

The Flexible and Sustainable Port Network

Vessel Traffic Analysis



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Objectives

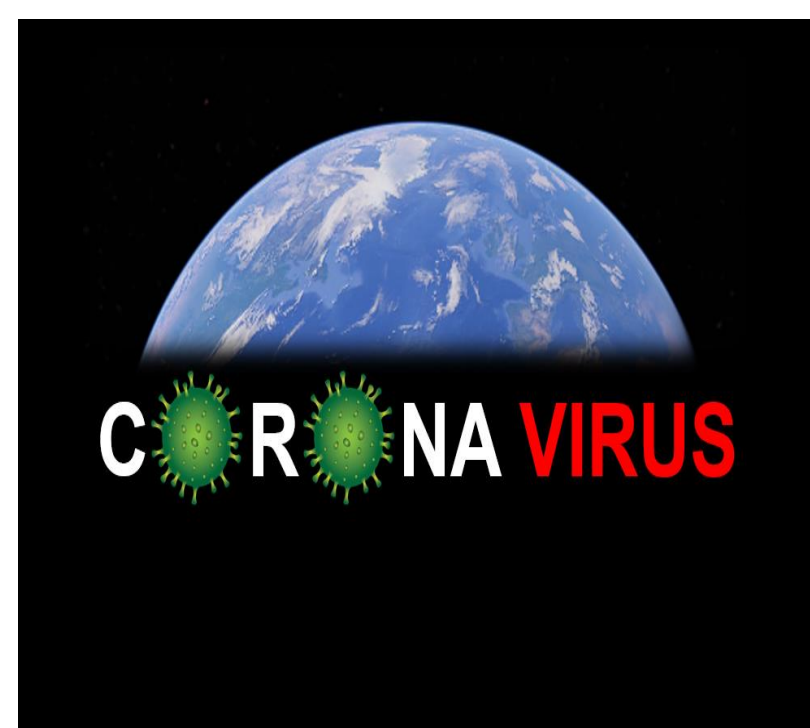
Flexible and Sustainable Port Development to ensure:

- Port operation under new or changing requirements (Port Flexibility),
- Economic growth in harmony with natural environment and responsible for surrounding community (Port Sustainability).

Introduction

Ports represent dynamic and complex engineering system due to their:

- Connection to the global trading network,
- Long design lifetime,
- Huge capital investments with a long payback period,
- Numerous stakeholders,
- Intricacy with society, environment, and economy.



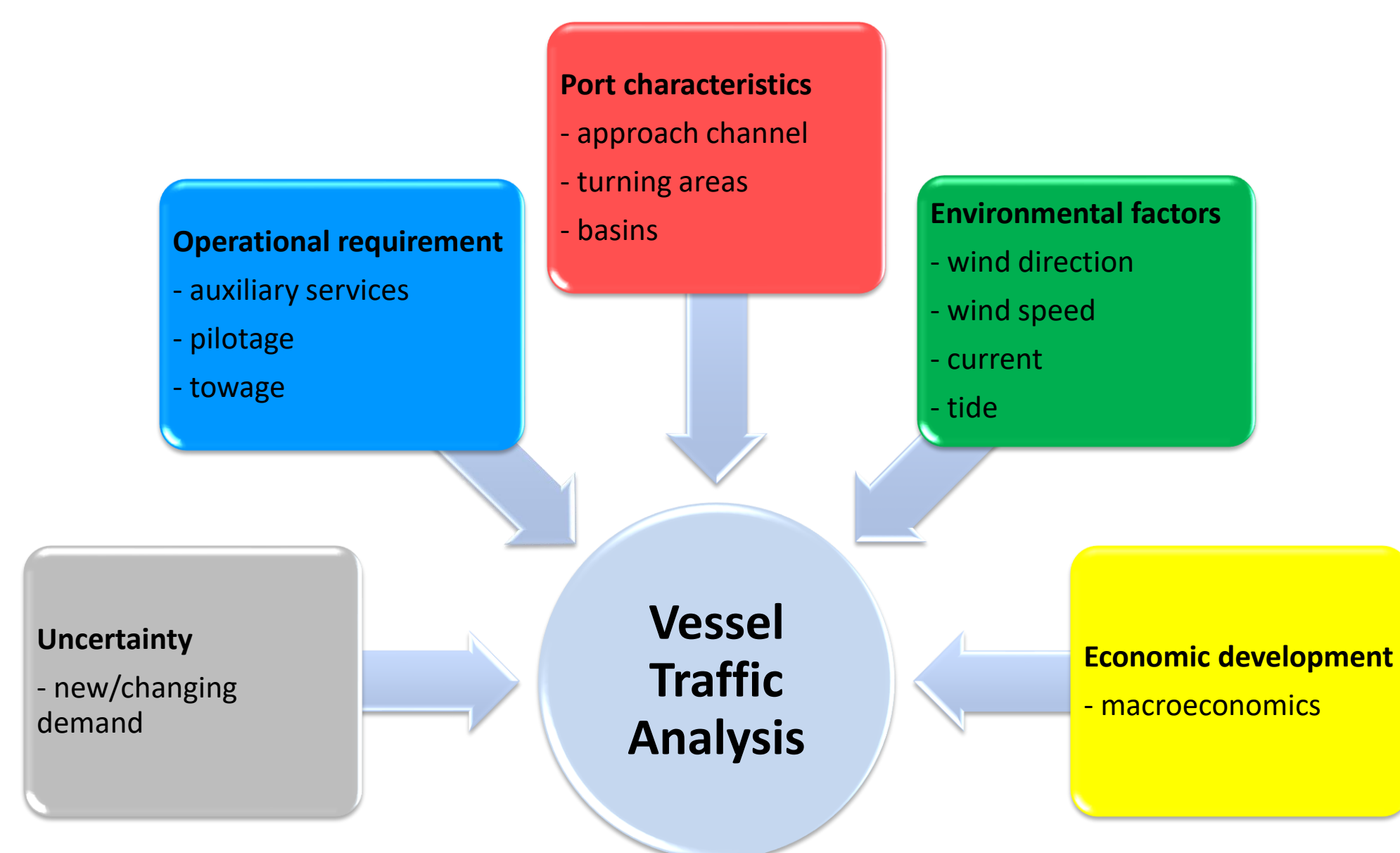
- Ports are developed under a high degree of uncertainty (e.g., new or changing demand, black-swan events)

- Vessel traffic has been significantly growing in ports all around the world due to world globalization and containerization. This growth has increased the number of port calls, and vessels' size. Shipping companies deploy large vessels to benefit from economies of scale, and a decrease in fuel consumption per unit during the voyage.

- Cruise sector has been growing faster than other segments of the travel industry. This growth has affected cruise ship fleets with a greater number of itineraries and larger vessel sizes. Cruise companies are increasingly looking for new destinations, diversified itineraries to unvisited, smaller, less-well-known, and less-frequented ports of call.

- Growth in industrial fisheries, sustainable aquaculture including fish farming, and further processing (e.g., packing, freezing) have affected fishing ports. These ports have been continuously developed to provide new infrastructure requirements of modern fishing vessel berthing, their off-loading facilities, repair and service of sophisticated equipment, and specialized terminal.

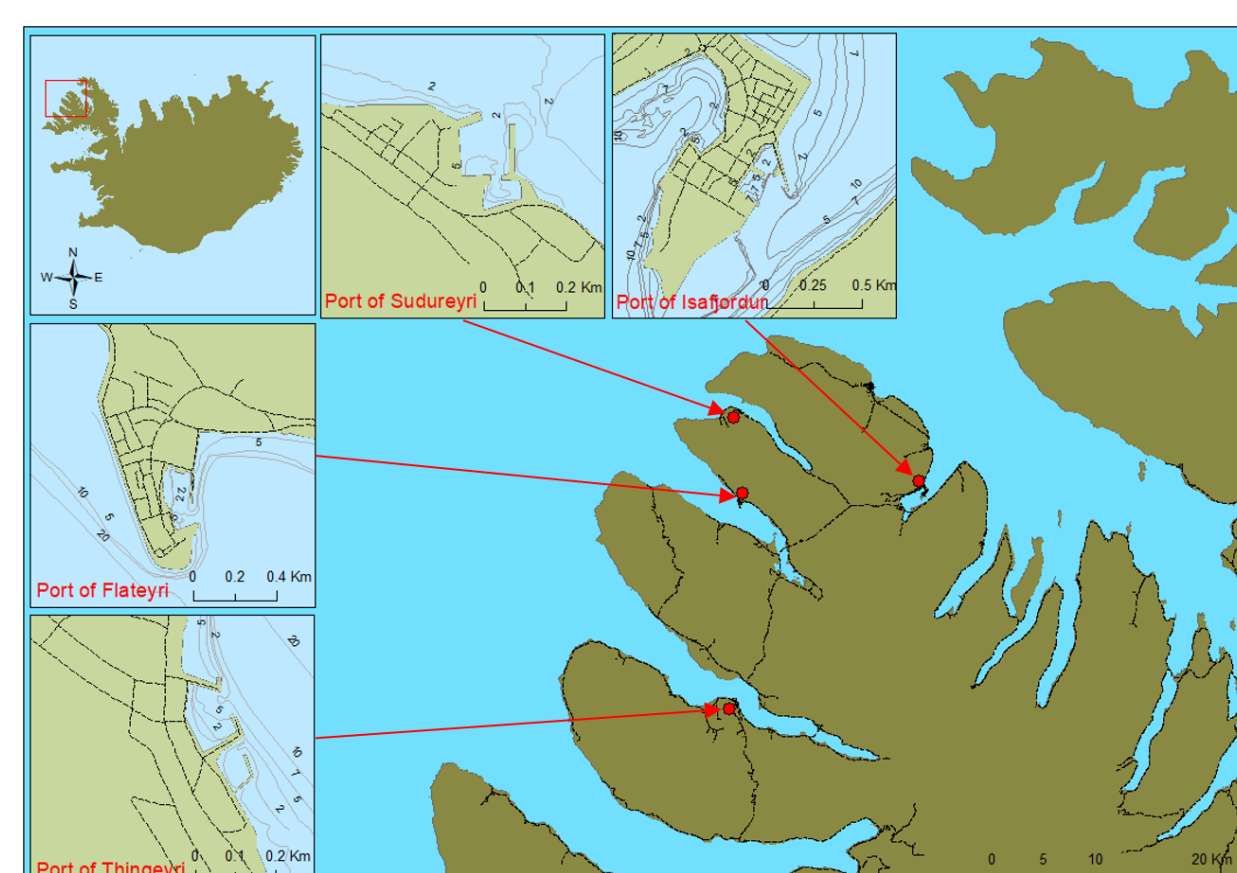
Methods



Study Area

Ports of Isafjordur Network:

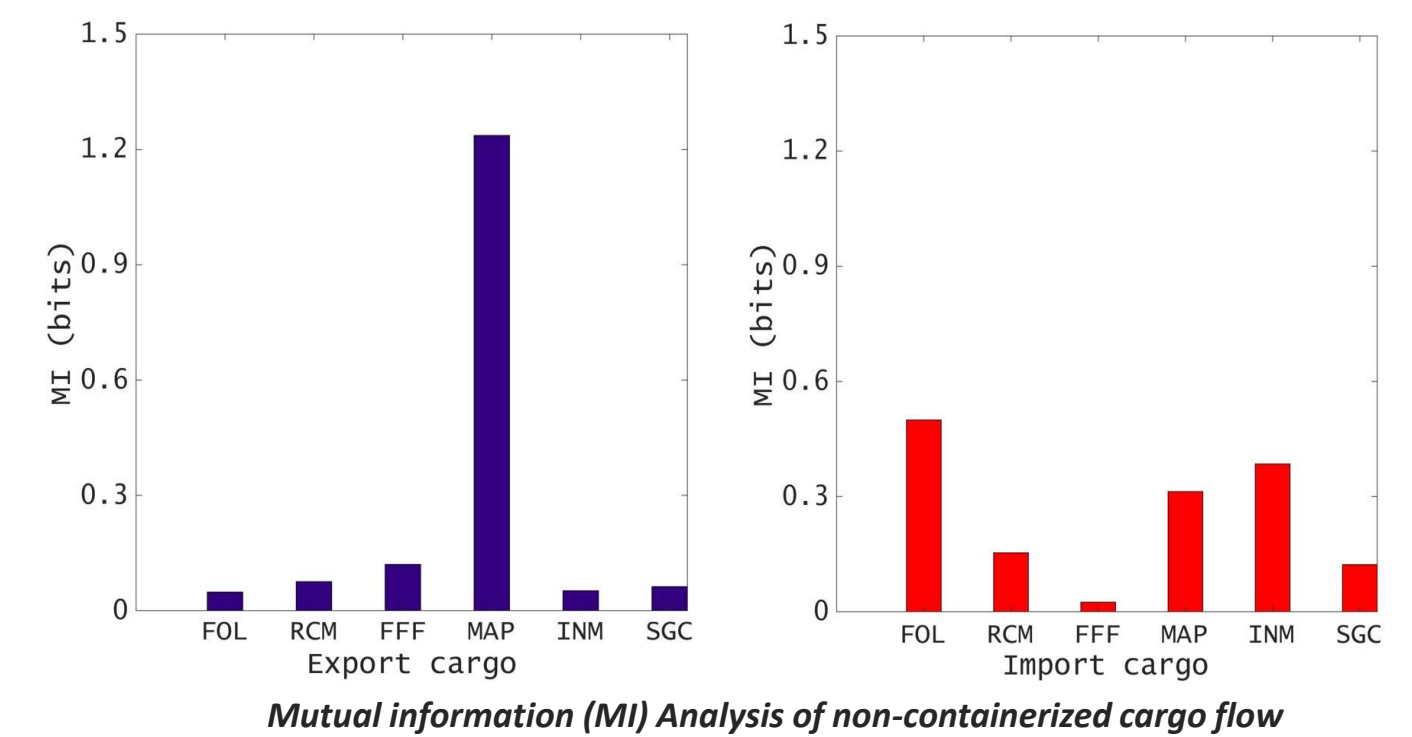
- Port of Ísafjörður
- Port of Suðureyri
- Port of Flateyri
- Port of Þingeyri



Data

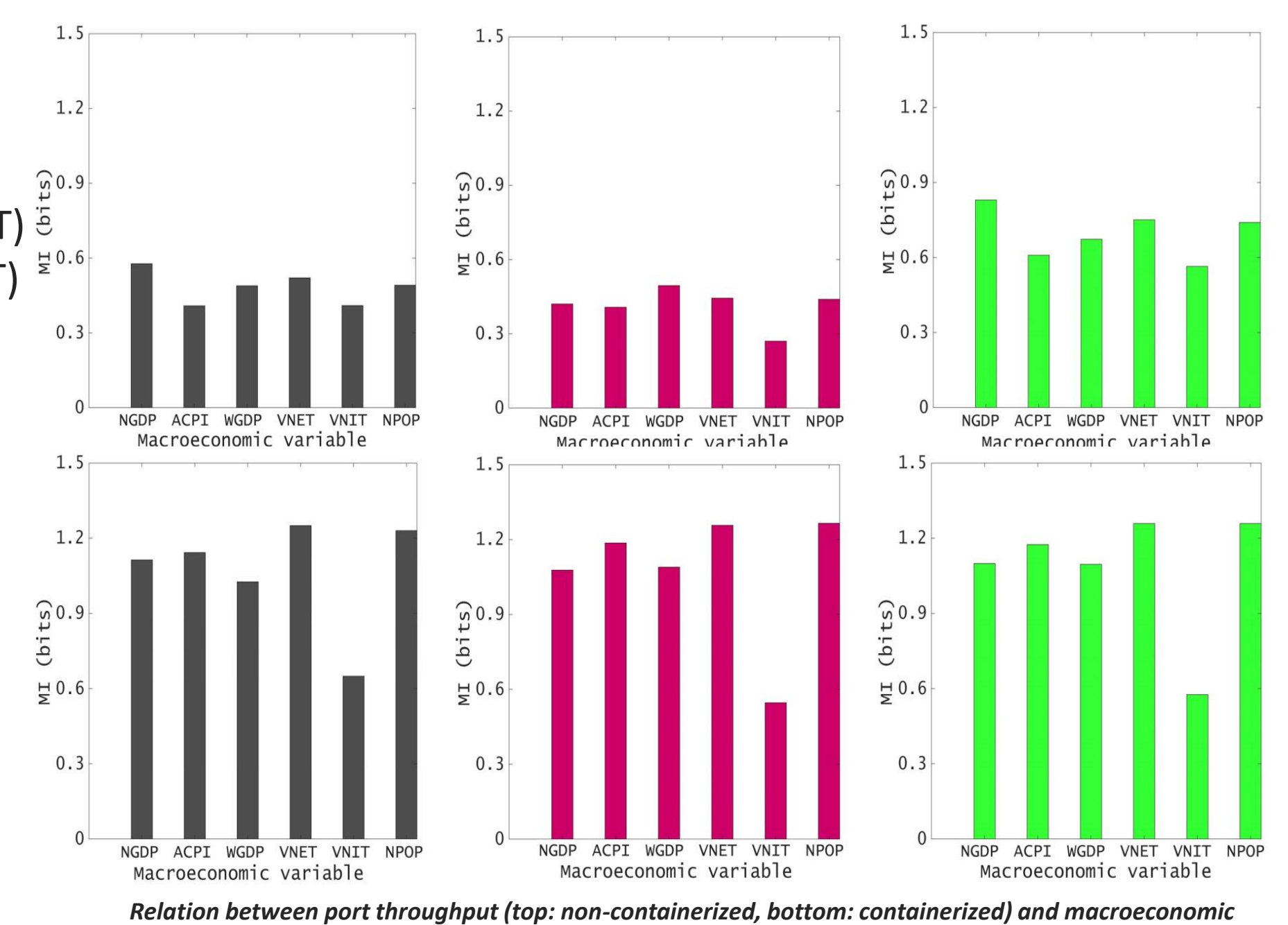
Non-Containerized Cargo

- Road Construction and Maintenance materials (RCM)
- Fuel Oil (FOL)
- Fertilizer and Fish Feed (FFF)
- Marine Products (MAP)
- Industrial Materials (INM)
- Small General Cargo (SGC)

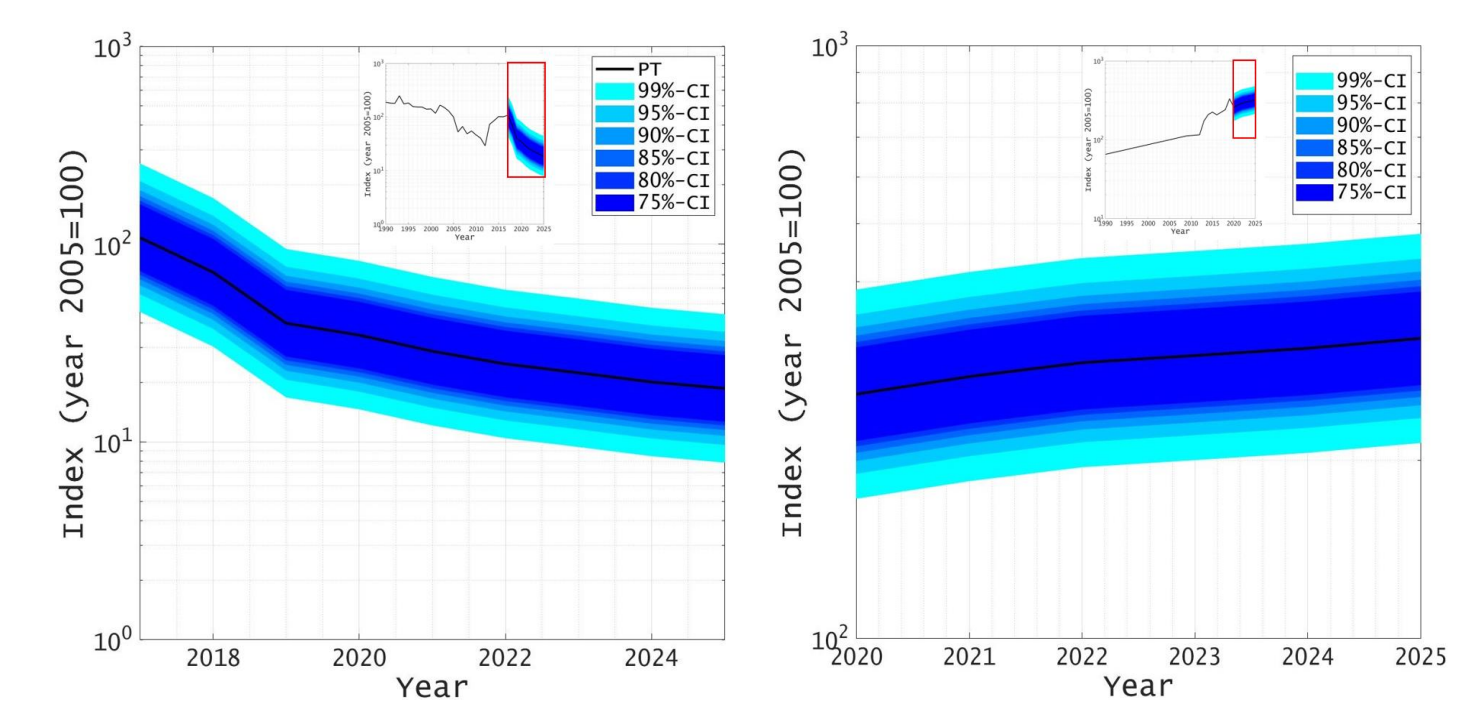


Microeconomic Variables

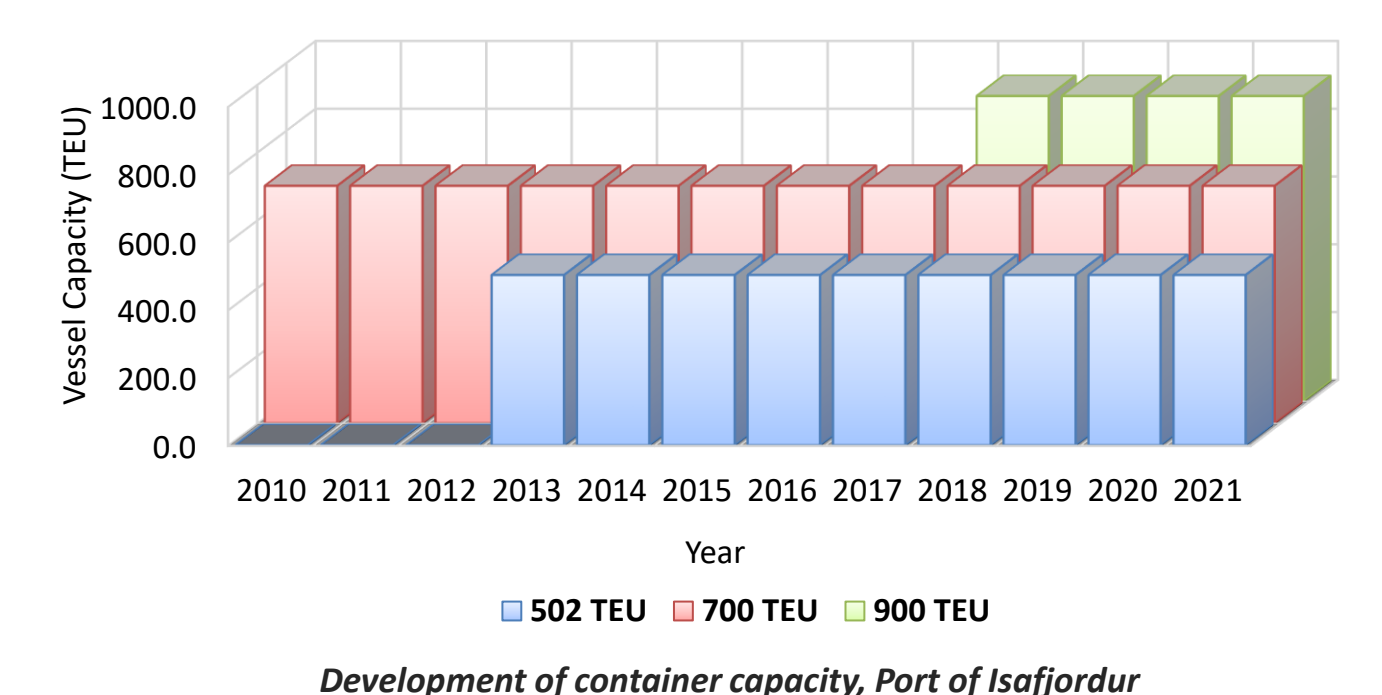
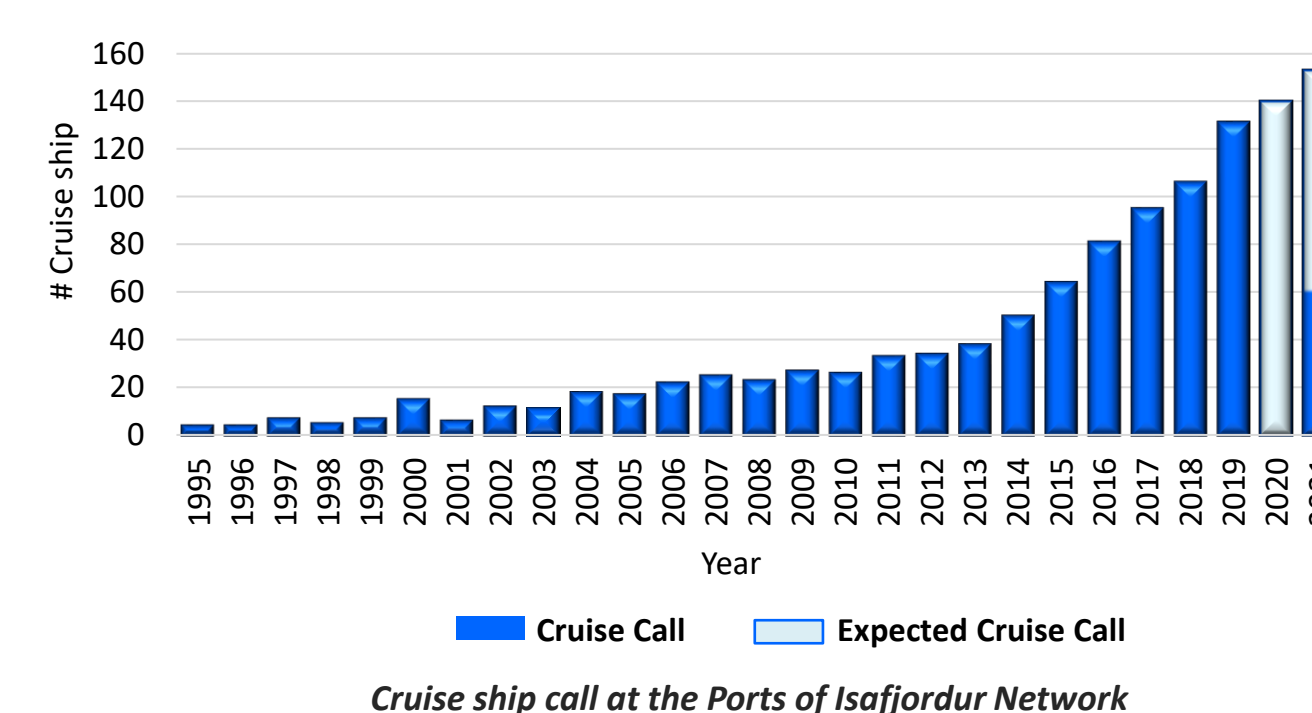
- National GDP (NGDP)
- Average yearly CPI (ACPI)
- World GDP (WGDP)
- Volume of national export trade (VNET)
- Volume of national import trade (VNIT)
- National population (NPOP)



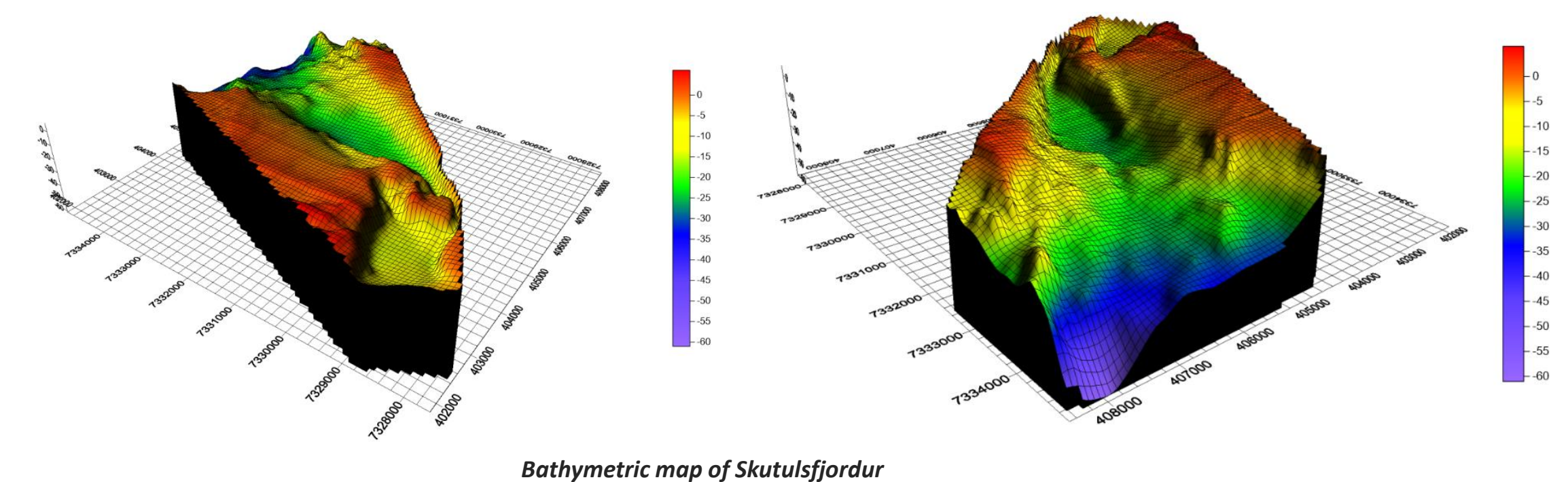
Port Throughput Forecast



Vessel Traffic



Access Channel



Concluding remark

- ✓ Vessel traffic analysis and forecast play a crucial role in port management (i.e., GHG emission mitigation, congestion management, recourse allocation, safe operation), and strategic port development.
- ✓ As vessels have changing and different sailing and operational requirements, port infrastructure and facilities should be flexible to accommodate various types of vessel at any time.
- ✓ Gradual increase in average 1- cruise ship size and call, and 2- container vessel capacity and sailing frequency, are expected in the future. The Port Authority, should be proactive and dynamic (instead of reactive and static) in planning and, in-time development used to satisfy growing demands.

Acknowledgements

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