



Integrated transportation systems, multimodality

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Road mobility projects in urban regions and their Impact on the environment

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1. Background

- **Accelerated urbanization and urban expansion**
 - Spatial scope of issue 2.1.2. is urban and peri-urban areas.
 - 65% of World's population will live in cities by 2050
 - 95% of its growth will take place in cities
 - Urban sprawl, low population density and car-oriented development
- **Urgent needs to address climate change**
 - Carbon neutrality goal: inevitable trend of sustainable development
 - Transportation is an important area towards carbon neutrality
 - Efficient, green, inclusive and shared
 - Required travel behaviour changes depend on available infrastructure and services

1. Background

- **Green recovery from the COVID-19 pandemic**
 - Return to private vehicles or no transport services (no jobs)
 - Investment in bicycle and walking infrastructure: driving force for green recovery
 - Connection between motorized modes and active modes should be explored.
 - For the long-term transportation system reform, lessons should be used to rethink mobility and create solutions: car pooling, active modes, multimodal transit centers.
- **New technologies and new models**
 - New mobility services including MaaS provide flexible solutions for first and last mile especially in less accessible sites and at non-peak hours.
 - Autonomous vehicle technology will promote alternative modes through optimized services including transfer services linked with transport hubs.
 - Sharing economy and sharing mobility -> new business models

1. Background

- **Why we need to promote multimodality in urban and peri-urban areas?**
 - Constraints in urban space and budget
 - Expansion of urban areas and increase in travel demand
 - Need to reduce car traffic and fossil fuel consumption
 - Need to use road network more efficiently through better integration with other forms of transport (multimodality)
 - Encourage alternative modes and their combination - rail, bus, active modes and carpooling
 - Integrated transportation system pays more attention to the coordination and connection of multiple transportation modes to improve efficiency, resilience and sustainability.
 - Alternative modes and their combination including car transfer to/from multimodal transit centers should be competitive to a door-to-door self-driving car.

2. Terms of Reference for the Issue 2.1.2. Integrated transportation systems, multimodality (from Strategic Plan)

■ Objectives

- Identify good practices of optimization of road networks through better integration with other forms of transport (rail, active modes, etc.) in terms of efficiency, resilience and sustainability.
- Focus on multimodal transit center (MTC), collect data and analyze the efficiency, the resilience and the sustainability.
- Encourage coordination with other TCs and TFs

■ Outputs

- Collection of Case Studies
- Briefing Note

3. Methodology and Work Schedule

■ Collection of Case Studies

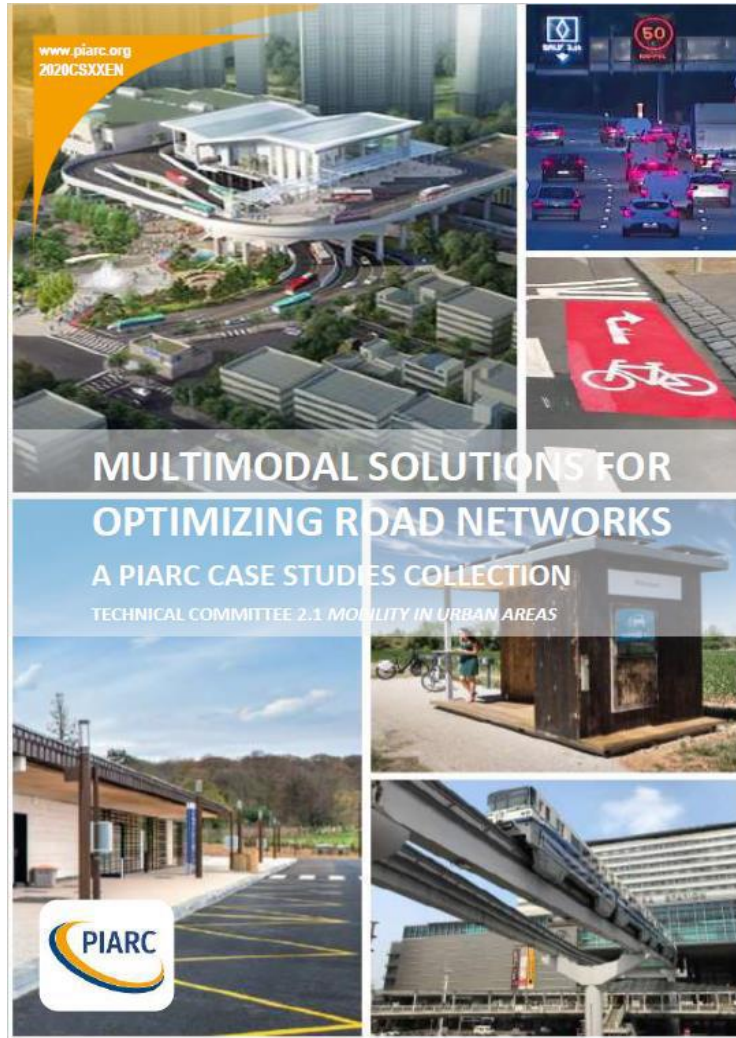
- The first stage: a survey of good practices aimed at collecting as many as possible worldwide (from March to September 2021)
- The second stage: development and collection of case studies out of good practices collected in the first stage (from October 2021 till March 2022)
- Mainly for technicians and engineers from various countries to exchange technical experiences and best practices in advancing integrated transportation systems.

■ Briefing note

- Based on the “Collection of Case Studies” and an analysis of general guidelines collected from 16 countries by a separate survey conducted in September and October 2022
- Contains recommendations and focuses on strategic and future directions for decision-makers.

4. Results: Collection of Case Studies (published in 2023)

<https://www.piarc.org/en/order-library/40749-en-Multimodal%20Solutions%20for%20Optimizing%20-RoadNetworks%20in%20Urban%20and%20Peri-Urban%20Areas%20-%20Case%20Studies>



- **Multimodal good practice collection**
 - 41 good practices were identified from 11 countries.
- **Case study** ■ 16 case studies from 8 countries

	Types involving multimodal transit centers (MTCs)			Types optimizing the use of existing road networks			Provision of environment to materialize the suppressed or emerging needs of inhabitants	
	Improvement of transfer between transport modes with MTC	Improvement of rail and/or bus services coupled with MTC	Local provision of small MTCs	Bus, carpooling and HOV	Park and expressway bus (or BRT) ride	Provision of new public transport services	Provision of environment to facilitate the use of active modes	Provision of environment for micro-mobility users
Belgium	Brussels		Mobihub	Namur Vilvoorde				
China	Shenzhen Chongqing	Kunshan						
Czech Republic	Prague (MTCs in the Suburbs)	Prague (MTC at a New Railway Station)	Prague (Micro-logistic Depot) , (Bike Sharing)			Prague (Aerial Cable Car)	Prague (Road Space Reallocation)	
France		Montpellier Marseille	Plaine de l'Ain - Rural mobility hub	Grenoble Lyon St-Rambert	Longvilliers Nîmes			
Italy			Bologna (Mobility centers)			Bologna (People mover)		
Japan	Kitakyusyu Hiroshima Tokyo Fukuoka Yokohama Daegu	Toyama Nagoya (Guideway Bus)		Nagoya (Bus lanes)			Utsunomiya	
Korea	Osan							
South Africa	Orange Farm							
Uganda							Kampala	
UK				Greater Belfast	Belfast		Greater Manchester Royal Borough of Kingston	
USA								Santa Monica LA

Development of Comprehensive Transport Hub Functions and Integration of a Monorail Extension to a Station Building



Before



After



Rural Mobility Hubs



Vertical Station Transfer Center



5. Tentative Recommendations: Briefing Note (being finalized)

5.1. General recommendations

- Transfer promoting solutions
 - Road space reallocation
 - Improving and optimizing the existing infrastructure
 - Increasing attractiveness of collective transport
 - Promoting active mobility for short trips, access to collective transport and health
 - Shared mobility: car and bike sharing, car pooling, commercial ridesharing, cab service and vehicle lending between people



5. Tentative Recommendations: Briefing Note (being finalized)

5.1. General recommendations

- **Establishing Multimodal Transit Centers (MTCs)**
 - MTC is a place where different transportation networks are interconnected.
 - Comprehensive process including physical design, multimodal information, consistent fare and ticketing policies, and coordination of the transport offer
 - Successful link between transportation and land use planning brings mobility for citizens and higher-density urban development
- **Adequate and recurrent funding for sustainable mobility**
 - Current car-based financing may no longer be the best with electrification and less car-based mobility
 - Evaluate the various economic tools available and their effects on transport revenues and demand

5. Tentative Recommendations: Briefing Note (being finalized)

5.2 Specific Recommendations

- **MTC development**
 - With railway system, MTCs at key stations in inner city and at suburban stations
 - Higher effects if accompanied by service level improvements of railway
 - Suburban MTC connects modes in less populated areas with railway leading to the city center; convenient transfer and well designed feeder system are necessary -> a solution to first and last mile problem
 - Three-dimensional use of land for inner-city MTCs
 - Closer cooperation and coordination among transport operators, central/local governments (urban planning authority)
 - Without efficient rail system, P+R and/or local bus operation at expressway bus stops

5. Tentative Recommendations: Briefing Note (being finalized)

5.2 Specific Recommendations

- **Small MTCs (Mobility Hubs)**
 - At train stations or nodal points near from trip origins
 - User-friendly one-stop services using ICT
- **Flexible Use of Road Space**
 - Installation of dynamic bus lanes
 - Installation of dynamic carpooling lanes
- **Promotion of Active Modes**
 - Bicycle lanes and dedicated paths reduce journey times for cyclists, and improve safety for cyclists and pedestrians.
 - Bicycle lanes are inexpensive and the construction work is simple and quick.
 - Non-motorized transport (NMT) is the cheapest and most accessible mode.
 - NMT corridor can be a model for cities without sufficient infrastructure for motorized transport

Thank you for your attention!



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