Developing islands' passenger transport connectivity indices

Maria Lekakou, George Remoundos

UNIVERSITY OF THE AEGEAN

Department of Shipping Trade
& Transport
Department of Environment

RE.SHI.P

**Research in Shipping
and Ports Laboratory**

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The agenda

→ The Greek Coastal Shipping

→ Assesement of the maritime transport system

→ Defining the critical parameters for the assessment of the islands' connectivity

THE DEFINITION

Connectivity is the availability of transport that enables people and goods to reach a range of destinations at a reasonable generalized cost *in an accountable and accepted way.*

Our case: The Greek coastal shipping system

- serves a complex network of mainland-to-island, island-to-island and mainland-to-mainland connections (serves about 100 islands and includes 200 ports)

- ranks first among the EU Member States regarding the number of passengers traveling on domestic voyages (holding one third of the total EU annual capacity)

- consists of passenger (pax) and freight-passenger (ro-pax) vessels, mainland and island ports, and coastal (multilink) and ferry (single/short-link) lines

- is highly dependent on fuel prices, seasonality and tourism

- faces major ongoing uncertainties

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SCOPE: Assesement of the maritime system

The assessment of the maritime transport effectiveness may be based on:

◆ **a systematic measurement of critical key performance indicators (KPIs)**

◆ **a broad, continuous and representative consultation with users and stakeholders**

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Assessment of the maritime transport system

- **ACCESIBILITY**

- **AFFORDABILITY** **3 As**

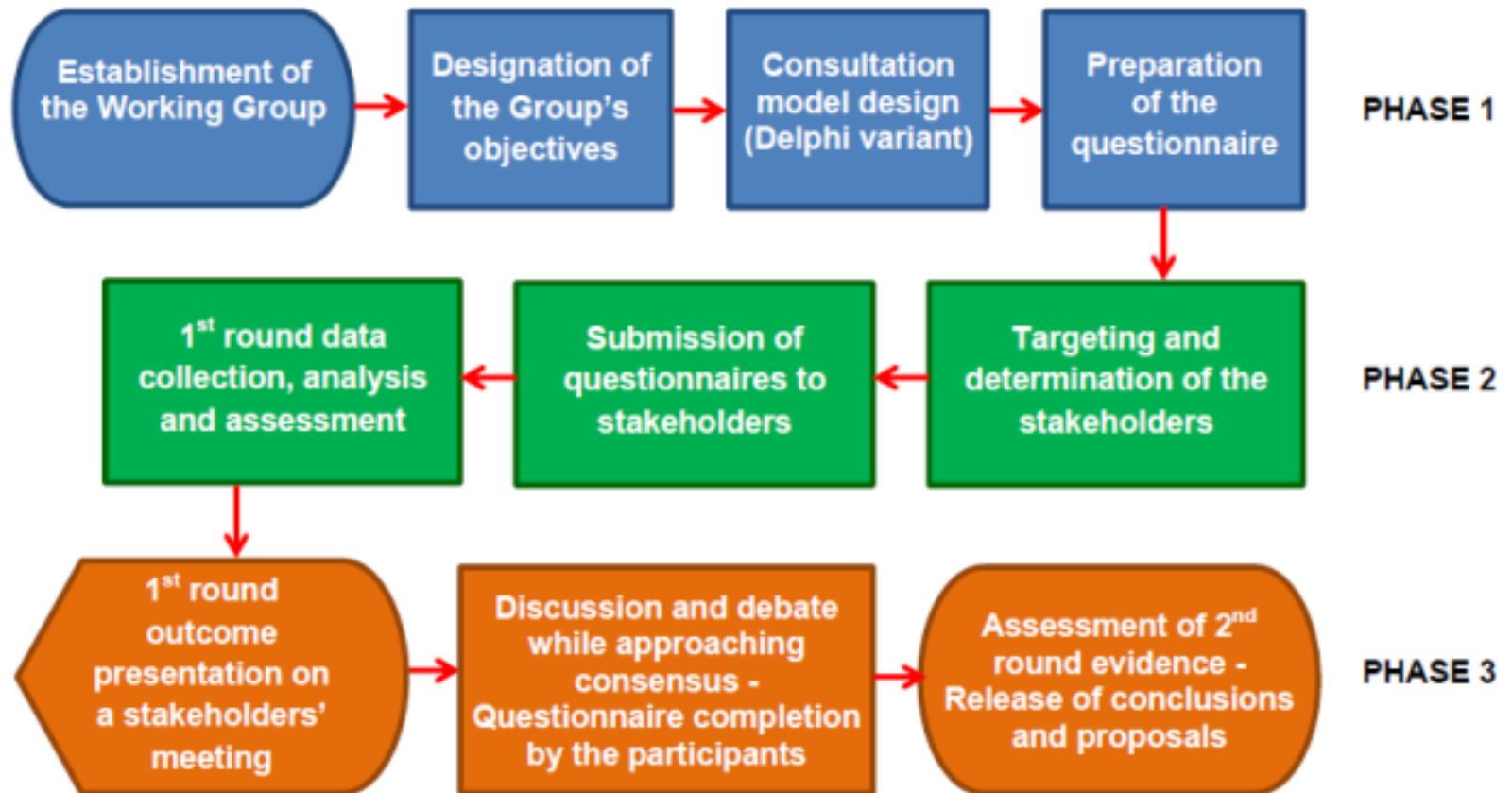- **ACCEPTABILITY**

3 ways of expressing transport users' VIEWS:

✓ **Usual tools of political lobbying**

✓ **Formal consultation procedures**

✓ **Informal participation exercises**

The participatory experiment for accessing islands maritime transport

Assesement of the maritime transport system

The consultation's recommendations:

1. Strategic issues

➢Reviewing and redesigning of the **minimum islands' connection** requirements as well as determining of an optimal islands' connections network

➢Examining and implementing joint **or multimodal transport systems** to and from the islands

➢Forming **joint ventures between port authorities and shipping companies**

➢Establishing a "**coastal shipping observatory"**

RECOMMENDATIONS (2)

2. Public service contracts system review

➢Reviewing of all subsidized lines concerning **connections between ports of the same island**

➢Reassessing of all lines serviced with **public service contracts which overlap the minima requirements** of the ferry network

➢Reconsidering of the relevant justification regarding the **determination of the annual compensation** of the subsidized lines

➢**Reducing or even removing of certain existing subsidized lines** of substantially high cost and low efficiency (mainly those calling to a big number of islands and lasting many hours or…days)

RECOMMENDATIONS (3)

3. Amendments of the statutory and legislative framework

➤Reconsidering of the **safe manning minimum requirements**

➤Removing the requirement for shipping companies to pay a fee for keeping **strategic oil reserves**

➤**Considering the ship size** in the relevant national legal framework regarding the sailing prohibition due to extreme weather conditions

➤**Enforcing mandatory early notice** of all ferry routes.

➤**Improving the process of payment of compensation** for the subsidized lines.

➤**Adopting unemployment benefits** to seamen

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RECOMMENDATIONS (4)

4. Elaboration of independent studies

➤A Study for the reconsideration of the **Minimum Island Connection Requirements** in order to determine the optimal Islands' Connections network (connectivity)

➤A Development of a **national transport strategy** for all transport modes and their combinations thereof for the entire country

➤**A 5-year horizon study for the transport system** (with emphasis on maritime and air domestic transportation)

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Assessment of the islands' connectivity

The actual (Ex Post) and the potential (Ex Ante) island's connectivity (ports' connectivity) is assessed through appropriate Key Performance Indicators (KPIs) for the measurement of specific criteria.
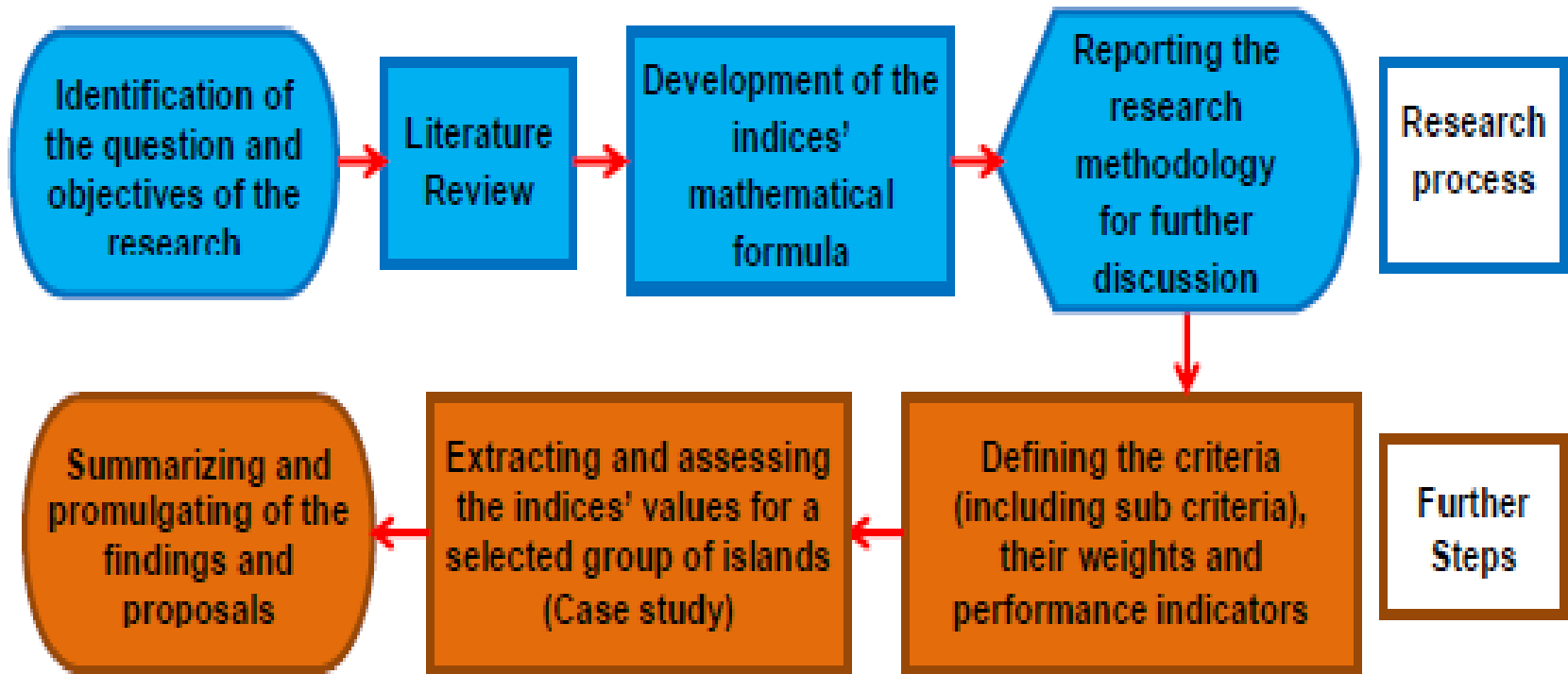
The islands' level of connectivity in terms of passenger ferry transportation may be primarily estimated according to the following main attributes:

➜ **Passenger ferry services**

➜ **Islands' transport potential**

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Building islands' connectivity index

The research process

Islands' connectivity indices

- Connectivity measurements, in terms of passenger transport have extensively been applied to **aviation**
- Maritime networks' connectivity, and especially ports and cargo **liner shipping, have been sufficiently studied,** but no significant attention has been paid to island's passenger ferry connectivity
- **The indicators that have already been developed are either just qualitative or quantitative** and usually derive as a function of selected but rather limited parameters
- **The islands**, mainly due to insularity, constitute a special case study regarding transport accessibility
- The measurement of islands' connectivity level with respect to their transport needs, through the development of appropriate indices, would be, except for an innovative scientific approach, a useful and necessary **decision making tool** both for the regulators and the operators

islands' connectivity INDEX

Islands' Connectivity: $IC = P * u(g)$

P = is the sum of the total number of the passenger transport **capacity provided through the port(s) and airport(s)** of an island

u(g), is the qualitative additive value function (**performance indicator**) of the transport services criteria g

$$u(g) = \sum_{i=1}^{n} p_i * \sum_{j=1}^{m} p_{ij} * u_{ij}(g_{ij})$$ N * v(f)

N = is the size of the **island's population** (in case of winter **season**), or the gross sum of the island's population plus the total available beds in all the island's tourist accommodation establishments (in case of summer season)

v(f), is the qualitative additive value function (performance indicator) of the transport potential of an island related to the islands' transport needs criteria f

Island Connectivity Index: $ICI = IC / IC_{max}$
Island Transport Potential Index: $IPI = IP / IP_{max}$
Island Connectivity Adequacy Index: $ICAI = ICI / IPI$

Islands' connectivity INDEX

Passenger Ferry Services' INDEX criteria and sub criteria:

Criteria g_i	Sub criteria g_{ij}
FINANCIAL COST	Fare cost - Cost for accessing port - Cost for "on board" services
TIME	Trip duration - Consistency of timetables - Access time to ports
ACCESSIBILITY	Number of itineraries - Frequency of itineraries, Number of transits - Number of interconnected destinations
QUALITY OF SERVICES	Ship's accommodation - On board services - Information services - Ticket purchase facilities
SOCIAL COST	Ships' environmental performance - Ships' age - Corporate social responsibility of passenger ferries' operators

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Assessment of the islands' connectivity

Islands' Transport Potential main criteria and sub criteria:

Criteria f_i	Sub criteria f_{ij}
DEVELOPMENT	Per capita income - (Un)employment rate - Entrepreneurship rate
TOURISTIC ATTRACTIVENESS	Interest for visiting - Availability of cultural sites, touristic areas and resorts - Multitude of cultural, athletic and touristic events and activities - Availability of hosting, catering and entertainment services
INFRASTRUCTURE	Adequacy of ports - Internal transport system - Existence of airport - Public services
LOCATION	Remoteness and isolation - National interests

Assessment of the islands' connectivity

Further research:

✓Assessment of the criteria and sub **criteria weights** (AHP)

✓Determination of the most applicable indices for the **estimation of the criteria** (and sub criteria) performance indicators

✓Measurement of the connectivity indices of a group of Greek Islands (**case study**)

✓Developing a **decision making algorithm** regarding the allocation of subsidies to the islands' transport means, based on a systematic data collection and evaluation of the islands' connectivity indices.

...Keep Ithaka always in your mind.
Arriving there is what you are destined for...
[C.P. Cavafy, Ithaka]

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