Demand-Responsive Transit (DRT)

DRT is a public transport operation management technology that reflects real-time user demand without setting public transport operation sections and dispatch intervals.

DRT provides convenience for residents in areas where regular public transportation is unavailable and improves transportation accessibility. Additionally, by operating optimized routes to destinations, it is expected to reduce public transportation costs.

▲ A user calls a Demand-Responsive Transit (DRT) bus using a smartphone app and boards it.

Issues to Tackle

☑ The number of public transportation-vulnerable areas is increasing due to reduced bus routes and longer intervals between buses in small and medium-sized cities in the provinces due to the aging population and population decline.

☑ It is necessary to introduce customized transportation modes to ensure mobility for all.

Expected Benefits ☑

☑ Providing mobility convenience for residents in areas where public transportation is inconvenient or not available, thereby reducing waiting and travel times for public transportation.

☑ Reducing carbon emissions by decreasing the use of private vehicles.
  * 2.8 times of private car use → 1.59 times
  * Annual carbon emission reduction of 478.7 tons (Gyeonggi-do, Ddokta, 2023).
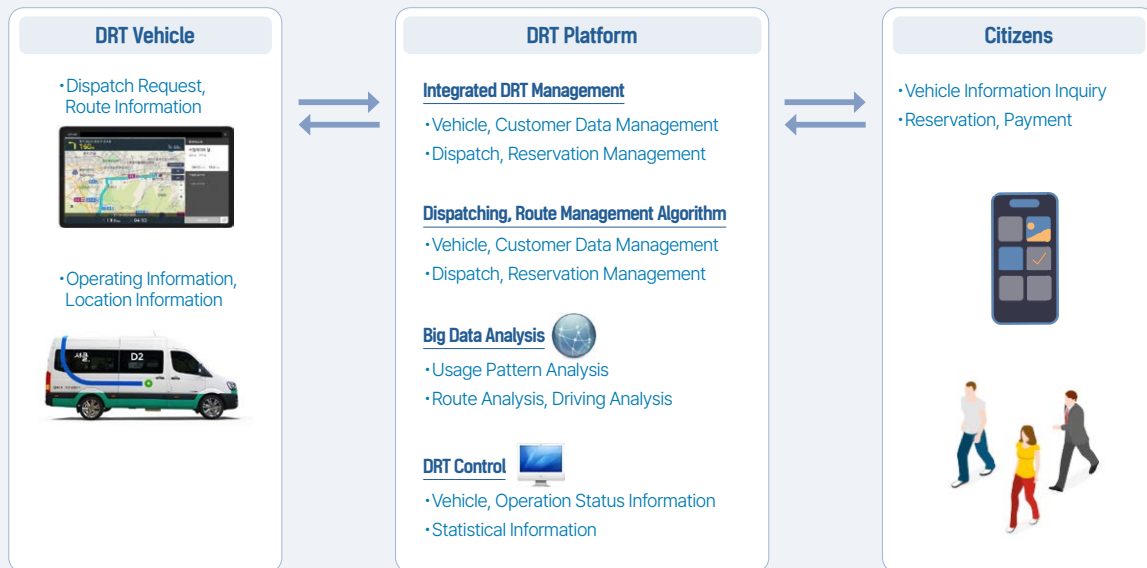
💡 Key Services

· When a passenger selects the departure and destination points on a smartphone app and calls for a vehicle, a real-time route is created and a vehicle is assigned to a nearby stop. The vehicle is moved to the drop-off stop via the optimal route through a ride-sharing service within similar routes.

· For the DRT fares, if you register a credit card, payment is made automatically when you get off, and payment can be made by tapping the transportation card.

· The crew operates the DRT by receiving guidance on the optimal route and boarding/alighting points generated using a smartphone app.

⚙ Use Cases

· Incheon Metropolitan City conducted a pilot of the I-MOD service in Yeongjongdo island, Songdo island, and Geomdan New Town from 2020 to 2022 as part of the Ministry of Land, Infrastructure and Transport's Smart City Challenge project.

  * Compared to the average waiting time of 78 minutes for public buses in Yeongjong International City, Incheon Metropolitan City, DRT reduces the average waiting time by 80% to approximately 15 minutes and 27 seconds.

· Since 2021, Sejong-si has been operating the demand-responsive mobility service 'SHUCLE' as part of a regulatory sandbox pilot project for its Smart City initiative.

· Starting in 2023, a wide-area DRT was introduced in areas with insufficient public transportation between cities and provinces in the metropolitan area.

Key Components

Configuration

DRT Vehicle
- Dispatch Request, Route Information
- Operating Information, Location Information

DRT Platform

Integrated DRT Management
- Vehicle, Customer Data Management
- Dispatch, Reservation Management

Dispatching, Route Management Algorithm
- Vehicle, Customer Data Management
- Dispatch, Reservation Management

Big Data Analysis
- Usage Pattern Analysis
- Route Analysis, Driving Analysis

DRT Control
- Vehicle, Operation Status Information
- Statistical Information

Citizens
- Vehicle Information Inquiry
- Reservation, Payment

Technology

1. DRT Platform Control System
· DRT real-time operation status control and vehicle, route, and station management.
  POINT Creating demand-responsive optimal routes using AI-based dispatch algorithms.

2. User Application
· Provides Demand-Responsive Transit (DRT) calling/reservation and payment functions.
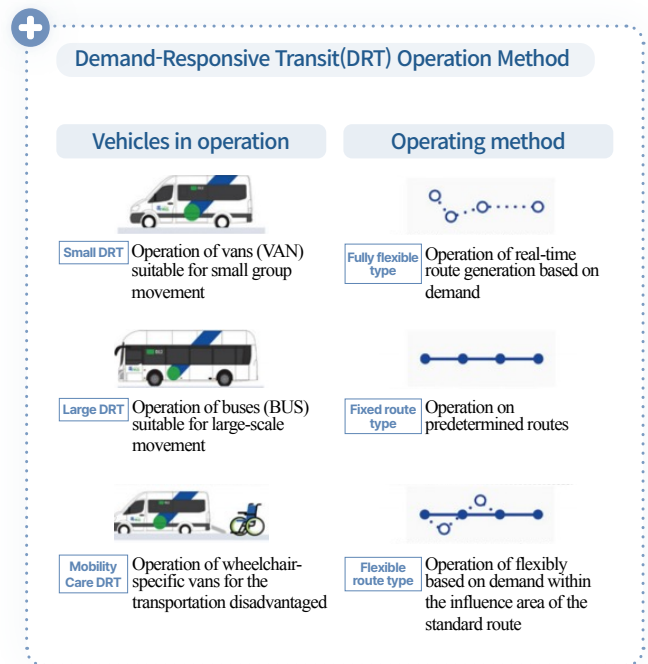
3. Crew Application
· Optimal route guidance, vehicle stop calls, and user status guidance are generated on the DRT platform.

4. Integrated Terminal
· Real-time collection of vehicle location, status, and operational information for Demand-Responsive Transit (DRT) vehicles.

5. QR Reader
· QR authentication processing for user boarding confirmation and payment.

Demand-Responsive Transit(DRT) Operation Method

Vehicles in operation	Operating method
Small DRT — Operation of vans (VAN) suitable for small group movement	**Fully flexible type** — Operation of real-time route generation based on demand
Large DRT — Operation of buses (BUS) suitable for large-scale movement	**Fixed route type** — Operation on predetermined routes
Mobility Care DRT — Operation of wheelchair-specific vans for the transportation disadvantaged	**Flexible route type** — Operation of flexibly based on demand within the influence area of the standard route

Technology Companies

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