The Cross-ministerial Strategic Innovation Promotion Program (SIP)

Development of Smart Mobility Platform

【Subtheme Ⅰ】Redesigning Mobility Services

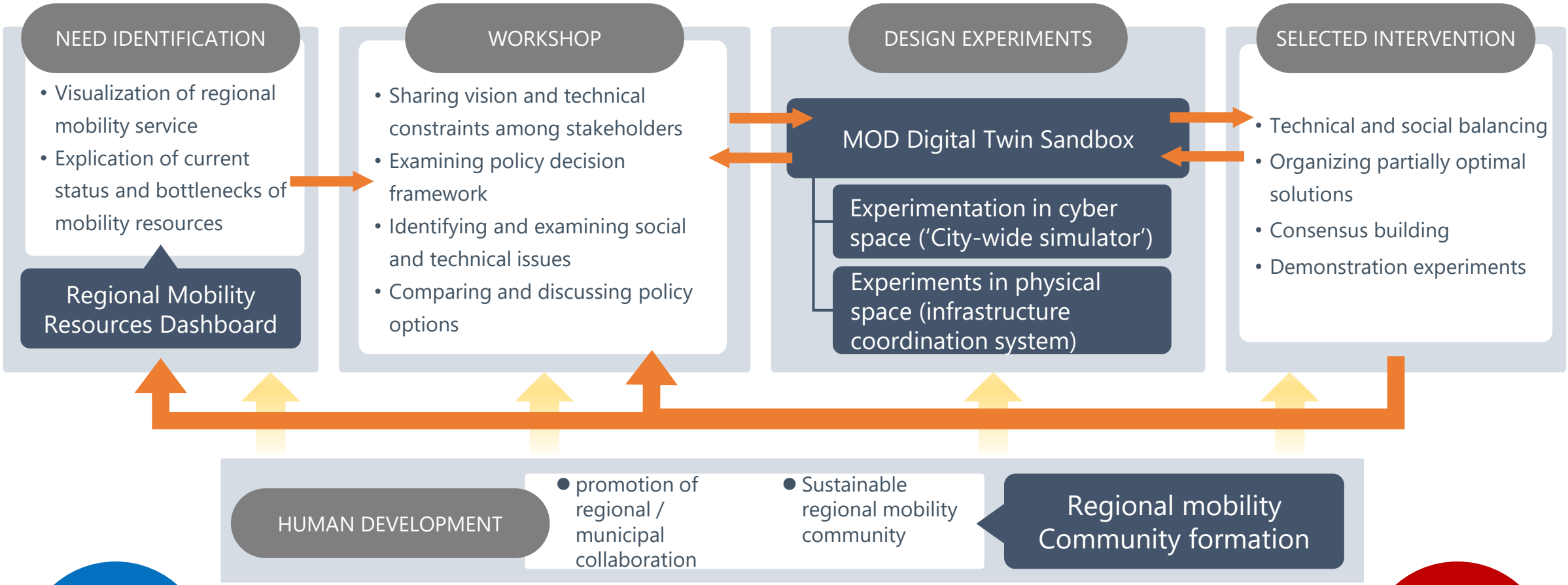
Development of a new mobility-oriented city with an agglomeration of places for social exchange

March 2025

Hiroshima University Consortium

Hiroshima University
Vital Lead Corporation
Pacific Consultants Co., Ltd.
National Institute of Technology, Kure College
The University of Tokyo

Framework



Linear Decision-making

Users: Municipalities in charge of city and transportation planning, regional mobility providers

Significant time reduction for policy decision-making and implementation related to urban transportation planning

Thought-seeking decision-making

Framework

- The issues in promoting mobility-oriented development (MOD) with an agglomeration of places for social exchange are as follows.

❶ Key issues in promoting MOD

Difficulty in sharing a common understanding of the problem among the parties concerned.

- In promoting MOD, it is difficult and time-consuming to properly understand and recognize the current situation and challenges.

Difficulty in accurately predicting the effectiveness of measures.

- Conventional simulators have difficulty in properly predicting the expected effects of MOD, such as increased “interaction” of people.

Experiments and simulations require a lot of cost and time.

- The time required to conduct multiple demonstrations and to estimate the future case for consensus-building is long, and the time required to introduce the system is long.

Lack of technology for vehicle-infrastructure coordination.

- In addition to mobility, it is essential for MOD implementation to establish technologies to link up with public transport and the infrastructure required for new mobility..

Lack of strategies to overcome the chasm.

- Between demonstration and full-scale implementation, the community promoting MOD has stagnated or shrunk because of the inability to overcome the chasm caused by technical and social factors, etc.

❷ Methods of solution through this project

Regional Mobility Resource Dashboard

- Visualize and diagnose the current status and bottlenecks of regional transport with easy-to-understand indicators to accelerate common understanding and discussion among stakeholders and citizens.

Development of “City-wide simulator”

- Develop a new simulator that can evaluate the introduction of new mobility and predict the effects of the exchanges.

Develop the MOD Digital Twin Sandbox

- Simplify and rapidly generate and visualize a large number of future scenarios from simulators and actual demonstration data, and develop tools for use among citizens and stakeholders.

Develop vehicle-infrastructure coordination systems

- Study, develop and demonstrate specific measures for priority signal control to prioritize public transport.

Managing the process of community building for local mobility services

- Verify and establish the design of communities and processes that do not stagnate and have a strong driving force for the project to achieve an appropriate MOD.

Progress: Development of City-wide simulator

Input data

- GTFS data 2022–2023
- Digital road maps Ver. 3403
- Population data H27/R2
- Building point data 2020
- Traffic diary survey data 2011

Traffic simulator infrastructure (MATSim)

Multimodal Dynamic traffic volume distribution

Demand and supply interaction

Activity-based Model

Pieter. Luo, Yaqiu Azis, Fukunaga(TBC)

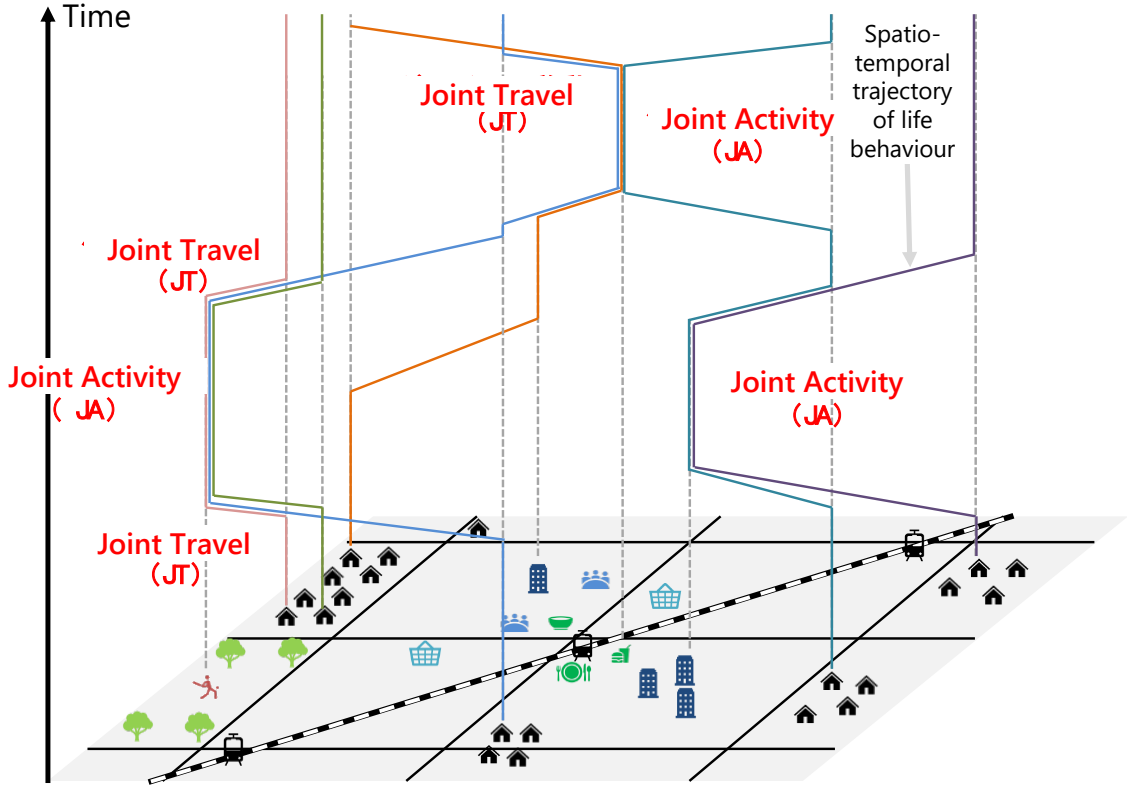
Output

Demand：
- Generation/ Attraction
- Destination distribution
- Modal share
- Departure time
- Social exchange

Supply：
- Traffic congestion
- Congestion in vehicles
- Link traffic volume
- Link travel speed

Issues

Joint activities



Urban and transport infrastructure

Social NW + JA data 2023 ＋ JA-JT generation model

Progress: Development of MOD Digital Twin Sandbox

❶ Required functions

- **The MOD Digital Twin Sandbox (M-DTSB) uses sophisticated models to make validation simpler and faster.**

Lightweight and mass output
Use the results of generating elaborate models to calculate countless scenarios at high speed.

Operability
Easy and intuitive operation and immediate visualization of calculation results.

Explicitness
Output the effects that citizens want to know and the information that the administration wants to know.

Linkage with real world
Real-world data, such as demonstration results, can be captured and reflected.

Surrogate and simple estimation

Design of browser UI

Output and comparison of different indicators

Data reflection through API linkage

Current regional situation and challenges

↓

・Target image
・Set KPIs

Set optimization indicators (e.g. resident convenience, specific OD)

Input measures

■**Improve public transport services**
- Realign routes
- BRT Introduction of BRT, introduction of formation
- PTPS (bus lanes)

■**New services**
- Rideshare Share
- Shared cycle
- Personal Mobility

■**Use of public transport**
- Review of fare structure
- Review of timetables

Output of results

■**Indicators for vehicles and travel**
- Benefits of reduced journey times

■**Indicators for people and town development**
- Accessibility
- Changes in liveliness

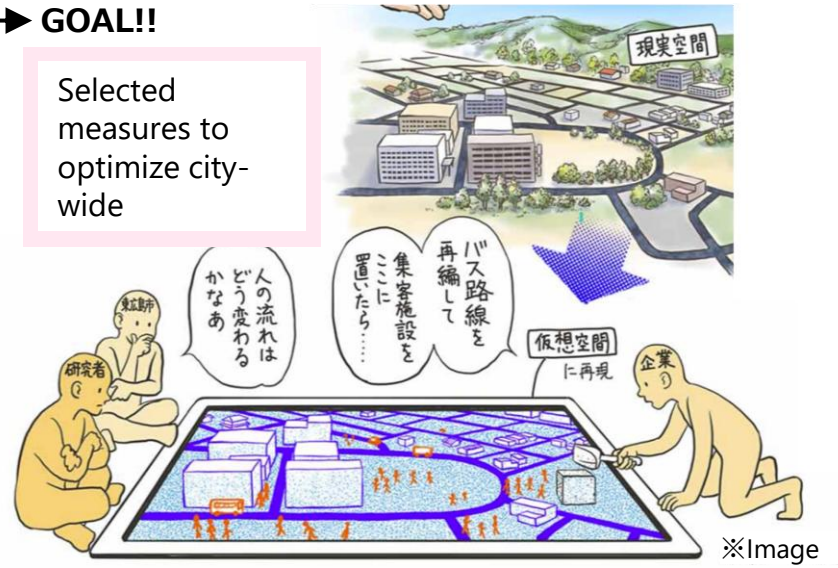
■**Indicators for consultation with relevant authorities**
- Change in congestion

■**Supply-side indicators**
- Operational costs/benefits
- Number of users

Comparative evaluation of various measures

→ **GOAL!!**

Selected measures to optimize city-wide



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Progress: MOD human resource development

❷ Regional mobility community building (Higashi-Hiroshima City)

Mobility Workshop

Hosted by: Hiroshima University Consortium
Date: 9 September 2024
Venue: Higashi-Hiroshima Innovation Space

About 30 participants, mainly administrative officials, transport operators and others involved in urban development in Higashi-Hiroshima City

Urban Transport Symposium

Hosted by: Higashi-Hiroshima City
Date: 1 February 2025
Venue: Higashi-Hiroshima Innovation Space

About 50 Higashi-Hiroshima City citizens and others participated

City planning brochure

Issued by: Hiroshima University Consortium

Use in Regional Public Transport Conference

- Higashi-Hiroshima City studied the introduction of automated and formation-running BRT.
- The study subcommittee established a system of close collaboration with the SIP.
- Tools and results established in the SIP were used in decision-making.

Outcomes for 2024

Top-down and bottom-up approach for MOD mobility community building.