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
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.”
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+
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...”
Various Market Potentials

Emerging markets
- Marked and rapid growth in urban populations
- Gaps in the provision of and access to the Internet, education and healthcare

Advanced markets
- Aging populations
- High level of education, healthcare and Internet services
- Environmental awareness
- Well established but congested public transport network

Diversities: Challenges And Opportunities

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

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
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
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
- Urban Rail w/ Mobile Phone
- Off-street Parking
- 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

Smart City Award
MOTC
iisi
Big Data Innovation
APTRC, NTU

Now N-1-N

MaaS

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

<table>
<thead>
<tr>
<th></th>
<th>TRIP PLAN TRAVEL_TIME_PREDICTION</th>
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<tbody>
<tr>
<td></td>
<td>THE TRIP PLAN IS BEING PROCESSED...</td>
</tr>
<tr>
<td>1.</td>
<td>MRT 26 MINS + 9 MINS Walk</td>
</tr>
<tr>
<td>2.</td>
<td>BUS 28 MINS + 4 MINS Walk</td>
</tr>
<tr>
<td>3.</td>
<td>AUTO 29 MINS + 6 MINS Parking</td>
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<tr>
<td>4.</td>
<td>Car Pool 25 MINS + 7 MINS Wait</td>
</tr>
<tr>
<td>5.</td>
<td>Public Bike, L. Car Sharing...</td>
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</tbody>
</table>
OR, you may select a taxi

Web Taxi or Cloud Taxi......

3. TAXI

- 2 MINS Arrival
- Fare $12
- 28 MINs
- Excellent Service
NO, I would like to have my car!

You will consume $3.5 gas and have GHG emission 2.2 kg Plus 0.012 fatality and 0.106 injuries.
Have a Safe and **Green** Journey
OR, I have changed my mind...

Still Car?  
YES  NO  V

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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