Competitiveness and trade: Infrastructure

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3-5 June 2009
ARTNeT GMS Capacity Building Workshop on Competitiveness Analysis
Hanoi, Viet Nam
Outline

- Infrastructure and competitiveness
- Asia’s infrastructure
- Asia’s trade
- Trade costs and infrastructure
- Transportation modal choice
- Soft infrastructure
- Regional cooperation in infrastructure
- Key points and policy implications
## Pillars of Competitiveness

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1.</td>
<td>Institutions</td>
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<tr>
<td>2.</td>
<td>Infrastructure</td>
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<tr>
<td>3.</td>
<td>Macroeconomic stability</td>
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<td>6.</td>
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<td>11.</td>
<td>Business sophistication</td>
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<td>12.</td>
<td>Innovation</td>
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# Global competitiveness rankings

## Overall global competitiveness index

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## Infrastructure subindex

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<td>United Arab Emirates</td>
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<td>Korea, Rep. of</td>
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<td>Iceland</td>
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<td>Taipei, China</td>
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<tr>
<td>20</td>
<td>Luxembourg</td>
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</table>

Observations

- 18 of top 20 countries in terms of infrastructure are also in the top 20 countries in terms of overall competitiveness
- 7 of top 10 countries in terms of infrastructure are also in the top 10 countries in terms of overall competitiveness
Regional Cooperation

Trade Costs

Trade Flows

Infrastructure

Regional Integration

Changes in Comparative Advantage
Role of infrastructure

- Essential driver of competitiveness
- Critical for ensuring effective functioning of the economy
- Facilitates connectivity and integration
- Includes transport, utilities, communication
Infrastructure indicators

- Paved road systems
- Rail lines
- Electrification
- Mobile telephony
- Internet usage
Apart from the People’s Republic of China, GMS countries have been lagging in efforts to improve their road networks.

Source: World Bank, World Development Indicators.
In Lao PDR, the population is growing at a much faster rate than the expansion in paved road networks.

Source: World Bank, World Development Indicators.
Railway systems and population
[rail lines (total route-km)/1,000 population]

GMS countries

Selected developed countries

Cambodia
China, People’s Rep. of
Myanmar
Thailand
Viet Nam

United States
Korea, Rep. of
Japan

Only in PRC is progress in railway systems evident.

Source: World Bank, World Development Indicators.
Electricity capacity per capita
[electricity production (kwh)/ 1,000 population]

Electricity production in Cambodia and Myanmar have lagged behind the other GMS countries.

Source: World Bank, World Development Indicators.
Mobile telephony and population
[mobile cellular subscriptions/1,000 population]

GMS countries

Selected developed countries

Mobile telephony conditions in Thailand are comparable to those in developed countries.

Source: World Bank, World Development Indicators.
Internet use and population

[Internet users/1,000 population]

GMS countries

Selected developed countries

Internet use has risen rapidly in PRC, Thailand, and Viet Nam.

Source: World Bank, World Development Indicators.
East Asian countries are generally above the average while South Asia as a whole is below the average.

Developing Asia’s Trade

Trade structure by destination (%)

- Trade with ROW
- Intraregional trade
- Trade with Japan
- Trade with EU
- Trade with NAFTA

Years:
- 1987-1991
- 1992-1997
- 1998-2002
- 2003-2007
Average annual growth rate of intra-regional export (1988-2007)

Bubble size indicates the value of intra-regional exports in 2007

Change in the world market share of intra-regional exports (1988-2007)

9.5%-world trade growth (1988-2007)

- Bubble size indicates the value of intra-regional exports in 2007.

- EU
- NAFTA
- MERCOSUR
- ASEAN
- East Asia

Trade in Developing Asia

- More than 40% of developing Asia’s exports are intraregional
- Most intraregional trade appears to be intra-industry as well (esp. electronics)
- Tripolar expansion of PRC, India and ASEAN expected to boost intraregional trade further
Trade in P&C in East Asia, 1990-2005

Source: UN COMTRADE
Note: East Asia here does not include Japan
Stylized facts

• Trade value falls rapidly over distance, but the relative cost of distant vs. proximate shipping is falling
• Trade is higher between adjacent countries, those sharing a common language, those with more migration
• Countries with “better” trade infrastructure and logistics trade more (not just transport, ICT important)
• Distance and diversification are increasing
What are Trade Costs?

• Broadly defined, trade costs include policy barriers (tariffs and nontariff barriers), transportation costs, local distribution costs, information costs, contract enforcement costs, and other border-related barriers such as language and currency conversion.
Variation in Trade Costs

- Trade costs vary widely across countries.
- On average, developing countries have significantly larger trade costs, by a factor of 2 or more in some important categories.
- Trade costs also vary widely across product lines, by factors of as much as 10 or more.
## Estimated ad valorem transportation costs in 2005

<table>
<thead>
<tr>
<th>Country</th>
<th>Cost (1000)</th>
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<tbody>
<tr>
<td>PRC</td>
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</tr>
<tr>
<td>India</td>
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<td>17.20</td>
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<td>Japan</td>
<td>10.40</td>
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<tr>
<td>Korea</td>
<td>14.90</td>
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<tr>
<td>Malaysia</td>
<td>18.40</td>
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<tr>
<td>Thailand</td>
<td>15.60</td>
</tr>
</tbody>
</table>

Source: De 2009
• Inland freight charges may be greater than ocean freight for Asia (esp. South and Central Asia)

• Railway construction crucial inland for bulk commodities

• Relative decline for air freight and insurance vis-à-vis ocean
• Changes in trade and competitiveness affect transportation service demand through:

  – Changes in weight/value

  – Demand for timeliness

  – Trade at the extensive margin

  – Production fragmentation
Infrastructure and Trade Costs

- Infrastructure reduces distribution margins
  - Lowers consumer prices and raises consumer welfare
  - Lowers transaction costs, raises value added, profitability, competitiveness
  - Expanded scope for domestic absorption and for supply to export markets
  - Expands links to global distribution networks
Infrastructure and Trade Costs (2)

- Nordas and Piermartini
  1. Direct Monetary Outlays
  2. Timeliness
  3. Risk of losses, insurance
  4. Market access limitations
Infrastructure and Trade Costs (3)

- Infrastructure can narrow the producer-purchaser price gap by reducing commercial distribution margins
- It can expand scope for domestic absorption and for supply to export markets
- Lowering trade costs by 10% with infrastructure can increase exports >20% (Limao and Venables 2001)
Infrastructure and Trade Costs (4)

- Lower marginal costs ➔ larger minimum efficient scale of production ➔ economies of scale ➔ greater competitiveness

- A country more deeply involved in global production networks will benefit more than one that is not.
Infrastructure, Trade Costs, and FDI

- Locational advantages closely linked to quality of infrastructure services
- Market and supplier access most important FDI factors, > production costs
- Service efficiency improvements equivalent to moving 1000’s of kms closer to trading partners
- Easing congestion costs
Technology and Changes in Trade Costs

- Faster transport (air shipping and faster ocean vessels) is equivalent to reducing tariffs on manufactured goods from 32% to 9% between 1950-1998 (Hummels 2001)
- Containerization in ocean transport changed the composition of freight rates, lowering the cost of distant relative to proximate travel (Hummels 1999)
Infrastructure influences both absolute and comparative advantage

- Mitigates limits in factor endowments
- Asia’s production fragmentation and trade in P&C
- Importance of timeliness and reliability of delivery
- Intraregional integration
Transportation modes

- Can be substitutes or complements
- Air- and seaports better with efficient rail and road connections
- Land transport about 7X more costly than sea
Asian Port Efficiency

- New harbor, wharf or terminal decreases port costs by 2%
- Procurement of a new crane decreases port costs by 1%
- Increasing # of berths and deepening channels at ports have less effect
Data source: Containerisation International Yearbook (2007) and data compiled by Dr. Jean-Paul Rodrigue.

Shares of port container traffic among regions (%)

- North America
- East Asia & Pacific (excl. North America)
- Latin America & Caribbean
- Europe
- South Asia
- Middle East & Africa

Notes: shares are calculated using the container traffic (TEU) of the top 100 ports for the period 1981-2000 and the top 50 ports for the period 2001-2005.

Data source: Shipping Statistics Yearbooks and Containerisation International Yearbooks.
Auxiliary Shipping Charges

- In a study of 7 Asian countries, De found:
  - 66% of total shipping costs was base ocean freight
  - 34% was auxiliary charges, such as duties and container handling charges
  - Covers peak season surcharge, congestion surcharge, bunker adjustment factor, yen appreciation surcharge, fuel adjustment factor, among others
Time Costs and Uncertainty

- Trade costs are reflected not only in direct monetary outlays, but also in indirect expenses such as time and uncertainties.
- US imports – one day in transit equivalent to 0.8% ad valorem tariff (20 days → 16% tariff equivalent for typical Asian export to US)
Importance of Time

- Each additional day spent in transport reduces the probability that the US will source from that country by 1-1.5%
- Relative declines over time in air shipping prices make time-savings less expensive → aggregate trade growth, growth in time-intensive forms of integration such as vertical specialization
Time costs and Air?

- Air prices are many times higher than ocean prices for the same good, but

- Air cargo is a rapidly growing share of trade
  - Ton-miles growing at 8.4% per year since 1975, faster than sea freight or total trade

- Reason: ocean shipping is slow and firms/consumers value timeliness
## Air Share in exports to USA

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<thead>
<tr>
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<th>1995</th>
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<td>PRC</td>
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<td>India</td>
<td>47.1</td>
<td>41.4</td>
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<td>Malaysia</td>
<td>48.2</td>
<td>71.6</td>
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<td>Philippines</td>
<td>44.8</td>
<td>48.0</td>
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<tr>
<td>Thailand</td>
<td>29.4</td>
<td>41.3</td>
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<td>Hong Kong, China</td>
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<td>Japan</td>
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<td>Singapore</td>
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<tr>
<td>Taipei, China</td>
<td>31.1</td>
<td>37.1</td>
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</tbody>
</table>

Source: Hummels forthcoming 2009
Shares of air freight among regions (%)

Data source: WDI (2008)
Why is air cargo growing?

- Rapid declines in air shipping costs
- Trade in high quality goods
  - Timeliness is a complementary input
  - Ad-valorem impact of air price is lower
- Consumer incomes and impatience (waiting is an inferior “good”)
- Growth in international production sharing (aka fragmentation, vertical specialization)
- Use of airplanes to hedge demand uncertainty
ICT Infrastructure

- Reduces times costs
  - Search and border costs
  - Costs of entering into, and monitoring, supply contracts
  - Time between perception of demand and supply response
  - Impacts trade of differentiated products more than homogeneous ones
Soft Infrastructure for Trade

- Predictable legal rights and procedures
- Enforceable and equitable competition policy
- Sound regulatory framework
- Long term, local currency bond markets
- Border clearance procedures
East Asian countries are generally above the average while South Asia as a whole is below the average.

East Asian countries are generally above the average while South Asia as a whole is below the average.

<table>
<thead>
<tr>
<th>Country</th>
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Regional Cooperation in Trade-related Infrastructure

- Externalities; Economies of scale

- Coordination can leverage impacts, boost competitiveness

- GMS special forums to coordinate transport, telecoms, electric power
Regional Cooperation in Trade-related Infrastructure (2)

- Cross-country economic corridors, hubs and gateways, including SEZs
- Special needs of landlocked economies
- Harmonization of soft infrastructure
Key Points

• Trade is growing, moving faster and farther, and growing lighter
• Asian exports expanding, reaching new markets with smaller shipments
• Infrastructure investment must adapt accordingly
• Emphasize speed, flexibility, information
Key Points (2)

- Asia, particularly East Asia, has high trade integration, mostly through trade in P&Cs;
- Asian economies have been important in world production networks, often involved at different stages in the assembly process;
- Cost of service links is very important in the process of integration, requiring superior infrastructure and logistics.
Key Points (3)

- Sequencing and complementarity of infrastructure investments closely related to industrial structure (and its dynamics)
- Infrastructure and logistics developing fast, but the needs are still large
- Regional Cooperation in development of trade and logistics infrastructure can boost regional integration, growth and development
Policy implications

- Infrastructure investment and trade facilitation needed to raise competitiveness, facilitate growth and development

- Improvements are evident, but more needs to be done to raise infrastructure standards

- Communications and electricity are starting to catch up with the developed world

- Transport infrastructure continues to lag
4 I’s for Investment

- Infrastructure
- Institutions
- Incentives
- Information
Thank you

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