

AI On-Demand Bus Service "KnowRoute"

Impact Report

Introduction

This report presents an evaluation and summary of the social impact generated by “KnowRoute,” an AI-driven on-demand bus service operated by Next Mobility Co., Ltd., a joint venture between Nishi-Nippon Railroad Co., Ltd.(Nishitetsu) and Mitsubishi Corporation.

Next Mobility aims to help solve many of the challenges facing Japan’s regional transportation systems through the deployment of KnowRoute, thereby contributing to the realization of a society in which local residents can continue living with ease and enjoy the freedom of movement.

Through this report, we hope readers will gain a better understanding of the issues we are working to address, the approaches we are taking toward solutions, and the actual contributions we are making to society.

The impact analysis and preparation of this report were carried out with the support of Mitsubishi Research Institute, Inc..

What is the AI On-Demand Bus "KnowRoute"?

KnowRoute is an on-demand shared transportation service that flexibly adjusts its route in response to passenger requests, combining characteristics of both fixed-route buses and taxis. It utilizes digital technologies such as AI and has the following key features:

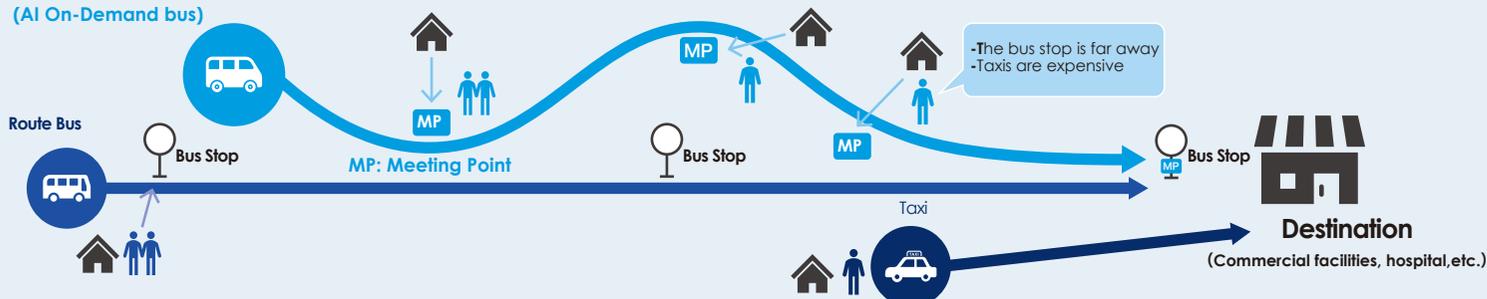
Features of KnowRoute

- Passengers can easily request rides via app, website, or phone.
- AI continuously learns from operational data to improve dispatch accuracy and efficiency.
- Compact vehicles offer shared rides based on demand, maximizing convenience and operational efficiency.
- Computerized guidance and dispatch reduce the need for human intervention.
- Municipalities can access operational data to assess current conditions and implement improvements.
- With a regular Class 2 license, the pool of eligible drivers expands.

Differences Between KnowRoute (AI On-Demand Bus), Route Buses & Taxis

	Route Bus	KnowRoute (AI On-Demand Bus)	Taxi
Operation Route	Operates only on fixed routes	Can operate flexibly anywhere	Can operate flexibly anywhere
Route Generation	Requires prior schedule creation	AI automatically generates optimal routes	None
Reservation	Not required	Required via app or phone	Required as needed
Schedule	Fixed	Flexible	Not available
Pick-up/Drop-off Locations	Bus stops	Designated Meeting Points	Anywhere

KnowRoute (AI On-Demand bus)



※ “KnowRoute” is a registered trademark of Next Mobility Co., Ltd. In some municipalities or service areas, the service may be operated under a different name. In addition, Next Mobility Co., Ltd. offers a wide range of public transportation solutions—not limited to bus alternatives—including shared taxis and public ride-sharing services.

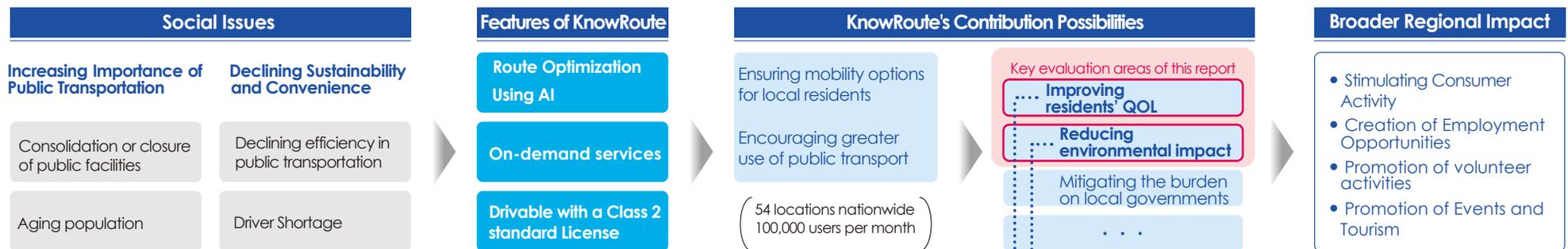
Social Issues Addressed by “KnowRoute”

In recent years, particularly in rural areas, the importance of public transportation has been growing due to a range of factors: the consolidation or closure of hospitals, schools, and public facilities; the decline of nearby retail outlets; and the increasing number of older adults returning their driver's licenses. At the same time, however, there has been a decrease in the operational efficiency and fare revenue of traditional public transportation—such as fixed-route and community buses—due to driver shortages and population decline. This has led to service reductions and route eliminations, resulting in lower convenience and further declines in ridership, creating a negative cycle.

KnowRoute addresses these challenges by offering on-demand, AI-optimized shared transit services that enhance both convenience and operational efficiency. This enables the use of smaller vehicles, which can be driven with a standard Class 2 driver's license* rather than the large-vehicle license traditionally required for buses—thereby helping alleviate the driver shortage. As a result, the service is expected to contribute to the long-term sustainability of local public transportation systems.

In this report, we conducted an analysis and assessment focused on two major areas of impact created by KnowRoute: improvements in residents' quality of life (QOL) and reductions in environmental impact.

Social Issues Addressed by KnowRoute and Its Potential Contributions



Overview of Underlying Issues

Improving Residents' Quality of Life

- The population living in "public transportation-deprived areas"—where the distance from home to the nearest station or bus stop exceeds a certain minimum distance—ranges from 2.36 million to 26.51 million people nationwide in Japan.
- In rural areas, survey results indicate that approximately 40% of residents cannot maintain their daily lives without driving a car, due to declining access to public transportations.^{※2}
- This poses a critical challenge to the daily lives of older adults, particularly those whose physical or cognitive decline makes driving difficult. Health concerns have also been raised due to reduced access to medical care as a result of limited mobility.
- Young people who have not obtained a driver's license or do not own a car experience limitations in mobility and autonomy, resulting in decreased convenience in daily life. In addition, middle-aged individuals often bear the burden of transporting children and elderly dependents, which negatively impacts their overall quality of life.^{※4,5}
- These challenges are seen as long-term drivers of population outflow and a decline in regional attractiveness.

Reducing Environmental Impact

- A particularly important environmental issue in Japan's domestic transportation sector is CO₂ reduction. The transportation sector, including public transit, accounts for around 20% of Japan's total CO₂ emissions^{※6}. The government aims to significantly reduce these emissions by 64–82% compared to 2013 levels by 2040^{※7}, making countermeasures an urgent priority.
- Within municipal CO₂ emissions, the transportation sector—including buses and private vehicles—is a major source. In Munakata City (the subject of this study), it accounts for approximately 40% of total emissions, while in Shiojiri City, the share is around 20%^{※8,9}.
- On a per-capita, per-kilometer basis, CO₂ emissions are generally lower for buses than for private cars^{※10}. Therefore, shifting transportation from private cars to buses, along with improving bus occupancy rates, is essential to reducing emissions in the transportation sector..
- However, if the total travel distance or number of users increases, overall CO₂ emissions may rise compared to those from conventional community buses.

※Note: Assumes vehicles with a capacity of 10 passengers or fewer. Sources: 1, 2, 4, 6, 10: Ministry of Land, Infrastructure, Transport and Tourism (MLIT); 3: Mobility Platform Operators Council; 5: Ministry of Health, Labour and Welfare; 7: Ministry of the Environment; 8: Munakata City; 9: Shiojiri City

Improving Residents' QOL (Overview)

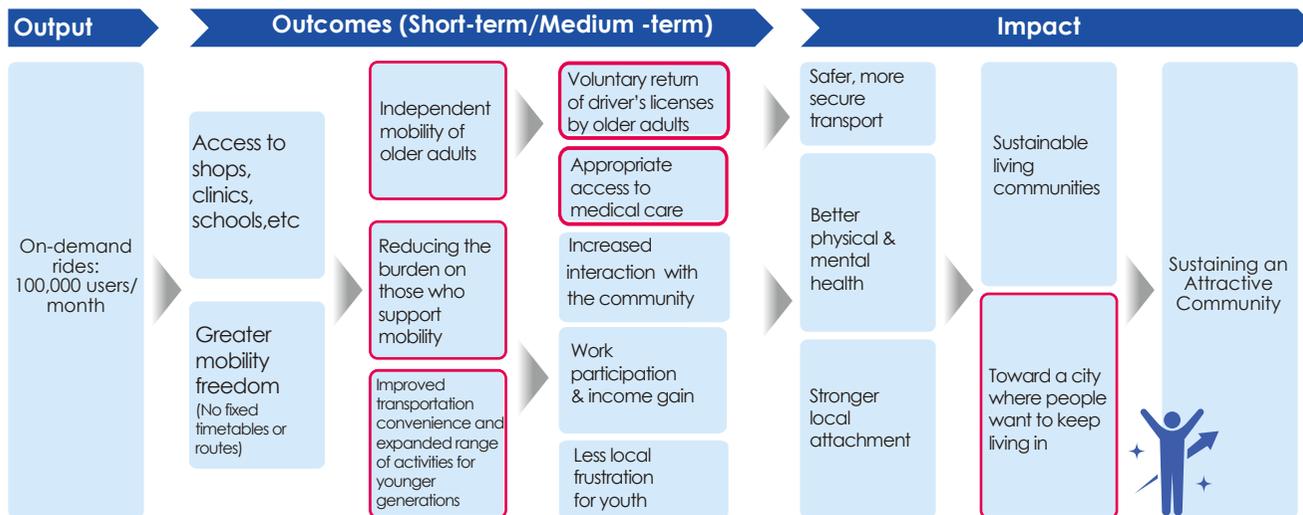
In selecting the outcome and impact indicators for this report, we focused on those outlined in the red frame, emphasizing both the importance of these issues to residents and society at large, as well as the potential contribution of KnowRoute.

We conducted user surveys and on-site interviews in two municipalities currently operating KnowRoute—Shiojiri City in Nagano Prefecture and Munakata City in Fukuoka Prefecture. In addition, we obtained operational data from the municipalities and interviewed relevant stakeholders. Based on these inputs, we carried out both quantitative and qualitative analysis to assess the impact of the service.

Improving Residents' QOL Logic Model

: Key elements evaluated in this report

Evaluation Methodology



	Survey (Online + In-Person)	Interviews (In-person)
Shiojiri City	<ul style="list-style-type: none"> Period July 8–16, 2025 Number of respondents 345 	<ul style="list-style-type: none"> Period July 8–9, 2025 Number of respondents 33
Munakata City	<ul style="list-style-type: none"> Period July 24–29, 2025 Number of respondents 52 	<ul style="list-style-type: none"> Period July 24–25, 2025 Number of respondents 20

The interviews were principally conducted with respondents who had completed the survey.

Shiojiri City (Nagano Prefecture)

City Overview

Area: Approximately 289.98 km² Population: 65,000

Status of Public Transportation and the City's Transportation Plan

Since the withdrawal of private bus operators in 1998, the city has outsourced the operation of community buses. However, declining population, diversification of mobility needs, and a chronic shortage of drivers have contributed to a steady decline in ridership, posing serious challenges. In response, the city formulated a Regional Public Transportation Plan in 2021, which includes as one of its four core policies the "establishment of an efficient regional public transportation system utilizing on-demand services and new technologies." As part of this plan, KnowRoute was introduced in April 2022 in a phased manner by partially replacing the functions of the community buses.

Operational Overview of KnowRoute in Shiojiri

Pick-up/drop-off points: 381 locations
Service area: Central urban area, Shiojiri East, Hirooka, Yoshida, Kataoka
(Population: approx. 52,000; Area: approx. 38 km²)



Munakata City (Fukuoka Prefecture)

City Overview

Area: Approximately 119.94 km² Population: 97,000

Status of Public Transportation and the City's Transportation Plan

In the Hinomoto district in the western part of the city, KnowRoute has been in operation since March 2021 as an alternative transportation service following the discontinuation of fixed-route buses. After a two-year pilot phase, the service continues to operate to this day. Based on the outcomes of the pilot, KnowRoute was evaluated as a potentially viable form of regional public transportation under certain conditions, with potential to contribute to regional revitalization. As a result, in the city's Regional Public Transportation Plan formulated in 2024, KnowRoute is positioned alongside existing community buses as one of the key transportation services under the policy goal of "maintaining and enhancing transportation services that improve mobility convenience."

Operational Overview of KnowRoute in Munakata

Pick-up/Drop-off Points: 66 locations
Service Area: Hinomoto District (Population: approx. 12,000; Area: approx. 5 km²)



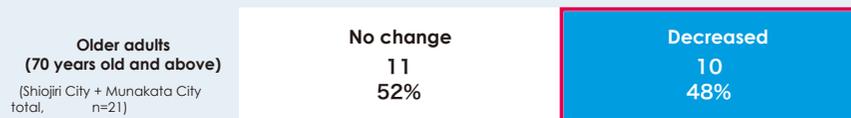
Improving Quality of Life for Residents (Evaluation Results)

Independent mobility of older adults/ Reducing the burden on those who support mobility

Approximately half of older adults experienced a decrease in the frequency of rides provided by family members or acquaintances
/Contributing to freer mobility without hesitation

- Among respondents aged 70 and over who had previously been given rides by family members or acquaintances before using KnowRoute (a total of 21 in Shiojiri City and Munakata City), 10 respondents (48%) answered that the frequency of such rides had decreased.
- It can be observed that those who do not own or cannot use a car are able to go out freely with KnowRoute and actively participate in shopping, hobbies, and volunteer activities.
- Additionally, cases were confirmed where KnowRoute contributed to reducing the burden on family members and acquaintances who provide transportation for the older adults and others.

Changes in weekly rides provided by family members or acquaintances before and after using KnowRoute (Respondents aged 70 and over, total of 21 people from Shiojiri + Munakata)



Shiojiri City, in her 80s

I live with my daughter, but she works on weekdays, so I cannot ask her for rides. Sometimes neighbors help, but I feel uneasy. Being able to shop freely is a great help.



Shiojiri City, in his 50s

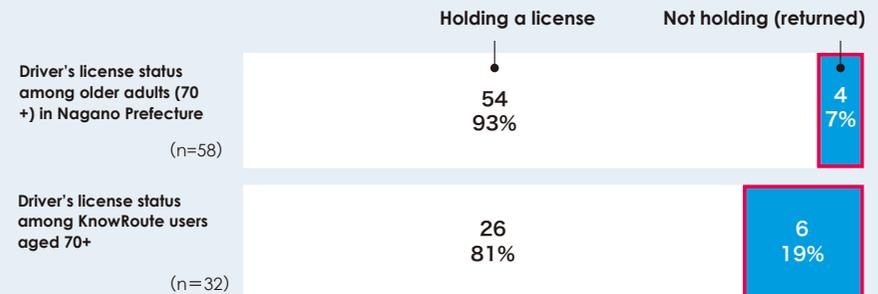
My mother, who has trouble walking, uses KnowRoute more than three times a week. It is a great help since our family cannot drive her on weekdays.

Voluntary return of driver's licenses by older adults

A high proportion of KnowRoute users have already returned their driver's licenses, and KnowRoute is supporting the mobility of these individuals.

- In Shiojiri City, 19% (6 out of 32) of survey respondents aged 70 and over had already returned their driver's licenses, a higher proportion compared to the overall figure for Nagano Prefecture※1 (7%).
- It can be inferred that KnowRoute is supporting the mobility of older adults who have returned their driver's licenses.

Driver's license status among older adults (70+) in Nagano Prefecture (n=58)



Shiojiri City, in her 90s

I returned my driver's license this spring. Since I can only ask my family for rides on Sundays, KnowRoute has been very helpful for shopping and medical visits on weekdays.

※1 The data for Nagano Prefecture is cited from Mitsubishi Research Institute's Consumer Market Forecast System (mif).

※2 n Munakata City, 7 respondents were aged 70+, and 6 (86%) had returned their licenses. Due to the small sample size, these results are shown as reference only, with the graph displaying Shiojiri City data

Improving Quality of Life for Residents (Evaluation Results)

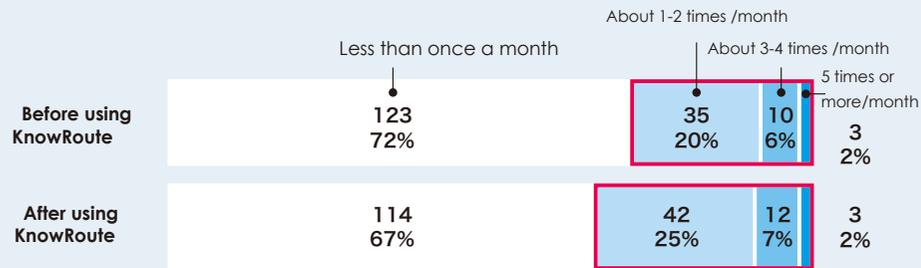
Appropriate access to medical care

The frequency of medical visits increased after the introduction of KnowRoute. This suggests that the service may have reduced instances of patients refraining from seeking care due to limited transportation options.

- In Shiojiri City and Munakata City, 171 respondents (43%) reported using KnowRoute for medical visits. Among them, the proportion of those visiting a medical facility at least once a month increased from 28% before using KnowRoute to 34% after its use.
- These results suggest that KnowRoute may help to reduce instances of patients refraining from seeking medical care due to lack of transportation options, particularly among those who cannot drive.

Change in Hospital Visit Frequency After Using KnowRoute

(Respondents using KnowRoute for hospital visits, total of 171 from Shiojiri + Munakata)



Munakata City, in her 80s

I use KnowRoute for my medical visits, and it has been extremely helpful.



Shiojiri City, in her 40s

I have been using KnowRoute for medical visits for the past two to three years. Although I cannot drive, KnowRoute allows me to travel comfortably even in rain or snow.

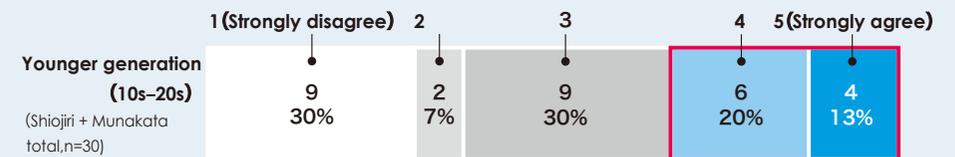
Improved transportation convenience and expanded range of activities for younger generations

Contributing to expanded activity range and greater mobility for one-third of younger people.

- Among 30 respondents in their teens and twenties (from Shiojiri City and Munakata City combined), 10 (33%) answered that their range of activities had expanded through the use of KnowRoute.
- Positive feedback was received regarding the ability to travel freely without having to worry about the availability of drivers or bus timetables.

Responses to the question: "Has the introduction of KnowRoute expanded your range of activities?"

(Respondents aged 10-20, total of 30 from Shiojiri City + Munakata City)



Munakata City, in his teens

I usually travel by car with my mother, but when that is not possible, I use Knowroute. It gives me a sense of security knowing that I can go where I want on my own.



Shiojiri City, in her teens

I use Knowroute when I am caught in sudden rain on my way home from high school or when I come home late at night. I appreciate not having to ask anyone for a ride.

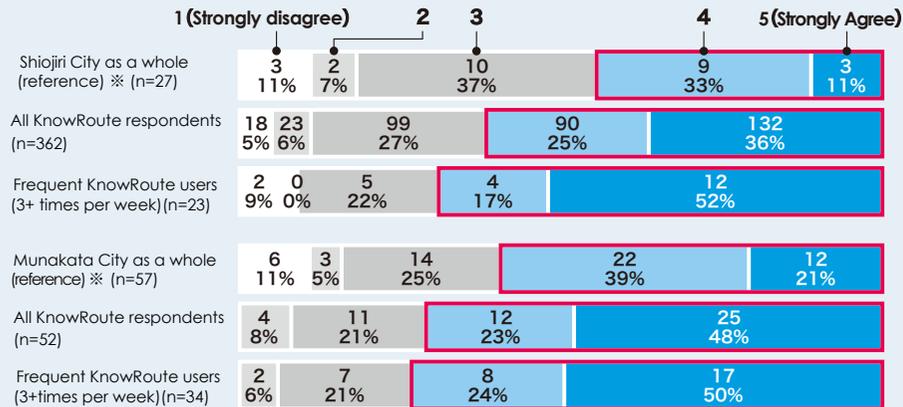
Improving Quality of Life for Residents (Evaluation Results)

Toward a city where people want to keep living in

Residents who use KnowRoute frequently show a stronger desire to continue living in the area.

- The intention to "continue living in this area in the future" was particularly strong among high-frequency users of KnowRoute (three times a week or more) in both Shiojiri City and Munakata City. This suggests that KnowRoute may contribute to maintaining and enhancing the attractiveness of the community.

Responses to "Do you want to continue living in this area?"



KnowRoute makes commuting and shopping easy, so it's very comfortable to live here.

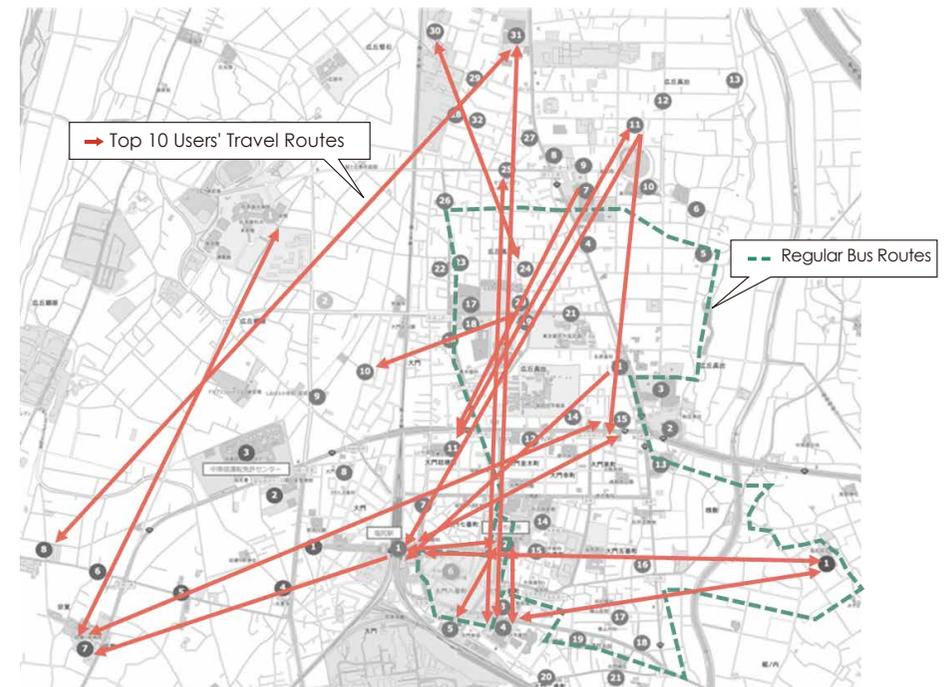
※ The data for Shiojiri City and Munakata City is cited from Mitsubishi Research Institute's Consumer Market Forecast System (mif).

KnowRoute is widely used for travel within the city center as well as between surrounding areas, improving the freedom and flexibility of mobility.

- From the data during the demonstration period in Shiojiri City (FY2021), travel patterns were observed with KnowRoute that differed from conventional transport modes such as taxis and buses, including short-distance travel within the city center and trips between surrounding areas.
- It can be inferred that KnowRoute has created new travel demand and enhanced the freedom and flexibility of mobility for its users.

Movement patterns of KnowRoute Shiojiri's top 10 users

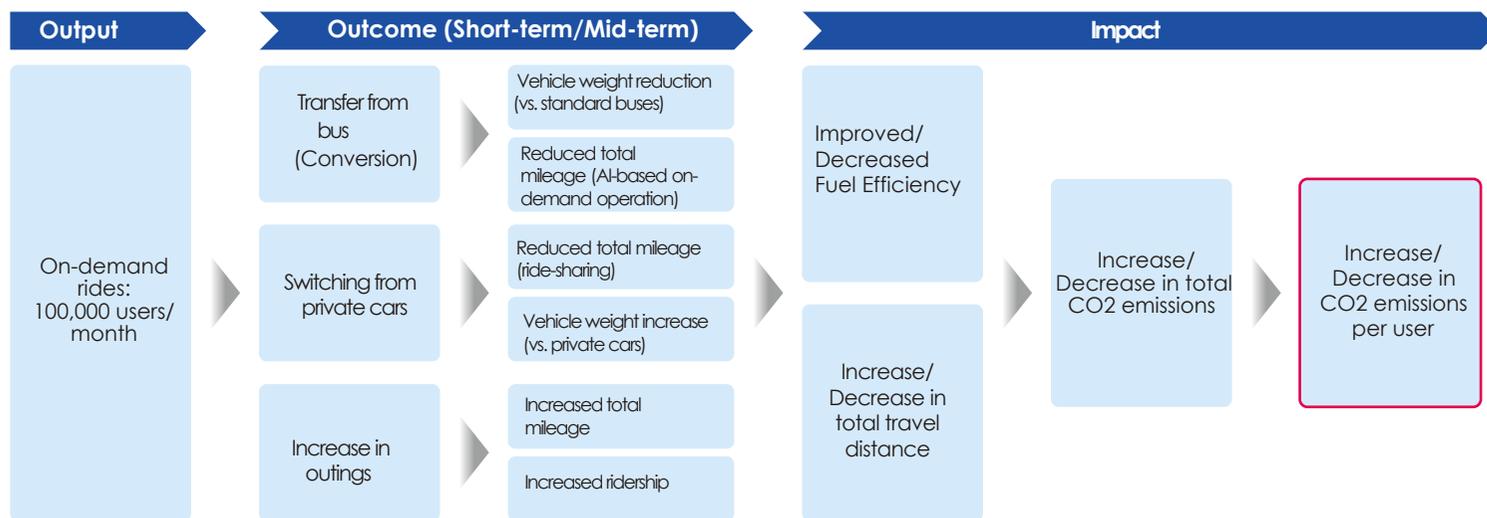
(The route shown below was used during the pilot period in fiscal year 2021)



Environmental Impact Reduction (Overview/Evaluation Results)

Outcomes and impacts were evaluated based on the importance of social issues and KnowRoute's potential contribution. Indicators were set based on the perspectives indicated in the red frame. Analysis was conducted using data provided by the municipalities and publicly available information.

Environmental Impact Reduction



Evaluation Methodology

- We analyzed the operational data (fuel costs, mileage, etc.) provided by Shiojiri City for the pre-operation (community bus and route bus) and post-operation periods.
- We conducted interviews with relevant organizations in Shiojiri City and personnel from the operating companies.

Evaluation Results

Improved transportation efficiency reduced CO2 per user and per travel distance by 18% and 27%, respectively

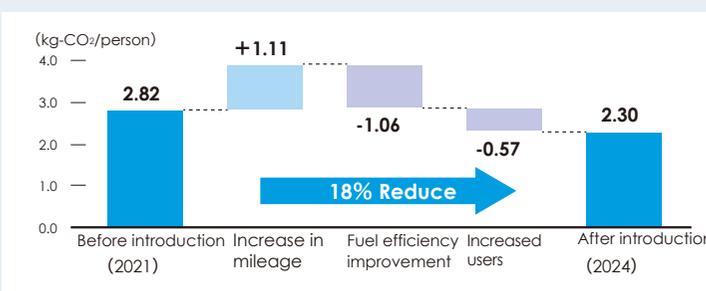
- In Shiojiri City, the total CO₂ emissions slightly increased (+2%) after the introduction of KnowRoute, but this was outweighed by a larger increase in annual ridership (+25%) and total mileage (+39%).
- As a result, CO₂ emissions were estimated to be reduced by 18% per person and 27% per unit of travel distance.

Calculated based on fuel cost, user numbers, and mileage data provided by the municipality as follows.

- Fuel consumption [L] was calculated by dividing fuel costs by the fuel price [¥ / L] for each fiscal year (FY2021/FY2024) (fuel type, Nagano Prefecture).
- Fuel consumption [L/year] × CO₂ emissions per liter for fuel type [kg/L] = CO₂ emissions [kg/year]
- CO₂ emissions per liter of fuel type [kg/L] (gasoline or diesel depending on vehicle type) were referenced from the Emission Factor List (FY2023 Edition) under the Greenhouse Gas Emission Calculation, Reporting, and Disclosure System.
- The reduction margin due to increased users is calculated from the difference between the per-person emissions assuming the same number of users in 2021 and 2024 and the actual per-person emissions in 2024

※ Only results for Shiojiri City, where data was available to calculate CO₂ emissions before and after the KnowRoute introduction, are presented.

Per-User CO₂ Emissions Before and After KnowRoute Shiojiri Implementation (2021: 10 community bus routes, 2024: 5 community bus routes + KnowRoute)



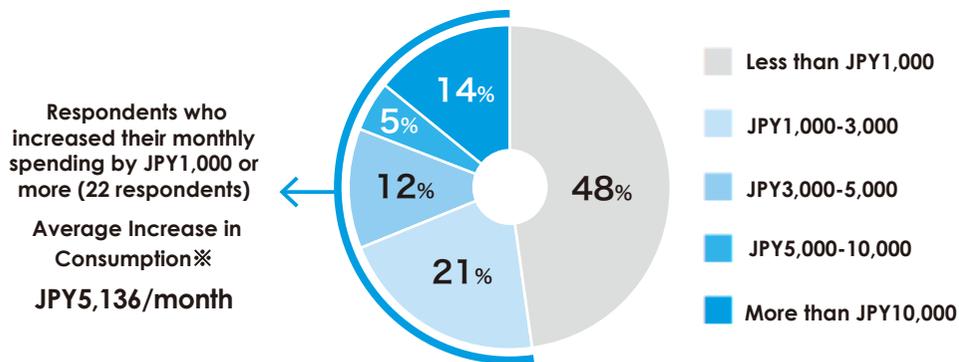
Regional Ripple Effects (Overview)

Beyond the two main impacts covered in this report, KnowRoute is believed to generate the following ripple effects:

Stimulation of Consumer Activity

- Among the 42 respondents in Munakata City who use KnowRoute for dining out, shopping, hobbies, and entertainment, when asked about changes in spending on these activities before and after using KnowRoute, 22 respondents (52%) reported an increase of JPY1,000 or more per month.
- The average increase in spending for these 22 individuals was estimated* to be JPY5,136 per month. Furthermore, extrapolating these ratios and amounts to the entire user base, the estimated increase in spending on dining out, shopping, hobbies, and entertainment due to KnowRoute Munakata was approximately JPY17.3 million.
- A similar analysis conducted for Shiojiri City (273 respondents, 40% of whom reported an increase of JPY1,000 or more in spending) estimated the increase in spending per person at JPY4,860 per month, and JPY17.5 million for all KnowRoute Shiojiri users.

Monthly increase in spending (dining out, shopping, hobbies, entertainment) before and after using KnowRoute (Respondents in Munakata City who use KnowRoute for dining out, shopping, hobbies, and entertainment: 42 people)



* Method for estimating the average increase in consumption:
For respondents with an increase in consumption of JPY1,000 or more, the per-person increase was calculated as shown on the right, and the average was determined.

Survey Responses	Conversion Amount
JPY1,000-3,000	⇒ JPY2,000
JPY3,000-5,000	⇒ JPY4,000
JPY5,000-10,000	⇒ JPY7,500
More than JPY10,000	⇒ JPY10,000

Creation of Employment Opportunities and Activation of Communication Among Local Residents

- In Shiojiri City, for users who find app-based reservations difficult, services such as telephone reservations and app consultation counters have been established. These reception tasks are handled by local residents working part-time and remotely. As of March 2025, a total of 15 people are engaged in this work, including handling reservation support for KnowRoute operations outside of Shiojiri City.
- In Munakata City, the community hub CoCokara Hinosato handles ride reservations and consultation services. This initiative also provides opportunities for mutual support and enhanced communication among local residents.

Promotion of Volunteer Activities

- This survey also found several individuals using KnowRoute as their transportation for volunteer activities. It provides opportunities for those who cannot drive their own cars or feel uneasy about driving after retirement to actively contribute as volunteers supporting their community.

Promotion of Events and Tourism

- An addition to examples where KnowRoute is used to guide visitors to local events, it is also utilized as transportation to wineries that have become tourist attractions in Shiojiri City, contributing to event and tourism promotion.

In Closing

We extend our deepest appreciation to all individuals and organizations who contributed to the successful execution of this project.

Although this report draws upon data from selected regions and reflects the perspectives of a limited number of respondents, it offers meaningful insights into the social impact our business has had on local communities—supported by actual changes and the valuable feedback we have received. We firmly believe that, in addition to quantifiable outcomes, the small moments of comfort and the smiles that emerge in everyday life are equally significant and worthy of recognition.

Furthermore, through interviews and questionnaires conducted to gain a clearer understanding of the current landscape, we received numerous constructive suggestions from users and business partners. These insights will be carefully considered as we continue to refine our operations and services, with the aim of generating even greater social value through close collaboration with all stakeholders.

Beyond this initiative, Mitsubishi Corporation remains actively engaged in a wide range of projects that address pressing social issues, in partnership with diverse collaborators. We are committed to contributing to the enrichment of society, while pursuing sustainable growth and the continuous enhancement of corporate value.

Again, we would like to express our heartfelt gratitude to the officials of Shiojiri City and Munakata City for their generous cooperation in this survey, as well as to all KnowRoute users in both regions for their invaluable participation.