SEOUL & ITS TRANSPORTATION

BRIEF HISTORY AND DIGITALIZATION

WELCOME TO SEOUL

25
DISTRICTS

Dobong-gu
Nowon-gu
Gangbuk-gu
Eunpyeong-gu
seongbuk-gu
Jungnang-gu
Seodaemun-gu
Jongno-gu
dongdaemun-gu
Gangseo-gu
Mapo-gu
Jung-gu
Seongdong-gu
Gwangjin-gu
Gangdong-gu
Yougsan-gu
Yangcheon-gu
Yeongdeungpo-gu
Dongjak-gu
Songpa-gu
Guro-gu
Gangnam-gu
Seocho-gu
Gwanak-gu
Geumcheon-gu

POPULATION

9,668,465

NUMBER OF HOUSEHOLDS

3.9 m

ANNUAL BUDGET

$26.9 bn

AREA

605.25 km²

POPULATION DENSITY

Approx. 16k people/km²

(PARIS 20k / TOKYO 6k / LONDON 5k/ BEIJING 1k)

HOUSING

3.64 m units
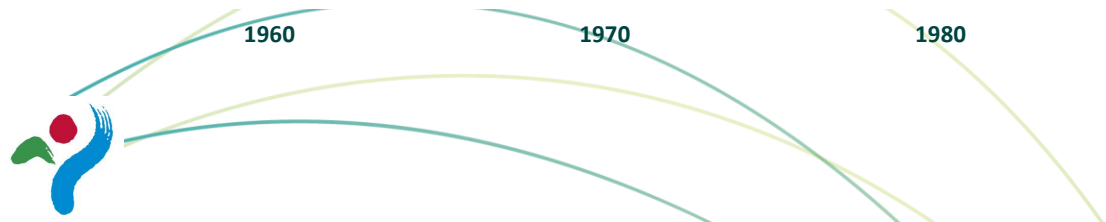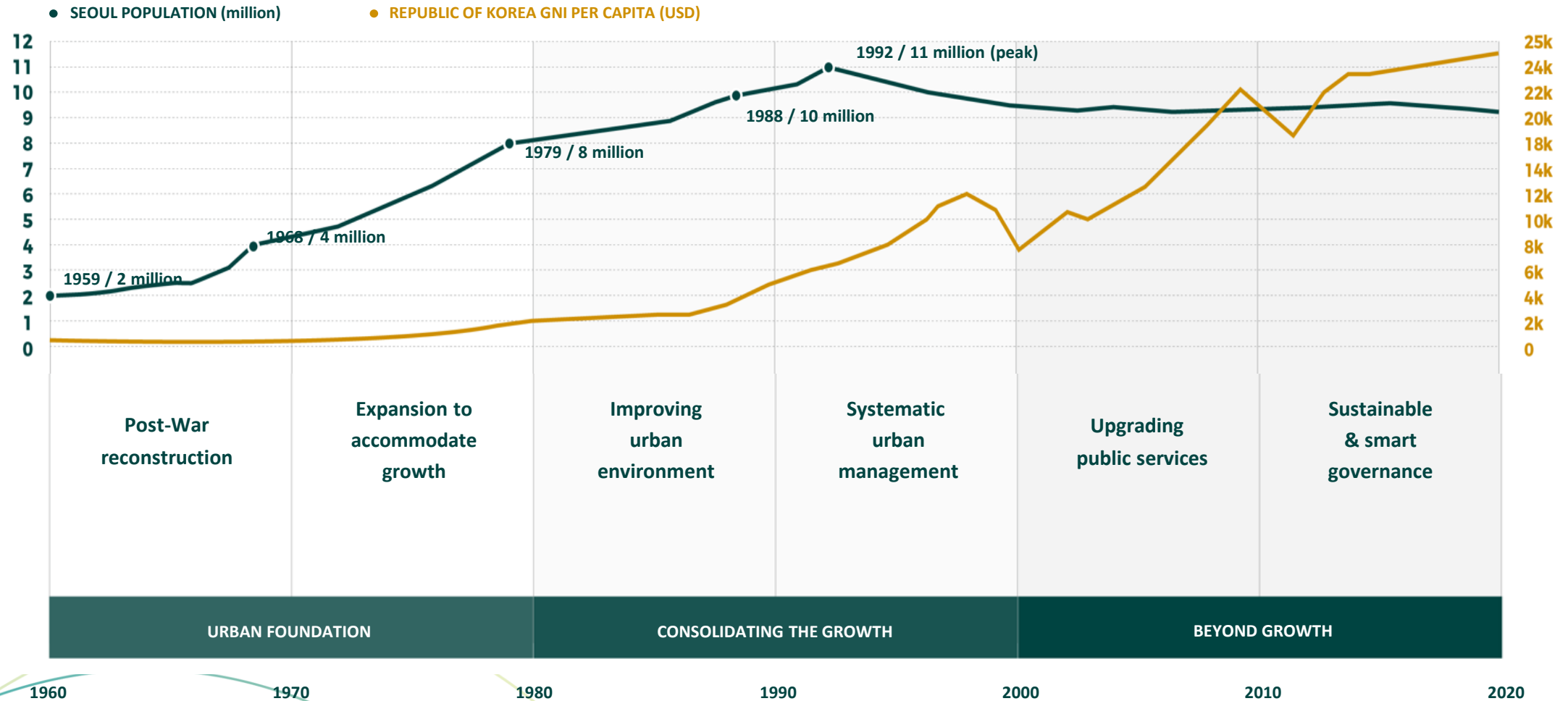
HOUSING SUPPLY RATIO

96%

LOCAL GOVERNMENT EMPLOYEES

51,028

(CITY 17,608 + DISTRICT 33,420)

THE MIRACLE ON THE HAN RIVER

LAYING THE URBAN FOUNDATION

Recovering from war damage & coping with explosive growth through expansion both in physical space and infrastructures

MAJOR DEVELOPMENTS & PROJECTS

- Yeouido Development Plan
- Gangnam Development Plan
- Major bridges across the Han River

- Cheongyecheon overpass constructed
- Subway Line 1 completed
- Removal of shanty town developments

EAKPF
Republic of Korea

ADB

CONSOLIDATING THE CITY'S GROWTH

Accommodating continued growth: improving urban environment through renewal projects: establishment of urban management systems

MAJOR DEVELOPMENTS & PROJECTS

- Mokdong/Sanggye New Towns
- 5 new satellite cities around Seoul
- Arterial roads along the Han River

- Subway Lines 2-8 completed
- 1988 Seoul Olympic Games
- Volume-based Waste Fee introduced

BEYOND GROWTH

SUSTAINABLE & SMART CITY

Shifting focus from growth to quality of life:
Promoting sustainable developments & ICT-driven innovations in urban management, governance, and industry

MAJOR DEVELOPMENTS & PROJECTS

- Cheonggyecheon restoration
- Nanjido Ecological Park
- Sangam DMC & Magok Smart City

- 2004 Public Transport Reform
- 'One Less Nuclear Power Plan' Initiative
- E-Governance

EAKPF
Republic of Korea

ADB

Little Transport Service

Not Enough Transportation Infra

Low Transit Service

Era of "My Car"

Building Urban Expressway

Urban Foundation

Consolidating the Growth

1950

1970

1980

1988

Korea War

Seoul Olympic

Building Urban Infrastructure

Building Transportation Network (Subway, Road, Bridge)

Public Transportation Reform

Expand BRT(Bus Rapid Transit)

Integrated Fare & Transfer system (Subway + Bus)

Consolidating the Growth

Beyond Growth

1990

2000

2004

2010

Public Transport Reform

Increased Traffic Congestion

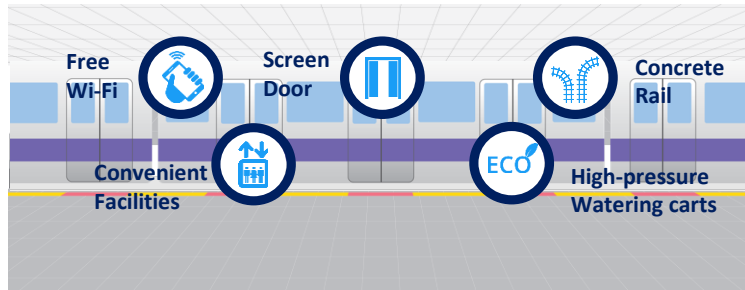**Initiating Travel Demand Management**

Starting ITS & TSM

Human-oriented transportation

Rebuilding Road Space for Pedestrian

Car Sharing and Bicycle sharing Services

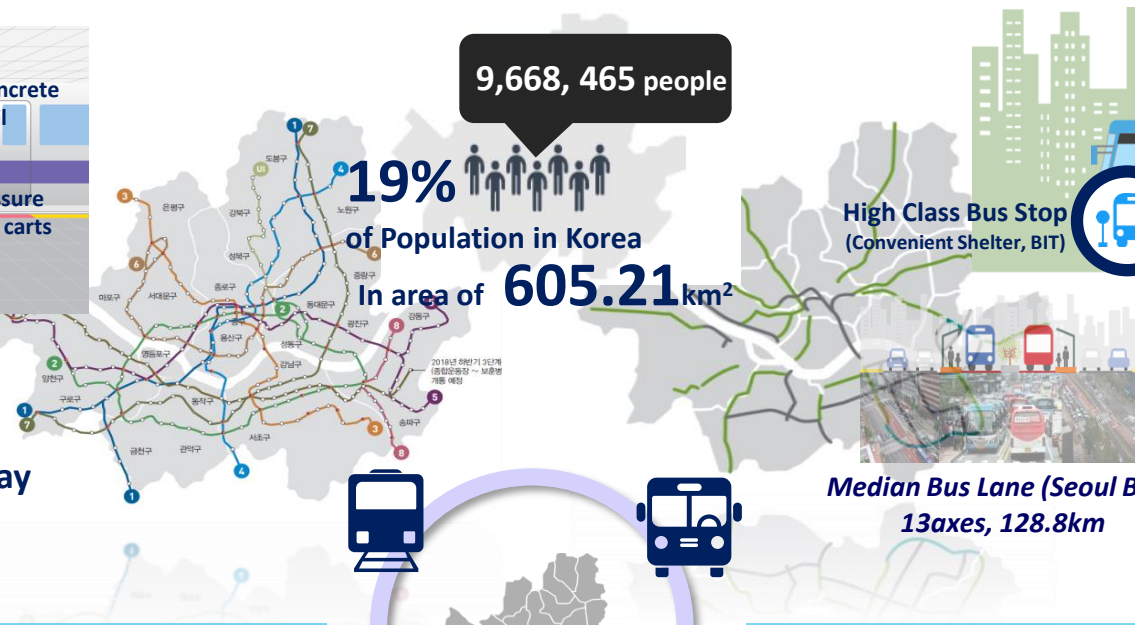# SEOUL TRANSPORTATION

Free Wi-Fi

Screen Door

Concrete Rail

Convenient Facilities

ECO

High-pressure Watering carts

9,668, 465 people

19% of Population in Korea In area of **605.21** km²

10 lines   **5.2** mil./day

All City Buses, Eco-Friendly (CNG, Electric, Hydrogen)

ECO

Free Wi-Fi

High Class Bus Stop (Convenient Shelter, BIT)

B **4,272 Low Floor Buses** (58% of All City Buses)

Median Bus Lane (Seoul BRT) 13axes, 128.8km

356 Routes   **7,393** Buses

17,630 Drivers   **4** mil. Users/a day

71,785 taxis   **71,747** drivers
- Corporate 31.5%
- Private 68.5%

287 stand   **24,289** passenger (in 2020)

Share by mode of Transport

- Subwa
- Bus
- Car
- Taxi
- Others

4.1%

6.3%

24.4%

24.5%

40.7%

65.1%

Public Bike Sharing Ttareungi
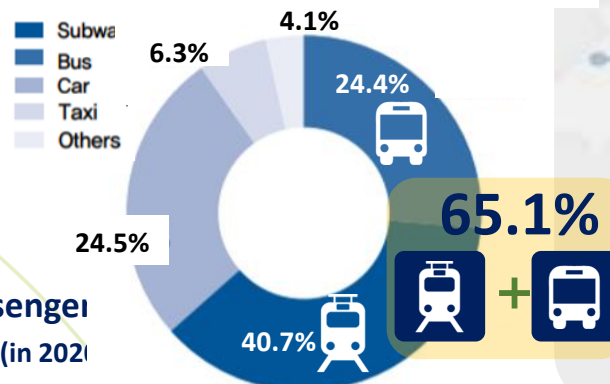
37,500 bikes

2,140 rentals

940.6 km Bike Network
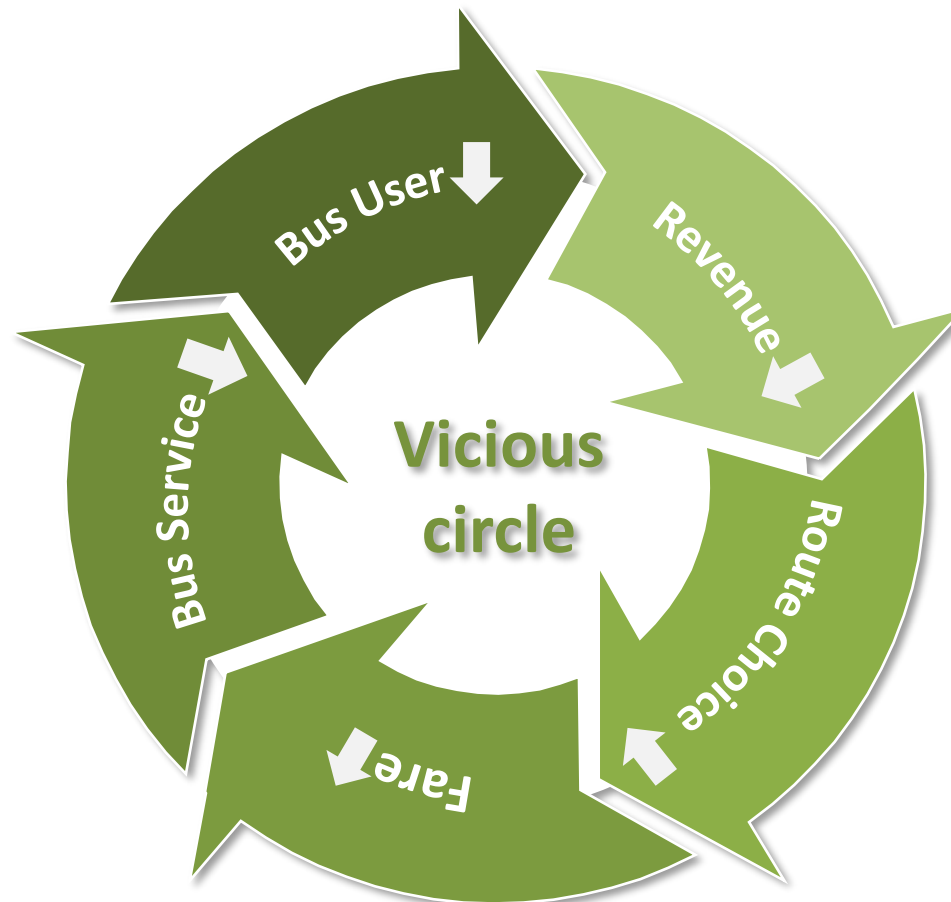
PUBLIC TRANSPORTATION REFORM - MAJOR POLICIES

2004 Public Transportation Reform

- Bus Routes Operation System
- Bus Facility Management
- Support Systems
- Social Agreement

Quasi Public Bus System
- Bus Manag. System (BMS)
- Systematic Bus Routes

High Quality Vehicles
- Dedicated Median Bus Lanes
- Transfer Centers & Stops

IT based Transport System
- Integrated Discount Fare System
- **TOPIS** Transportation OPeration & Information Service

Bus Reform Civic Committee to reach social agreement

PUBLIC TRANSPORTATION REFORM - STRATEGIES & ACTION PLAN

4 **Social consensus**
4-1. Civic Committee

3 **Assistant system**
3-1. Integrated Fare system (Subway + Bus)
3-2. IT based Transport System

2 **Infrastructure**
2-1. Expansion of BRT
2-2. Improvements in transportation centers
2-3. Introduction of high-quality buses

1 **Bus routing/operating**
1-1. Public ownership, Private operation
1-2. Establishment of trunk and feeder lines
1-3. Scientific operation management(BMS)

New Era

1 July 2004

Monitoring & Adjustment

Customer Satisfaction

PUBLIC TRANSPORTATION REFORM - IMPACTS

Seamless Integration
Integrated Fare and Multi Modalism

- **Integrated fee** based on combined **distance traveled** for up to five transfers, instead of per-ride flat rates

Transfer		Before (Korean won)	After (Korean won)
5km + 4km		900 + 900 = 1,800	900 (Basic rate within 10km)
5km + 7km		900 + 900 = 1,800	Basic rate + 100 = 1,000 (additional fares for 10 to 15km)
4km + 8km + 4km		900 + 900 + 900 = 2,700	Basic rate + 200 = 1,100 (additional fares for 10 to 20km)

※ exchange rate = 1,100 won/1$

- Major transport nodes were upgraded as **transfer centers**

- The centers facilitated **quick & easy transfer** between **bus lines to subway and taxi**

Ridership Increased
9.4%

On-Time Arrival Increased
4.6%

Average Bus Speed Went Up
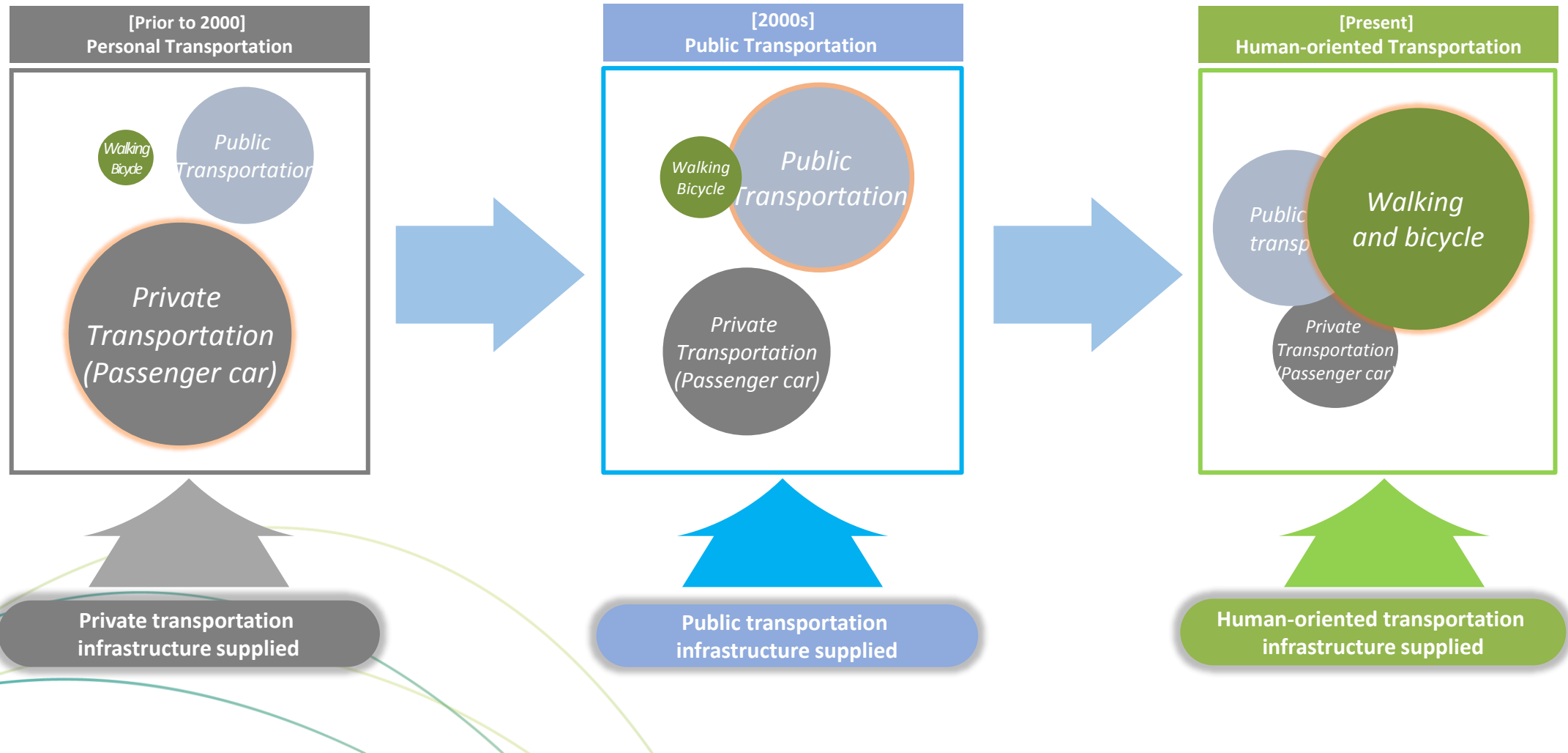# 30%

Overall Satisfaction
Up 32%
as of 2017

Innovation through ICT
Integrated Payment Card & Real-time Information

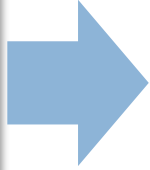- **ICT innovation** was essential to enable the distance-based fare

- **T-money card system** was developed & deployed through PPP scheme

- The system allowed the **collection of fares based on travel distance** by collecting data

- **TOPIS** facilitates **multi modalism** by providing **real-time** traffic information

- **Passengers can access the information** through mobile apps, websites, and BIT in bus stops

Paradigm Shift in 2010 and Beyond

from Car, Ownership and Development to Human Values

[Prior to 2000]
Personal Transportation

Walking Bicycle

Public Transportation

Private Transportation (Passenger car)

Private transportation infrastructure supplied

[2000s]
Public Transportation

Walking Bicycle

Public Transportation

Private Transportation (Passenger car)

Public transportation infrastructure supplied

[Present]
Human-oriented Transportation

Public transp

Walking and bicycle

Private Transportation (Passenger car)

Human-oriented transportation infrastructure supplied

SEOUL TRANSPORTATION 2030 VISION

Human

- **More Walking & Bicycle**
- **Less Car Accident Fatalities**
- **More Accessible Transportation**

Sharing

- **Railway-centered Public Transport**
- **Faster Public Transport**
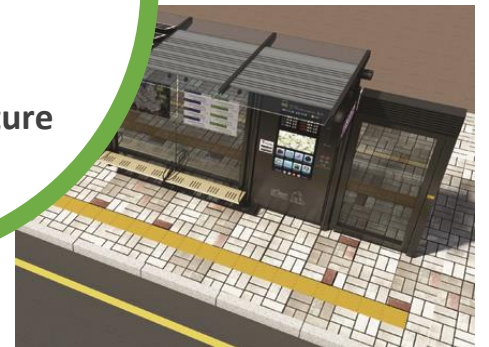- **Sharing-oriented environment**

Seoul 2030 Vision

established in Dec. 2014

Environment

- **Eco-friendly Transport**
- **Efficient Transit culture promoted**
- **Transportation culture advanced**

DATA LED SCIENTIFIC MANAGEMENT - SEOUL TOPIS

Center Platform

Center Operating System Integrated
Surveillance & Response System

Bus Platform

Bus Information System
Bus Management System

UR Platform

Unmanned Regulation System
Automatic Penalty Charging System

ITS Solution

Seoul TOPIS Platform

'14~ *TOPIS 3.0*

Open integrated control center, TOPIS Platform…

'08~ *TOPIS 2.0*

BIT, Mobile Service, Open traffic data, VMS, VDS…

'04~ *TOPIS 1.0*

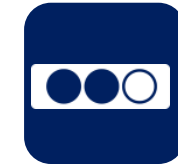Open TOPIS, Transport Card, Unmanned Regulation…

'98~ *1st ITS*

10.6km long, ATMS in urban expressway…

FTMS Platform

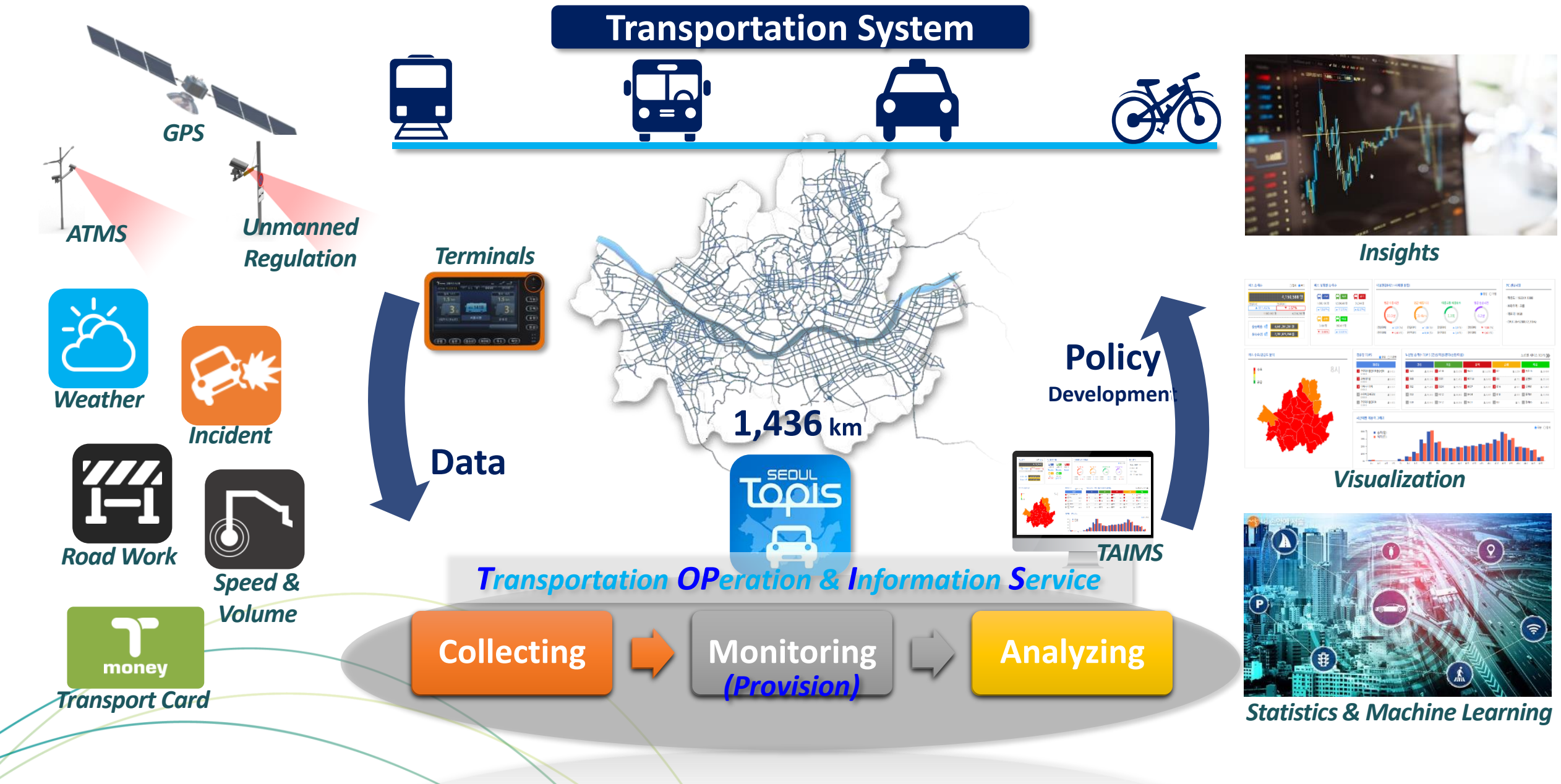Urban expressway traffic
Management System

ATMS Platform

Advance Traffic Management System
Traffic Signal Operating System

Big Data Platform

Traffic Forecasting System Analysis
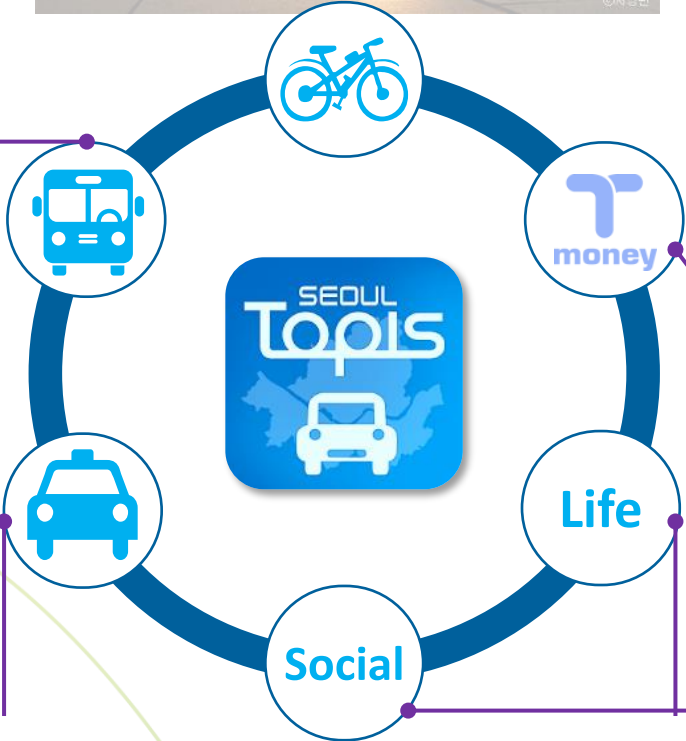System for building Transport policy

Transportation System

GPS

ATMS

Unmanned Regulation

Weather

Incident

Road Work

Speed & Volume

Transport Card

Terminals

1,436 km

Data

SEOUL Topis

Policy Development

TAIMS

Insights

Visualization

Statistics & Machine Learning

Transportation OPeration & Information Service

Collecting → **Monitoring** *(Provision)* → **Analyzing**

Collecting → Monitoring → Analyzing

Big Data from Various Sources

Bus

Bus Station
- Arrival Time
- Departure Time

→ Intersection Crossed Time → Server

Data Collecting Process in BMS

Taxi

Update Information Every 2min. and 30 sec.

Ttareungi

Terminal | Rental | App

Server
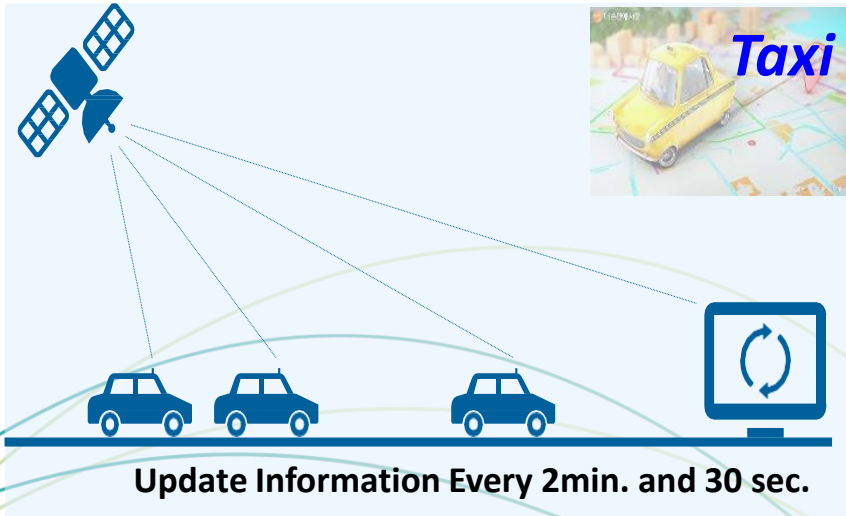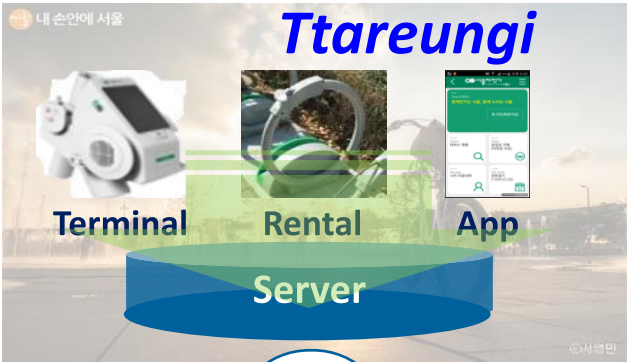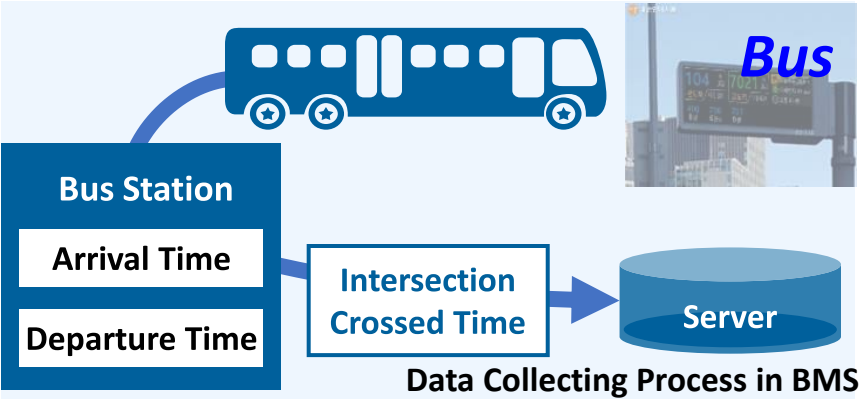
Transport Card

3.95 mil. people used

18.5 mil. times a day in

used by mode — 100% / 98.9% / 70.4%

- Train(KTX)
- Express Bus
- Express way
- money
- Taxi
- City Bus
- Subway

Socio Economic index

DATA 공공데이터포털 .GO.KR

서울 열린데이터 광장

서울대중교통
SEOUL PUBLIC TRANSPORTATION

SEOUL Topis

Life

Social
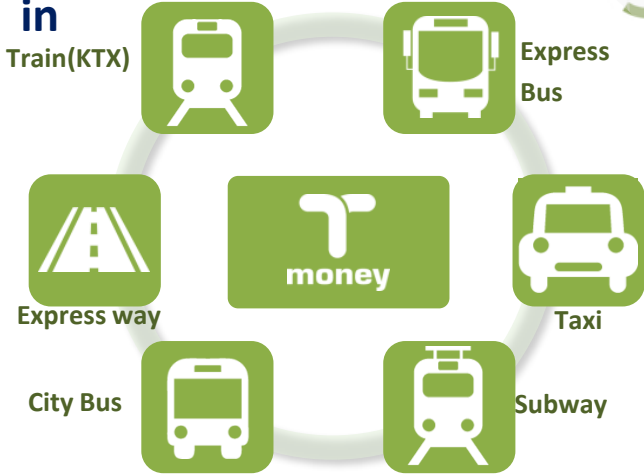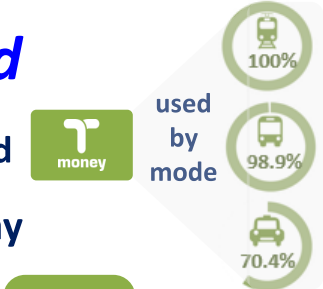
DATA LED TRANSPORT MANAGEMENT – MONITORING

Collecting ➡ **Monitoring** ➡ Analyzing

Road Traffic Monitoring

SEOUL
TOPIS

1,436km
Extended length of roads for travel speed data collection`
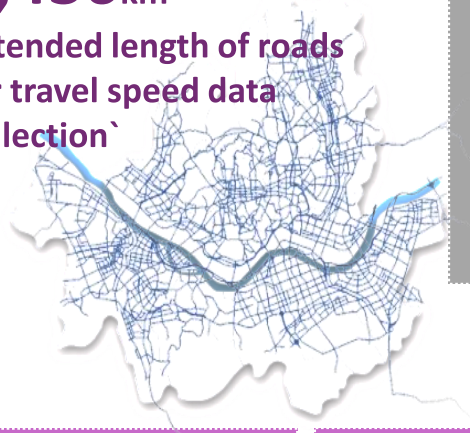
VDS
Vehicle Detection System
Volume Speed Incident

1,955detectors

4,070
Real time
Signal Controllers

Taxi | GPS
70,000 Vehicles
Probe car collecting GPS data

CCTV
849
24-hour Traffic surveillance & monitoring
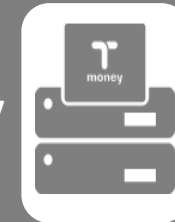
308 systems
Unmanned Regulation System
(illegal parking, exclusive bus & bicycle lane violation)

85mil./day
The number of transportation Card Data

9,550devices
BMS & Transportation card devices

Collecting ➡ **Monitoring** *(Provision)* ➡ **Analyzing**

Providing Real-Time Information

78%
of all bus stops

4,927 BIT

Bus Information Terminal

24mil./day
The Number of Open Data
(Traffic & bus information)

Web Portal
(Open API)

Information media

Web, Mobile

Broadcasting
(Radio, IPTV)

VMS & BIT
SNS, LED
Sign

Telecom company

326 VMS
Variable Message Sign

95 LCS
Lane Control System

192km
Length of Roads for Forecasting

Traffic Forecasting Service on Web

DATA LED TRANSPORT MANAGEMENT – ANALYZING

Collecting ➡ Monitoring ➡ **Analyzing**
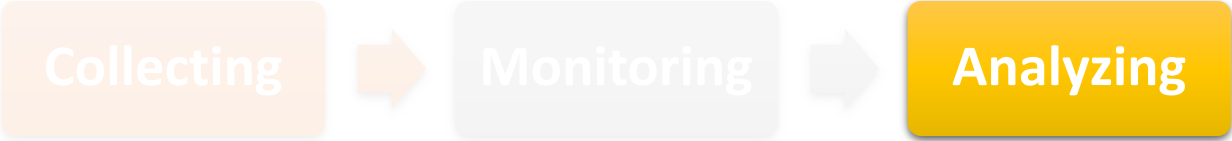
Transport Analysis Index Management System (TAIMS)

As a **transportation data analysis tool**, it assists SMG officials to develop improved public transport policies through the development of **analysis indicators** by means of transportation.

Bus
Bike
Taxi
Subway

Data Analysis → **Review of Policy Index (Visualization)** → **Index Analysis** → **Evaluation & Planning** → **New Policy**

Card Data
85 mil./day
(bus, subway, taxi)

Real time Operational Data
26 mil./day
GPS & GIS data, Traffic speed & volume

Socioeconomic Index
Population, vehicle, lane use, etc

Descriptive Statistics

Machine Learning

Route O/D Review

Bus Station Review

Route Redundancy

선택	구분	노선	노선유형
✓	—	5623	지선
✓	—	5531	지선

Bus Punctuality

Route Evaluation

Station Evaluation

Illegal Parking Enforcement

Night Bus Route Adjustment

New Bike Path

Green Circular Bus

SMART BEYOND INTELLIGENT – COOPERATIVE ITS

Autonomous Vehicle Testbed where
Everything is connected by 5G, C–ITS

Connected & Supporting Place

V2E Vehicle to Entertainment

V2V Vehicle to Vehicle

5G

V2N Vehicle to Network

V2P Vehicle to Pedestrian

V2B Vehicle to Bicycle

V2I Vehicle to Infra

V2C Vehicle to Center

V2W Vehicle to road Work

Advanced Network Based

HD Map Based Urban Management

Based on Real-Time HD Map Updates

Thank you
감사합니다.

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