Railways!

(Not) Smoother Freight Transport in Road Network

(No) Manufacturing Growth enjoying Low Labour Cost

Globalisation becomes Useful (Harmful)!
Slower Vehicle Ownership Growth can reach Higher GDP/capita!

Source: World Bank
Rapid Car Ownership Growth Spoils Manufacturing Growth!
Background factors

- Income divide
- Poor financing for infrastructure
- Loose control of land use

The Mechanism

Economic Growth/
Globalization

- Motorization
- Urbanization

- Car Ownership
- Urban sprawl

- Road Congestion

- Lack of Road supply
- Lack of Rail supply

- Delay in Airport Improvement
- Delay in Port improvement

- Lowering of Airport accessibility
- Lowering of Port accessibility

- Bottleneck of mobility divide

- Mobility divide
- Climate Change

International passenger demand

International freight demand

Economic Growth/
Globalization

- Lowering of economic growth

Negative Impacts

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School boy waiting a bus at 4:30 am in Suburb of Bangkok (1993)

Bangkok Post
4 Sept 1993
Slower than walkers in Sukunvit Rd., Bangkok
Neglected Railways in Bangkok

Photo by Hayashi (1994)
Car Ownership vs. Road Supply

![Graph showing car ownership vs. road supply for different cities over time. The graph plots road length per car (m/passenger car) against passenger car per 1000 persons. The cities shown are Nagoya, Tokyo, London, and Bangkok. The graph illustrates a trend for each city, with data points for 1970, 1980, 1990, and 2000. Nagoya shows a consistent decrease in road length per car over the years, while Bangkok shows a slight increase in the same period.](image-url)
Challenge of transportation and energy in the future

Figure 14: Vehicle Penetration as an Income Function, including China and India Projections to 2030

China's vehicle fleet is slated to grow from 37 million today to more than 370 million in 2030.

Source: Dargay, Gately and Sommer (University of Leeds)
Change in Built-up Areas

Tokyo

Nagoya

London

Bangkok

1910

1965

1985

0 50 km

Tokyo
max. 15,400

Nagoya
max. 17,100

London
max. 11,500

Bangkok
max. 42,200

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Change Population Pyramid
(Growth → Maturity → Shrink)

Germany

1900

1/1.4

1950

1/2.04

2000

1/2.13

2050

1/1.28

Japan

1/1.48

1/2.14

1/1.04

China

1/1.63

1/2.15

1/1.56

Korea

1/1.24

1/2.55

1/1.20
Change of Birth Rate

Reference: Earth Trends (World Resource Institute)
Change of Birth Rate

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