Governing multimodal transport and integrated hubs in rural areas

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Background

Rural area experience declining accessibility of services because of two major reasons:

1. Efforts to achieve economies of scale lead to spatial concentration of amenities in regional (sub)centres. This shift increases travel distances for rural residents to access daily activities. Public transport options have limited economic viability due to limited and dispersed demand.
2. Inadequate public service contributes to car dependency, which may marginalise individuals who lack access to private vehicles (e.g., low-income households, students, and people with mobility impairments).

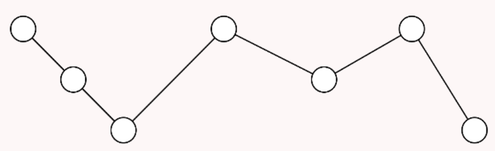
Aim and scope of study

- *The objective of this study is to analyse the enabling conditions for effective governance of multimodal integration in low-density areas.*

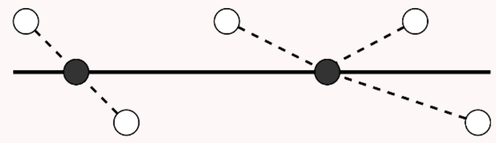
- This study focused on **integrated hubs** and **multimodal transport** applying the trunk/feeder model of transport networks (see Figure at the right)

Transport networks

Direct/linear routing



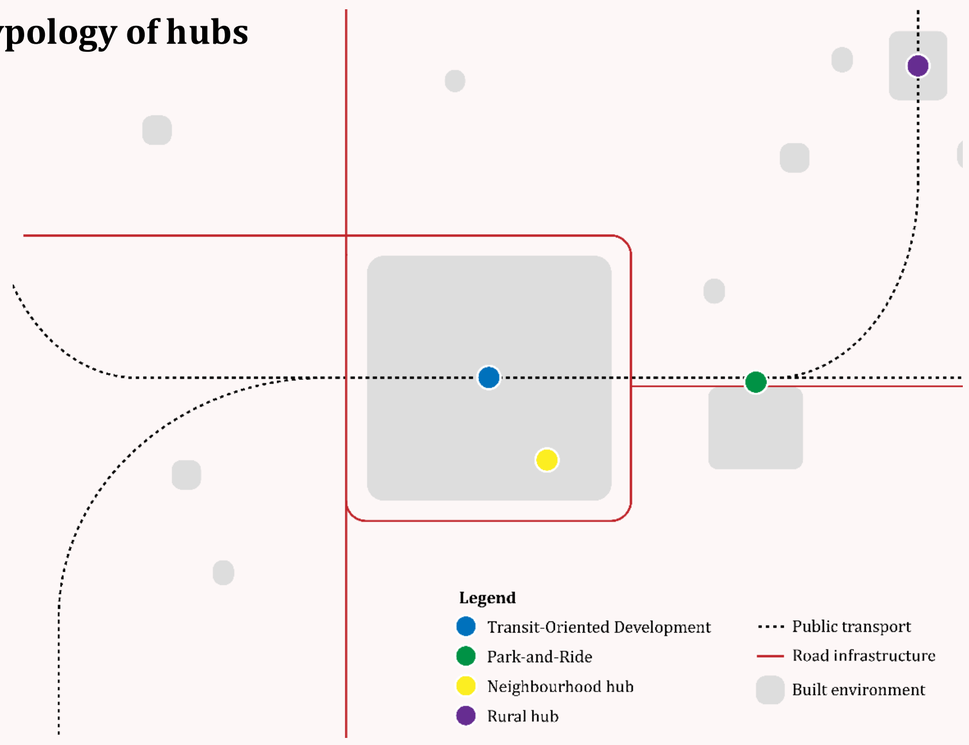
Trunk-and-feeder



Three modes (subject to public policies):

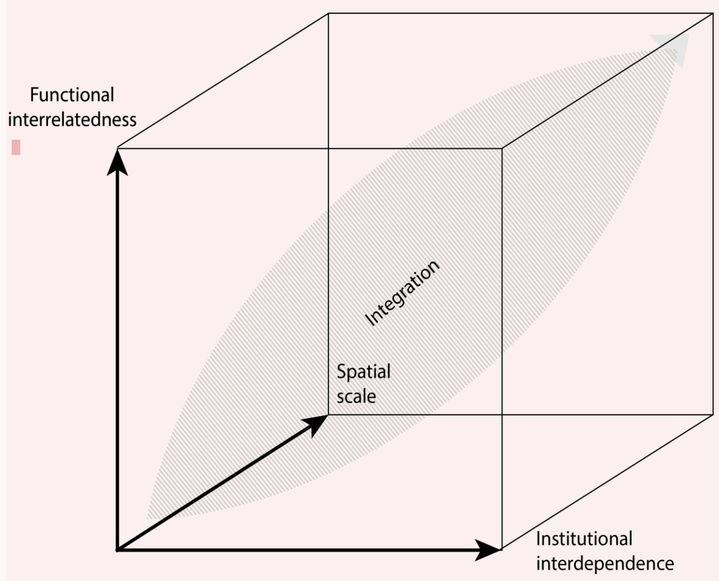
- **Public Transport - PT** (trunk): linear connections between hubs covered by train, bus.
- **Demand-Responsive Transport - DRT** (feeder): providing flexible, on-demand service in low-demand areas. Technological advances enable real-time operations, minimising detours and improving access to hubs
- **Shared Mobility** (feeder): including car- and bike-sharing, complements PT by extending coverage and reducing costs. Integrated with PT and/or DRT, it can enhance service hours and operational reach.

Typology of hubs



- **Transit-Oriented Development (TOD) hubs:** train or bus station, located in urbanised areas. High degree of (interurban) connectivity combined with high-density, mixed land-use patterns.
- **Park and Ride (P+R) hubs:** extensive public transport station and car parking facilities, bundling transport flows towards central urban areas by linking car traffic to public transport in the urban fringe.
- **Neighbourhood hubs** concentrate shared transport modes at strategic locations within high-density and mixed-use urban neighbourhoods (often part of urban redevelopment projects), for enhanced liveability and sustainability.
- **Rural hubs:** regional nodes linking regional train or bus rapid transit services to DRT and shared modes, leading to more frequent and faster public transport services.

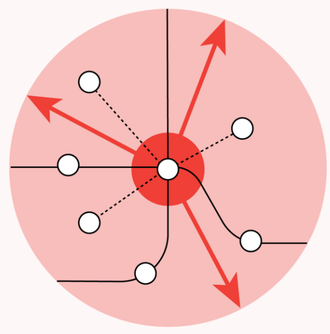
Conceptual model



3 interconnected dimensions relevant for integration:

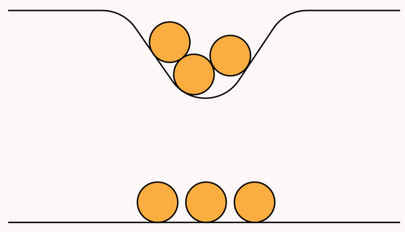
- Functional interrelatedness
- Institutional interdependencies
- Spatial scale

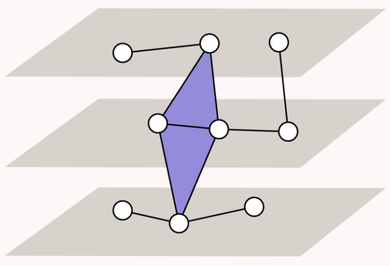
Results: Enabling conditions



Condition 1
Multimodal access in rural areas requires spatial upscaling

Condition 2
Balancing between central coordination and adaptability





Condition 3
Cliques formation across spatial scales to coordinate network

1

Research Question 1:
How can historical lessons and transport innovations related to the mobility hub concept inform its implementation to meet current policy objectives?

2

Research Question 2:
What is the potential of jointly implemented actor strategies to achieve multimodal integration and increase ridership at peripheral mobility hubs?

3

Research Question 3:
What are the conditions for the governance of a 'network of networks' related to multimodal integration in rural areas?

4

Research Question 3:
How can institutional designs for multimodal integration be aligned to ensure sufficient access to public transport in rural areas?