The 33rd Pacific Economic Community Seminar
Sustainable Development and Circular Economy

Sustainable Mobility for Smart and Livable Cities

張學孔/ 台大土木系教授
S.K. Jason Chang
Professor
National Taiwan University
skchang@ntu.edu.tw

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Agenda

- Smart & Livable Cities
- Challenges and Crucial Issues
- Urban Transportation Policy: Green, Shared, Intelligent
- ITS for Sustainable Mobility
- Concluding Remarks

Innovative Services…

Google Self-Driving Bike

Taipei Shared Bike & Motorcycle
Connected V.I.P. Vehicle, Infrastructure and People

Livable Cities

- Livability of Cities: stability, healthcare, culture and environment, education and infrastructure.
- Top Cities: Melbourne, Vienna, Vancouver, Munich, Toronto, …
- Livable cities in Australia and Canada: Low population density: 30~40 people per square kilometer.
- The EIU's Global Livability Ranking, Monocle's Quality of Life Survey, and Mercer's Quality of Living Ranking (The Most Livable Cities Index)
- "Good public transport," "Good Active Mobility," and "Nice to live, to work and to have fun."

The EIU's Global Liveability Ranking

Melbourne has been ranked by the Economist Intelligence Unit as the world's most liveable city since 2011

Mercer's Quality of Living Ranking

article: *Mercer Quality of Living Survey*

Vienna was top ranked in the 2016 Mercer Quality of Living Survey

Monocle's Quality of Life Survey

Tokyo was ranked highest by *Monocle* in 2015

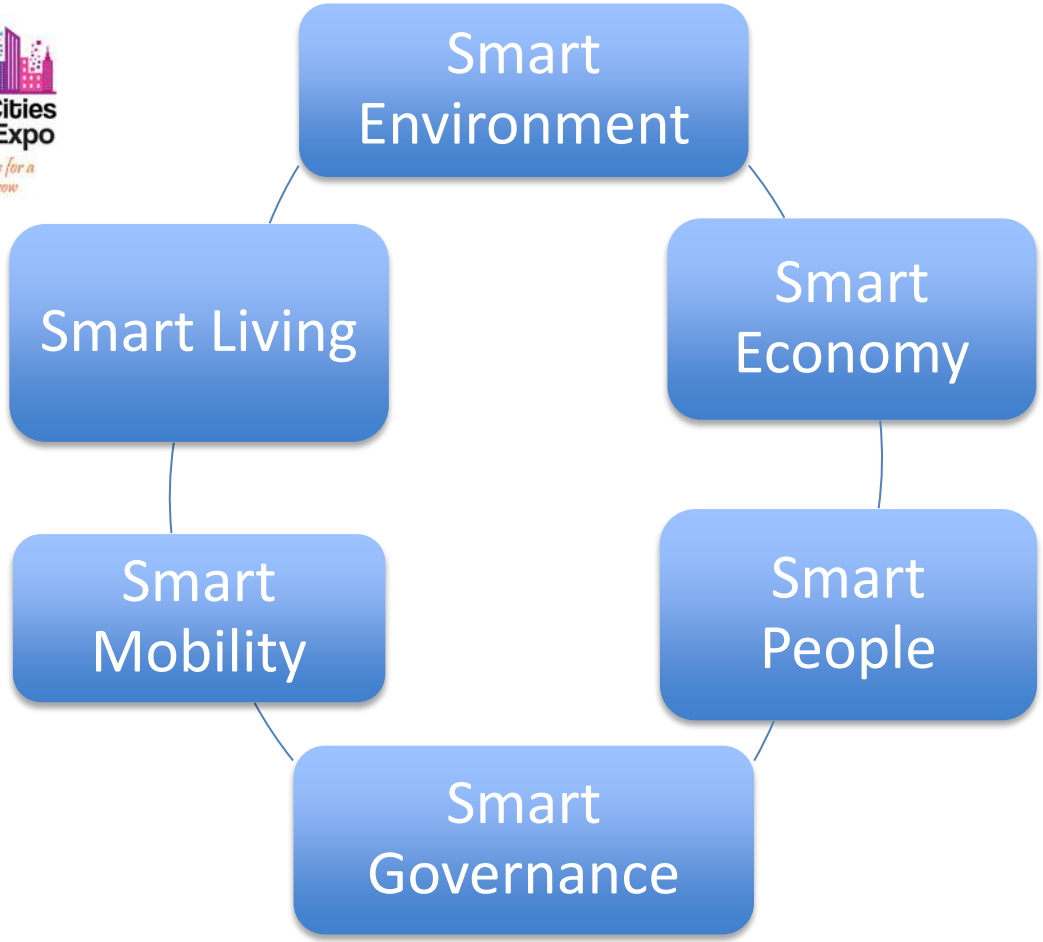
Smart Cities

- China: 300 Smart Cities
- The Kingdom of Saudi Arabia: “Knowledge Economic Cities” and Smart Cities
- India: 100 Smart Cities
- EU: Smart City Initiatives 2010~2020
  City Service Development Kit
- Japan: e-Car + Smart Grid + ITS
- Amsterdam Smart City
- Taiwan: Smart Villages, Smart Cities & DiGi+

CSCF 中国智慧城市论坛

Japan Smart Community Alliance

2nd Smart Cities India 2016 Expo
Smarter Solutions for a Better Tomorrow



Smart Cities:
Technology Trials and Deployments

Real-world test environment: Singapore

Singapore: Jurong Lake District was nominated in June 2014 as a test and demonstration platform bed for innovative technologies, systems and services: *"a mini version of a 'smart city' - with more than 1,000 sensors deployed to control and monitor everything from traffic to street lights, and crowded buses..."*

asiaone singapore

Search here... SEARCH

Jurong Lake District to be test bed for 'smart nation'

Irene Tham Technology Correspondent | The Straits Times | Wednesday, Jun 18, 2014

File photo: ST

A view of the Jurong Lake and its vicinity.

LATER this year, the Jurong Lake District will become a mini version of a "smart city" - with more than 1,000 sensors deployed to control and monitor everything from traffic to street lights, and crowded buses.

Its residents will be able to use phone applications that can help them

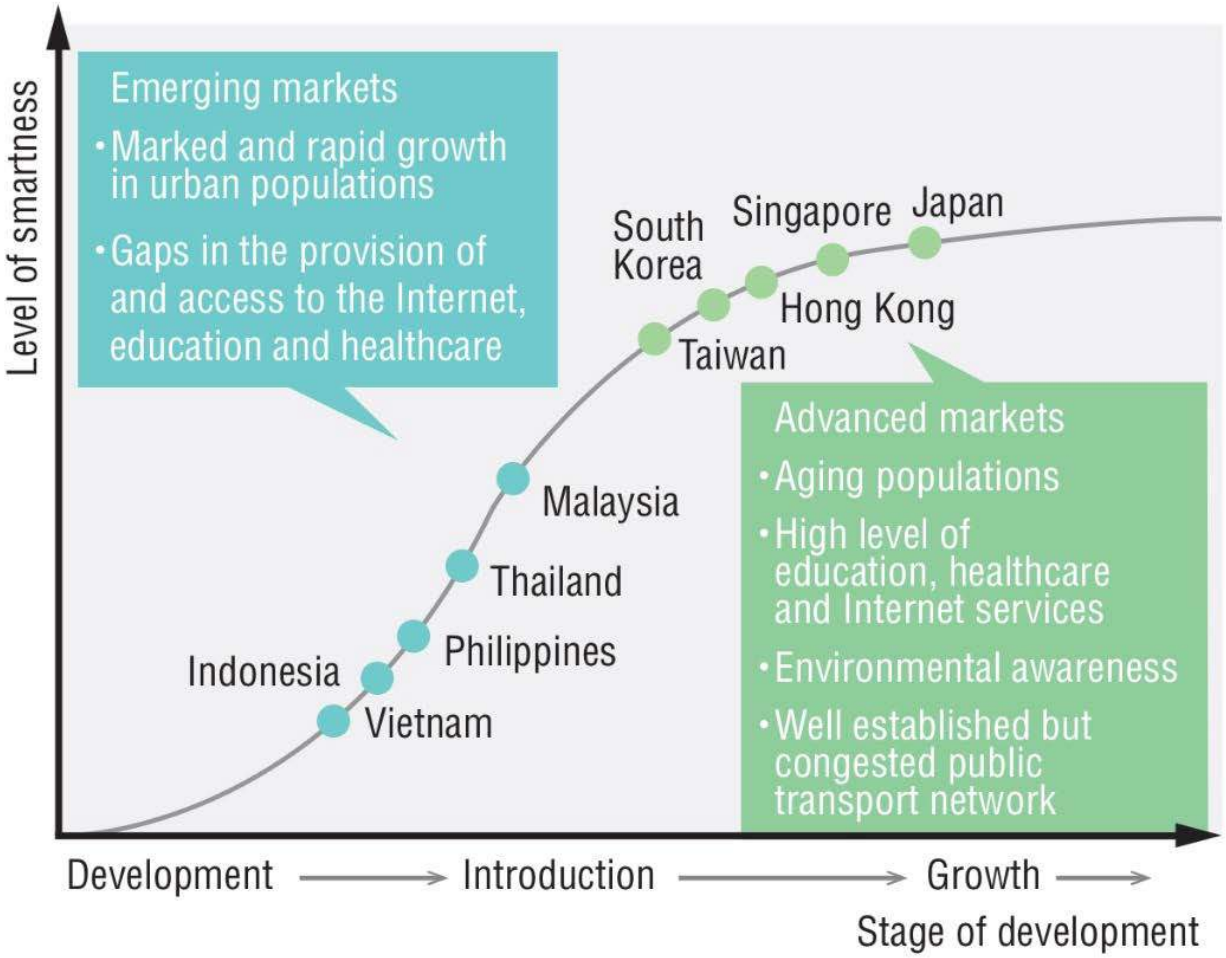
walkways. Motorists stuck in a jam may find

ease the gridlock,

Driverless Bus Trials
In NTU Campus

Asiaone, 18 June 2014

Various Market Potentials



Source: UK Trade and Investment, "Smart Cities of the Future in Asia" (Feb. 2012)

Smart city development has reached various stages in Asia where it offers businesses both great opportunities and challenges.

Diversities:
Challenges
And Opportunities

European Initiative on Smart Cities 2010~2020

Strategic objective

驗證在提升能源效率與降低污染的投資，可以增進生活品質與地區經濟發展，同時示範計畫所累積經驗與經營模式能帶領全歐洲城市邁向低碳永續的未來。

To demonstrate the feasibility of **rapidly progressing towards our energy and climate objectives** at a local level while proving to citizens that their **quality of life and local economies** can be improved through investments in energy efficiency and reduction of carbon emissions. This Initiative will foster the dissemination throughout Europe of the most efficient models and strategies to progress **towards a low carbon future**.

Building, Heating and Cooling, Electricity and Transport

Digital Tsunami is Hitting Transport Sector !!

- Cloud
- Big Data
- Mobile Broadband
- Positioning
- Smart Phone
- Automated and Connected Vehicle
- IoT and IoX
- Cooperative Society
- Sharing Economy

Taiwan and Urban Areas

- Taipei: 3,000 sq km, Pop 6.8 m
  - Car- 2.5 m, Motorcycle-3.2 m
  - MRT 136 km + Pre-BRT 60 km
  - Bike Sharing: 16,500 bikes w/ 580 stns
- Kaohsiung: 2,200 sq km, Pop 2.8 m
  - Car- 0.7 m, Motorcycle- 2.3 m
  - MRT 43km + Tramway 15 km
  - Bike Sharing: 2,400 bikes w/ 182 stns
- Freeway Network: 1,000 Km
- High Speed Rail: the journey b/w Taipei and Kaohsiung (360km) 90 minutes.
- Taiwan: 23 mi Pop; 7 Mi Cars; 14 Mi Scooters; GPS Bus: 100%; e-Tag Car: 94%; e-Payment: 92% (Public Transport) ; GPS Taxi: 75%

Taiwan National Plan

Digi +
Intelligent Community

- 2015 ICF TOP 7 New Taipei City
- 2015 ICF Smart 21 Taoyuan County
- 2015 ICF Smart 21 Changhua County
- 2015 ICF Smart 21 Taitung Count
- 2016 ICF TOP 7 New Taipei City
- 2016 ICF TOP 7 Hsinchu County
- 2016 ICF Smart 21 Taoyuan City
- 2016 ICF Smart 21 Kaohsiung City
- 2016 ICF Smart 21 Taitung County

2017 Top 21
Keelung
Yilan
Taoyuan
Chiayi
Tainan

- 2006 ICF TOP 1 Taipei City
- 2009 ICF Smart 21 Taoyuan County
- 2010 ICF Smart 21 Taoyuan County
- 2011 ICF Smart 21 Taoyuan County
- 2012 ICF TOP 7 Taichung City
- 2012 ICF Smart 21 New Taipei City
- 2013 ICF TOP 1 Taichung City
- 2013 ICF TOP 7 Taoyuan County
- 2013 ICF Smart 21 Hsinchu City
- 2014 ICF TOP 7 New Taipei City
- 2014 ICF TOP 7 Hsinchu City
- 2014 ICF Smart 21 Taoyuan County

Resource:
Intelligent Community Forum (ICF)

Real Challenges!

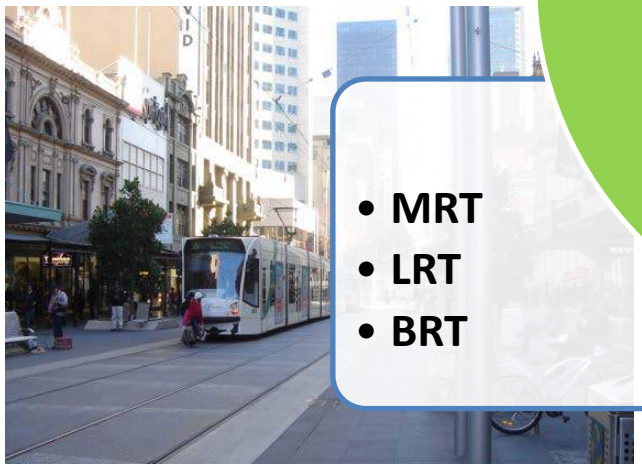
Policy of Green Mobility and Livable City

BBMW Integration Policy (TOD + ICT)

- Integration of Bike, Bus, Metro, and Walk through land use, urban planning, urban design, and urban re-generation as well as ICT

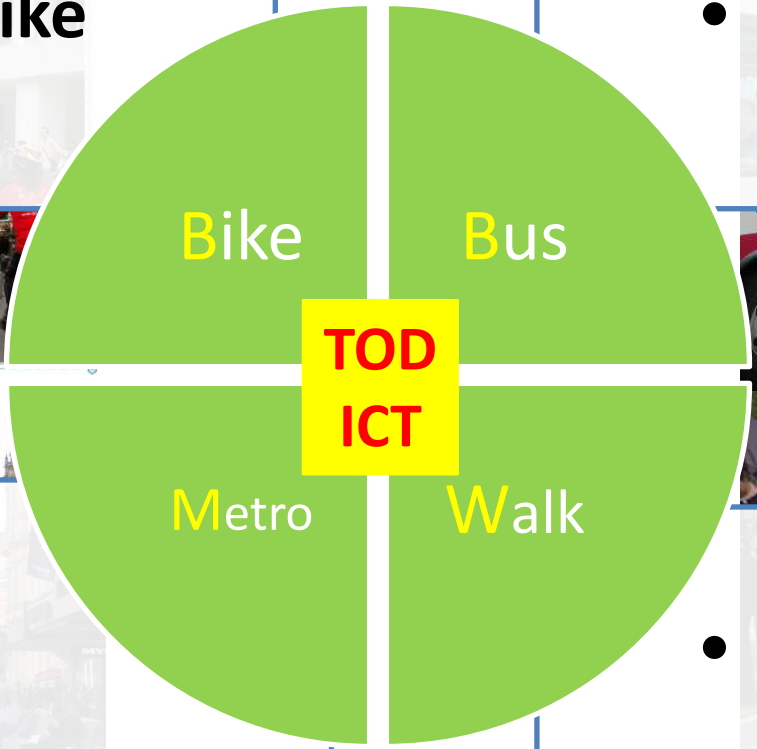
- Bike

- Bus



- MRT
- LRT
- BRT

- Walk

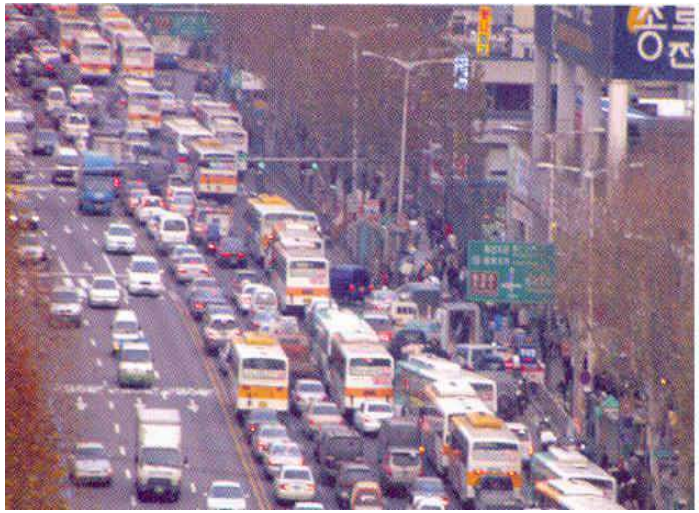


Excellent Public Transport Services

- Public Transport Oriented Development TOD
- World Class Metro
- High Quality Bus Services
- Friendly Environment for Cycling and Walk
- Safe, Reliable Taxi and DRT Services
- ITS for PT & Active Mobility

Learnt from Int'l Experience: Singapore, London, Paris, Melbourne, Seoul and New York City…

Seoul: People-Centered Revolution



Before

After(May 2004)

New York City

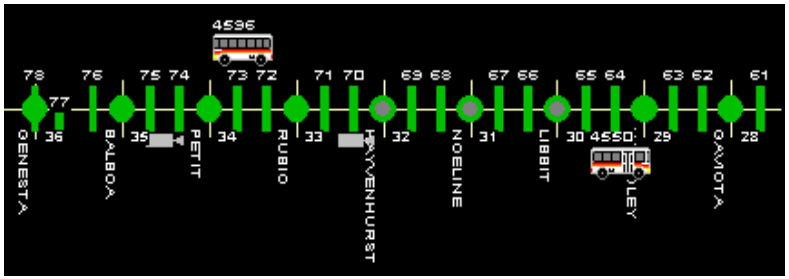
Green Mobility and Vision ZERO

Taipei: Livable TOD Corridor

1. Re-allocation of road space in Metro Corridor; 2. Active Mobility on Streets with 40+ m; 3. 192 km bike tracks will be added within 3 Years.

Advanced Public Transport Systems: Excellent Services

- Passenger Information System
- Operation Management System
- E-Payment/Ticketing System
- Safety and Security System
- E-Terminals
- Taxi, DRTS, Ride Sharing
- Public Bike System



Smart Design of Multimodal Terminals

➔ City-Bus + Intercity-Bus
MRT + Taxi + Bike + Walk + Parking

➔ Office + Shopping Mall + Hotel

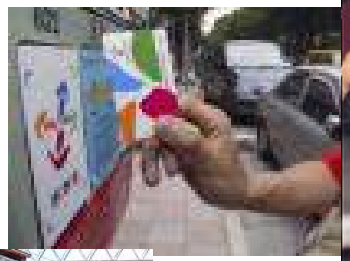
➔ Transit-Oriented Development

➔ PPP Projects

e-Payment/ Ticketing System

Ferry

Curb Parking



Off-street Parking

Urban Rail w/ Mobile Phone

Railways

Bus

Taxi

Cable Car

+ Security + e purse

Public Bike Sharing Systems

- ➔Taipei Core City: 230 Stations + 7,000 Bikes
- ➔Metropolitan: 580 Stations + 15,800 Bikes
- ➔Turn over Rate: 8.6 /bike/day
- ➔To be 30,000 bikes within 2 Years
- ➔And, other bike sharing schemes (oBike…)

www.youbike.com.tw

Push & Pull Policy

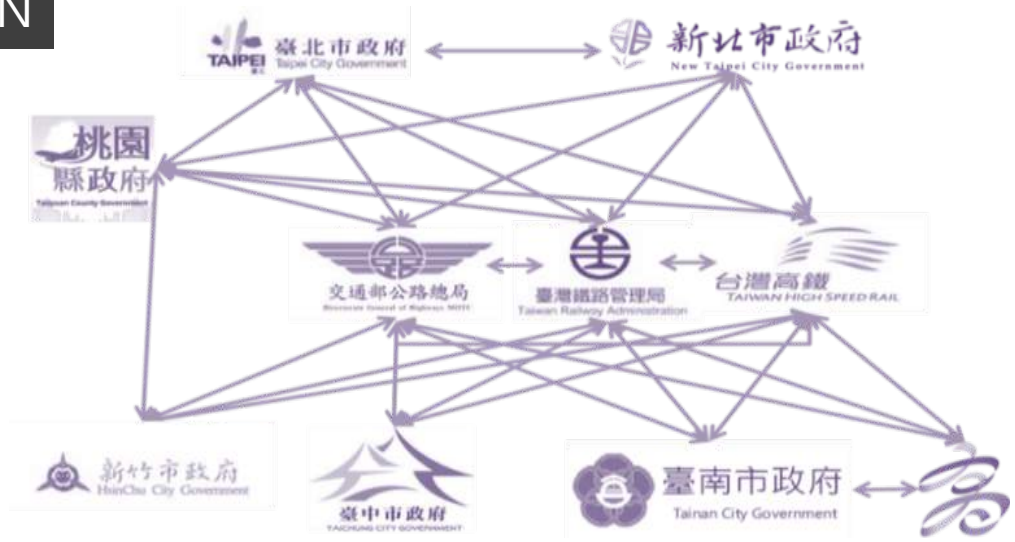
Clear Policy and Management:

- No Free Parking
- Engineering
- Education
- Enforcement
- Innovative Services

e.g., e-Car Sharing & e-Scooter Sharing

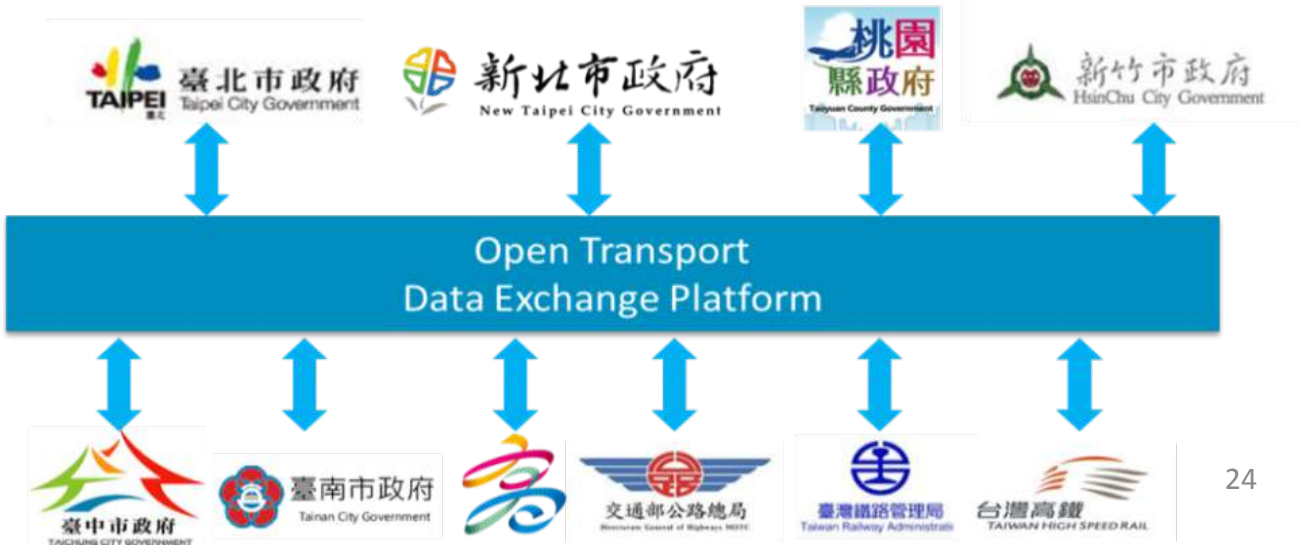
Information Sharing and Service Platform of Public Transport Systems

Past N-N



MaaS

Now N-1-N



Smart City Award

MOTC

iisi

Big Data Innovation

APTRC, NTU

ptx.transportdata.tw

BIG Transport Data Sharing for Innovative Services

Strategic Goals:

- Service Quality for Passengers
- Productivity of Operators (efficiency and cost)
- Decision Making Quality
- Research & Innovation
- Economy Benefits

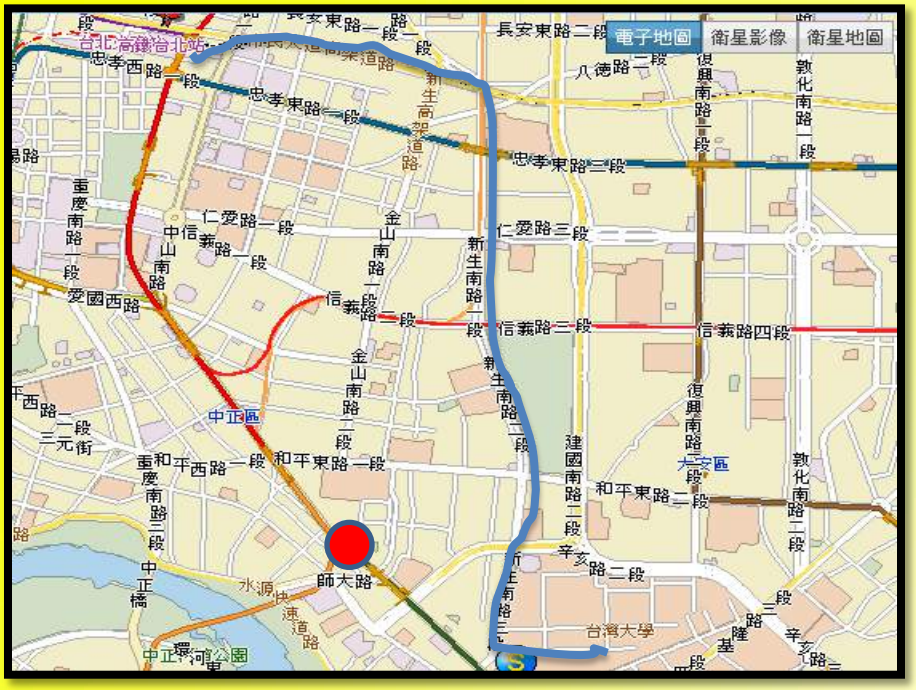
Mobility as a Service, MaaS

- US$28.88 = Bus + Metro + Public Bike
- US$48.88 = Bus + Metro + Public Bike + 68 km Taxi
- US$88.88 = Bus + Metro + Public Bike + 68 km Taxi + 99 km Car Sharing
- US$118.88 = Bus + Metro + Public Bike + 68 km Taxi + 99 km Car Sharing + 4 High Speed Rail Travels




Smart Mobility: Smart Travel and Sustainable Mobility

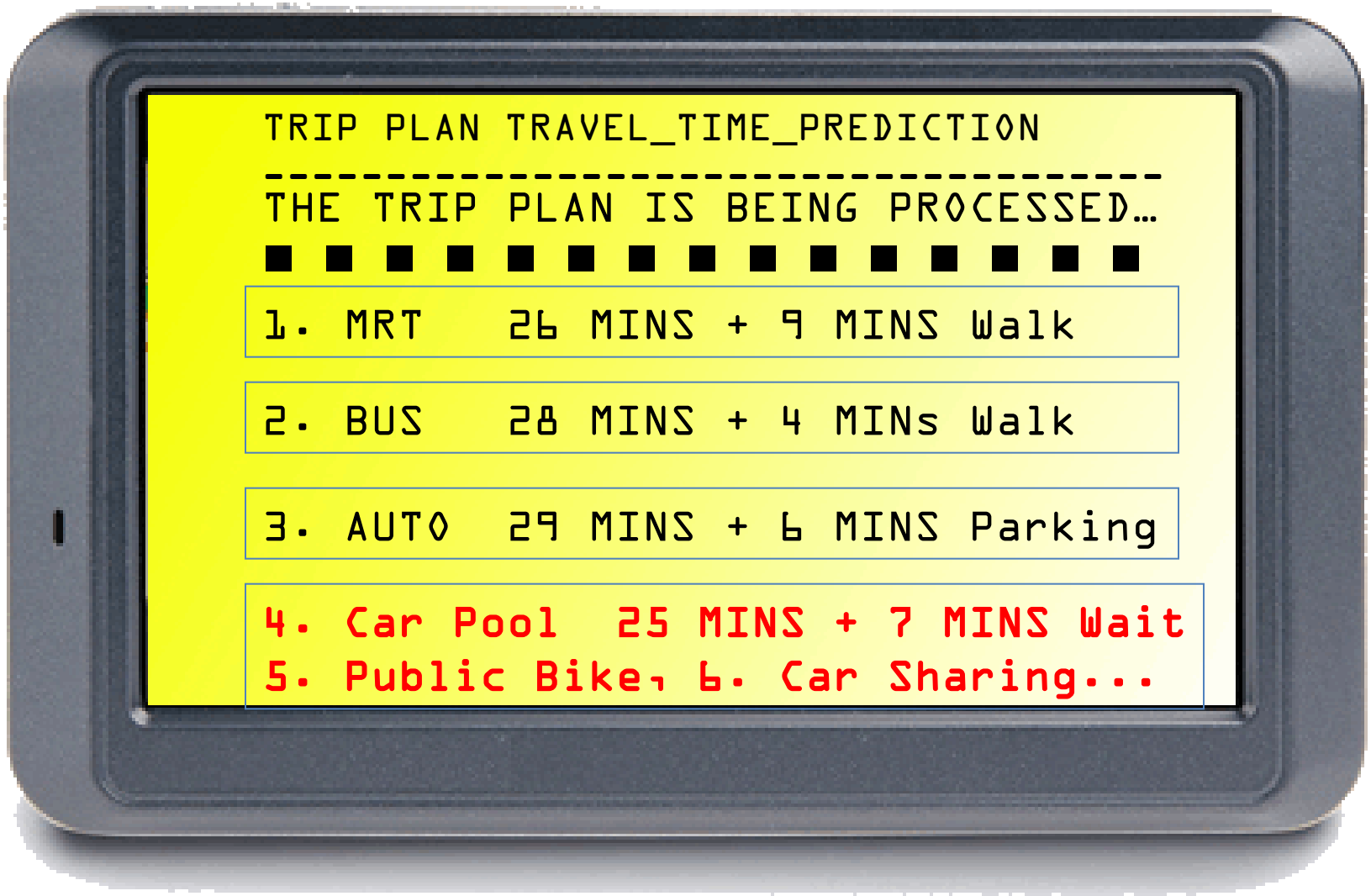
The Shortest Path for ODs based on Historical and Real Time Information



1. Travel Time:
   35 MINS
   + 2 MIN WALK
   Parking Lot:
   A12 $6/hr

2. Travel Time:
   29 MIN
   + 7 MIN WALK
   Parking Lot:
   B10 $4/hr

We have other smart choices with ITS technologies

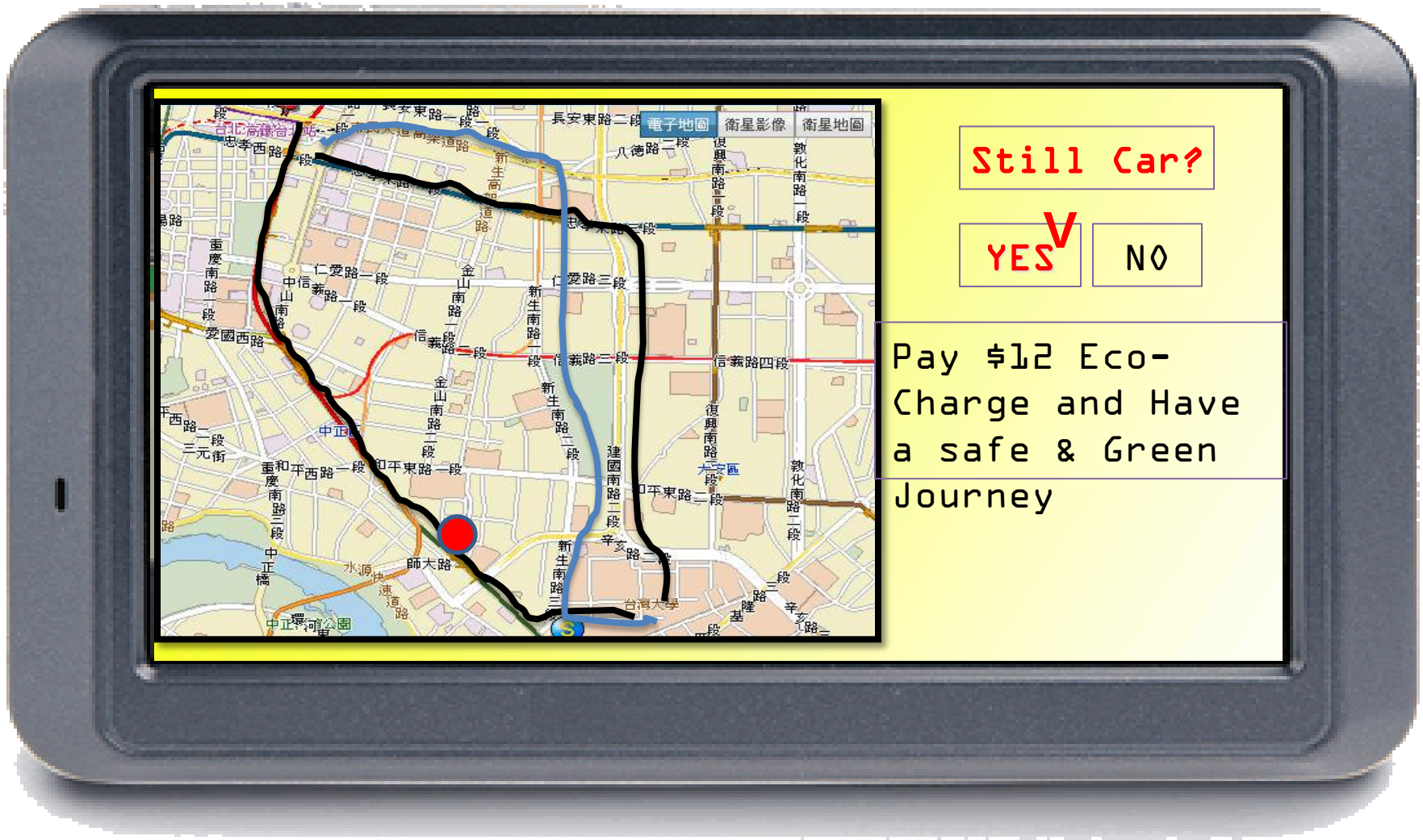


OR, you may select a taxi

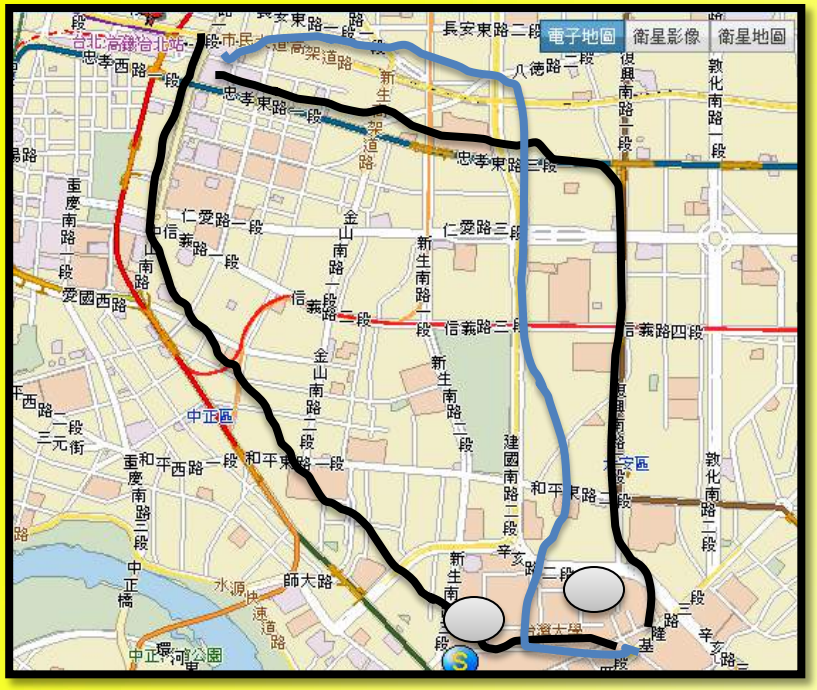
Web Taxi or Cloud Taxi……

NO, I would like to have my car!

Have a Safe and Green Journey



OR, I have changed my mind…



Still Car?

YES NO

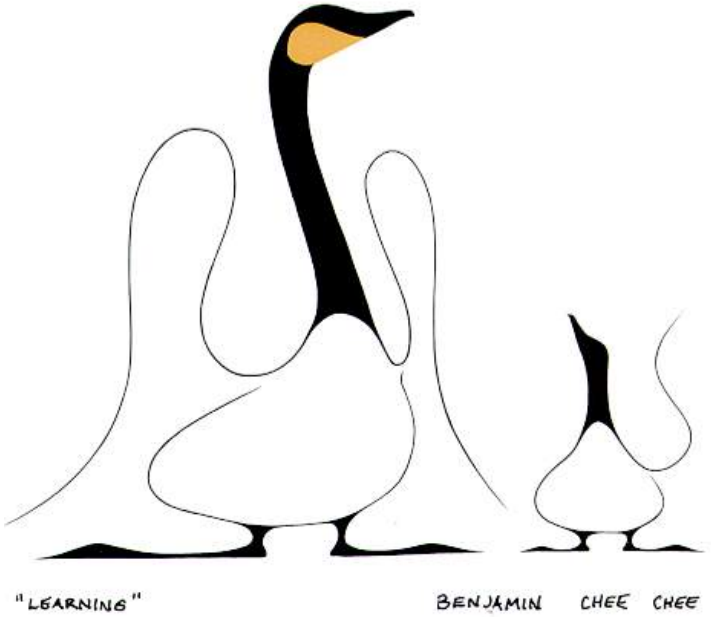
Great! Have a discount:
40% for Public Transport
25% for DRTS
20% for Car Sharing
-$15 for Public Bike

Intelligent Transport for Sustainability

- Smart Choice for Travel
- Travelers make the best choices on departure times, modes, routes, and destination with the real time and intermodal information as well as appropriate tax/pricing schemes.
- Smart Travel and Sustainable Mobility
- Research Subjects:
  - Full trip cost, External effects, Internalization of external effects, Behavior change, Big data, Big transport data and analytics

Concluding Remarks

- Goal of Smart Cities and ITS: Livable Cities and Sustainable Mobility
- ITS for Safety and Sustainability
- Mobility as a Service: Better options through Integration
- Public Transport + Active Mobility + Shared Transport
- Vision, Strategies, Action Plan and Governance Sustainability
- Collaborations of Government, Industry, Academy and NGOs



Thanks

S.K. Jason Chang
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