

SOLUTIONS FROM SEOUL

Sharing experiences in sustainable urban policy



TOPIS: The “Control Tower” for Seoul’s Intelligent Transportation System

There is an emergency on one of Seoul’s roads. An alarm system is automatically triggered and informs all concerned parties – police stations, bus operators and citizens – who are able to respond swiftly thanks to the real-time, on-site information obtained through surveillance cameras.

This is all possible with the Seoul Metropolitan Government’s (SMG) Transport Operation and Information Service (TOPIS), the “control tower” for the city’s transportation system. It gathers and processes real-time road traffic and subway train information to enable the city to efficiently manage the interval between buses, relieve congestion and take timely action in case of an accident.

Challenges with the old transportation system

Seoul’s transportation system was suffering from chronic problems caused by the growing number of vehicles, deteriorating service quality of intra-city buses, and an inadequate subway system. Despite various efforts by Seoul City, such as opening new subway lines and expanding road networks, the city’s already-saturated transportation facilities were showing serious limitations. A highly advanced transport information system was needed, and its implementation urgent.

TOPIS has increased rider satisfaction and engendered trust in the municipal government.

Linking various transportation demands

For more than 30 years, Seoul has enforced diverse transportation policies, some of which worked for a time. But what was really needed was an integrated system that could connect various transportation demands – the municipal government, transportation companies, drivers and citizens – as a more fundamental and affordable solution. This meant not just practical measures, such as more exclusive bus lanes and oil subsidies, but also an integrated information system to provide comprehensive management.

Consolidating and managing disparate information

Different organisations – the SMG, the Traffic Broadcasting System (TBS), the Korean Expressway Corporation and private bodies – were generating information related to transportation, including transportation cards, bus operation, traffic volume, speed, expressway conditions, and emergencies such as accidents and protests on roads. Because each organisation and system produced information in its own format, a consistent and integrated management system was critical.

Goals and Objectives

The SMG decided to develop a new system that would:

- Allow real-time information sharing and management of bus operation
- Enhance user convenience and attract more passengers to public transportation
- Collect traffic information to help alleviate road

congestion and respond more quickly and efficiently to unexpected situations

- Analyse the accumulated information to devise science-based public transportation policies

Implementation and Expertise

Real-time monitoring of traffic and information

The SMG discloses real-time traffic information 24 hours per day throughout the year. By linking 741 CCTVs in the city, it can determine traffic conditions of major roads at a glance and share road control and congestion information with the Seoul Police Agency and the TBS. Citizens can also check any unexpected traffic situations through the city’s website, mobile apps, and SNS (Twitter, etc.).

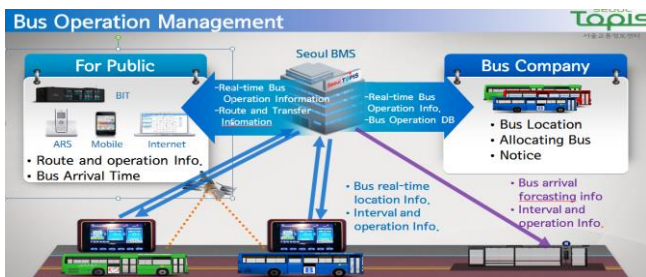
Average number of cases reported per day

No. of cases	Roadworks	Accidents	Rallies	Total
	9	43	1	53

A system for better on-time performance

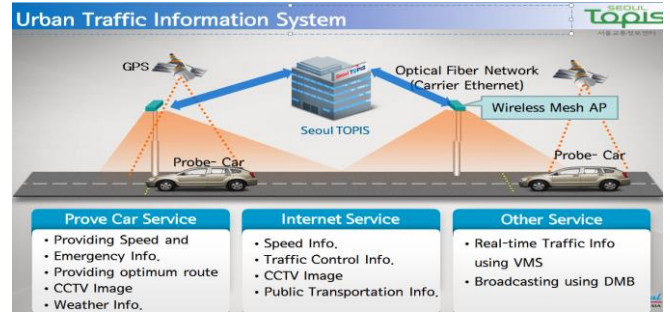
The system, which utilises satellite technology, innovated Seoul city’s bus operations (9,400 vehicles and 610 routes), leading to a significant increase in punctuality and accuracy of operation intervals.

Providing information through bus management



Real-time transportation information for riders

Citizens can now access real-time traffic information including arrival times on bus routes, bus stops, and subway operation through various means – the Internet, mobile devices, BIT, and QR code. As the city now even allows private developers to utilize the information, the service has become truly ubiquitous.



Complete overhaul of bus numbering system

For consistent management of traffic information, a bus with a particular number was supposed to operate on a given route. However, in Seoul, the numbers were allocated as requested by bus companies, creating confusion. Riders found it difficult to link old numbers and new ones whenever a route was removed or newly created.

To resolve this issue, the SMG implemented a reform orientation in which a bus number indicates the driving direction – allowing riders to easily match stopovers and destinations. Buses are now classified into trunk, feeder, inter-regional, and circular lines, colour-coded with blue, green, red and yellow respectively.

Bus numbering



Evolution from TOPIS 1.0 to TOPIS 3.0

The Traffic Operation Information System has evolved from the era of the ‘Cutting-edge (TOPIS 1.0)’ to ‘Openness (TOPIS 2.0),’ through to the current ‘Collaboration (TOPIS 3.0)’. It is now seeking to share its know-how with foreign cities, along with tech companies, while positioning itself for future transportation needs, such as traffic forecasting systems using big data.

Overcoming Challenges and Limitations

Challenge 1: Fierce opposition from bus companies and street vendors

While setting up TOPIS, the city government also carried out projects to establish a dedicated median bus lane system and quasi-public bus operation. In particular, the median bus lane was needed to ensure punctuality and even intervals. Despite its good intentions, however, the city faced strong resistance from interested parties – bus companies opposed to the quasi-public operation, and street vendors opposed the idea of moving bus lanes from roadside to centre lanes.

Solution: Dialogue involving all parties

Faced with the resistance from street vendors, SMG tried to persuade them through continuous dialogue. In cooperation with the bus association, SMG organised workshops for the reform of Seoul's bus operation system, in which it coordinated conflicting views and guaranteed management rights to bus companies and reasonable compensation to street vendors. As a result, consensus was achieved after multiple rounds of negotiation.

Challenge 2: Lack of cooperation among agencies

Building a framework for information-sharing and smooth cooperation among all the relevant parties was not easy, and it was difficult to encourage their active cooperation.

Solution: Consensus building through dialogue

The city continued discussions with all concerned parties including police stations, fire stations, military bases and local governments to create a consensus on the need for building an integrated transportation management system.

Resources

Budget: Approximately KRW 200 billion

Because Seoul was the first local government in the nation to develop such an intelligent transportation system (ITS), the project began 1998 entirely financed by the municipal budget, without any support from

the central government. However, the benefits of the system soon became apparent to other local governments, and the central government came to recognise its value. As a result, some of Seoul's additional projects are now subsidised by the state on a 50-50 basis.

Human resources

In the initial stage, a total of 29 professionals planned and developed the system. The on-site facility management and maintenance, such as electronic road signs, have been outsourced or consigned to private enterprises.

Staffing for TOPIS (2008)

Classification	Staff composition (persons)	
Total	35	-
BMS management	25	Repair & Maintenance (bus stops) Management of bus companies
Unmanned surveillance system	3	Traffic violation control (illegal parking and standing, violation of exclusive bus lane), support for the operation of exclusive bus lanes
Unmanned surveillance system (exclusive bus lanes)	3	

Revision of laws and regulations

The Intelligent Transport System is based on the National Transport System Efficiency Act, which offers state subsidies. The city continued to ask for a revision to the Act, and succeeded in making the ITS eligible for the subsidy since 2008.

Results

Rising customer satisfaction among riders

Riders' satisfaction level has risen with the real-time bus operation information available. They gave high marks to the improvements in service quality, especially the even intervals, safer driving, and reduced wait times.

Greater profitability for bus companies

The regular intervals and predictable arrival times have attracted more passengers to buses and, with greater control over drivers' speeding and aggressive driving, there are now fewer accidents and shrinking insurance premiums. All these improvements have resulted in higher profitability and improved quality of service. As an added benefit, the bus companies are now able to regulate illegal operation, such as drivers passing by a bus stop without stopping.

Increased trust in the Seoul Metropolitan Government

The city has regained public trust that was lost with the inefficiencies of the previous transportation system, thanks to the more convenient, accessible operation of the new system. The advanced science utilised in the system has reinforced accuracy, objectivity and profitability in the management of the bus system. The dedicated median bus lane system also contributed to greater punctuality of intra-bus operation, while the city's efforts to take swift action against illegal operations has encouraged drivers to comply with the regulations.

Applicability

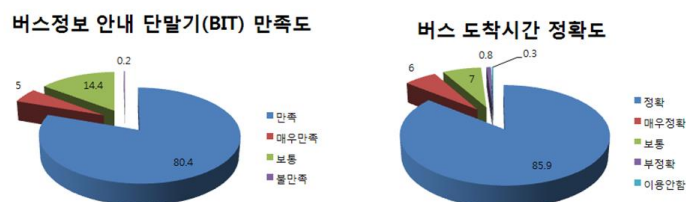
Support for Korean tech companies in their efforts to expand abroad

The municipal government has stepped up efforts to support related businesses in exporting their intelligent transport management technologies. Because the city receives as many as 1,300 international officials a year, it has built the ITS-Friendship programme in which Korean ITS firms are connected with foreign city officials.

Standardising the ITS for wider application

Utilising its technology and experience, Seoul plans to develop a standard platform for an Intelligent Transport System that can be applied to other domestic governments, and then share it internationally. Using a standard platform will help other interested cities introduce ITS with less initial investment, although they may need to acquire the necessary skills and experience.

Satisfaction for the Public Transport Information (99.8%)



* Satisfaction levels for the Bus Information Terminal and arrival punctuality

Seoul's TOPIS has been recognised internationally, receiving the PTx2 Showcase Award at the 59th UIPT in 2011 and the Local Government Award in 2013.