Information & Fare Integration: Mobile All Transit

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2. Recent Effort & Technology for Public Transport
3. Limitation of Smart Card System
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Introduction
Socio-Economic Environment(1)

**Geography**
- South Korea area: 100,140 km², Seoul 605 km²
  * Capital area (Seoul, Gyeonggi, Incheon) 11,801 km²

**Administrative Districts**
- 1 capital city
- 6 Metropolitan cities
- 9 Provinces

**Population**
  * Capital area Population 22 Million (45%, 2008)

**GDP**
  * Average income: 2,609$ (1970) → 23,000 $ (2008) per capita income
Socio-Economic Environment (2)

  * Passenger car Ratio: 37% (1970) → 84% (2008)

- Road Congestion Cost: 26.9 trillion-won (2008)
  * Congestion Cost (2008) increased about 3 times since 1995
### Summary of Index

<table>
<thead>
<tr>
<th></th>
<th>1970</th>
<th>2008</th>
<th>Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>32,241,000</td>
<td>48,607,000</td>
<td>1.5 times</td>
</tr>
<tr>
<td>Vehicle</td>
<td>130,000</td>
<td>16,794,000</td>
<td>129 times</td>
</tr>
<tr>
<td>GDP / p</td>
<td>$2,609</td>
<td>$22,974</td>
<td>10 times</td>
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- 1899: Became the capital of Chosun dynasty
- 1911: Population: 30,000
- 1942: First cars imported
- 1950: Outbreak of Korean War
- 1962: Five-year economic development plan began
- 1974: 1994 HOV Lane on Kyungbu
- 1988: 90’ Highway & Railway network covered
- 1990: 43 Mil 3 Mil veh.
- 1994: HOV Lane on Kyungbu
- 1995: 10Mil veh.
- 1997: 1968 Kyungbu Highway construction began
- 2004: KTX Launched
- 2002: Korea-Japan Worldcup
- 2004: KTX Launched

**Serious transport Problems began**
After the Korean War, Supply-oriented Development

Focus on providing roads, railways, etc
Satisfaction of brand new public transport

Simple Transportation network & route
Easy to use transportation system
Since 1990,

Key Issue: Transportation Management

As vehicles increased, every 5 Koreans began to own a vehicle in 1995.
Traffic jams and congestion cost became a social issue.
Set government’s priorities to reduce road congestion.
Apply the Technologies (ITS)

- **Electronic Fare Payment Service (EFPS)**
  - Electronic Toll Collection Service
  - Electronic Fare Collection Service

- **Advanced Public Transportation Service (APTS)**
  - Public Transportation Information Service
  - Public Transportation Management Service

- **Advanced Traffic Management Service (ATMS)**
  - Traffic Flow Control Service
  - Incident Management Service
  - Automatic Traffic Enforcement Service

- **Advanced Traffic Information Service (ATIS)**
  - Basic Information Broadcasting Service
  - Traffic Information Management Coordination Service
  - Vehicle Traveler Additional Information Service

- **Advanced Traveler Information Service (TIS)**
  - Non-vehicle Traveler Additional Information Service

- **Commercial Vehicle Operation (CVO)**
  - Logistic Information Management Service
  - Hazard Material Vehicle Management Service

- **Advanced Vehicle and Highway Service (AVHS)**
  - Safety Driving Support Service
  - Automatic Driving Support Service
Who takes the benefit of technology?

- Early ITS technology was focused mostly on the drives & road traffic management
  - Priority: Car owners / Drivers
  - Secondary: Public Transport Users

- Urban Activities Increased with Multiple O/D
  - Cities develop and transportation expands
  - People travel frequently in complicated routes & network
  - Hard to take an efficient trip by public transport
Recent Effort & Technology for Public Transport
Seoul Public Transport Reform  
(Problems before the reform)

- Public Transport Reform to balance out the use of public transit and vehicle

**Seoul (Capital Area)**  
Socio-economic Index

- Area: 11,801 km²  
- Pop.: 22 million  
- Population growth  
- Geographic expansion

- Population concentrated towards the metropolitan area  
- Trip demands increased  
- Area of travel expanded

**Public Transportation**

- 765 bus routes  
- 9,540 buses  
- 9 metro lines  
- 391 stations

**Problems**

- The people use less and less of Public transportation  
- The use of personal vehicles increased quickly
Change to Seoul Public Transport
(Paradigm Shift on Transport Policy)

- Quantity (Volume)-oriented Service
- Vehicle Oriented Policy
- Development-oriented system
- Supply oriented Infrastructure

Public Transport Reform
- Service quality oriented
- Public transport passenger-oriented
- Transport system sustainability Oriented
- Operation & Management Oriented
Technologies for Restructuring Seoul Public Transportation

- Buses on a regularly fixed schedule & effective management system
- Increases convenience in using buses
- Help government to pursue policies toward public transport
Bus Management System

- BMS play a Key role in maintaining the bus services
- The Passengers can be more comfortable

For Public
- Real-time Bus Operation Information
- Route and Transfer Information
- Bus real-time location Info.
- Interval and operation Info.

Bus Company
- Bus Location
- Allocating Buses
- Notice
- Bus Interval Info.
- Bus Operation Info.

On-board device installed on every bus

On-board device installed on every bus
Bus Information System

- Bus arrival time information at a certain bus stop for the passengers
- High usage and satisfaction of BIS

<Display at each bus stops>

<Check through mobile-phone, internet, ARS>
Smart Card System

- Paying one time according to the distance based (include transfer other modes)
- Detecting the demands of public transport as well as collecting the fares

Bus Calculation System

- IN
  - No. of Bus Route
  - Boarding Bus & Stop
  - Boarding Time
  - User’s Basic Info. (Adult/Student/Child)
- OUT
  - Get off Bus & Stop
  - Alight Time
  - Total Distance
  - Total Fare

Card Transaction Data Center

- IN

Subway Calculation System

- IN
  - Subway Station
  - Time of Transit Passage
  - Total Distance
  - Total Fare
- OUT
  - Subway Station
  - Alighting Time
  - Total Distance
  - Total Fare
Smart Card System  
(Funding & Business Model)

- Smartcard system is carried out by Public-Private Partnership
  : Continues to research projects for the ICT based transport system with private corporations

* Card Reader on 8,000 buses & 300 subway station
Fare Policy (1)
(Before Smart Card System)

- Each time to pay when the passenger transferred to a different transportation
Fare Policy(2)
(with Smart Card System)

- Use multiple rides and not pay by the number of transfer
- Public transport users incentive with distance based fare policy
  - ex: inexpensive price for passengers by transferring or a long distance trip

<table>
<thead>
<tr>
<th>Smart Card System</th>
<th>Bus</th>
<th>Metro</th>
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</thead>
<tbody>
<tr>
<td>Single Ride</td>
<td>Flat Fare</td>
<td>Distance-based Fare</td>
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<tr>
<td>Multiple Rides</td>
<td></td>
<td>Distance-based Fare (Bus⇔Bus / Bus⇔Metro / Metro⇔Metro)</td>
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</table>
Benefit

Effects on Public Transport Policy based on technologies

Bus Management & Information System
- BMS manages all the buses to keep their interval
- Buses are running immediately
- BMS & BIS provide information on time for bus companies & users

Smart Card System
- Passengers to pay their fare quickly and easily
- Transparent revenue management
- Public transport satisfaction with distance based Fare system
Limitation of Smart Card System
Limitation of Smart Card System

- Each city owns independent public transport fare system.
- Regional public transports have their own fare policy and payment system.
  - Passengers can’t receive benefits such as transfer discount, or free transfer to urban transport.
Barriers on Smart Card System

- Limitations on the use of certain transports
  - Expansion to high-speed trains, express & intercity buses that travel between different regions

- Limitations on Independent Fare System by Regions
  - Begin to carry out the national fare policy which will increase the use of public transport
  - Realizing and responding actively toward demands
Next Step for Fare Integration
The change of transport environment

- Combination of the ICT and the transportation system
- Users will be able to change to a green and intelligent travel society

Based on the ICT and the smart device

Next Paradigm of Transport

Mobile Society

Green Travel

Intelli Travel

Sustainable transport system

Travel efficiently & change to green travel
Running a system to locate & manage the transports with ICT & the wide use of smart phone

Receive information on transportations and on passengers
Green Travel Society

◆ Green House Gas (GHG) Reduction
  - To Reduce up to 35% GHG in Transportation by 2020
  - To accomplish this goal: A high need to promote Public Transportation

◆ Networked Transport
  - An environmental change in technologies as a Mobile society
  - Great way to change into a Green Travel Society

◆ Connected Traveler
  - Each travelers can receive information whenever they are
  - Guide travelers how to reduce pollution & congestions
  - Management on trip demands, road traffic, air pollution, etc
Intelli Travel Society

◆ Smart Journey Plan
  - Travelers can receive a Smart Journey Plan through their mobile phones: how to minimize their travel time, transfers, fare, and Carbone production
  - Providing the most efficient travel plans, public transport users will increase

* Lead to the Increase of Public Transport, Next step is the Integration of Information & Fare System
Information & Fare Integration:
Mobile All Transit
Concept of Mobile All Transit

- Combining all national public transportation to strengthen the public transport than vehicle usage:
  - multi-transport info and to make a payment with a single mobile phone

Which the is best Trip Plan for me?

How do I pay for?
What’s the cost effective?
Establishment of national transportation control center
- Manage the different kinds of transport information & fare system
Mobile all Transit find the most efficient use of public transport
- Assist traveler with convenient trip plan, short waiting time, lower fare, etc
- Cover all nationwide public transport modes by mobile at any time, any where
Incentive for Regional Trips with Public Transport
- The passengers will feel the convenience of payment
- Travel long distance will receive a discount or free transfer fare
- Strengthen and increase the use of Public Transports
Nationwide Demand Management

- Information & Fare integration allows to gather various data
- Provide the most efficient way to use the public transport

Revenue of transport modes in fare system
- Analyzing Transit, Boarding Record, Fare, etc.

Operation data
- Master Data
- Real-Time Transport Operation Data

Passengers’ boarding data
- Route
- Speed
- Travel time
- Emergency
- Traffic Volume
- Travel Cost
- Waiting time
- Pattern

Routs management
- Analyzing Route and Administration Area
- Analyzing Days of the Week, Peak Times and Specific Periods

Decision Making with data
- Public Transport Policies Transport Demand Management
- Cooperate with Associated Agencies
- Converting into a Variety of Information Formats
Nationwide Demand Management

- Pursue a nationwide public transport continuously develop
  - Government establish a efficient and realistic public transport policy
  - Public transport company can provide service that people need

Concept

Government
- Revise Policies
  - Policy goals
- Business Players
  - Marketing On Demand
    - Routes, Interval, Price, etc

Monitoring
- Feedback
  - Routes of each transport
  - Demands each routes
  - Pattern for driving
  - Traffic congestion
  - Passengers satisfaction
  - etc

Traveler
- Information & Fare Integration
Summary
Conclusion

The Integration of National Public Transport System
: The merge of traffic info and payment system

- Government
  · Reform nationwide public transport routes & network efficiently
  · Optimum the subsidies for public transport sustainably

- Public Transport Companies
  · Monitor the needs and demands of the travelers
  · Provide them with the best route service
  · Carry out active management for revenue

- Passengers
  · Much comfortable for regional trip with public transport
  · Receive traveling information and pay easily with a reasonable price
Discussing Issues

- A sustainable transportation with Mobile all Transit
  - Head toward a public transport oriented green travel society
  - Share the knowledge that relates to Mobile all Transit
  - Harmony between international technology & standardization
  - Need to create a cooperative system to vitalize businesses
Recommendation

- KOTI-ITF Joint Research Report Publication Proposal

1. ICT based Integration system for Seamless Public Transport in 2012

2. Funding & Business Model for ICT based Public Transport System in 2013

- To continue a cooperating between KOTI and ITF
Thank you!

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