

2nd International Forum on Low Carbon Development for Cities
“Acting Together for Low Carbon, Livable, and Prosperous Cities”

第二届城市低碳发展国际论坛
“共同实现低碳、宜居和繁荣的城市”

Millennium Seoul Hilton, Seoul, Republic of Korea
韩国首尔千禧希尔顿酒店

2-5 September 2019

2019年9月2-5日

Session 3: Low Carbon Transport Options in Mega-Cities

论坛3：特大城市的低碳交通选择

SEOUL TRANSPORT REFORM
- POLICY AND ICT -

首尔交通变革
—政策与行动—

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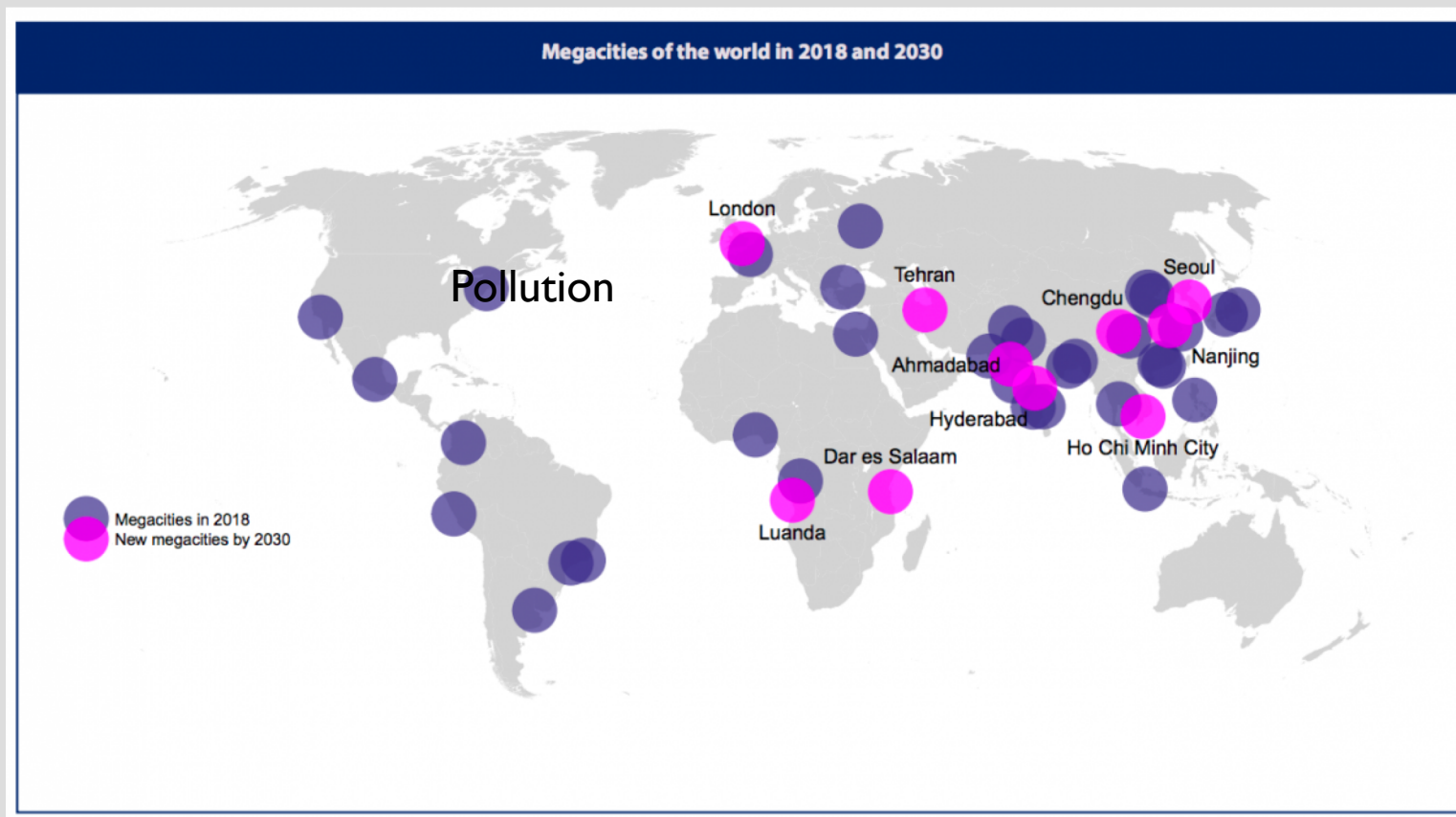
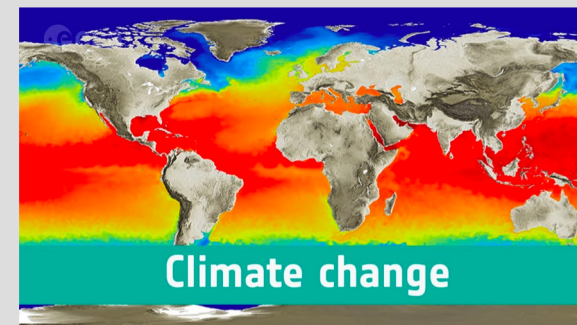
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Mega Cities = Mega Problems

特大城市 = 特大问题

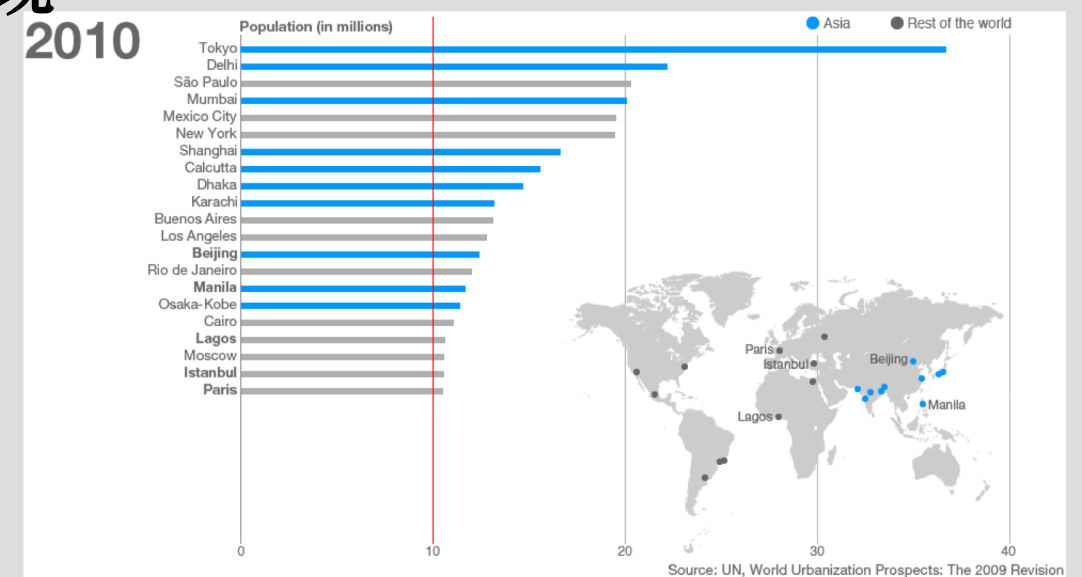
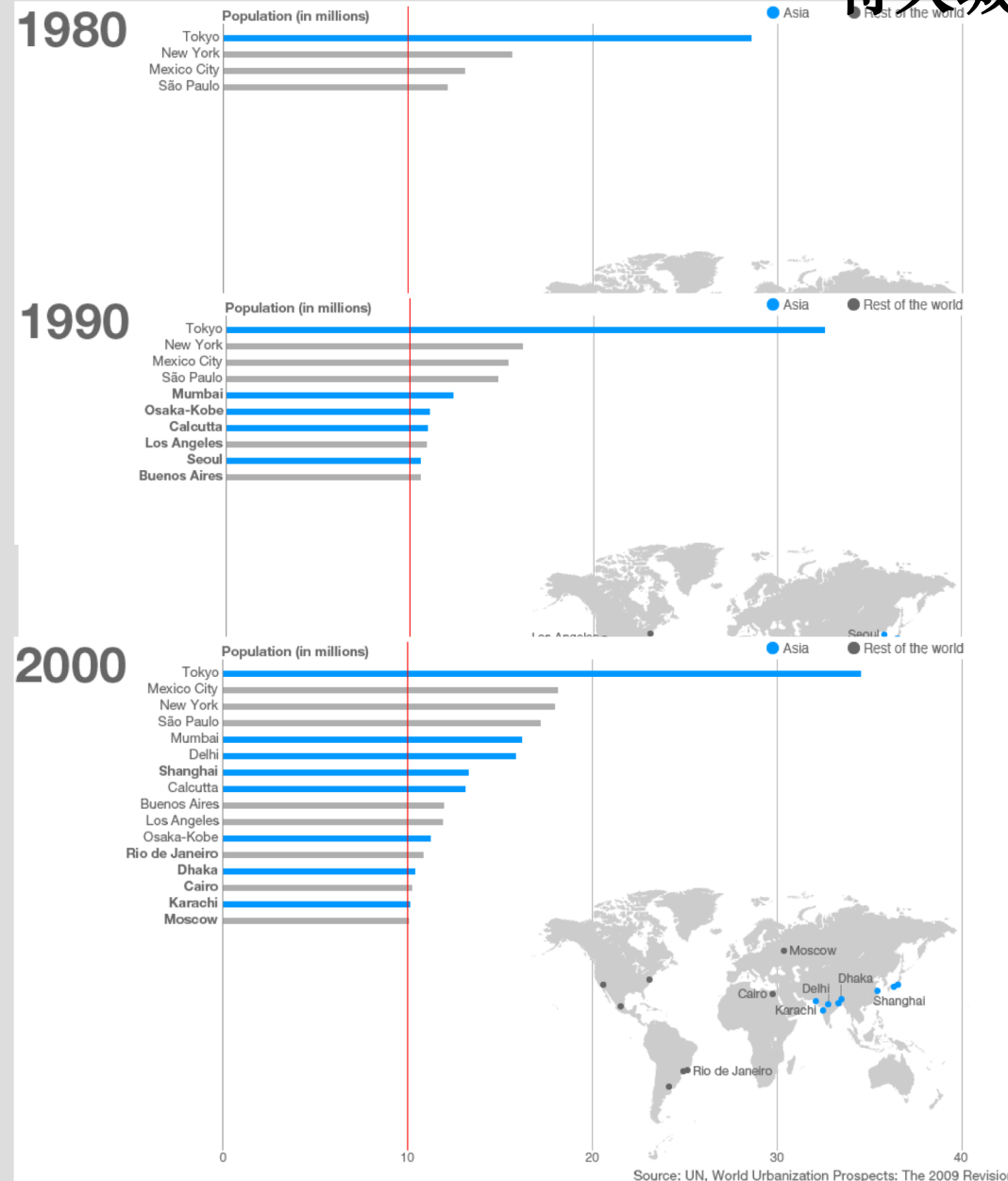
Priority is Important

必须优先解决



Merge of Mega-Cities

特大城市的出现



Questions :

问题：

1. Why Cities grow so Big ?
1. 为什么城市会发展得如此巨大？
2. Why Mega City merges in particular regions/economies ?
2. 为什么特大城市会出现在特定的区域/经济体？
3. What is the role of transport policy & Infrastructure in Mega Cities ?
3. 在特大城市中，交通政策和基础设施会扮演怎样的角色？



New York 纽约

1876



1932



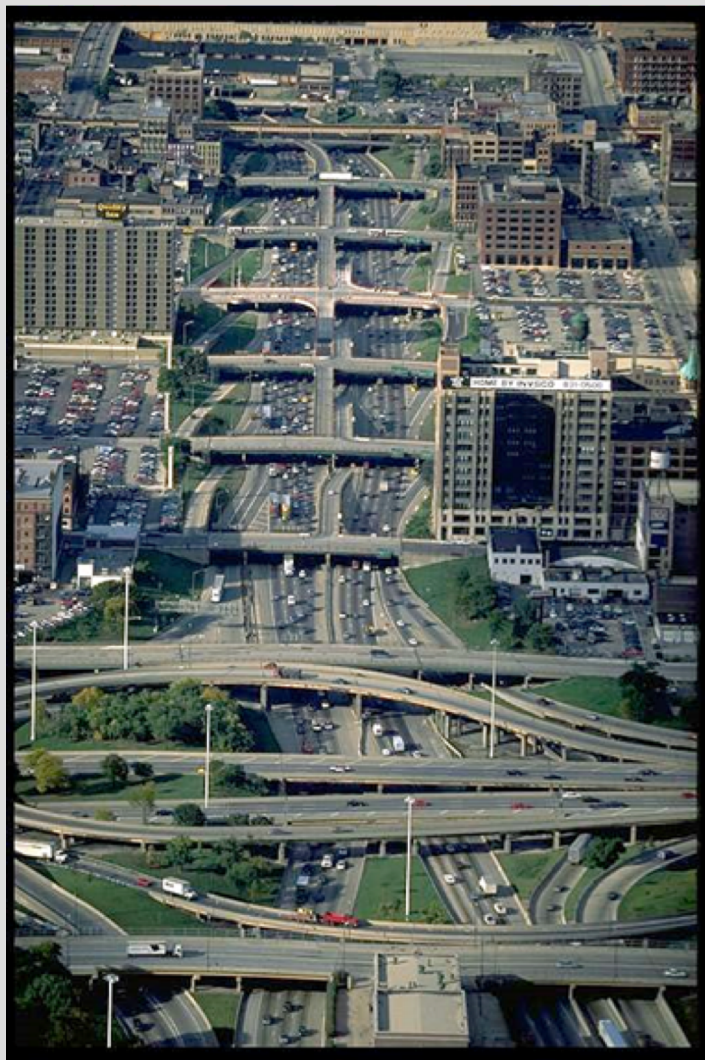
1988



2013

New York City 纽约市





Chicago
芝加哥



Tokyo 東京





Beijing
北京

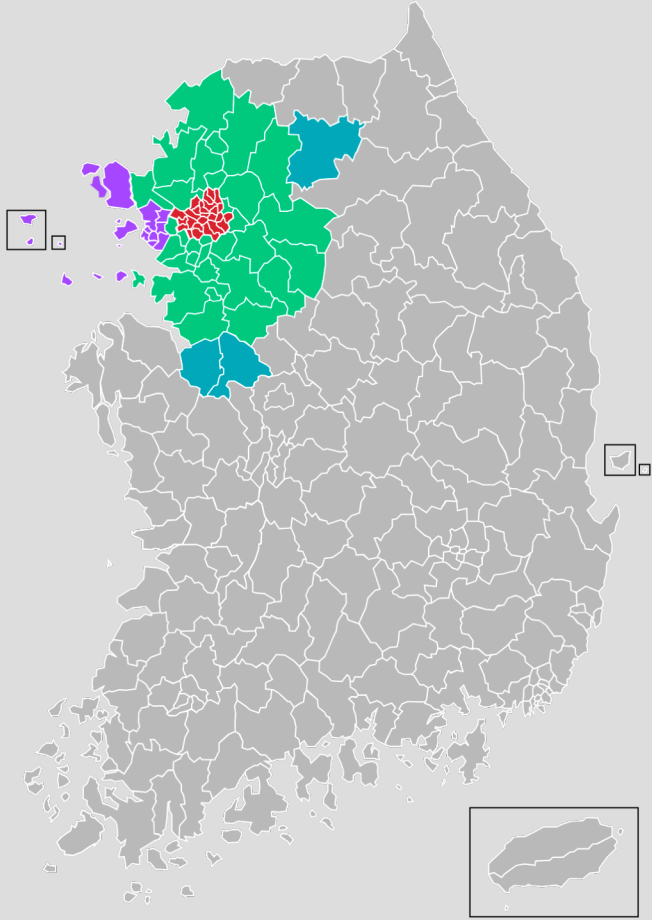


Case of Seoul Capital Area

首尔首都圈案例

Seoul Capital Area

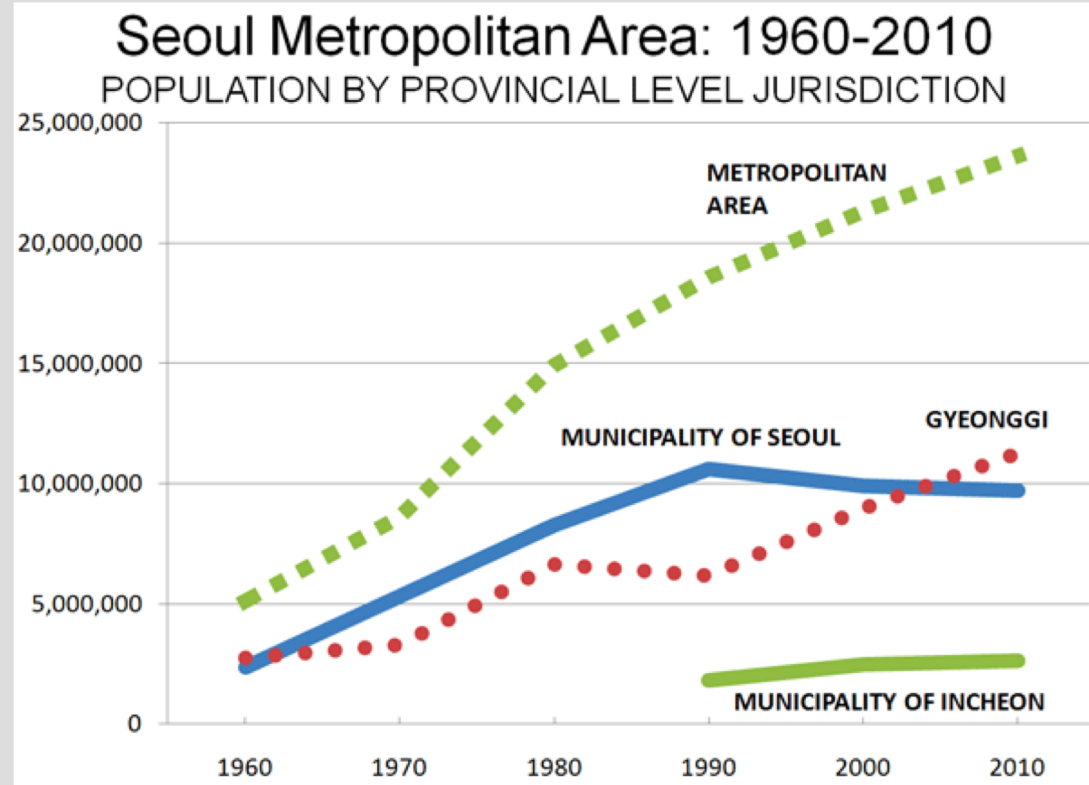
首尔首都圈



Red: Seoul, Violet: Incheon, Green: Gyeonggi-do,
Blue: other areas connected by rapid transit
红色: 首尔, 紫色: 仁川, 绿色: 京畿道,
蓝色: 其他通过快速公交连接的地区

Population 人口 (2016)

• Seoul City 首尔市	10 Million 1000万
• <u>Metro</u> ^[1] 都市区	25,5 Million 2550万
• % of South Korea's total pop 占韩国总人口的百分比	~50% (51 million) 约50% (5100万)



The Past 过去

1950s

- 朝鲜战争 (1950-1953)
- 开始战后修复工作
- 出行方式以步行和自行车为主
- **Korean War (1950-1953)**
- **War restoration work started**
- **Walk, bicycle dominant travel patterns**



1960s

- **Urbanization and industrialization**
- **Migration from rural to urban areas**
- **Bus dominant travel patterns**
- 城市化和工业化
- 人口从乡村迁移到城市
- 出行方式以地面公交为主



1970s

- 首尔人口过度集中
- 1974年首尔建成首条地铁线
- 出行方式仍以地面公交为主
- 小汽车保有量逐渐增加
- **Over-concentration of population in Seoul**
- **First subway line built in Seoul in 1974**
- **Still bus dominant travel patterns**
- **Gradual increase in car ownership**



1980s

- **Increase in subway passengers**
- **Decline in the number of bus passengers**
- **Car ownership (one million in 1985)**
- **Traffic impact assessment (TIA)**
- **Transportation system management (TSM)**
- 地铁乘客增加
- 地面公交乘客减少
- 小汽车保有量 (1985年达到100万辆)
- 交通影响评估 (TIA)
- 交通系统管理 (TSM)



Road Expansion + Capacity Increase + Traffic Management

道路扩宽 + 交通供给增加 + 交通管理

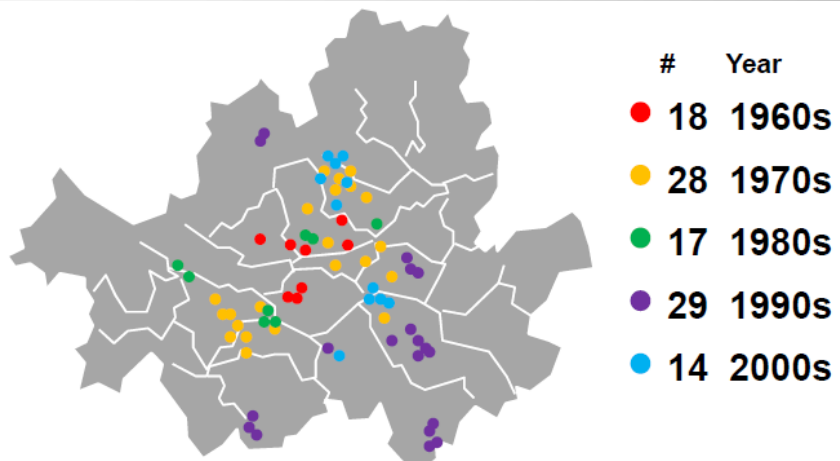
Seoul

首尔

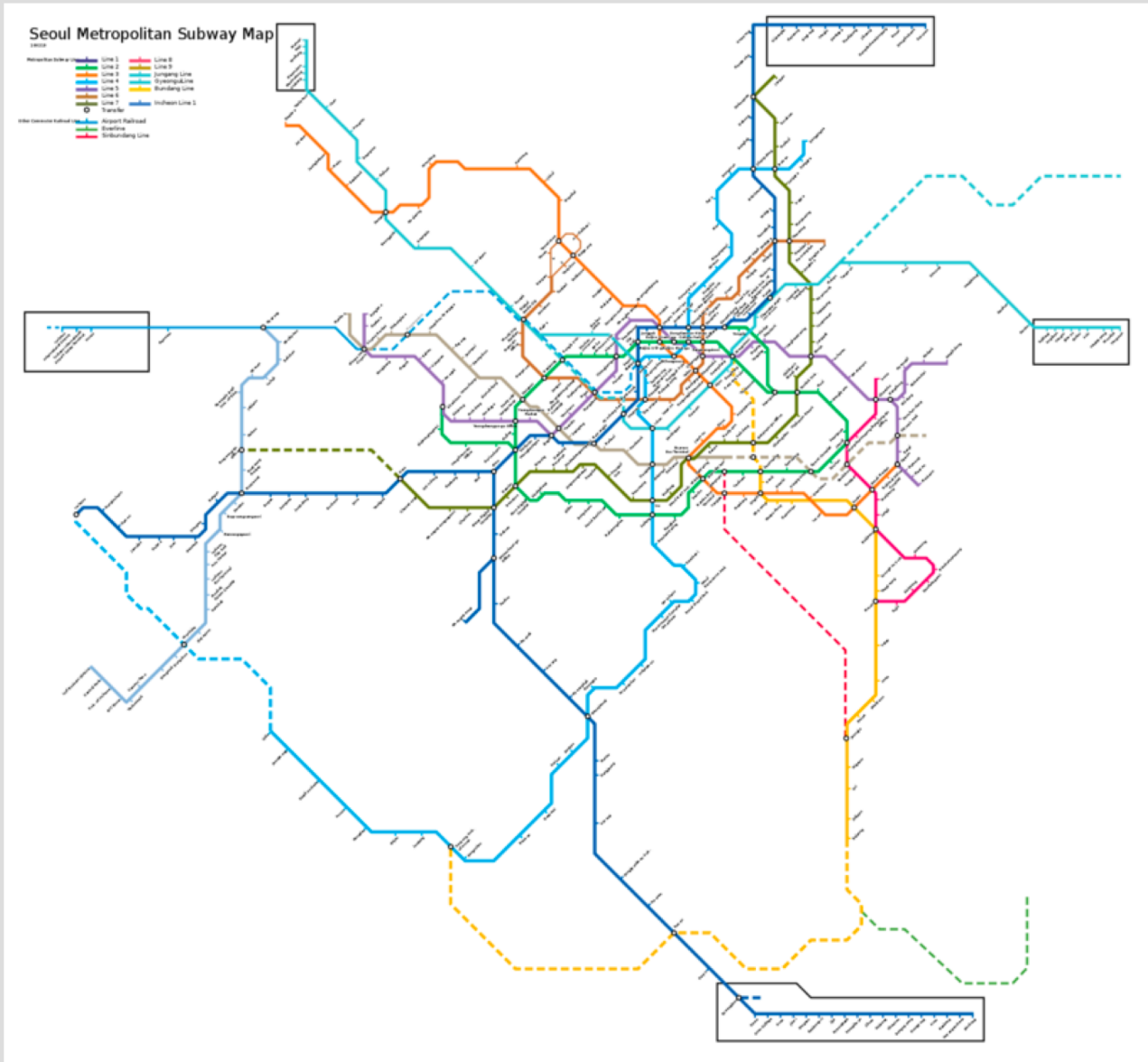


建成106座高架桥

Construction of 106 overpasses



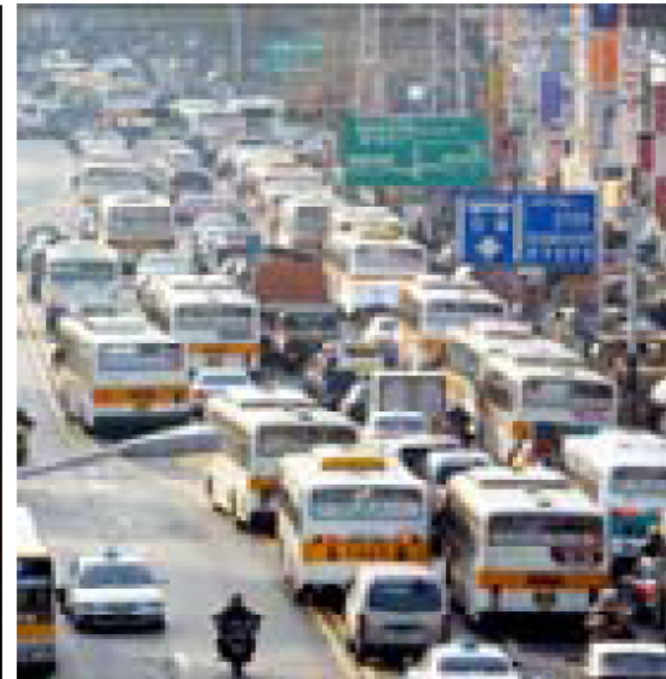
Urban Rail from 1974
城市轨道交通始于1974年



Line name 线路名称	Stations 站点数	Total Km 里程数	Opening Year 开通运营时间	Last Extension 最新延长时间
<u>Line 1</u>	98	200.6	1974	2010
<u>Line 2</u>	51	60.2	1980	1996
<u>Line 3</u>	44	57.4	1985	2010
<u>Line 4</u>	48	72.1	1985	2000
<u>Line 5</u>	51	52.3	1995	1996
<u>Line 6</u>	38	35.1	2000	2001
<u>Line 7</u>	51	57.1	1996	2012
<u>Line 8</u>	17	17.7	1996	1999
<u>Line 9</u>	38	40.6	2009	2018
<u>AREX</u>	14	63.8	2007	2018
<u>Gyeongui-Jungang Line</u>	55	121.7	2005	2017
<u>Gyeongchun Line</u>	24	81.3	2010	2016
<u>Bundang Line</u>	37	55.3	1994	2018
<u>Suin Line</u>	14	19.9	2012	2016
<u>Ui LRT</u>	15	11.4 km	2017	-
<u>Shinbundang Line</u>	13	31.0 km	2011	2016
<u>Incheon Line 1</u>	29	29.4 km	1999	2009
<u>Incheon Line 2</u>	27	29.1 km	2016	-
<u>EverLine</u>	15	18.1 km	2013	-
<u>U Line</u>	15	11.1 km	2012	-
<u>Gyeonggang Line</u>	11	54.8 km	2016	-
<u>Seohae Line</u>	12	23.4 km	2018	-

1990s

- **Emerging sustainable development paradigm** 出现可持续发展范例
- **Severe air pollution due to traffic congestion** 交通拥堵造成严重的空气污染
- **Congestion charging system was introduced** 实施拥堵收费政策
- **Car ownership (ten million in 1997)** 小汽车保有量 (1997年达到1000万辆)
- **Eight subway lines (287km) in Seoul were completed** 首尔建成8条地铁线 (总长287公里)



POPULATION & VEHICLES

人口与机动车

Population: doubled 人口：2倍 Registered vehicles: 46 times 注册机动车：46倍

1970: 5.4 million 540万

1970: 60,000

1990: 10.9 million 1090万

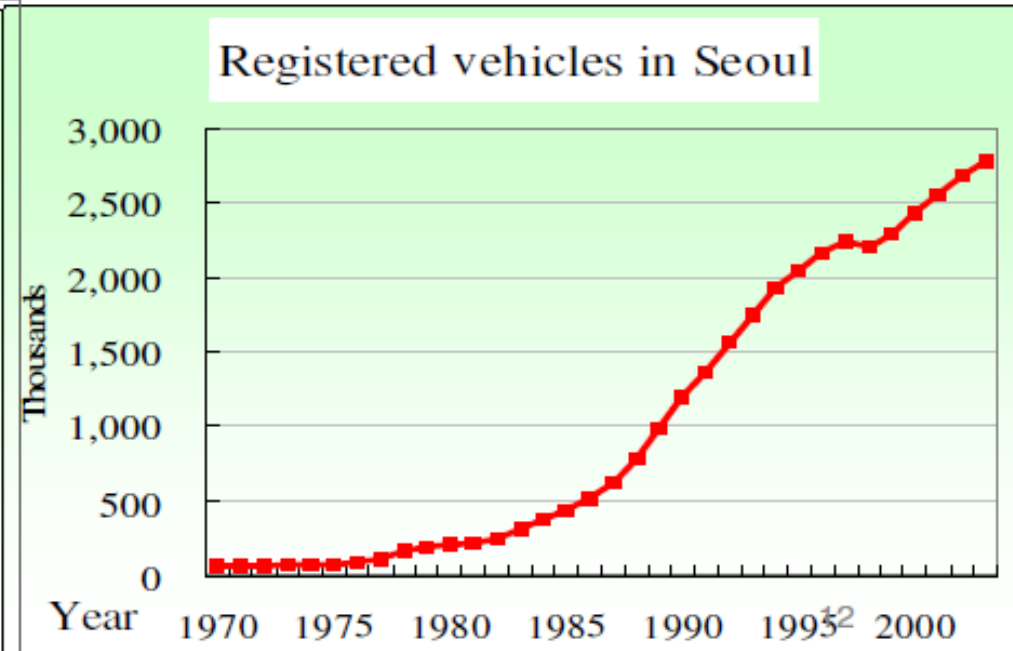
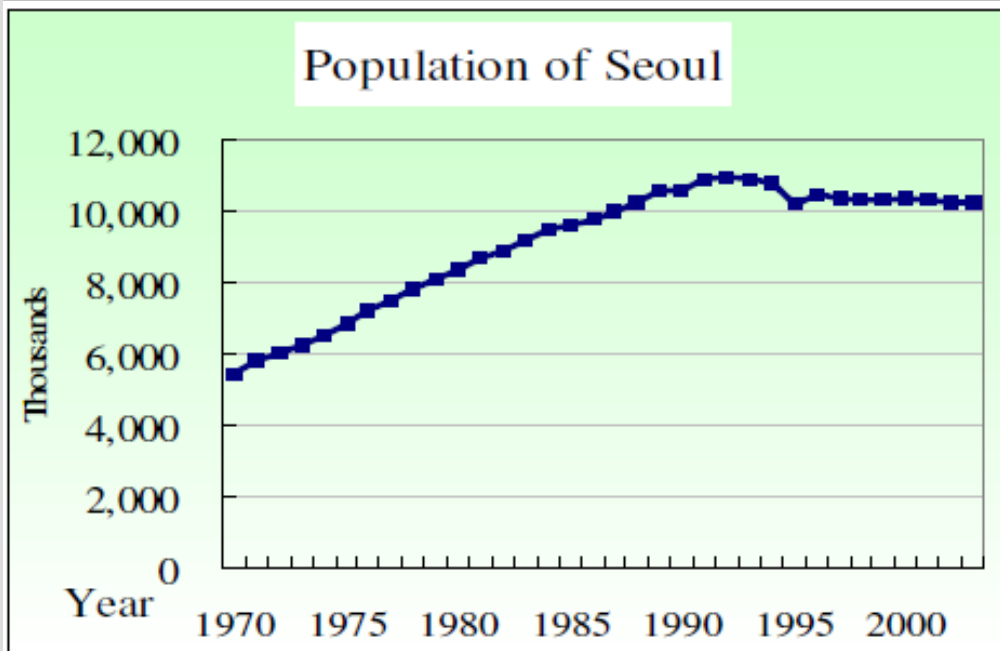
1990: 1.2 million 120万

2007: 10.4 million 1040万

2007: 2.9 million 290万

Population density: 17,000 persons/km²

人口密度：每平方公里17,000人

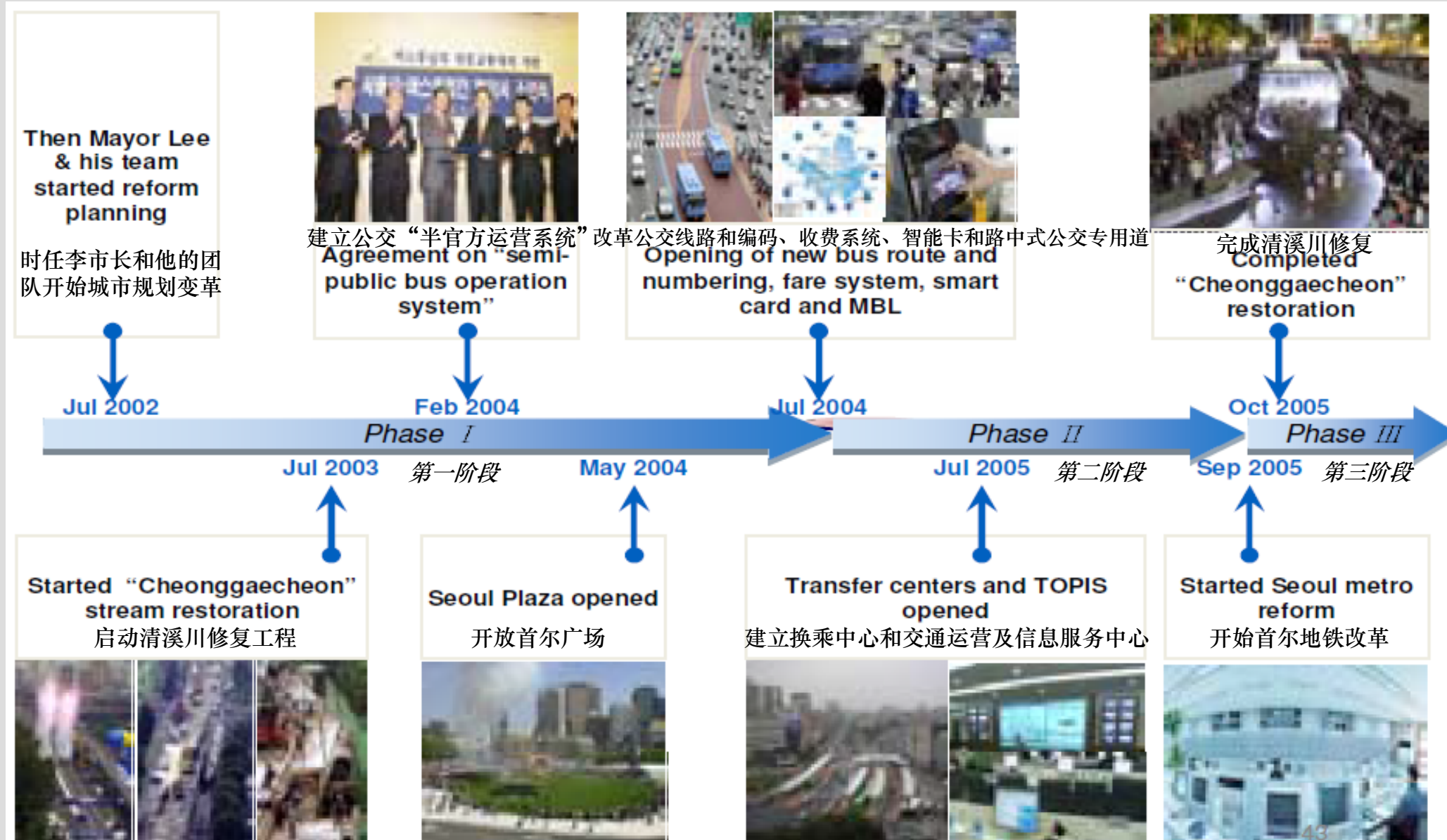


MODE SHARE 出行分担率

	Bus 公交	Subway 地铁	Bus + subway 公交+地铁	Passenger car 小客车	Taxi 出租车	Others 其他
2000	28.3	35.3	63.6	19.1	8.8	8.5
2001	27.6	36.5	64.1	18.7	8.4	8.8
2002	26.8	37.8	64.6	18.4	8.0	9.0
2003	27.6	35.0	62.6	25.0	7.3	5.1
2004	26.3	35.7	62.0	26.4	6.6	5.0
2005	26.8	35.9	62.7	26.3	6.2	4.9
2006	27.6	34.7	62.3	26.3	6.3	5.1

Seoul City Reform Brief

首尔城市变革概况



Seoul City Reform Brief : Median Bus Lane

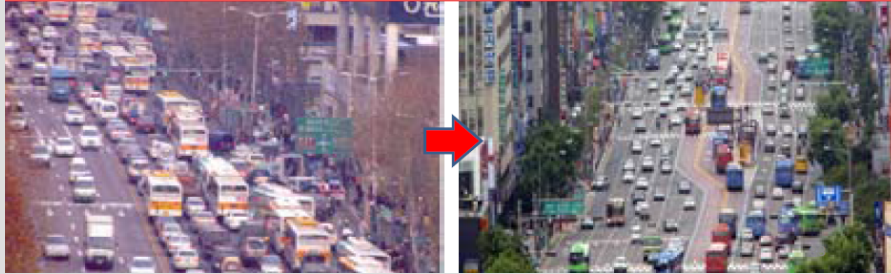
首尔城市变革概况：路中式公交专用道

路中式公交专用道

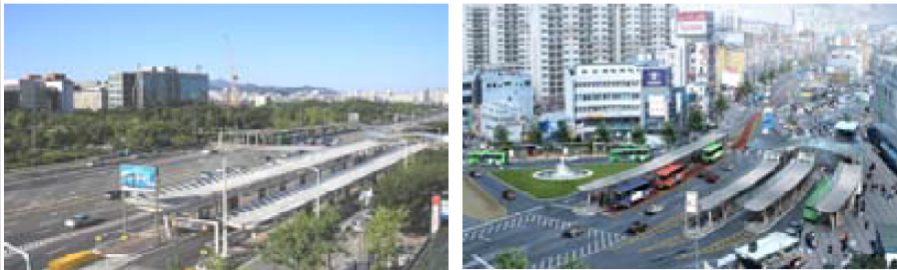
- ✓ 路侧专用道总长183公里，但效果不佳
- ✓ 为8条线路开辟74公里的路中式公交专用道，旨在提升公交车速
- ✓ 另外还规划建设221公里的路中式公交专用道，覆盖20条线路

MEDIAN BUS LANES

- ✓ A length of 183km of curbside bus lanes was built but not functioned well
- ✓ Median bus lanes (MBL) with 74km long in 8 lines contributed to increase bus travel speeds
- ✓ A length of additional 221km of MBL on 20 route was planned



FACILITY UPGRADE (TRANSFER TERMINALS) 设施升级（换乘枢纽）



Yoido and Cheongryangni multi-modal transfer terminals
汝矣岛和清凉里多模式换乘枢纽



Seoul City Reform Brief : Removal of Large Flyovers

首尔城市变革概况：拆除大型高架桥

Chonggaecheon 清溪川



Seoul Station Flyover 首尔站高架桥



Reduce Through Traffic
In the CBD
(65%)

减少CBD区域65%的过境交通

Seoul City Reform Brief : Removal of Large Flyovers

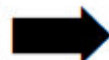
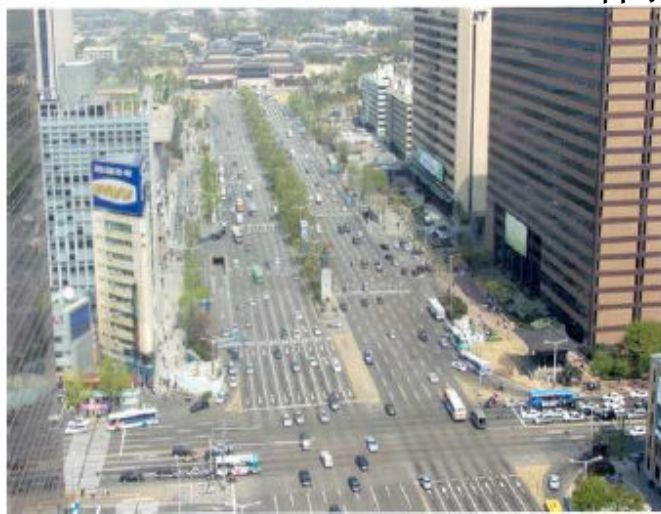
首尔城市变革概况：拆除大型高架桥



Before and After Seoul Plaza Renovation

首尔广场改造前后

Public Space
公共空间

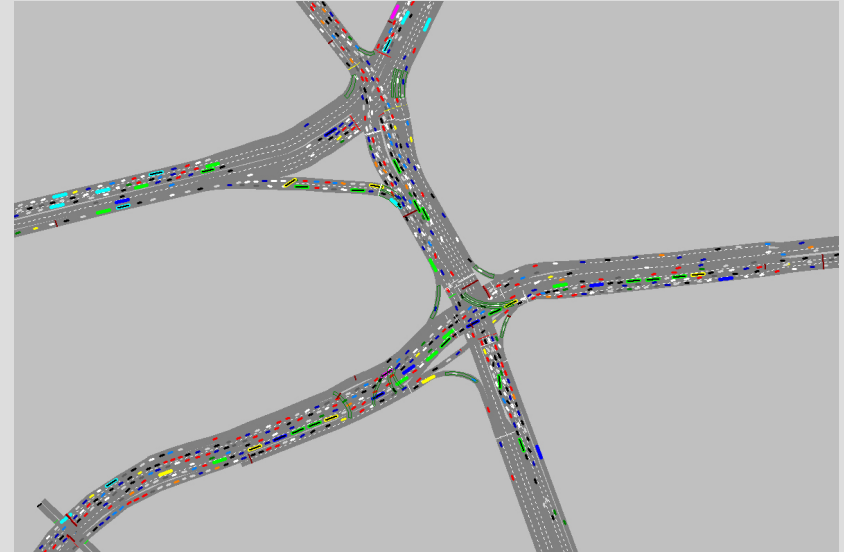


Before and After Gwanghwamun Square Renovation

光化门广场改造前后

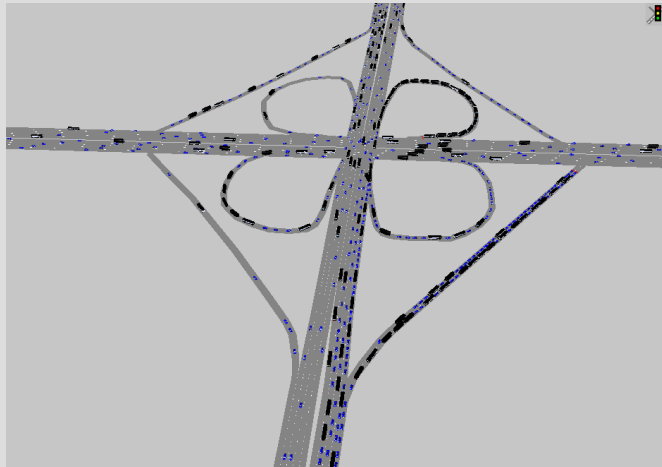
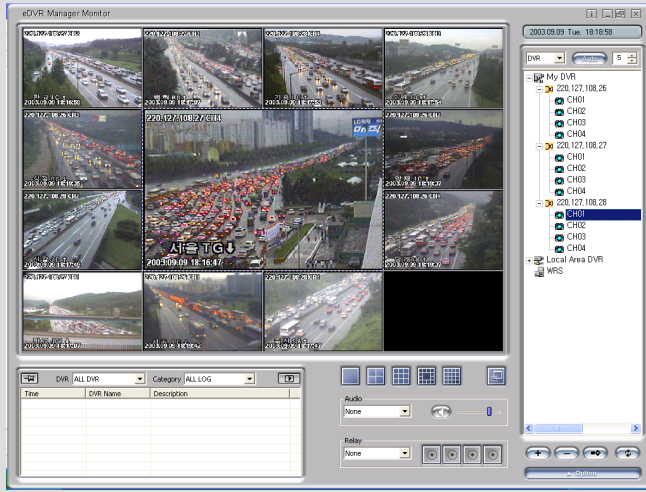
Seoul City Reform Brief : Removal of Large Flyovers

首尔城市变革概况：拆除大型高架桥



Seoul City Reform Brief : All Day Bus Only on Expressway No. 1

首尔城市变革概况：一号高速公路上的全天公交专用道



Transport Reform 3 main Tasks

交通变革的三项主要任务

Management 管理

**Scientific
Transport Planning**
科学的交通规划

**Distance-Based
Fare Integration**
按距离收费

Route Restructuring
线路调整

**Unified Fare System,
Free Transfers**
一体化票制票价系统,
免费换乘

Infrastructure 基础设施

Quality Bus Stops
高质量的公交站点

Dedicated Lanes
公交专用道

Safe, Low-Emission Buses
安全、低排放的公交车

**Pedestrian-friendly
Policies(TDM)**
行人友好的政策（交通需求管理）

Easy Transfers
换乘方便

Technology 技术

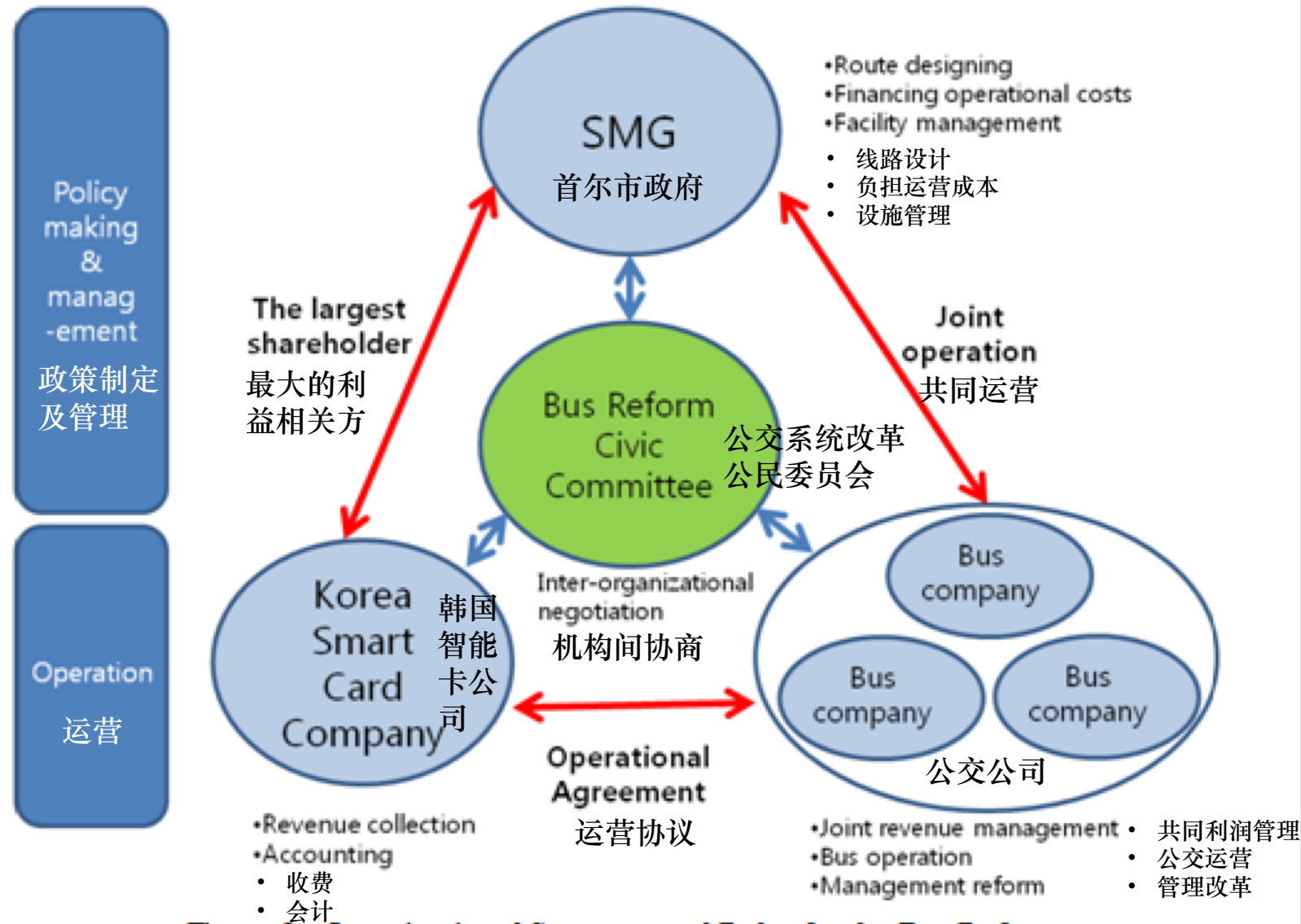
Smart Card System
智能卡系统

**Bus Management
System(TOPIS)**
公交管理系统（交通运营及信息服务中心）

**Transport Information
System (TIS)**
交通信息系统

Bus Reform: Structure

公交改革：结构



<Figure 3> Organizational Structure and Roles for the Bus Reform

图3. 公交系统改革的组织结构和角色

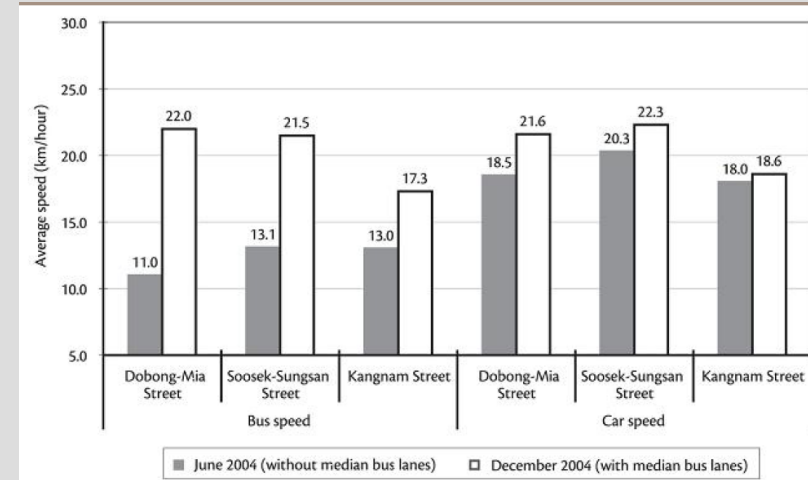
Bus Reform : Impact

公交改革：影响

CITIZEN SATISFACTION SURVEY
市民满意度调查

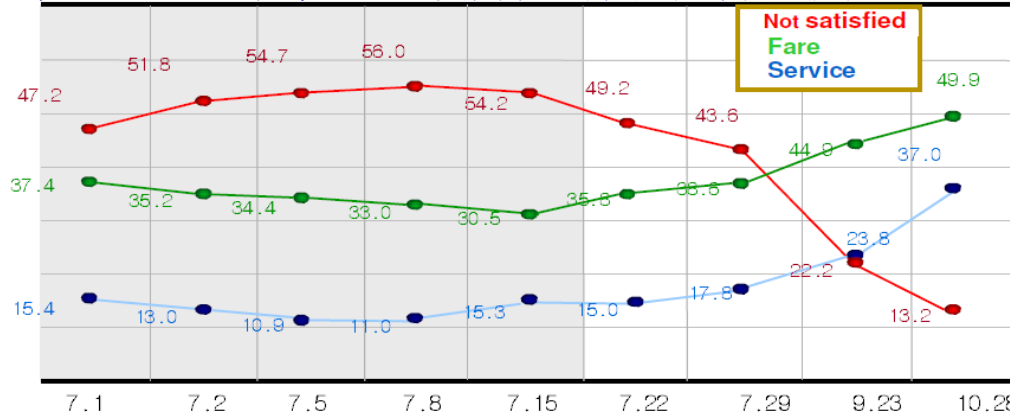
		Jul-Dec 2003	Jul-Dec 2004	Jan-Jun 2005	Jan-Jun 2006
Citizen satisfaction (%)	Total (%)	-	45.6	69.0	84.1
	Bus (%)	-	-	58.9	85.5
	Subway(%)	-	-	79.1	90.2
Citizen satisfaction (10 scale)	Bus + subway	5.15	5.30	5.55	5.62
	Bus	4.75	4.85	5.64	5.68
	Subway	5.99	6.08	6.29	6.31
	Taxi	4.72	4.96	4.72	4.87

Speed 车速

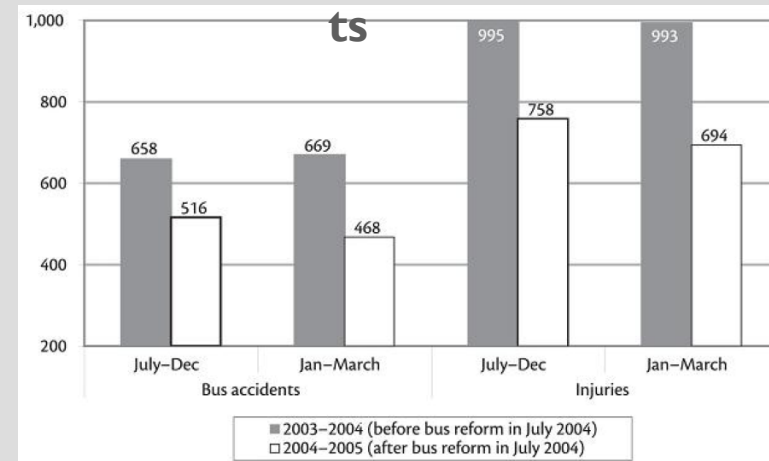


CITIZEN SATISFACTION SURVEY
市民满意度调查

Citizens satisfaction with the bus reform has risen over time in terms of fare and service provision.
市民对于公交改革后公交费用和服务水平的满意度随时间上升

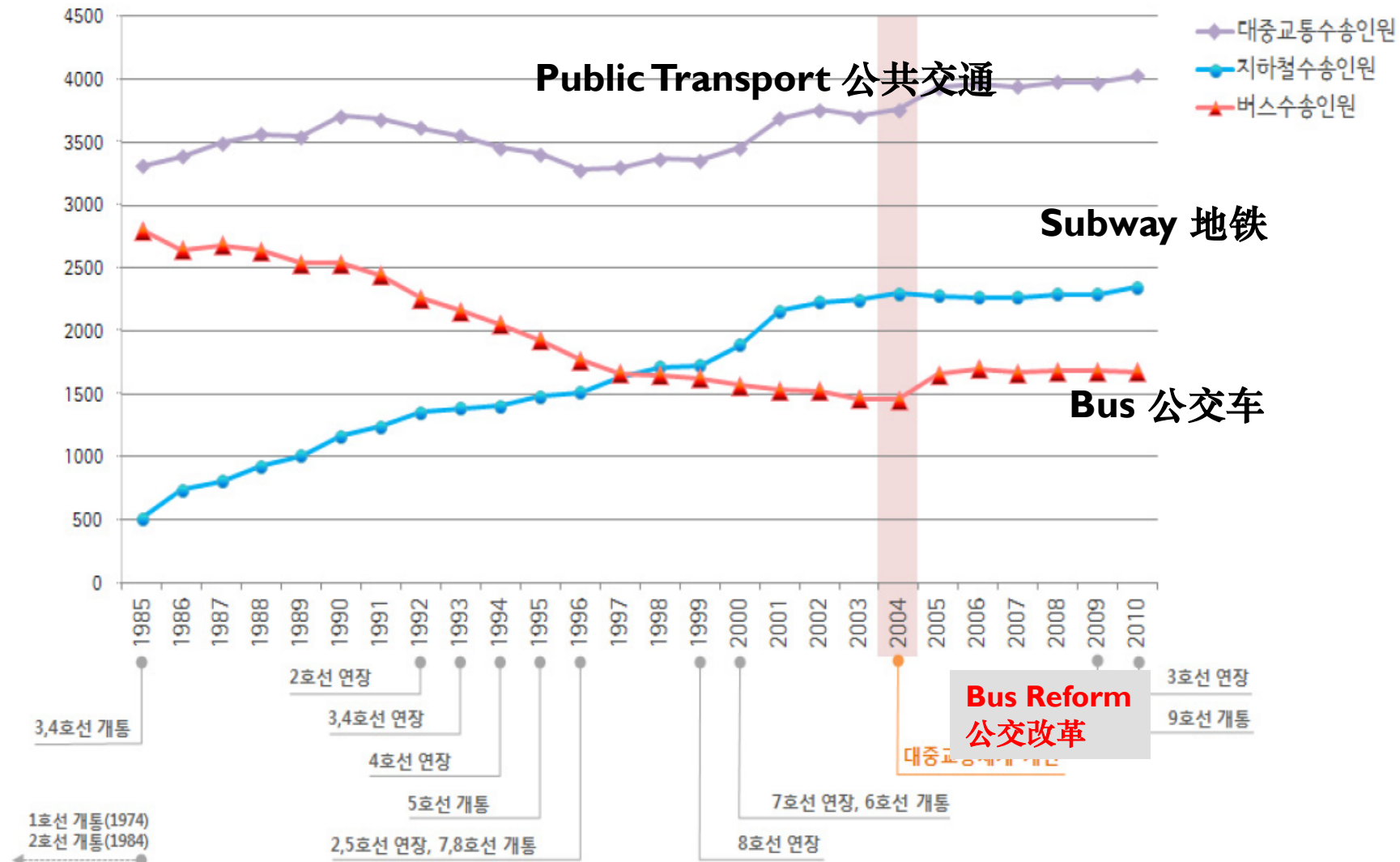


Acciden 事故数



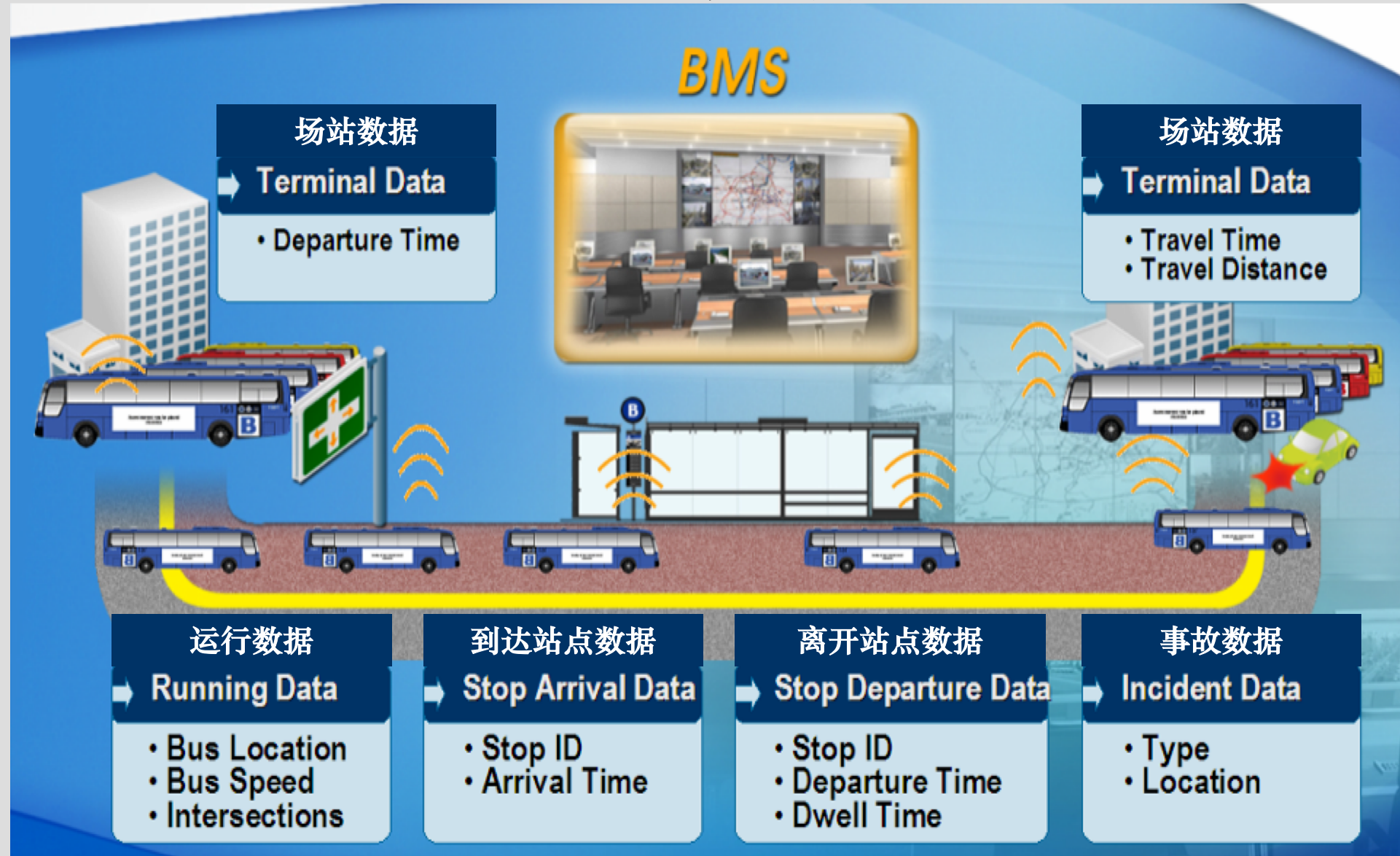
Bus Reform : Impact

公交改革：影响



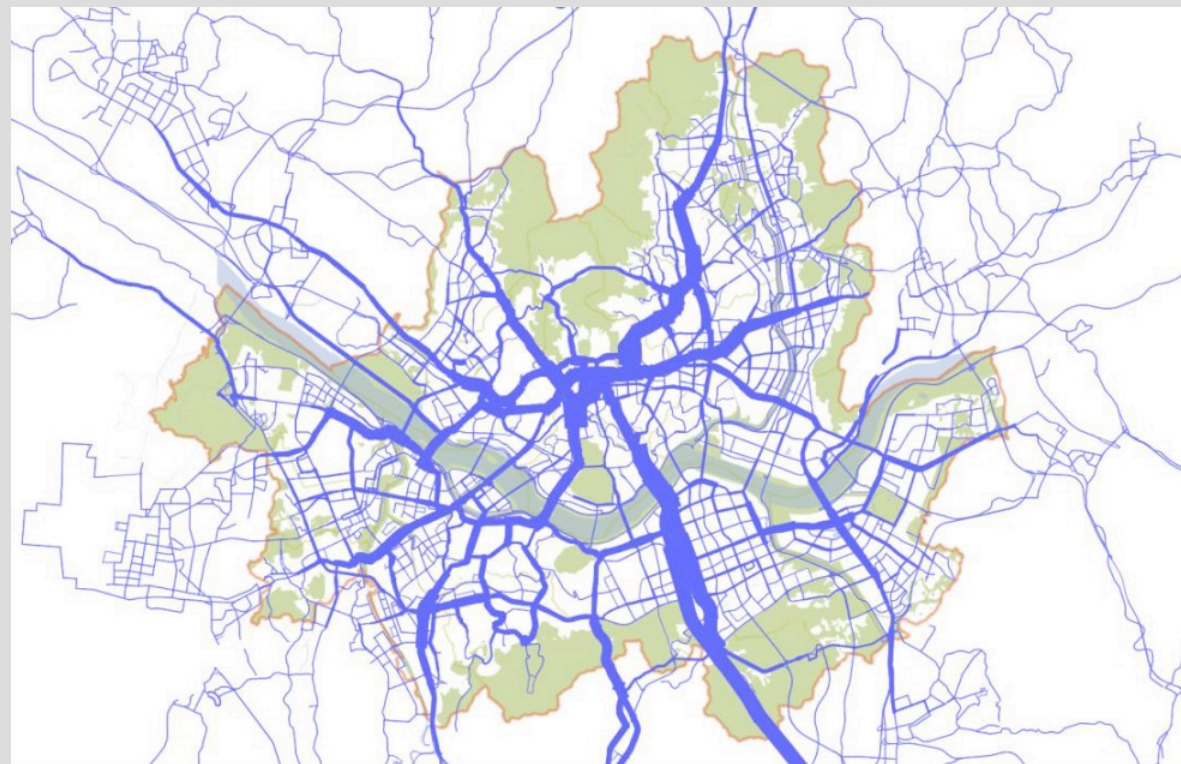
Bus Management System

公交管理系统



PAYMENT FOR PUBLIC TRANSPORT

公共交通的支付系统



BUS INFORMATION SYSTEM 公交信息系统



空位数

Vacant seat
indicator

通过智能手机?
Through
smartphone?



Enforcement: Surveillance Cameras

执法：监控摄像头

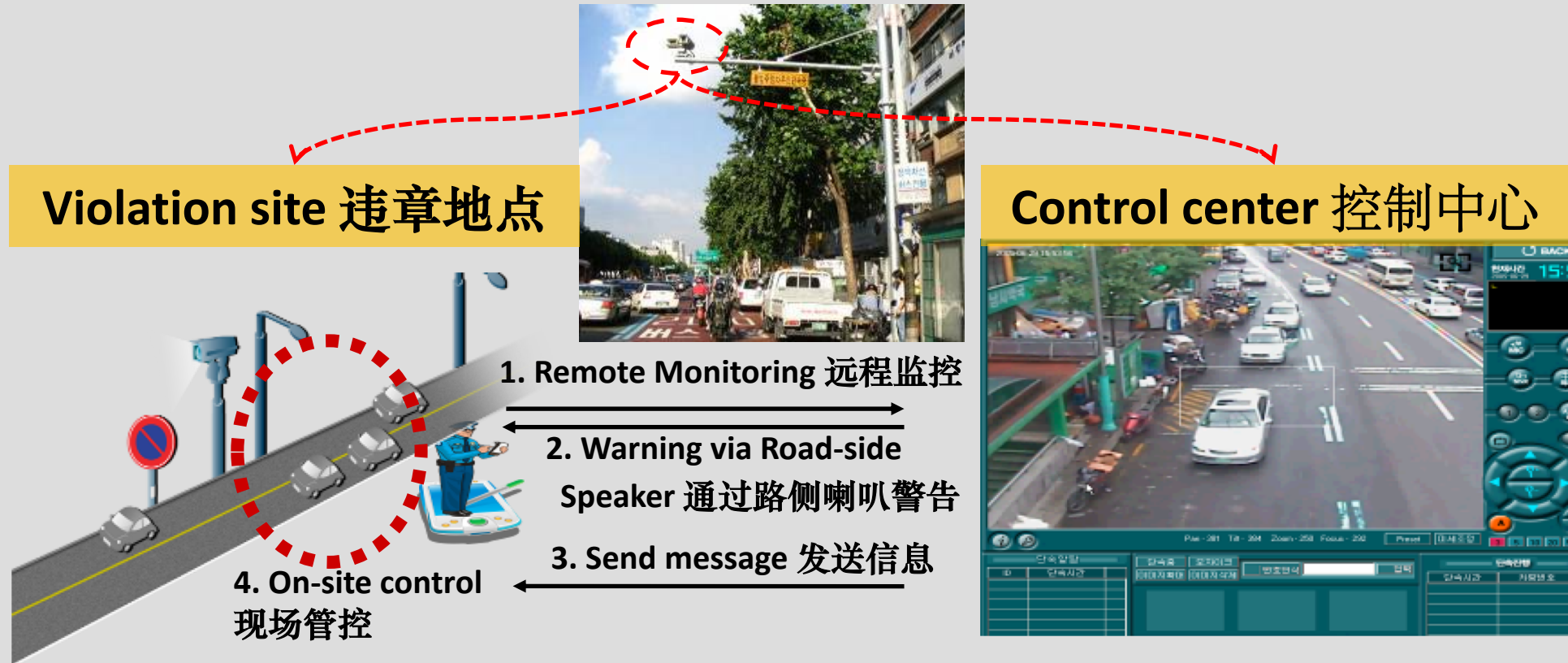


Enforcement by camera on bus

通过安装在公交车上的摄像头进行执法

Enforcement : Remote Surveillance

执法：远程监控



- **362 CCTVs** installed from 2004 to 2005 2004-2005年间安装了**362**台**高清摄像头**
Controlling illegal operation/parking/stopping at bus only lane
管控公交专用道上其他车辆的违章占道和停车等行为
Monitoring cars with their plate number
通过车牌对小汽车进行监控

(Seoul Transport Operation & Information Service)

首尔交通运营及信息服务中心



Seoul Mobility Management Center.

首尔出行管理中心
@B3 of City hall
位于市政厅B3

Transport Reform Result 交通变革成果

For High Quality Services 提供高质量的交通服务

- 1. Network effect → Increase ridership (13%) 对公交网络的影响 → 客流量提升 (13%)**
- 2. Travel Time Saving 节约出行时间**
- 3. Cost down, Triple win(P-G-O) 降低成本, 三赢 (乘客、政府、运营商)**
- 4. Transparency improvement, Reliability 改善透明度和可靠性**
- 5. Reduce Accident → 27.6% down 减少交通事故 → 下降27.6%**
- 6. Technology upgrade – ICT, Easy to use 技术升级 — 信息通信技术, 容易使用**

Thank You 谢谢

KI-JOON KIM 金骐峻

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