



Cross-ministerial Strategic Innovation Promotion Program (SiP) Term 3

Development of Smart Mobility Platform

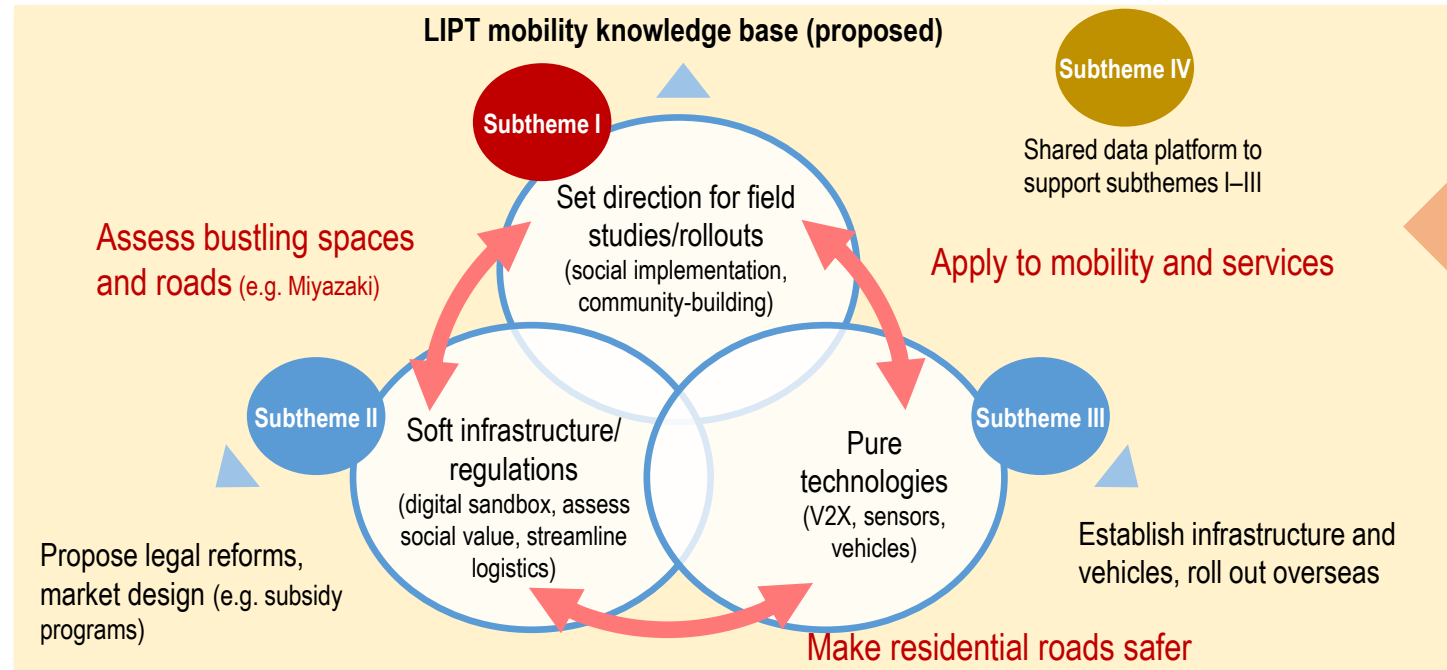
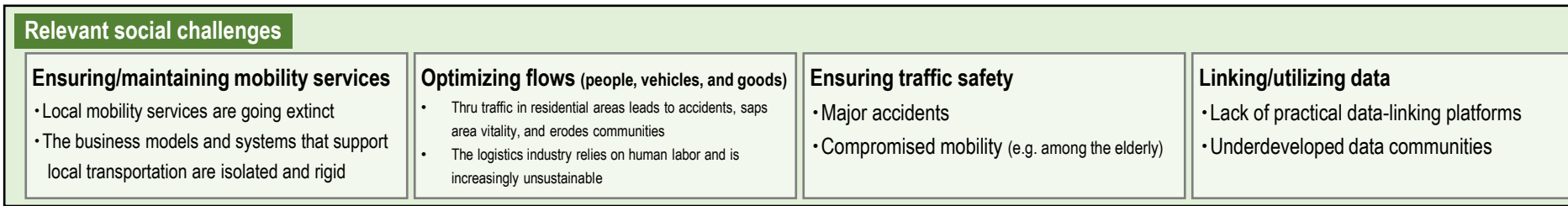
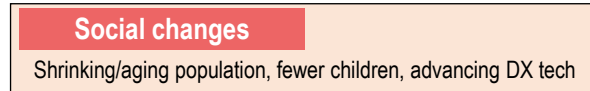
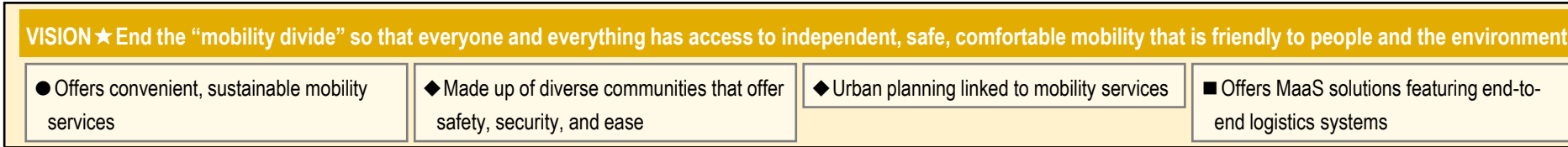
Subtheme I: Redesigning Mobility Services

Development of Smart Districts with Advanced Mobility Systems

March 2026

Tokai National Higher Education and Research System

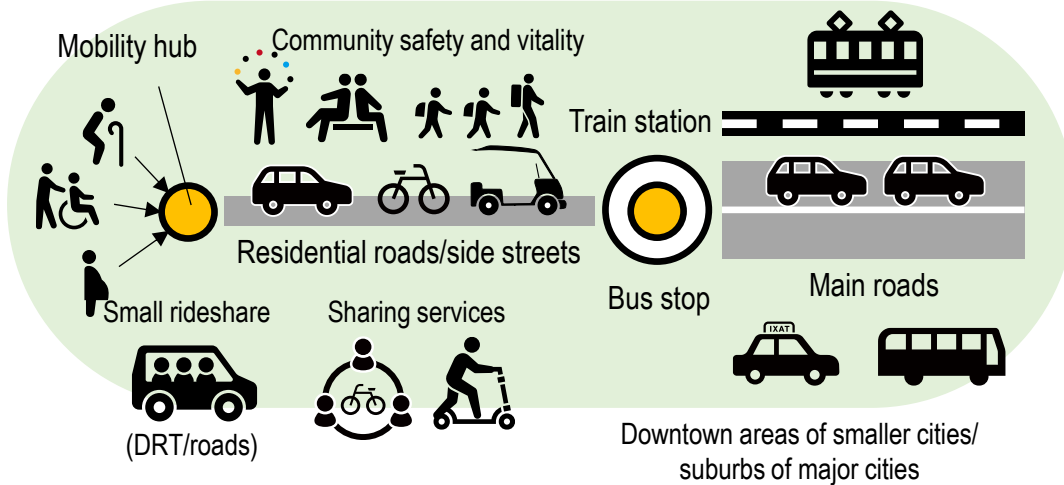
1-1 Subtheme I: Smart mobility vision and subthemes



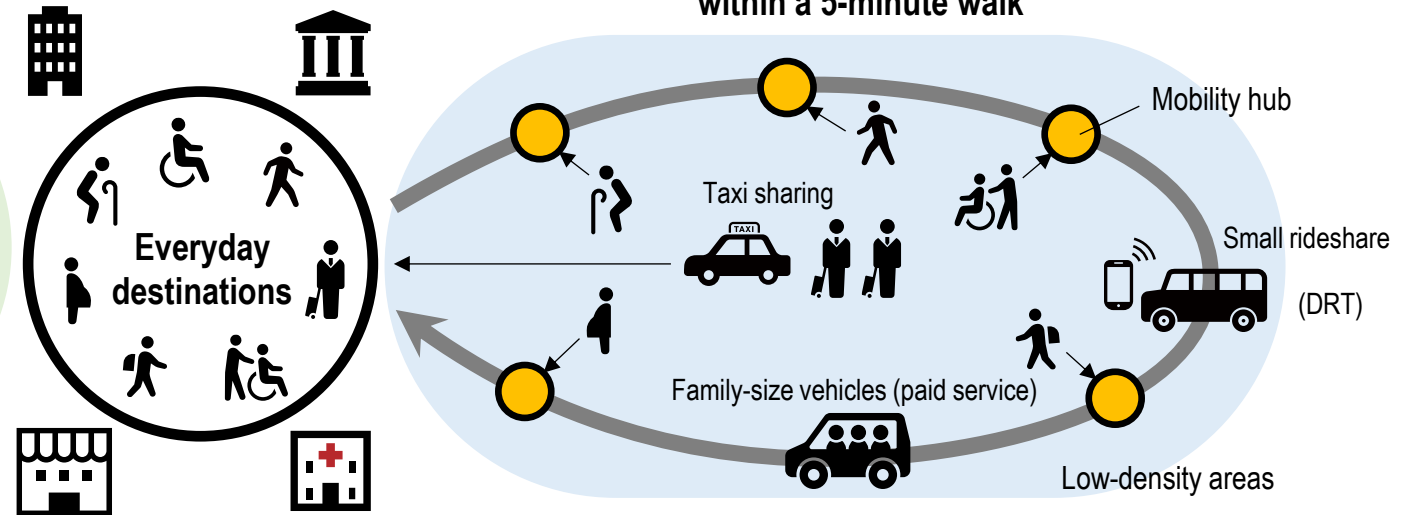
1-2 Subtheme I: Overall vision

- 1) Provide safe, independent **mobility services that help overcome local challenges**
- 2) Help **build sustainable, vital communities** that erase the mobility divide

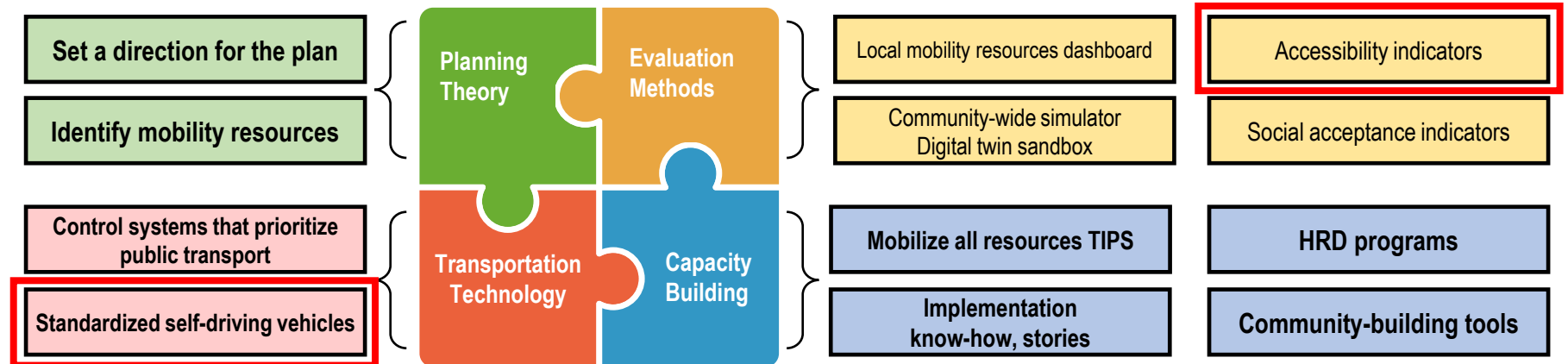
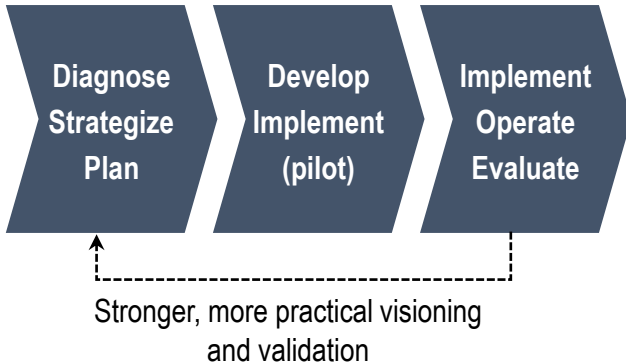
★ Spaces where anyone can walk slowly with safety and peace of mind



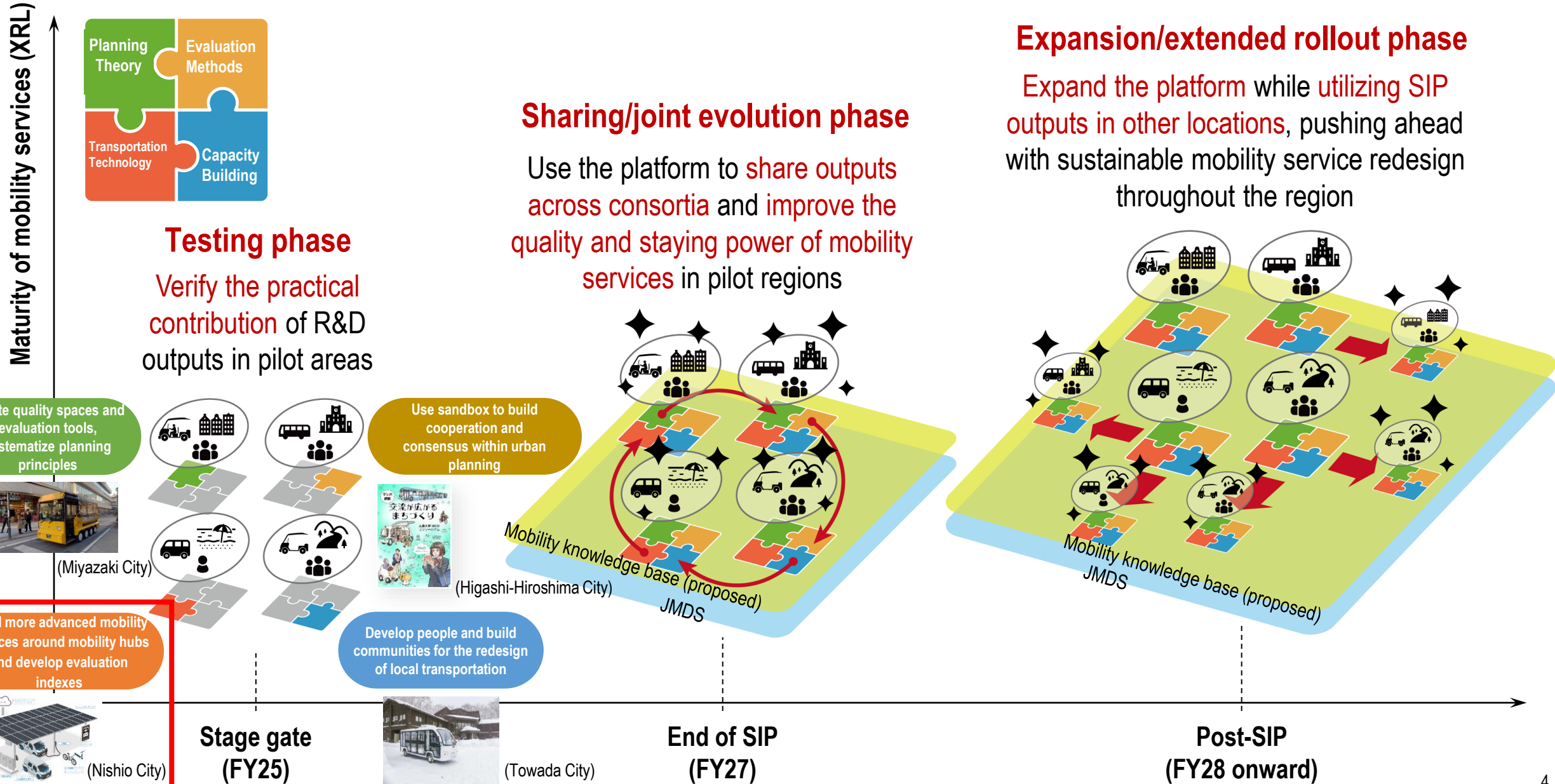
★ Everyone can access public transportation within a 5-minute walk



Redesign process

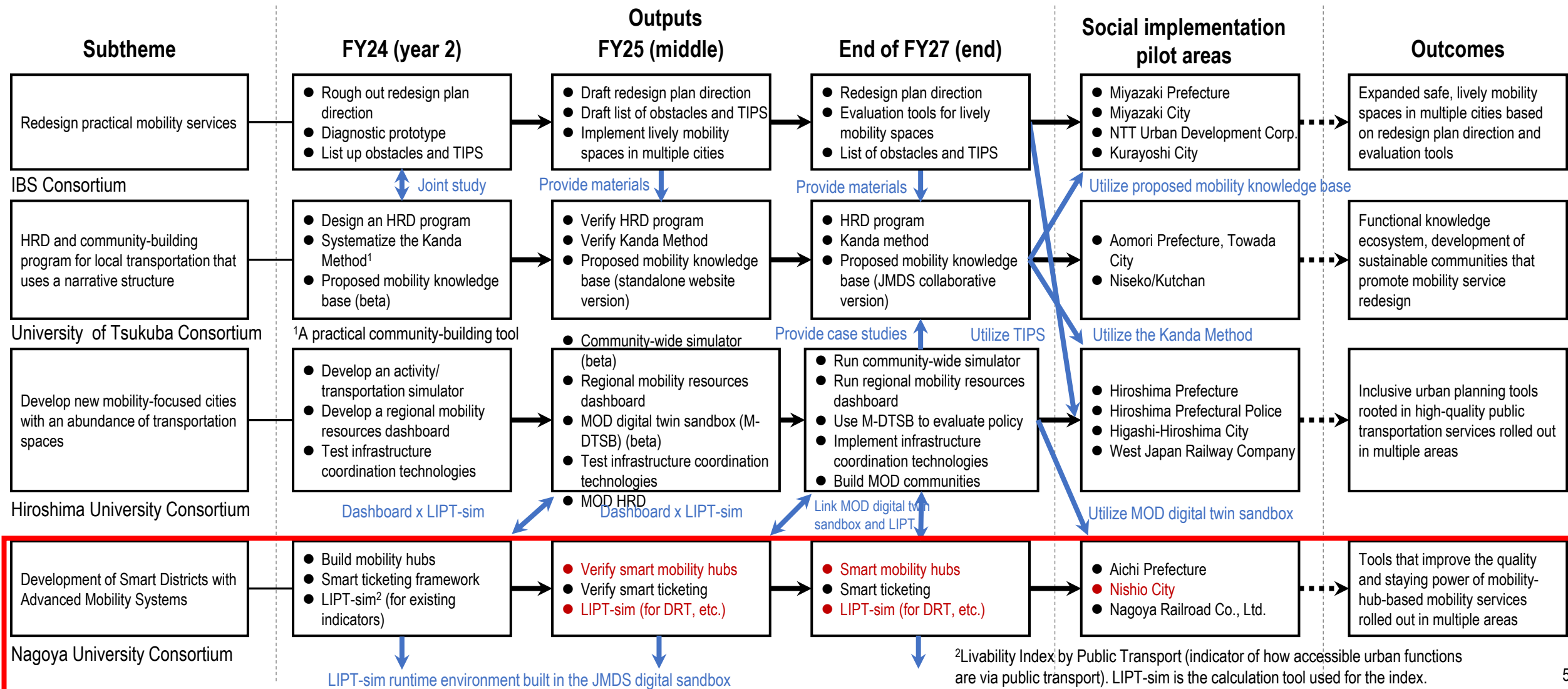


1-3 Subtheme I: Overall strategy



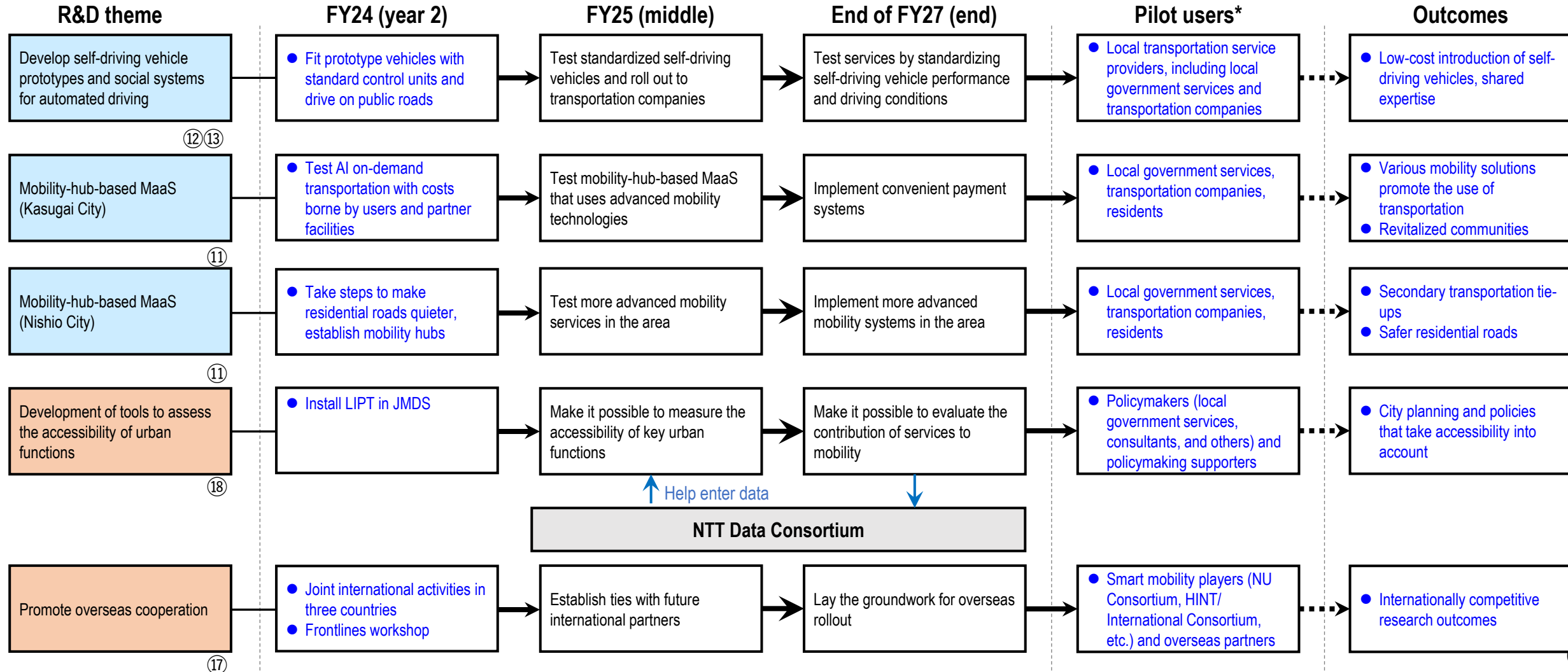
1-4 Subtheme I: Overall roadmap

- VISION (recap)**
- 1) Provide safe, independent **mobility services that help overcome local challenges**
 - 2) Help **build sustainable, vital communities** that erase the mobility divide



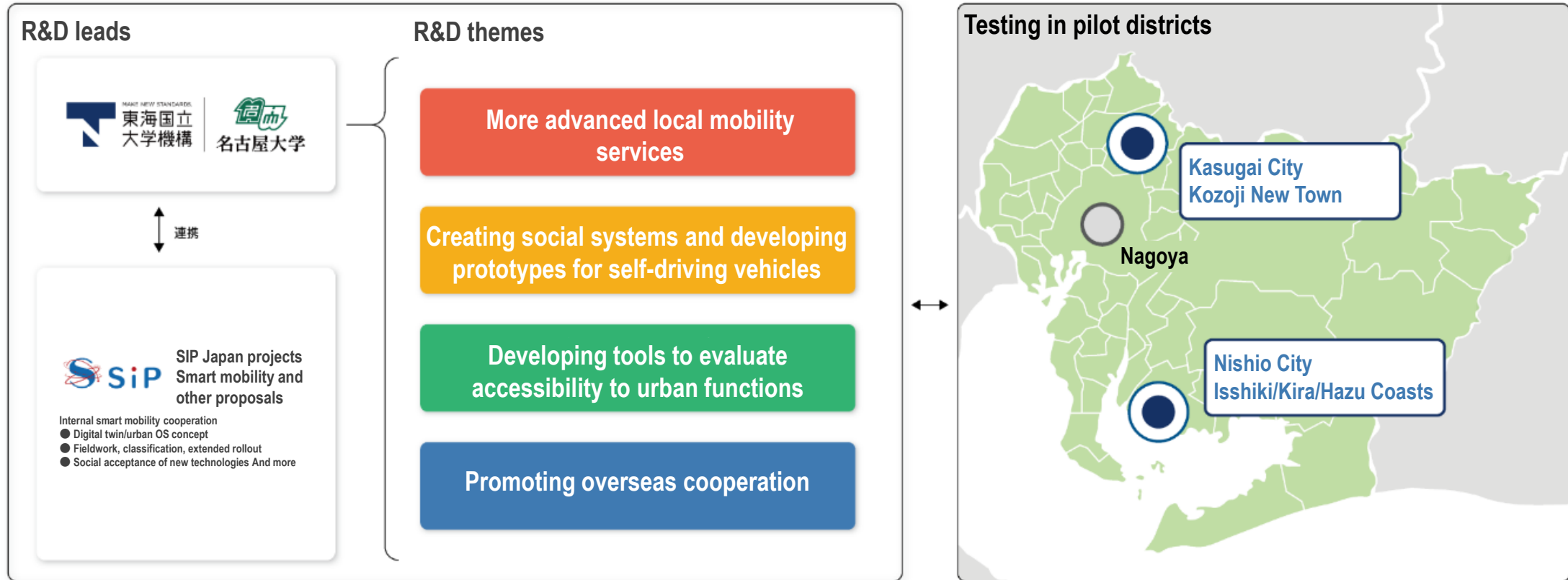
2-1 R&D theme roadmap

- Developing self-driving vehicle prototypes will contribute to safe, independent mobility. Mobility-hub-based MaaS and the development of tools to assess the accessibility of urban functions will help create social systems that erase the mobility divide.



2-2 R&D Progress: Nagoya University Consortium

Create safe, convenient Smart Districts using the Smart Local Mobility concept, which is based on mobility hubs that serve as focal points for mobility and activity



Partners

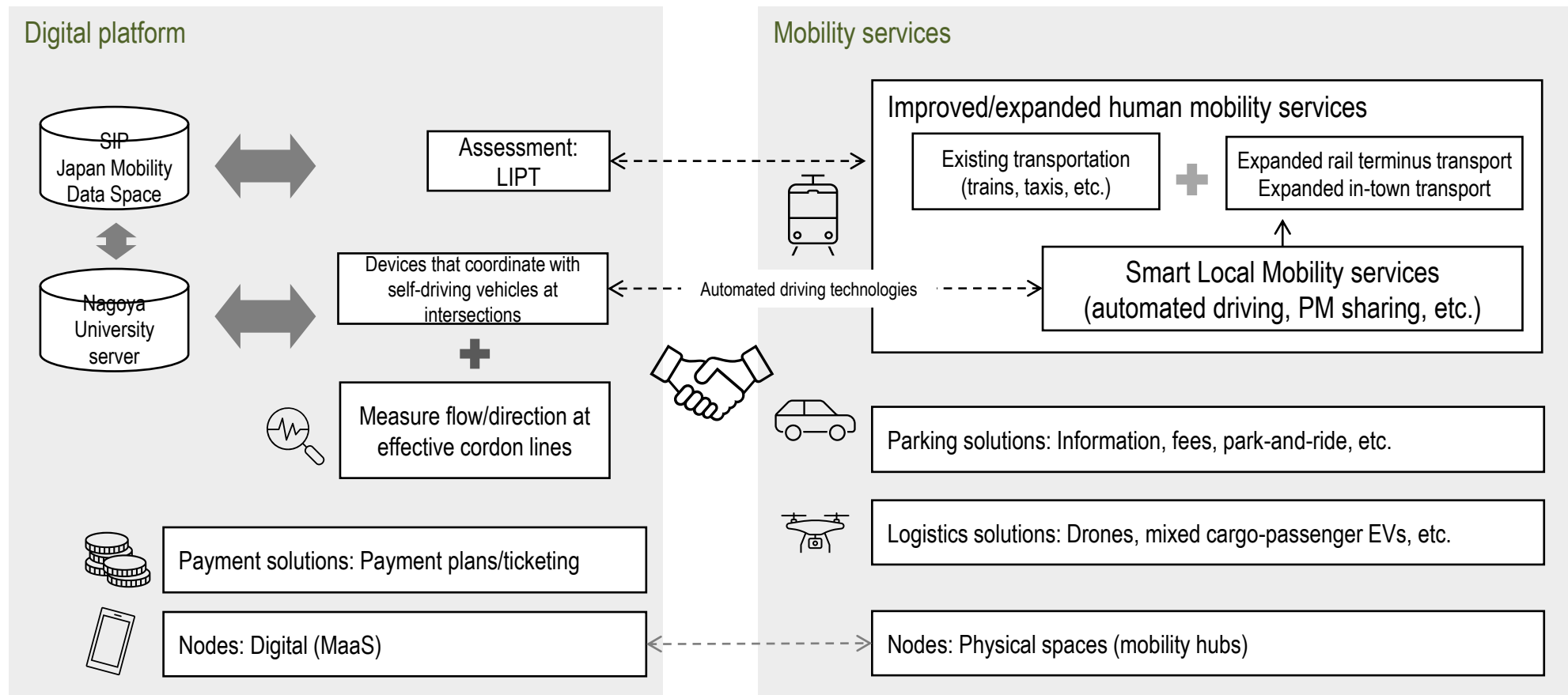


Nagoya University
Venture

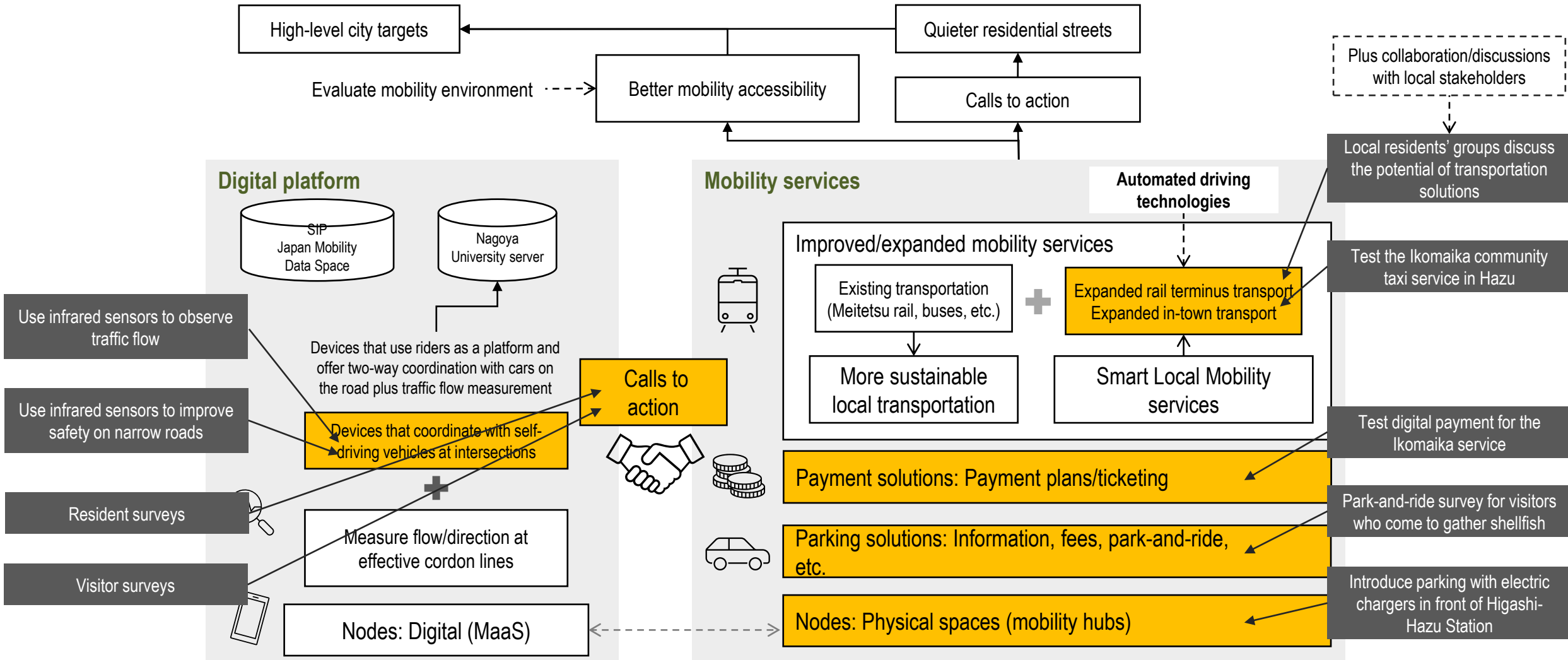


2-2 R&D Progress: Nishio City initiatives (Isshiki, Kira, and the Hazu coast)

Turn areas without convenient transportation into Smart Districts by implementing mobility-hub-based physical mobility strategies (such as more advanced local mobility services, traffic flow/parking management, and logistics solutions) and linking them into digital solutions (such as transportation data, payment solutions, and MaaS apps)



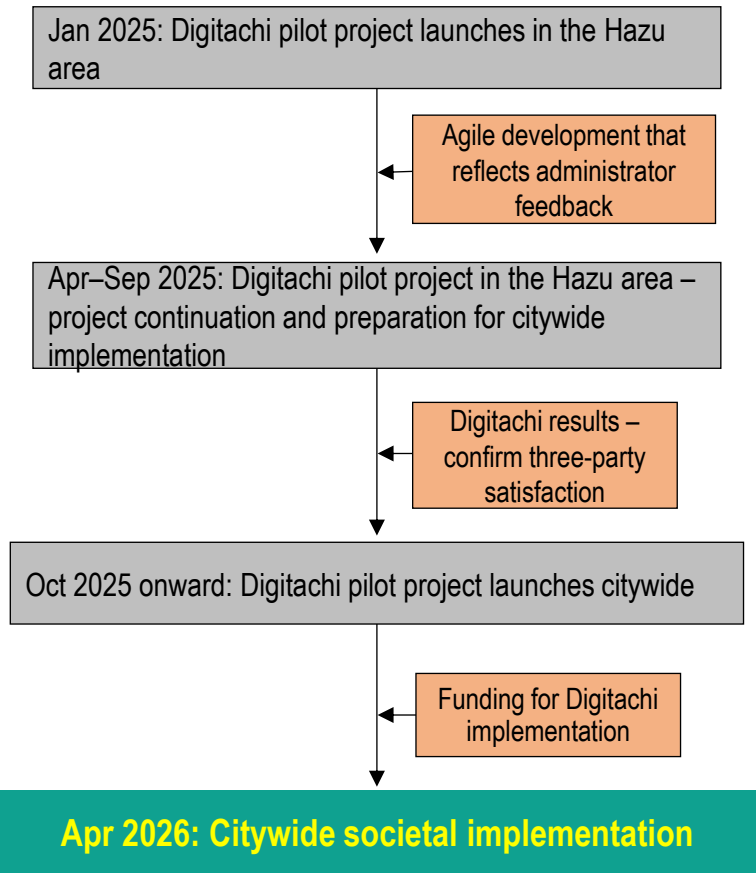
2-2 R&D Progress (Nishio City)



2-2 R&D Progress (Nishio City)

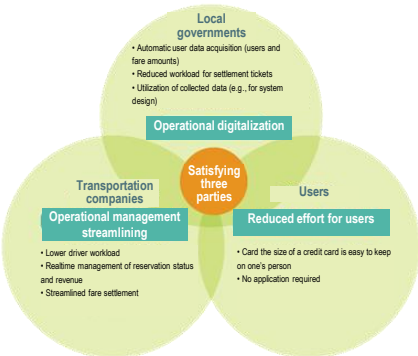
Development of Digitachi, a ticket validation system for transportation services that utilizes 2D barcodes

Societal implementation process in Nishio



Societal implementation process in Nishio

In addition to reducing user effort, Digitachi enables local governments to review the design of its systems on the basis of administrative task streamlining achieved through digitalization as well as the data it accumulates. Additionally, it allows transportation companies not only to reduce driver workload but also real-time management of reservation status and revenue.



Case studies

A pilot program for the adoption of Digitachi was conducted in the city of Nishio, Aichi Prefecture, from December 2024 through FY2025. During this pilot program, the number of registered users, the number of rides, and the amount of fares paid were significantly higher than during the same period one year earlier. A full-fledged launch of the program will take place in FY2026.

Ikomaika, Nishio, Aichi Prefecture

Target users

Usable by anyone who resides in Nishio

Operating hours

8:00 a.m. to 5:00 p.m.

Areas served

Transportation to designated destinations within the user's elementary school district, including train stations, financial institutions, shopping facilities, and hospitals

Usage fee

The cost is ¥300 per ride, regardless of the number of users. (Users who surrender their drivers' licenses pay ¥200.)

The local government pays ¥1,127 per person for transportation (actual amount from April to November, 2025).



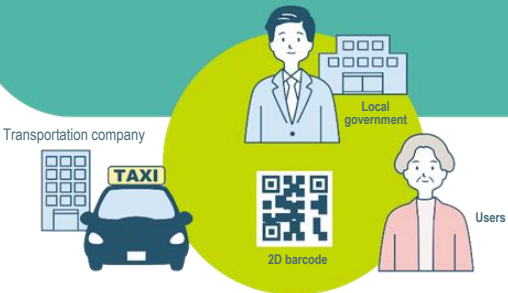
Adoption periods	Details
Jan 27 – Mar 24, 2024	Target area: Hazu area Growth in number of users: 112% Growth in number of registrants: 107% Growth in total revenue: 140%
Apr 1 – Sep 30, 2025	Validation of the program's effectiveness and continuation in the Hazu area – citywide expansion
Oct – Nov, 2025	Target area: Citywide Growth in number of users: 126% Growth in number of registrants: 120% Growth in total revenue: 160%

Contact information for adopting Digitachi

Life & Mobility (L&M)

Tel: 052-789-3730 Contact: (unreadable) Email: info@life-and-mobility.com

Digitalize your operations by adopting Digitachi, a 2D barcode-based ticket validation system.



Numerous local governments have taxi services for elderly residents or welfare recipients in which the local government covers all or part of the user's taxi fare based on the date and time of the ride, the meter fare, and the name of the transportation company, which are recorded on paper tickets issued to the user.

Digitachi is a ticket validation system that utilizes 2D barcodes to easily, accurately, and speedily convert the information on these paper tickets into digital data.

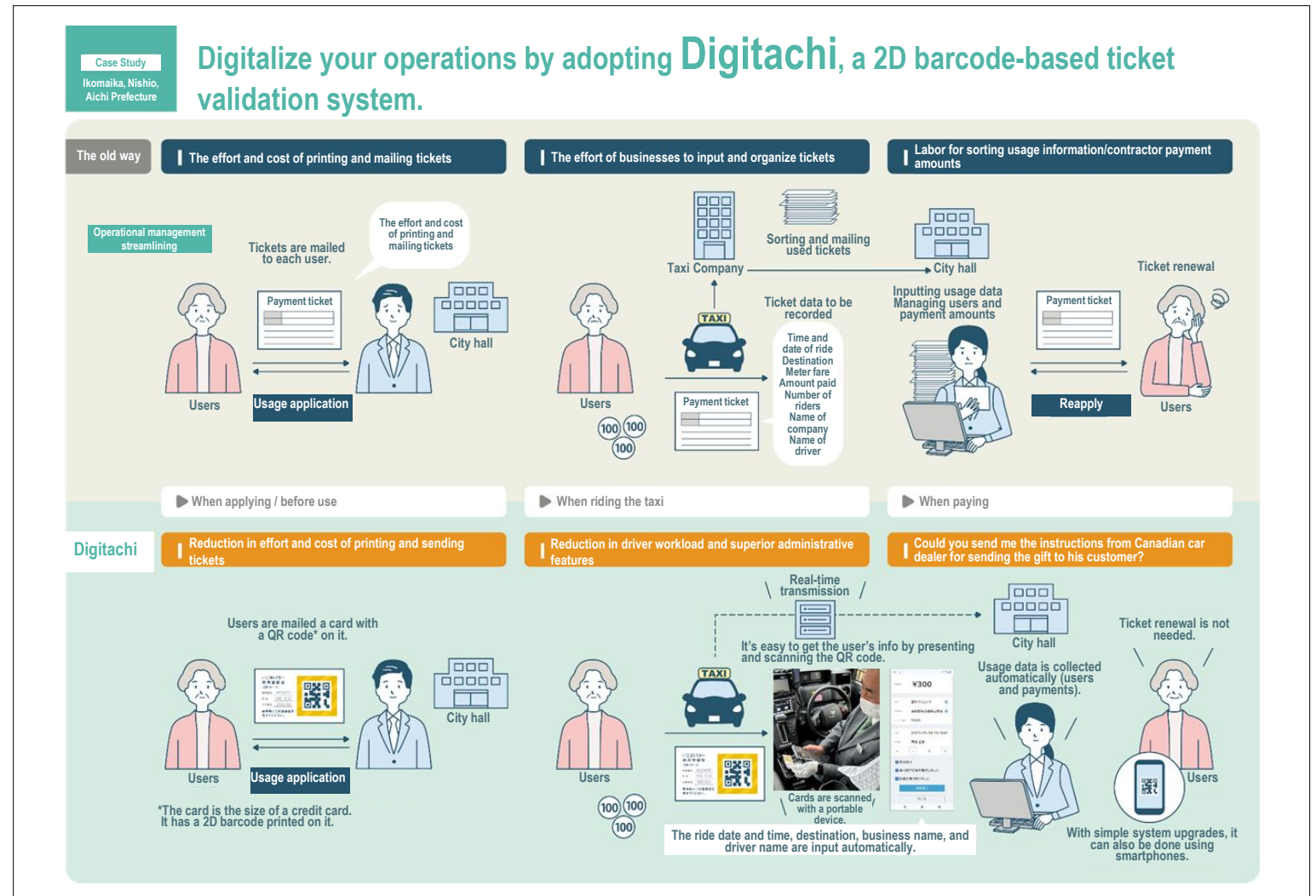
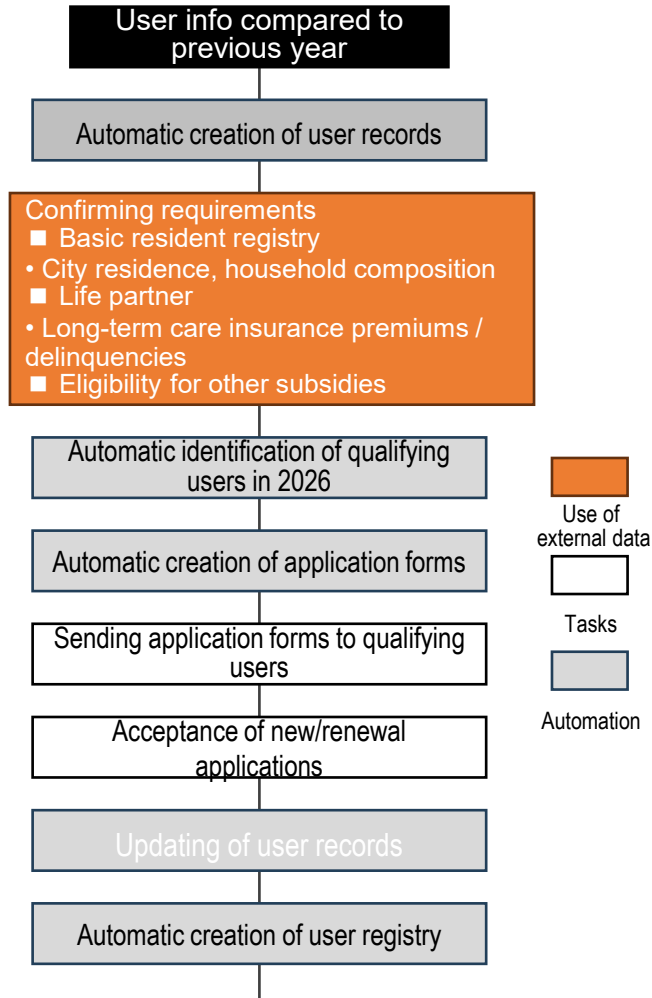
Digitachi also streamlines the work required by drivers as well as the settlement process between companies and local governments.

It also enables real-time monitoring of reservation status and operational status, and it lets governments design their services on the basis of accumulated data.

2-2 R&D Progress (Nishio City)

Adoption of Digitachi in Nishio's senior citizen taxi program to digitalize operations and payments

Achieving digitalization in Nishio through the introduction of Digitachi in other programs



2-2 R&D Progress (Nishio City)

Conducting a large-scale MM pilot project on the Meitetsu Nishio and Gamagori Lines, the main transportation routes in the area

1 Installing signs that indicate number of users

- Installed at two local elementary schools and three branch offices
- Installed in road-facing locations that are easy for drivers to see



Sign near Hazu Branch Municipal Office

Encouraging all local residents to use the trains

2 Implementing large-scale MM

Objectives:

1. Distributing flyers that convey the importance of the Meitetsu Nishio/Gamagori Lines
2. Handing out free train tickets to local residents
3. Conducting a questionnaire-based survey after people have ridden the train

Trains ridden by about one in seven residents: 1,693 people (2.5 times our goal)



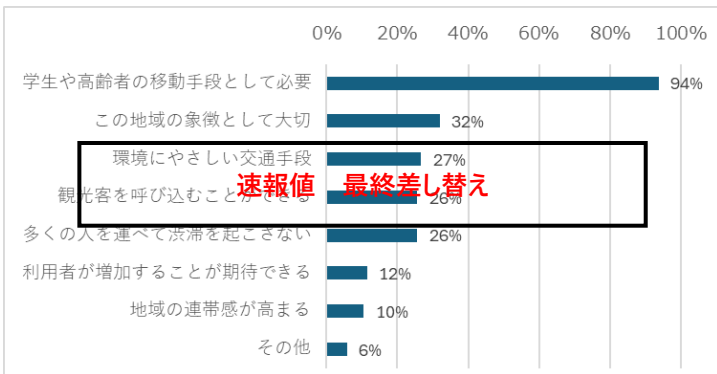
Proof of ride



Ticket exchange at Kira Yoshida Station

3 Questionnaire-based surveys

Ninety percent of respondents recognize the necessity of trains for students and senior citizens.



4 Implementing special MM classes at elementary schools and putting up initiative posters

Teaching the importance of trains for transportation



Class at Hazu Elementary School



Poster displayed at local shop



2-2 R&D Progress (Nishio City)

Nishio City: Studies and measures to make residential streets quieter

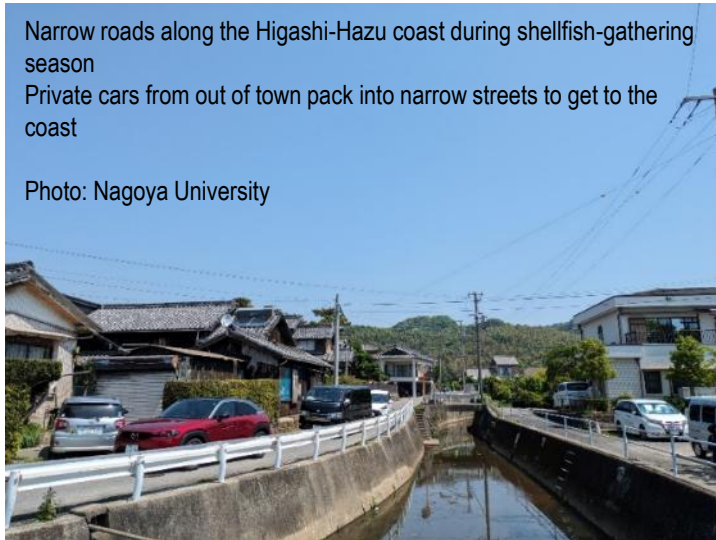
● Out-of-town visitors flock to the Higashi-Hazu coast during shellfish-gathering season, the majority by car

- Cars flood into narrow residential streets, causing congestion and safety issues
- The area needs a comprehensive solution that includes parking/parking information and mobility services
- Traffic flow was measured during peak season in FY2024 to build support for automated driving technologies
 - LiDAR was confirmed as a way to measure traffic flow (see right)
 - Visitors were also surveyed and studies were done on parking conditions



Narrow roads along the Higashi-Hazu coast during shellfish-gathering season
Private cars from out of town pack into narrow streets to get to the coast

Photo: Nagoya University



The Higashi-Hazu coast during peak shellfish-gathering season (Golden Week)

Photo: Nagoya University



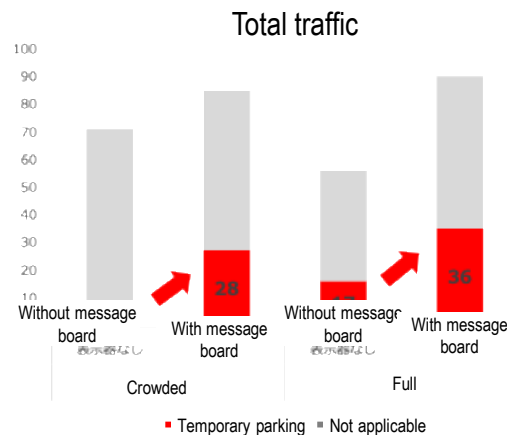
2-2 R&D Progress (Nishio City)

Nishio: Surveys and measures for reducing traffic noise on local roads (2025)

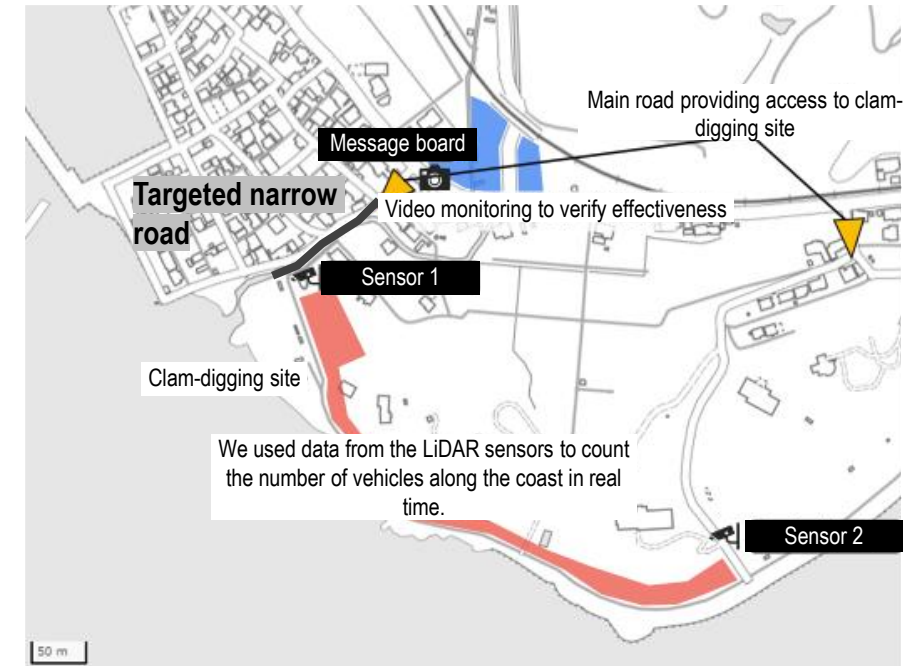
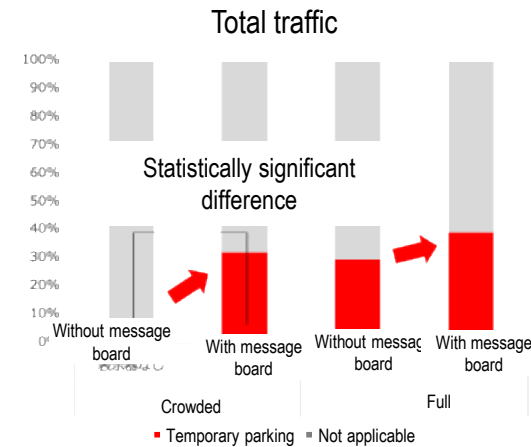
- Based on the results of the FY2024 pilot project, a parking guidance pilot project took place at the Higashi-Hazu coast in FY2025 (during Golden Week, when visitor numbers were high).
- Using self-driving technology developed as part of a self-driving project, we successfully measured the number of vehicles parked by visitors at a clam-digging site in real time using just two roadside LiDAR sensors.
- The calculated parking lot occupancy data was displayed on a variable message board installed at an intersection leading to a narrow road to evaluate its effectiveness at directing traffic to temporary parking lots further from the beach.

Percentage of vehicles by clam-digging visitors that use temporary parking lots
 → Increase in use of temporary parking lots when message board is present
 → This demonstrates the effectiveness of the message board for parking guidance and reducing the use of the narrow road.

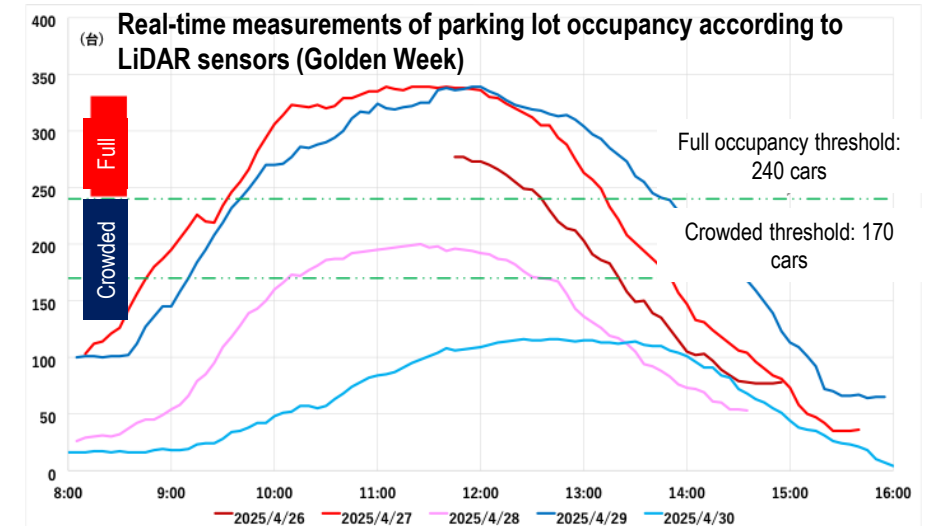
Number of cars



Percentage of cars



Real-time measurements of parking lot occupancy according to LiDAR sensors (Golden Week)



The pilot project results were reported in an international English-language journal:
 From Sensing to Impact: LiDAR-Based Parking Guidance for Narrow Streets in a Coastal Tourist Village
 Gen Hayauchi, Yasuhiro Akagi, Tomio Miwa, Yuki Matsui, Chiho Kenmochi, Takayuki Morikawa
 International Journal of Intelligent Transportation Systems Research, 2025
<https://doi.org/10.1007/s13177-025-00596-4>

2-2 R&D Progress (Nishio City)

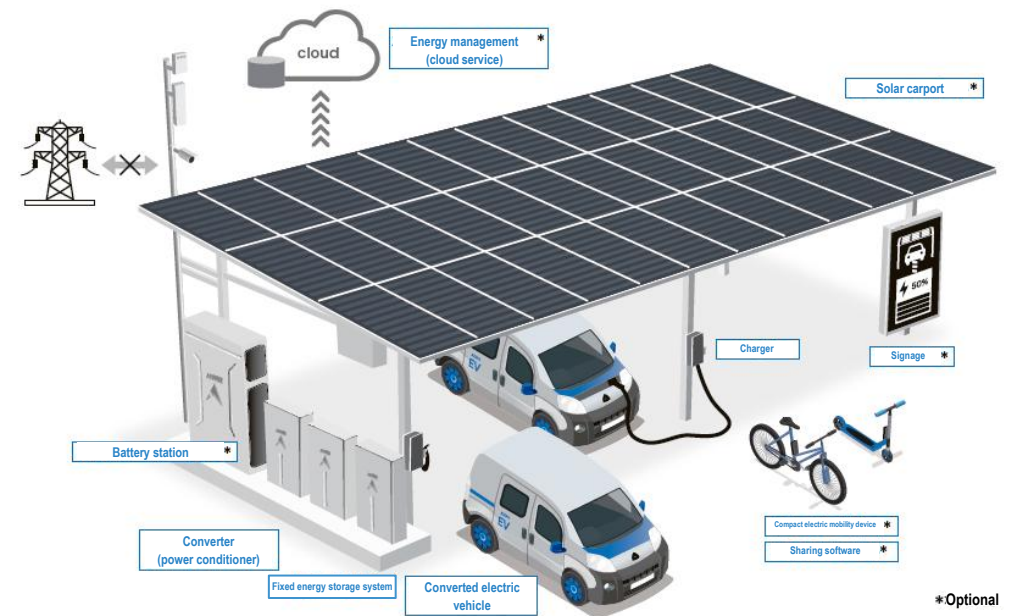
Nishio City: Setting up mobility hubs to serve as physical nodes

- **Rail (the Meitetsu-Gamagori line) is the primary form of public transportation in the Kira/Hazu area**
 - However, in-town and train-terminus mobility services are limited (the Ikomaika community taxi service is available for residents)
 - In March 2025, facilities such as EV charging stations were set up to support a Meitetsu-Gamagori Higashi-Hazu Station mobility hub to serve as a physical node
 - Service rollout in FY2025: We relocated existing bike-sharing stations to hubs and launched an electric kick scooter and electric-assist bicycle sharing service (to become a paid service at a later date).
 - To evaluate hub functionality, we will launch a continuous survey of stagnation and other factors using Wi-Fi packet sensors in July 2026.

The Mobility E-Station at Higashi Hazu Station (the facility on the left in the photograph)



Photo: Nagoya University



Source: AZAPA Co., Ltd. <https://azapa.co.jp/index.php/2022/10/14/e-station/>

2-2 R&D Progress (Accessibility)

Evaluating the accessibility of urban functions via public transport

BACK- GROUND

- The focus of local transportation planning and evaluation should be whether accessibility to urban functions is sufficiently ensured
 - Accessibility evaluations need to look beyond operational frequency and coverage. There is a lot of academic research on those indicators.
 - Practically speaking, however, the usual practice has been to evaluate circular areas around transportation nodes (coverage assessment) (aware of limited data/manpower)
 - In addition to the evaluation indicators that have been used to collect academic data so far, it is essential to have a system that is practical to use

AIMS

- Proposed an indicator for evaluating the level of local transportation services in terms of accessibility to urban functions (roundtrip)
- Set up and published a tool/system to easily calculate multiple indicators (compatible with standard data formats)



- Link academic data relevant to accessibility evaluations to planning and policymaking to improve quality and reduce manpower
- Create an accessibility planning platform* for local transportation planning and policymaking

*Takami, Kiyoshi. "Framework of Accessibility Planning and its Application to Spatial Planning in England". *Reports of the City Planning Institute of Japan* (2011). Vol. 10(3), pp. 145-148



Multiple concepts covered by LIPT (Livability Index by Public Transport)

- ❑ Newly proposed indicator: LIPT
- ❑ Set of easy-to-use calculation tools that include existing indicators: LIPT-sim

2-2 R&D Progress (Accessibility)

LIPT-sim rollout in JMDS

- The first round of LIPT-sim was installing a calculation tool compatible with the standard data format used in existing indicators
 - Existing indicators are based on PTAL/GMAL developed in the UK, and evaluate the level of public transportation services around a given point
 - The standard data format is General Transit Feed Specification (GTFS) for fixed time/fixed route transportation
- Installed the first-round LIPT-sim tool in the Japan Mobility Data Space (JMDS) digital sandbox in December 2024*
 - Through discussions with and advice from PDC/SPDs within SIP Smart Mobility, this was [the first installation of JMDS content via consortia collaboration](#)
 - Calculations are Japan-only for the time being, with GTFS data linked to the GTFS data repository developed and operated by AIGIT
 - There are plans to steadily improve/expand the current tool in terms of features and compatible indicators

〈The March 2025 update expanded two features and has already been released on JMDS〉

Now compatible with user-supplied data

- Users can now upload their own data, even if it is not in the GTFS data repository
 - Calculations now handle data outside of Japan along with virtual data in addition to Japan data that has not yet been recorded

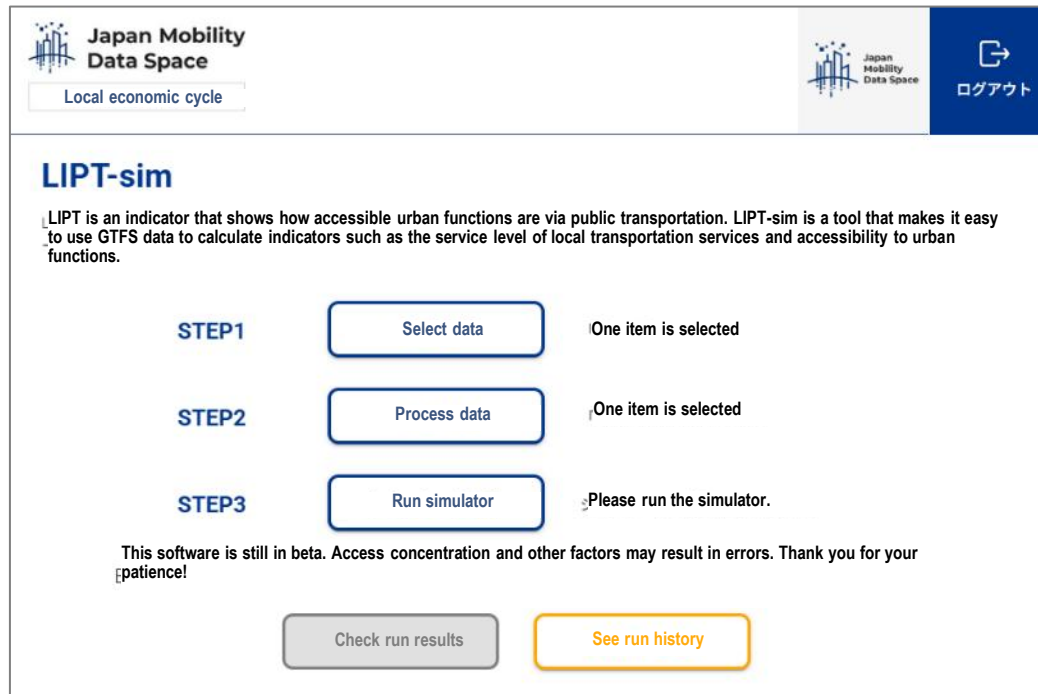
New standalone GTFS file selection feature

- There is now a standalone service in JMDS that allows for the selection of GTFS repository data tied to certain local government bodies
 - Given that local governments and operators do not correlate one-to-one in Japan, a feature was added where users can select a local government body to automatically select GTFS data for all mobility services operated within that jurisdiction. This added feature makes the tool even more convenient by pre-processing data for various types of analysis.

2-2 R&D Progress (Accessibility)

Rollout of LIPT-sim on JMDS (screenshot of phase-one tools)

Example screen



The screenshot shows the LIPT-sim interface. At the top, there's a header for "Japan Mobility Data Space" with a "Local economic cycle" dropdown and a "ログアウト" (Logout) button. The main section is titled "LIPT-sim" and includes a description: "LIPT is an indicator that shows how accessible urban functions are via public transportation. LIPT-sim is a tool that makes it easy to use GTFS data to calculate indicators such as the service level of local transportation services and accessibility to urban functions." Below this, there are three steps: STEP1 (Select data, One item is selected), STEP2 (Process data, One item is selected), and STEP3 (Run simulator, Please run the simulator). At the bottom, there are buttons for "Check run results" and "See run history". A disclaimer at the bottom states: "This software is still in beta. Access concentration and other factors may result in errors. Thank you for your patience!"

More intense colors indicate higher service density.

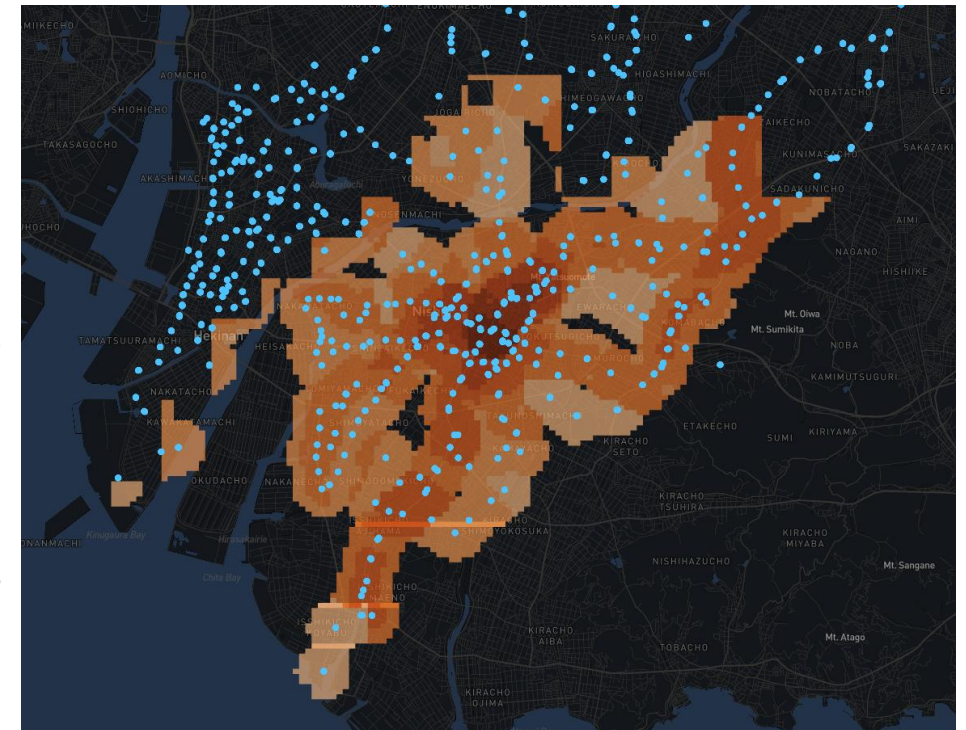


Works in a browser, can output GeoJSON and other data formats

- Upload GTFS data, or...
- Select the municipality you want to calculate for and retrieve the file from the GTFS data repository
- Calculate accessibility indicators
- Draw on screen and output results file

Example of calculation results output

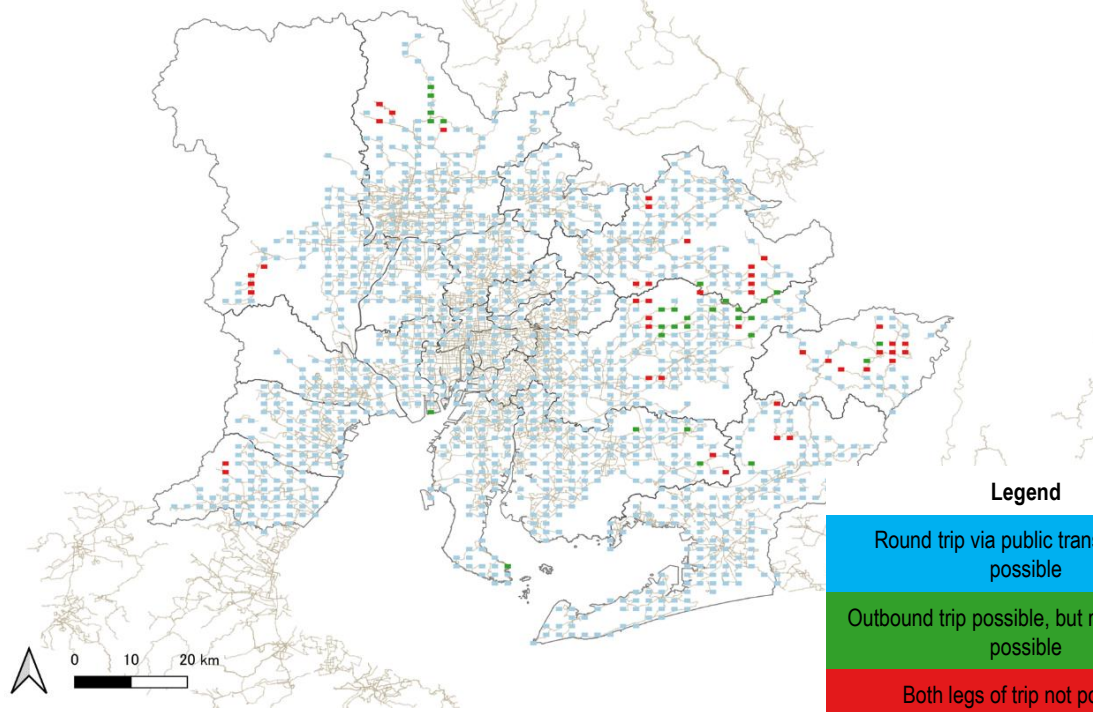
Example of calculations performed in Nishio, Aichi using data stored in the GTFS Data Repository (AIGIT) through an API



2-2 R&D Progress (Accessibility)

LIPT phase two: Developing indicators and calculation tools that take trip chains into account

- When the number of trips is limited (a few per day), the frequency-based indicators used in the phase-one tools do not provide a comprehensive enough perspective.
- The “trip chain” concept makes it possible to evaluate whether an appropriate travel time, arrival window, and time spent at current location can be achieved.
- FY2025 initiatives
 - As our initial step, we developed a decision-making tool using a commercial route search API (see figure below).
 - We continue to develop indicators that take travel costs and other factors into account, as well as tools that can calculate those indicators directly from GTFS data without the use of commercial APIs.



Sample calculation for the Greater Nagoya area:

Visits to supermarkets using public transportation between 10:45 and 11:15 a.m. on weekdays

There are 73 locations where, despite being within 300 meters of a bus stop, the results indicate that a trip chain using public transportation is impossible.

Hayauchi Gen, Yoshida Kensaku, Morikawa Takayuki (2025) “Towards a Livability Index by Public Transport (LIPT): Conceptual Framework and Tool Prototyping”, CASPT and Transit Data 2025



In the future:

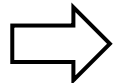
Develop discrete classification into indicator metrics.

+ We aim to develop a tool that can perform calculations based on GTFS data.

2-2 R&D Progress (Accessibility)

Efforts toward societal implementation and adoption of LIPT / LIPT-sim

- **We delivered an oral presentation on our LIPT initiatives at an international conference, CASPT and Transit Data 2025.**
 - Hayauchi Gen, Yoshida Kensaku, Morikawa Takayuki (2025) “Towards a Livability Index by Public Transport (LIPT): Conceptual Framework and Tool Prototyping”
- **We presented our LIPT initiatives at symposia and workshops.**
 - Oct 2025: Building the SiP Smart Mobility Platform – 2nd Public Symposium
 - Nov 2025: 72nd Infrastructure Planning and Management Research Conference – Fall Meeting
 - Mar 2026: Public Transportation Open Data Frontiers 2026 ...and more
- **We also provide explanations and presentations for prefectures and local governments that are responsible for developing regional public transportation plans.**
 - In the revised Kawasaki Regional Public Transportation Plan for FY2025, LIPT has been positioned as a monitoring tool for various public transportation initiatives.



We plan to continue our efforts toward widespread adoption and societal implementation.

2-2 R&D Progress (Development of a Self-Driving Car Prototype)

Results

Practical use of the prototype vehicle for mixed passenger/cargo transport (light vehicle) – Conducting a pilot project for home deliveries (personal mobility) on public roads

- **Implementing a delivery robot for personal mobility**

- The robot is an electric wheelchair-style personal mobility device that has been modified to enable cargo transport.
- It is equipped with LiDAR sensors and self-driving software to enable autonomous operation.
- It has been implemented with specifications that allow it to operate on public roads as a pedestrian-equivalent light vehicle.



- **Implementing automatic route-finding integrated with a delivery system**

- To achieve autonomous deliveries to homes, we have implemented a system that can generate autonomous driving routes between any two points rather than relying on predetermined waypoints.
- We implemented a system that finds optimal delivery routes based on instructions from the delivery system, and we verified its feasibility through a pilot program.



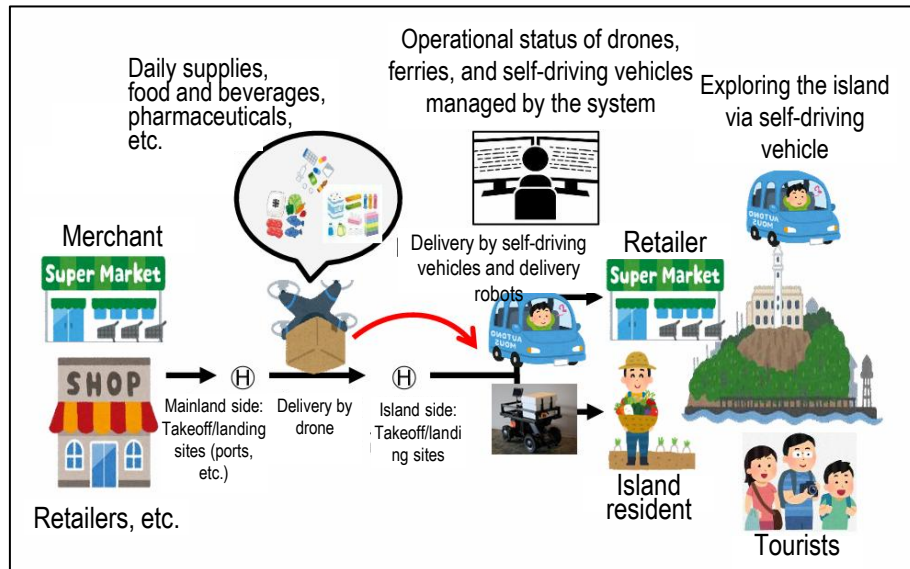
2-2 R&D Progress (Development of a Self-Driving Car Prototype)

Experiment Pilot project on public roads (Nishio, Aichi)

Dates: October 27 – November 28, 2025

Location: Sakushima Island, Nishio

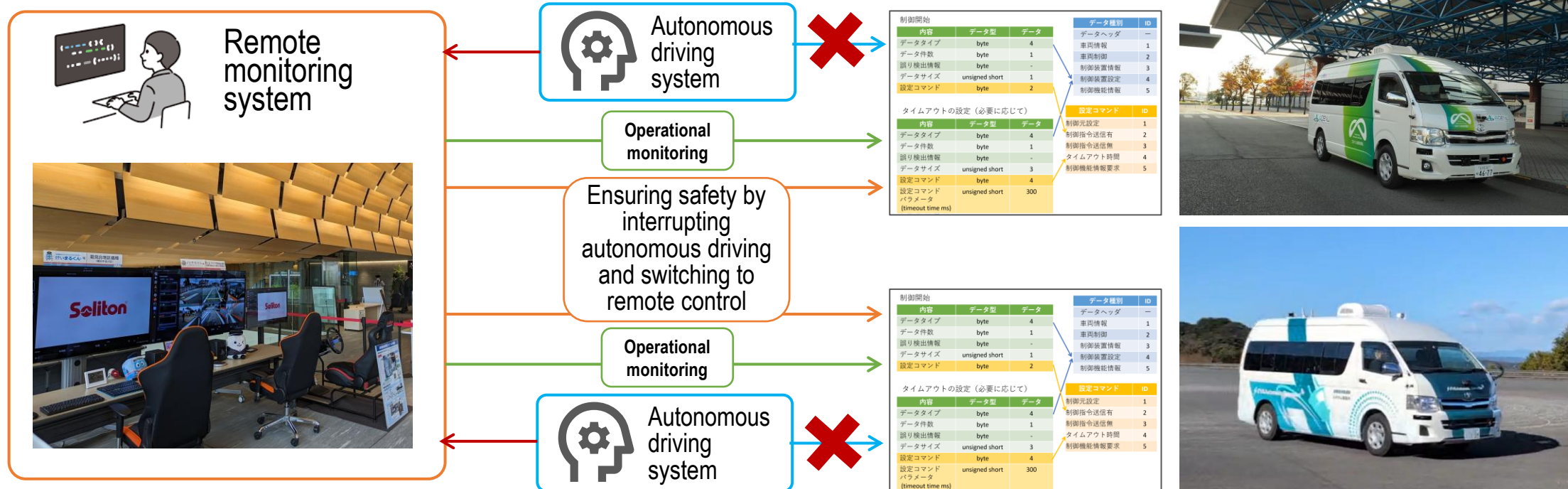
Implementation details: A mixed passenger/cargo delivery vehicle that utilizes drones and ferries (in collaboration with Aichi Prefecture's Aichi Mobility Innovation Project and MLIT's Smart Island Promotion Project)



2-2 R&D Progress (Development of a Self-Driving Car Prototype)

Results Expanded deployment of standard self-driving vehicles

- Systematic implementation based on self-driving vehicle control units with standard control specifications, jointly developed with Nagoya University and Tokyu Bus
- Implementation of a mechanism for managing vehicles remotely without the use of autonomous driving systems
- Implementation of an operational experiment that involves switching to remote control during autonomous driving



2-2 R&D Progress

International collaboration through a Nagoya University-led project team

- ❑ **Strengthening relationships with partners** by building on this project's other achievements and activities from previous years
- ❑ Building relationships through mutual learning and sharing of knowledge **between Japan and other countries** instead of one-way sharing by Japan with other countries



Partner activities with Thailand

- **Taking advantage of summer school for student exchange activities**
 - In August 2025, as part of the Nagoya University project team's efforts to address mobility challenges, we planned out some summer school fieldwork that was jointly hosted by Chulalongkorn University and Nagoya University, and we provided the status of LIPT research with Thai and Japanese students as input for that fieldwork.
 - We also invited a researcher with whom we have been collaborating to deliver lectures as part of our efforts to build sustainable relationships and foster collaborative activities.
- **Taking advantage of Mobility Innovation Week to conduct activities**
 - As part of our ongoing collaboration, we invited researchers from Chulalongkorn University to attend Mobility Innovation Week, held in Tokyo in November, and asked them to speak at the event.
 - We held mutual two-way discussions on mutual challenges facing Japan and Thailand, which produced tangible results.



Partner activities with Australia

- **Workshop with the University of Sydney**
 - In December 2025, we held a joint workshop with the University of Sydney to share the results of our research with a wider audience. We also organized and presented at a Japan-Australia collaboration session at TDM 2025 in Sydney, which involved a public discussion regarding the respective situations and perspectives of our two countries.
- **Workshop with the University of Western Australia**
 - In February 2026, we held a workshop with the University of Western Australia. In collaboration with the Oricon project team and the University of Tokyo international collaborative project team, we exchanged research information involving various research topics related to the SIP Smart Mobility project. This also served as an opportunity for collaboration with other project teams involved with SIP.

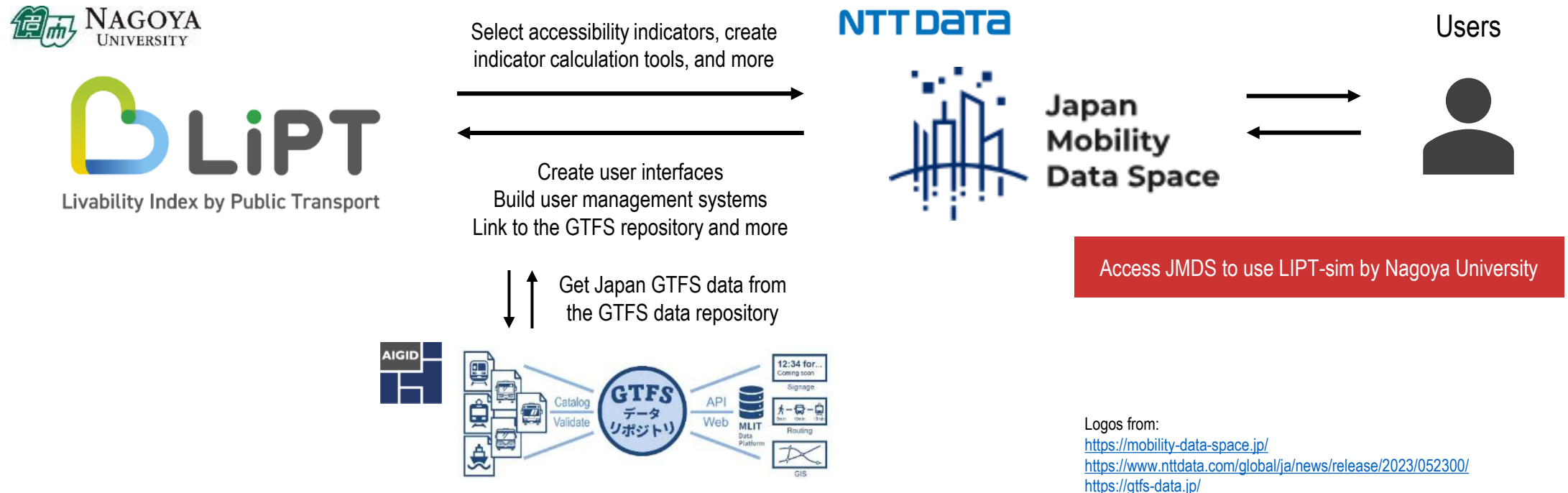


2-3 Other consortia, themes, and ministerial collaborations

LIPT-sim rollout in JMDS

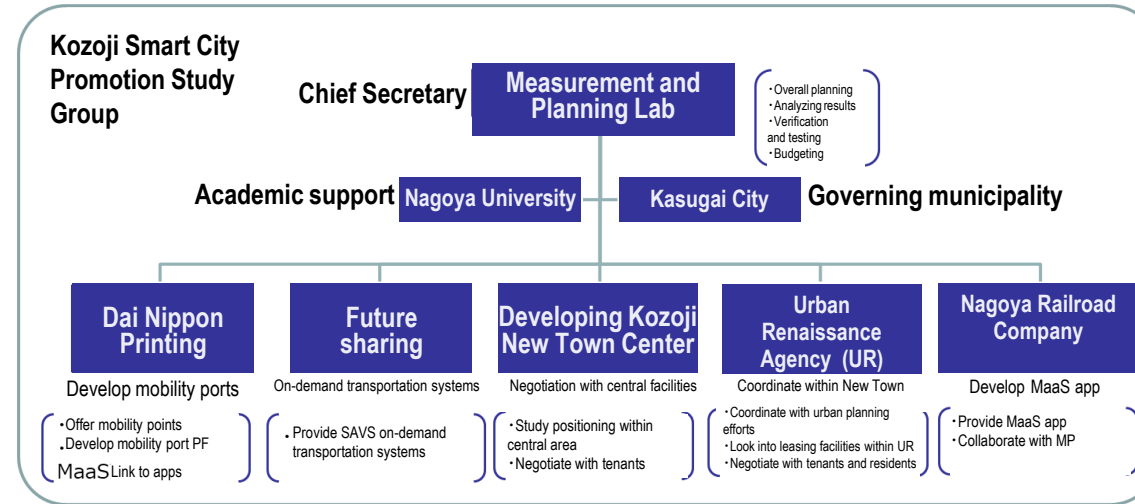
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 - Calculations are Japan-only for the time being, with GTFS data linked to the GTFS data repository developed and operated by AIGIT
 - There are plans to steadily improve/expand the current tool in terms of features and compatible indicators

Linked with JMDS for quick install and safe user management



2-3 Other consortia, themes, and ministerial collaborations

National and prefectural support for the Kozoji New Town mobility hub tests

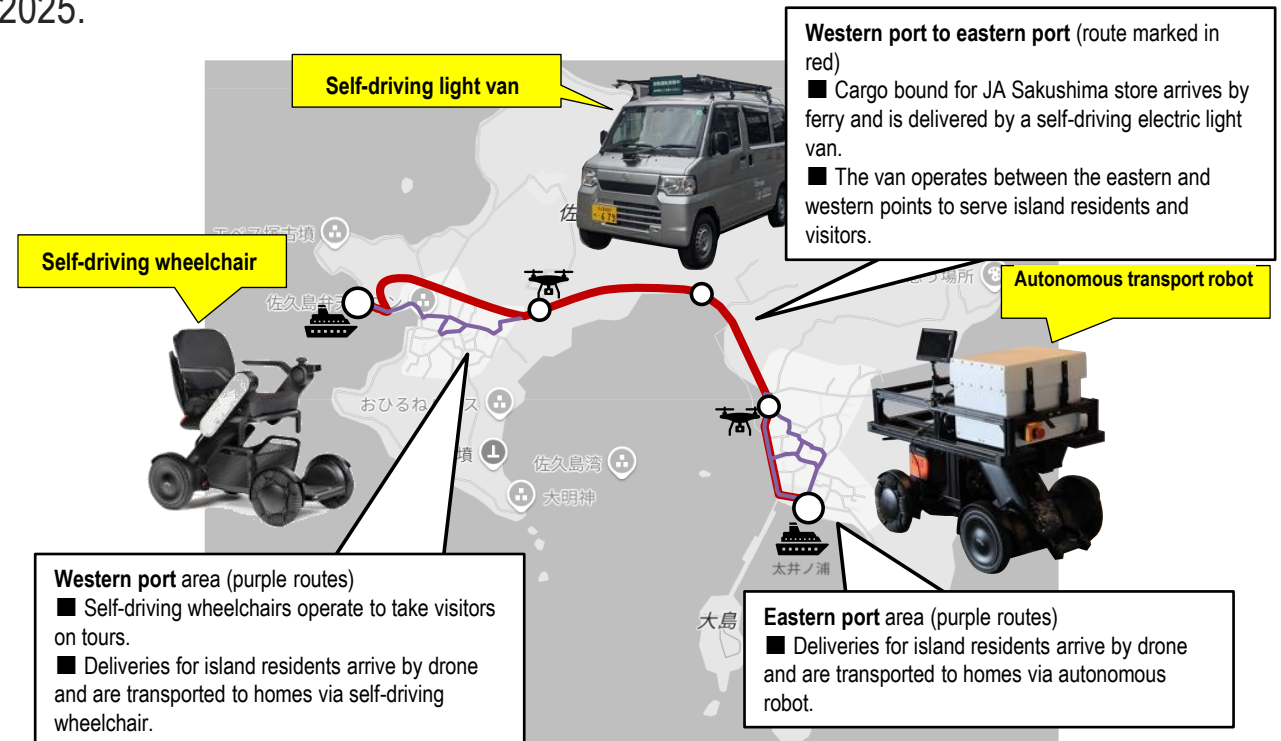
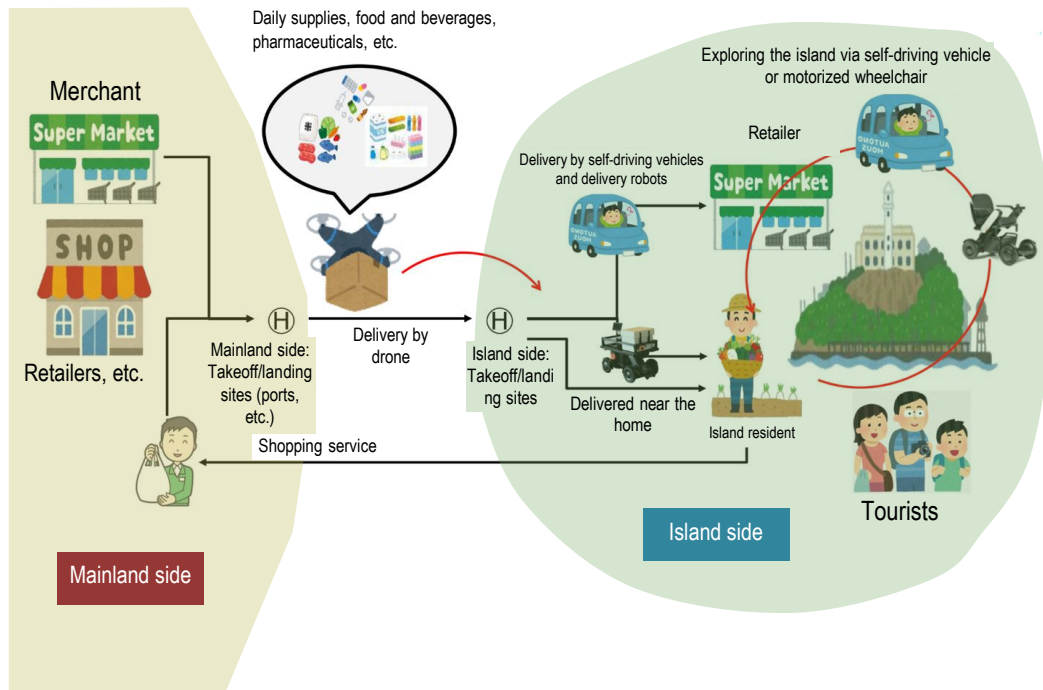


	FY2022	FY2023
Implementation period	January 30–March 3, 2023 (33 days)	January 9–May 24, 2024 (137 days)
Ports established	Five locations: Apita Building, Gruppo Fujito, Fujiyamada, Tokai Memorial Clinic, Tokushukai General Hospital)	Six locations: Apita Building, Gruppo Fujito, Fujiyamada, Tokai Memorial Clinic, Tokushukai General Hospital, Kozoji Station) Note: Reduced to four locations (eliminated medical facilities) after February 10
Mobility services offered at ports (functions that could be used with signage)	Bicycle share (rental/return) On-demand transportation services (dispatch request) City buses (route search, timetables)	Bicycle share (rental/return) On-demand transportation services (dispatch request) City buses (route search, timetables) Electric wheelchairs (rental/return) Note: Transportation IC cards could be used for rentals and other fees
MaaS app tie-up	None	Tie-up with the Move! Kasugai MaaS app
Financial support (funded projects)	- Smart City Implementation Support Project, City Bureau, MLIT - Independent development by Dai Nippon Printing	- Japan MaaS Promotion and Support Project, Policy Bureau, MLIT - Smart City Promotion Project, Aichi Prefecture - SIP Term 3 and other projects, Nagoya University - Independent development by Dai Nippon Printing and Nagoya Railway Company

2-3 Other consortia, themes, and ministerial collaborations

Collaboration with Aichi Model 2030: Connecting Sky and Road, which is part of the Aichi Mobility Innovation Project

- We developed a logistics model for islands that utilizes drones, ferries, self-driving vehicles, and autonomous transport robots on Sakushima Island in Nishio and conducted a one-month-long pilot project.
- We were selected under MLIT's Smart Island Promotion Project to collaborate with Aichi Prefecture and other partners on developing a pilot project.
- We developed a system that automatically assigns delivery routes for purchase and delivery orders received from Sakushima Island.
- Drones and ferries are used to transport ordered goods between the mainland (Isshiki Port in Nishio) and Sakushima Island. They are then delivered to customers via light vans or autonomous transport robots.
- This pilot project took place from October 30 to November 28, 2025.



2-4 R&D support from outside the consortia

- In addition to ventures originating at Nagoya University, we provide opportunities for local ventures in Aichi Prefecture by incorporating them into the framework.
- In collaboration with the the “Aichi 2030 model linking the roads and the skies” Aichi Mobility Innovation Project, we are building partnerships with drone startup companies and mobility startups such as Map-NAGOYA, part of the Chubu Economic Federation.
- Regular meetings are held involving Nagoya University, local transportation operators (Meitetsu), local governments (Nishio City), and companies capable of providing various solutions (AZAPA Engineering) as a platform for discussion. Nagoya University, Nishio City, and AZAPA Engineering in particular signed an MOU for three-way partnership and collaboration at the start of the SIP.

Support from Meitetsu Tobu Transportation

- Hazu in Nishio City is one of the areas where Meitetsu Tobu Transportation was founded
- Support for testing (in addition to advice when building systems)
- Support with extended rollout of developed systems (planned)



Sales office in front of Higashi-Hazu Station in the late 1950s

Kasugai City

- Signed a Cooperation and Collaboration Agreement with Nagoya University (March 2021)
- Introduced advanced mobility initiatives in Kozoji New Town under the regional public transportation plan
- Shared a vision for the Kozoji “Renew” Town Plan
- Conducted testing and discussed implementation of the Kozoji Smart City Action Plan (Urban Bureau, MLIT)

4 先進技術の活用による移動手段の確保
 <施策の内容>
 高蔵寺ニュータウンなど、丘陵地にある地形条件から、高齢者などがバス停へ移動する際に身体的負担が大きい状況にある地域は、地域生活交通を確保するエリアとして位置づけられています。そのような地域では、高齢者の生活環境の向上と多世代層の住居の確保に向け、団地内の店舗や最寄りバス停への移動について更なる人的資源で支援するため、先進技術を活用した自動運転車両によるラストマイル自動運転やA1オンデマンド乗合サービスなどの移動手段の導入を図ります。

■自動運転車両の実証実験（2019年） ■指乗りタクシー実証実験（2019年）

＜施策の実施主体・スケジュール＞

施策	実施主体	2021年	2022年	2023年	2024年	2025年
① ラストマイル自動運転の導入	名古屋大学 春日井市	実証実験	本格運行			
② A1オンデマンド乗合サービスの導入	名古屋大学 春日井市	実証実験	本格運行			



Aichi Prefecture

- Collaborated with the SIP Nagoya University Consortium to develop a remote-island logistics model utilizing drones between Isshiki and Saku Island
- Frequent drone deliveries between Isshiki Port and Saku Island were tested October 7–November 5, 2024
- In FY2025 there are plans to build a mobility hub on Saku Island and test mixed cargo-passenger runs using EVs and self-driving EVs in addition to drone logistics

