Integrated Urban Public Mass Transportation System

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Urban Bus

Urban Railway

Integration of Operations

Suggestions
Public Transport Operations
Transport offered to passenger is usually referred to as *service*, while *operations* covers system management, scheduling, and functioning from the operating agency’s point of view.

The public transport services are performed by vehicles or trains along fixed lines according to predetermined schedule.
Basic Elements

- **Line, Network, Stop, Stations**
  - The infrastructure and service provided on a fixed alignment by vehicles or trains operation on a predetermined schedule

- **Vehicle, Transit Units, Fleet Size**
  - Single vehicle, trolleybus, guided modes, trains

- **Travel Demand**
  - Public transport service must be based on the demand for travel by transit along the line

- **Capacity**
  - Maximum ability to perform under prevailing conditions

- **Travel times/Speed**
  - Duration of individual time for passenger or vehicle along the routes
People want competitive public transport service;
- easy to use,
- cheaper cost than car
- comfortable
- less travel time than car
- safe

Can we make it?
Ⅱ Urban Bus
Condition for bus operations

- Private companies operate buses in Korea since 1960.
- Private company suggests bus route, and local government approves it.
  - *The route should not be planned as a similar route with existing bus network.*
- Once the route is approved, the company owns the operation right forever.
- Local government should monitor the operation, but can not cancel the route operation by law.
- Bus operation has been a good business during developing period.
- But situation has been changed....
Only one provider at the market in good days
Deterioration of Bus Operation

Increasing vehicles
- Lack of bus priority policies (bus lane & subsidies)
  - Poor punctuality
  - Poor reliability
  - Slow speed

Inefficient bus management system
- Worsen bus operating conditions
  - Stress on driver from traffic congestion
  - Unfriendly to passenger, and causing accident

Limited road capacity → congestion
- Abolition of route, → reduced operation,
- Periodic increase of fare
- Labor dispute → inconvenience for citizen
- No other options except periodic fare raising

☐ Decrease of bus users
☐ Abolition of bus service
☐ Bankrupt of bus company
Problems of Bus Operation in Seoul

- Unstable Service by deteriorated bus company
  - Unpunctuality, abolition of bus routes

- Unstable employment
  - Continuous reduction of labor (driver’s low salary)

- Excessive competition to increase revenue
  - Reckless driving: accident, uncomfortable ride

- Routes owned by private bus company as a patent
  - Hard to adjust routes by demands
Seoul Public Transport Reform Project

Transit System Renovation

- Low cost • High efficiency city
  - 30 passenger car’s capacity = 1 bus
- Economize on energy
- Reducing air pollution

Competitive public transport
(Public transport > private vehicles)
  - speed
  - convenience
  - safety
  - social fare

World Best Transit City
Multi-Modal Transit System

- Physical (between modes)
- Network (Railway, Bus, and others)
- Fare (Equity, Providing incentives)
- Information (Seamless transfer)
- Institutional (Custom-based)
  - (Mode, Area, TOD, Energy)
Action Program(I)

- Reorganization of the Bus Industry
  - Introduction of bidding main routes
  - Joint management of revenue
  - Reform of revenue structure based on operating distance

<table>
<thead>
<tr>
<th>Previous system</th>
<th>New system</th>
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<tbody>
<tr>
<td>Revenue based on number of Passengers</td>
<td>Revenue based on Service distance (Veh-km)</td>
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Better service for passengers

**Reorganized Route System**
- Functional Route system
- Altered Bus colors
- Trunk line, Feeder line, Circular, Wide-area
- Reorganized route numbers

**New Fare System**
- Unified distance-based fare system
- Free transfers
Fare Integration

Before

Close to Station
- High Price of Asset: Richer
- Lower Fare for Transport

Away to Station
- Low Price of Asset: more poor
- Double Fare for Transport

After

New Fare System
- Distance-based
- Unified among modes

Equity + BMS
Improvement of Infra-facilities

- Exclusive median bus lane
- Bus-Priority signal system

Transfer facility
- Expansion of Transfer centers
- Improvement of transfer stations
- Transfer parking lot

Facility and vehicles
- Improving deposits and stations
- High quality buses
- Introduction of low-floor, articulated buses
Expansion Plan (13 lines/192 km)

- Status of Existing Bus Lanes (2005)
  - Exclusive median bus lanes: 7 lines/ 84 km
  - Curbside bus lanes: 293.6 km
Better transfer facilities

- Transfer terminal for downtown & suburban
- Better street furniture design
III  Urban Railway

Construction of Subway

Stage 1
- Lines: 1/2/3/4
- Lengths: 135km

Stage 2
- Lines: 5/6/7/8
- Lengths: 152km

Graph showing the growth of subway lines and lengths from 1974 to 2004.
The 1st Subway Project

Seoul Station ↔ Cheongnyangni Station
(Connected with Subway)

Subway Line No. 1

Distance: 71.4~74.8 km

Connected with Seoul Station and Cheongnyangni Station.
The 2nd Subway Project

Line 1-4

135Km

'70-'80s
The 3rd Subway Project

Line 5-8

155 Km

’80~’00

The 3rd Subway Project
Mode Share & Operation (2008)

Transportation mode share

- **Bus**
- **Subway**
- **Automobiles**

- **Operation**
  - **Seoul Metro**
  - **SMRT**

**Downtown Rush Hours**
- 56% Uses Subway

**Line No.1~4**
- **Seoul Metro**
- 56% Uses Subway

**Line No.5~8**
- **SMRT**

**8 Lines**
- **Total Length of 287km**
- **263 Units**

**Operating Speed**
- **30 ~ 36 km/h**
Railways in Korea are operated by public company

Why did SMG make another public operation company?

1) Competition each other:
   - To reduce operation cost
   - Self-learning Public Company

2) Labor Union’s power:
   - Alternatives for continuous service
Urban Transport Operation Issues

- Seoul could not accommodate increasing number of cars any more.
- Metro network could not cover all of Seoul metropolitan area (limit of Rail based urban network).
- Private operated buses could not be improved, because of passenger decrease.
- Isolated design and plan of Metro and bus network.
- Transition from bus based public transport network to metro based public transport network.
Major stress on municipal financial status
- 87% of total debt, caused by subway
- Construction and operation cost/km = 100 Mil. USD
- Pressure on fare increase
Inefficient investment?

Mode Share Trend

- Number of passengers below expectation: for line 5, 23,000 passenger/km expected → 11,000/km realized
- Operation cost for each trip of subway and bus: $1.148 vs. $0.7
Issues in Bus Operation

- Unstable Service by deteriorated bus company (reduction of passenger, reduction of revenue)
  - Unpunctuality, abolition of bus routes

- Unstable employment
  - Continuous reduction of labor (low salary and poor working condition of driver)

- Excessive competition to increase revenue (same number of bus with decrease number of passenger)
  - Reckless driving: accident, uncomfortable ride

- Routes owned by private bus company as a kind of patent
  - Hard to adjust routes by demands
Integration of Urban Transport Network & Operation

- Integration of Metro & Bus network/service
- Financial stability for private bus operator
- Promoting use of public transport by integration of metro & bus system
- Paradigm shift to sustainable transport from private car use
- Transport is one of key factor for competitive city
Network Integration of Railway & Buses

- **Hub & Spoke System in Urban Public Transport**

**Before**
- **Suburban**
  - Irregular headways
  - Decreasing ridership
- **Inner City**
  - Fierce competition
  - Reckless driving

**New**
- **Suburban**
  - Regular headways
  - Increasing ridership
- **Inner City**
  - Reduced traffic
  - Reduced operation cost

**Transfer facilities**
Integration of Operation : PPP

Route (Phase I)
Gimpo Airport~Gangnam (25.5km, 25stations & 1 Depot/Phase II-12km, 12stn)

Details of Work Scope for private SPC
E&M, Test & Commissioning, Operation & Maintenance

Budget
USD 4.5Bil. Civil by SMG, USD 1.2Bil.(E&M+O&M) by Private SPC

Construction Period
May 2004 ~ April 2009 (5 years)

Type of Project
Korea’s First Private Investment Project under BTO scheme
(under 30 year concession agreement)
Semi-Public Operation System (PPP)

- Government: Operational plan, Infrastructure management
- Bus company: Operation and maintenance, labor management

Joint management of revenue pool

- Seoul Metropolitan Government
  - Operational plan
  - Infrastructure management
  - Service evaluation, tenders
  - Operation monitoring

- Bus company
  - Operation and maintenance
  - Labor management

- Smart card settlement company
  - Financial support
  - Route planning
  - Request for financial support

- Bus operation consulting body
  - Settlement of operational profit
  - Distribution of operation profits

Integration of Operation: PPP
Fare Integration & Smart Card

- **Distance based fare**
  - Subway single trips: fare according to distance-traveled
    - (basic fare: 800 won up to 12 km; extra fare of 100 won for every additional 6 km)
  - Bus single trips: single fare of 800 won

- **Free of charge for transfers**
  - For transferring trips: accumulated distance-based fare system
    - (basic fare up to 10km; extra fare for every additional 5 km)
Fare Integration & Smart Card

Smart Card
- Distance-based Fare
- Free Charge for Transfers

Transportation
Medical services
Recreation
Shopping
Banks
Public sports facilities
Public agencies/Tax/
Reservations for tourist resorts
BIS (Bus Information System)

Managing information and bus operation

Monitoring of bus operation

Collecting and providing information

Services for Citizens: Real-time information

In-Bus Devices & Driver

BMS, BIS Center

Bus Company

Internet, PDA, Cellular Phone, ARS
Information Integration

Smart Phone App.
Suggestions
Suggestions

- Considering operation during construction
- Close Monitoring of operator’s performance
- Competition for service quality
- Integration
Integration for Public Transport Operation

- Planning
- Governance
- Finance
- Network
- Operation
- Monitoring/Management
- Fare system
- Information
Thank you!!
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