International trade and freight by 2050

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Intergovernmental Organisation

- 57 member countries (23 non-OECD) focussing on transport
- A strategic think tank for global transport policy issues
- An annual summit of Ministers
Model framework

International trade projections

Centroids

Mode split

Weight model

Shortest path assignment to routes by mode

Model steps sequence

Outputs:

- 310 centroids, 20 products
- International trade by product in weight and tonne-km by origin-destination pair by mode
- Related CO₂ emissions by mode and region
- Travel time and delay by link and node

Underlying network model

Source: ITF International Freight model
OpenStreetMap, OpenFlights, Sea Project, UCL
What drives future trade?

- **Scale and distance**
  - Size of the economies
  - Distance (restrictions to trade, transportation technology, etc.)

- **Production factors**
  - Physical and human capital (natural resources, arable land, skills)
  - Changes in productivity

- **Transport policies**

- **Changes in global value chains**

- **Geopolitical forces**

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**Global trade elasticities have changed**

![Graph showing global trade elasticities](image)

Own calculations based on World Bank and OECD
Emerging economies still drive growth

GDP growth

% average annual rate


Emerging economies

World

Advanced economies

A growing share of trade between emerging economies

2012

Within OECD 47%

OECD with non-OECD 38%

Within non-OECD 15%

2050

Within OECD 25%

OECD with non-OECD 42%

Within non-OECD 33%
Emerging economies move to higher value-added activities – changing trade composition

Value-added shares by sector

Emerging economies move to higher value-added activities – changing trade composition

Global freight will more than quadruple by 2050
(by a factor of 4.3)
(trade value by a factor of 4.2)

Average hauling distance +17%

Increasing capacity constraints can hamper economic growth

Strong growth of CO₂ emission (+290%) undermines climate change goals

An unprecedented challenge
Global freight volumes and CO₂ emissions by corridor

- Intra-North America: +344% +263%
- North Atlantic route: +270% +191%
- Mediterranean and Caspian Sea: +280% +195%
- Intra-Asia: +344% +263%
- Intra-India: +263% +191%
- North Pacific route: +403% +332%
- Oceania: +274% +206%
- South Pacific route: +374% +273%
- Intra-South America: +406% +315%
- North Pacific route: +403% +332%
- South Atlantic route: +715% +689%
- Intra-Africa: +191% +332%
- Indian Ocean route: +374% +273%

Freight volume in billion tonne-km
CO₂ Emissions in million tonnes

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Domestic share of global freight

- 10% of international trade takes place within domestic borders

Domestic share of trade-related CO₂ emissions

- 10% of international trade takes place within domestic borders
- 30% of total trade-related CO₂ is emitted here
Aligning policies across supply chains

**Improve capacity management**

Many freight facilities are underutilised or managed at low efficiency level.

Focus on managing supply chains – not only nodes.

**Invest in missing links**

More alternative and multi-modal connections to increase efficiency.

Adapt infrastructure to more and bigger vessels.

Also at port-hinterland links.

**Prepare for mega-ships**

Adapt infrastructure to more and bigger vessels.

Also at port-hinterland links.

**Increase vehicle utilisation**

Improve load factors and reduce idle times across supply chains.

Prepare for mega-ships.