CALD Smart Mobility Conference

Transforming Smart Mobility Ideas into Local Government Solutions

Session IV: Partnering Towards Mobility Reforms

Challenges and Preparing for Smart and Sustainable Mobility

S.K. Jason Chang, Ph.D.
Professor, National Taiwan University
Director, Advanced Public Transportation Research Center, NTU
skchang@ntu.edu.tw

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Agenda

- Urban Mobility New Frontiers and Next Steps
- Smart and Sustainable Mobility Development in Taiwan
- Trends on Transport System Development
- Two Zero Challenges & Opportunities
- Preparation for the Future Sustainable Mobility
- Concluding Remarks

Urban's Mobility New Frontiers

- Innovations in Public Transit Approach
- Electric and Autonomous Vehicles
- Urban Air Mobility/Drone Integration
- 5G and Urban Mobility Connectivity

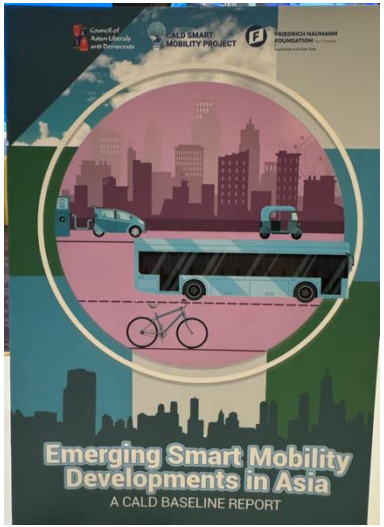
Source: ITS Indonesia, 2024

The mobility systems of tomorrow should be Intermodal, Connected, Convenient, & Customized; and encouraging more sustainable modes of transport (public transport, cycling, walking) while integrating new mobility solutions and autonomous vehicles (AV).




Next Steps_CALD

- **Leverage Resources**
  - Funding & Bridging..
  - Think Tanks
  - Platform: ITS AP Forum, ITSWC, EASTS, ADB Summit..
- **Documenting Benchmarks in Smart Mobility Applications**
  - Smart Mobility Handbook
  - Case Studies and Models
- **Next Generation**



Next Steps_City

- **Identify Challenges and Barriers**
  - Institutional, Legal, and Technological Aspects
- **Planning of Urban and Transportation Development**
  - Strategic Planning; Integration of Land Use and Public Transportation Planning
- **Information Sharing Platform**
  - Evidence-based Decision, Technology-based Approach
  - Service Quality, Efficiency, e-Governance, Economy
- **Applying PPPP Approach**
  - Public, Private, and People Partnership

Smart and Sustainable Mobility = $[(PA + PT + AC + SM + DM + FP + IG)^{S}]^{P}$

PT: Public Awareness; PT: Public Transport; AM: Active Mobility; SM: Shared Mobility; DM: Demand Management; FP: Financial & Pricing Schemes; IG: i-Governance; S: Stakeholders; P: Political Will

Transportation Technology Industry Board formed by MOTC in 2019 and reformed on 2022

- Intelligent Electric Motorcycle
- Railways Industry
- **Intelligent Public Transportation Services**
- Smart Harbor, Airport, and Logistics
- Drone Technology
- Big Data and Test Fields of 5G/AIOT Applications
- Bicycle and Tourism

Goals: ITS[5]
Safe
Smooth
Seamless
Sharing
Sustainable

2025~
GO Safe
GO Smart
GO Green

5G x AIoT Driven ITS Deployment Projects

Smart Railway POC, Smart Highway Corridor Applications, Smart Harbor Management POC, i-Services in Airport Terminal, Smart and Eco-Tourism POC, and D-City: Field for Various and Integrated Trials

Transportation Data eXchange Platform

Wide Range Data Coverage and Information Integration PTX >> TDX






Bus

Static Data：
- Authority
- Route
- Stop
- Station
- Schedule
- ODFare

Dynamic Data：
- Estimate Time
- GPS
- Alert

City Bus | Intercity Bus

Rail

Static Data：
- Route
- Station
- Trip
- ODFare
- Mode Transfer
- Disability assistance

Dynamic Data：
- Estimate Time
- Delay
- Alert
- News

TRA | THSR | MRT | LRT

Air

Static Data：
- Airport
- Airline
- International Schedule
- Domestic Schedule
- AirType

Dynamic Data：
- FIDS
- Metar

CSS | Taoyuan Airport

Ferry

Static Data：
- Operator
- Port
- Route
- General Schedule
- Daily Schedule
- Route Fare
- Vessels

Dynamic Data：
- Estimate Time
- Alert
- News

Ferry | Blue Highway | Island Ship

Traffic

Static Data：
- VD
- AVI/ AVI Pair
- CMS
- eTag/ eTag Pair

Dynamic Data：
- VD
- CCTV
- CMS
- AVI
- eTag

Parking Info Data

Section Data
- Section

Others

Tourism Data：
- Scenic Spot
- Restaurant
- Hotel
- Activity

Bike Data：
- Bike Station
- Bike Availability

Weather Data：
- Weather Forecast

PM2.5 Data：
- Station PSI (AQI)
- Station PM2.5

Public Transportation eXchange Platform **PTX** ⇔ Traffic and Travel **TDX**

2015~2020

2021~ **For National MaaS…**

Source: Hsiao, 2019

600 Value-added Services in TDX

5,000+Members

- Public Sector Academia 365 / 2,356
- Free lancer 954
- Service Providers 54
- Tourism 19
- Consultants 39
- IT Service 1,180
- Insurance Developer 10
- Retails Restaurant 11
- Medicine Social Service 12

International

Google, TOMTOM, THALES, yahoo!, here, TOYOTA, Sabre, ito world, GARMIN

Innovative

Citymapper, moovit

Domestic

everrich 昇恒昌, 燦星旅遊 www.startravel.com.tw, e-go .com.tw 台灣租車旅遊集團, ASUS, WHATS MEDIA 鏡米智慧媒體, iRent, NOVA SMART novaunica com tw 諾亞智能, 永慶房屋 yungching.com.tw, 首都客運 CAPITALBUS, 台灣高鐵 HIGH SPEED RAIL, 財團法人資訊工業策進會 INSTITUTE FOR INFORMATION INDUSTRY, 鼎漢 國際工程顧問, 工業技術研究院 Industrial Technology Research Institute, King WAY TECHNOLOGY, CECI 台灣世曦 工程顧問股份有限公司, GOLiFE

Public Sector/Res Inst.

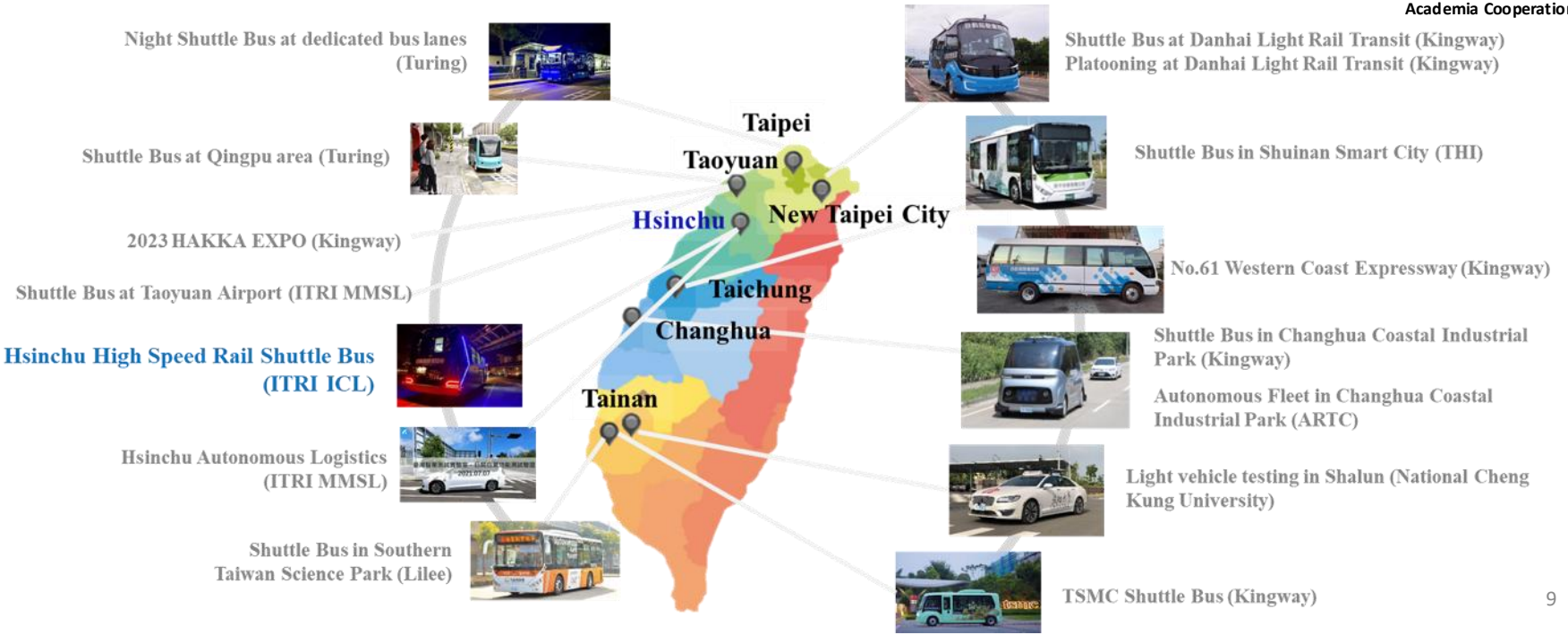
衛生福利部 疾病管制署, 行政院環境保護署 Environmental Protection Administration Executive Yuan, R.O.C. (Taiwan), NCDR, 國立臺灣大學 National Taiwan University, 國立陽明交通大學 NATIONAL YANG MING CHIAO TUNG UNIVERSITY, 財團法人中華顧問工程司 China Engineering Consultants, Inc.

Autonomous Vehicle Pilot Trials in Taiwan

- **In 2018, Taiwan rolled out the <u>Unmanned Vehicles Technology Innovative Experimentation Act</u>, and launched the UV Technology Innovative Experimentation Project in 2019. Sixteen projects approved and tested on the public roads (12 Driverless City Bus Trials + 1 Freeway Bus Trial).**

Feb 2022~
Chulalongkorn University

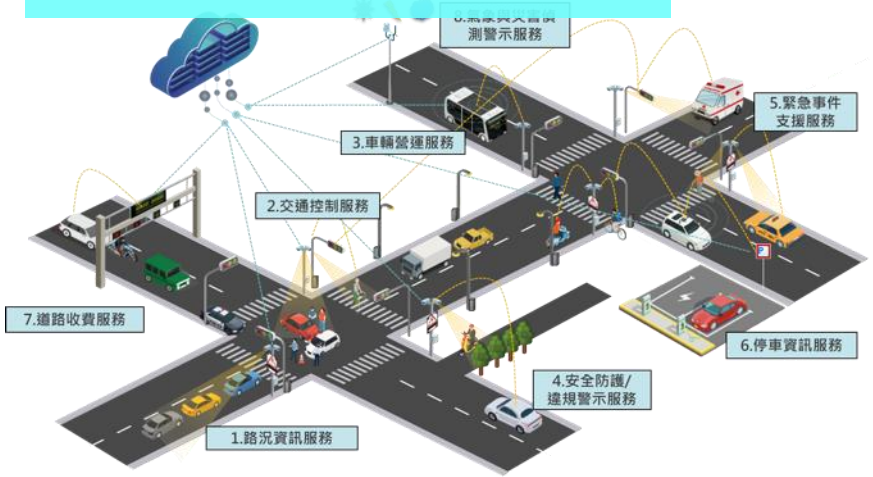
- Industry-Government-Academia Cooperation



Autonomous Bus Trials
+ 5G and AIOT Applications in D-City

Trials of AB and C-V2X
In Dain-Hsui Test Region

2023.1106~10
2023 OmniAir
Taipei PlugFest
Co-Org TTIA



MaaS: T-Pass NT$1,200 (US$40)…

資料來源：風傳媒、聯合

T-Pass NT$1,200(US$40) …. T-Pass2.0

Multi-Options to meet various needs

- $19.99 = Bus + Public Bike
- $29.99 = Bus + Metro + Public Bike
- **$40 = Bus + Metro + Public Bike + Reginal Rail**
- $58 = [**40**] + 66 km e-scooter Sharing
- $68 = [58] + 88km Car Sharing
- $98 = [68] + 4 High Speed Rail or 10 Freeway Bus Travels
- Green credits for other public transport services (e.g., Taxi, regional bus…)

Next Step…Pay as you travel…

MaaS for Sustainable Mobility and Net Zero Goals

Achievements and Truths

- **Achievements**
  - Public Transport
    - High Speed Rail, TaiRail, Metro, Bus Transit, DRTS + On Demand Service, Bus Informationn, T-Pass…
  - Bike and Active Mobility
  - TDX + e-Payment + MMP
  - Mobility as a Service, MaaS
- **Truths, Inconvenient**
  - Taipei Metropolitan: PT Share 33.2% (Daily trips: 14.5 Mi / $32 Bi Investment in MRT in the past 30 years)
  - West Corridor: PT Share 18.5% (Daily trips 0.320Mi / $15 Bi Investment in High speed rail and $20 Bi in Modernizing TaiRail in the past 20 years) vs. TOKYO to NAGOYA 78.5%
  - PT in Taiwan: 15% (COVID-19 hurts…)
  - Road Safety: Injuries 539,535 + Fatalities 3,023 (Social Economic Loss 3.172% GDP/yr)
  - Public Health Risk: 20,000 deaths/yr due to air pollutions

Road Safety and Vision Zero

In the past 10 years……

- Fatalities ： > 35,000
- Injuries ： > 3,000,000
- Serious Injuries: > 400,000
- Social/ Economic Loss: > 15 Bi. /Year (= 3.12% GDP)
- In 2022: 8 Fatalities, 1,368 Injuries / Day
- High Risk Group: (1) 15~24 Young Generation (6 Fatalities/ week)
  (2) > 65 Seniors （35%）

Sources: MOTC, CT, UDT, LT,

Prime Minister finally announces US$ 1.4 Bi National Road Safety Program (2024~27) and President Dr. C.D. Lai committed Vision Zero: 50% Fatality Reduction by 2030!

In Asia:
620,000+ Fatalities/yr
In Thailand:
20,000+ Fatalities/yr
1.0 Mi+ Injuries/yr

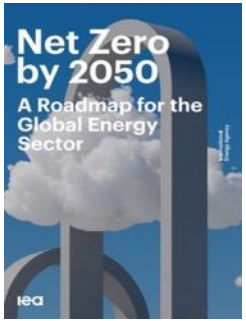
TWO Zero Challenges:

- ✓ Net Zero
- ✓ Vision Zero

How digital technology and appropriate policy can help of achieving the goals of 2 Zeros?

"There is no path to delivering net-zero by 2050 that doesn't run through de-carbonising transport."
"Significant reductions in carbon emissions need to start now."
Rachel Skinner, President of the UK's Institution of Civil Engineers, June 2022.

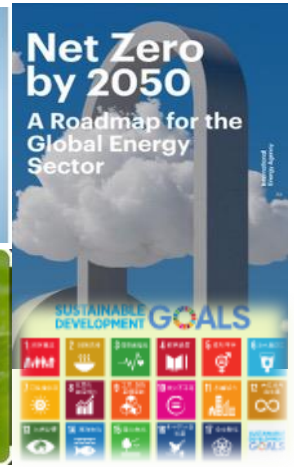
"Achieving the 2050 Net Zero Goal is hopeless without deep decarbonization in transport sector."
Othmar Karas, The First Vice President, European Parliament (April 2023)



Net Zero Transportation Policy

- **3+2 Policy and Roadmap**
- **3**: (i) Green Transportation, (ii) Zero-Emission and Electrified Mobility; (iii) Management of Car and Motorcycle
- **2**: (2-1) **TOD** + (2-2) **Green Living & Behavior Change**
- **Technology-based** Approach and **Evidence-based** Decision for NZ Goals
- **Green Transportation**: Public Transportation + Active Mobility + Shared Mobility + MaaS and **SDGs+ ESG**
- **TDM** and Management of Motorcycles and Cars:
  - Low Carbon Zone; Parking Management; Shared e-Mobility and Public Bike
- **Zero Emissions** and Electrified Mobility Policy:
  - **2030**: All City Buses are Electrified (e-Truck on planning stage)
  - **2035**: **40%** New Motorcycles and Cars are Electrified
  - **2040**: **100%** New Motorcycles and Cars are Electrified

Full Value Chains are Crucial for e-Mobility Development: Vehicle, Infrastructure, Network & Service



Development Trends in Transportation Systems

- **Vehicles**: Automated, Connected, Electrified, Shared (ACES)
- **People**: Ageing, Learning Capability, AI-assistant, Living in Cities, Social Value? Life Style? Also, Lack of Manpower…
- **Infrastructure**: Digital, Resilient , Life-cycle, Integrated, Connected, Recycled…
- **Services**: Digital, People-centered, Customer-made, Inclusive, Equitable…
- **Governance**: De-Regulation, Transparency on Policy Formulation and Financial Schemes, Safety and Security, Open Data, Evidence-based Decision…

Preparing for Smart and Sustainable Mobility

- Smart Design of City V
- Behavioral Change for Sustainable Mobility V
- For our Young and Next Generation
- Applications of Advanced Technologies: Myths and Missing… V
- Formulation of Clear Policy and Roadmap
- e-Governance
  - Evidence-based Decision, Legal Reform, Open Data, Tools (e.g., Simulation, XR, Digital Twin), Collaborative Platform, Cybersecurity…

Smart Design of City

Transit-oriented Development

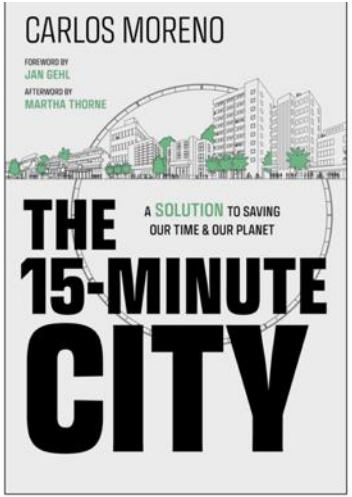
Mobility-oriented Development

Affordable & Walkable

Paris 15-Minute City …

- **Mayor Anne Hidalgo: “the 15-minute city will be the backbone for creating a new urban plan.”**
- **Prof. Carlos Moreno: Quality of life is related to access different local services in proximity)**

Other Cities: Utrecht (10-minute city), Milan (15 minute city), Melbourne (20 minute neighborhood), Scotland (20-minute territory)…



The 15-minute City Transition Pathway (15mC)

The 15-minute City transition pathway focusses on rethinking the existing mobility system and urban morphology to encourage sustainable mobility choices, redistribute urban space and reorganise our daily activities so to make our cities more climate neutral, liveable and inclusive.

The concept of the 15-minute City is based on the idea that city dwellers should be able to cover the vast majority of their daily needs within a 15-minute radius, by walking and cycling, while connecting to further districts and travelling larger distances by other forms of sustainable transport. The 15-

“To have happy citizens in a happy city for a happy life. It’s simple.” Paris Mayor Anne Hidalgo

Green Transportation and People-Centered Health City 綠色交通與人本健康城市

Integration BBMW Public Transport + Active Mobility

+Shared Mobility

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

- Bicycle
- 自行車

- Bus
- 公共汽車

- MRT
- LRT
- BRT

- Walk
- 步行

Bike | Bus | Metro | Walk

TOD
MOD
ICT

Behavioral Change for Sustainable Mobility

- ✓ Public Awareness
- ✓ Excellent Public Transportation and On Demand Services
- ✓ Excellent Environment for Active Mobility
- ✓ Full and Integrated Travel Information
- ✓ Eco-Charging and Pricing Schemes

The mobility systems of tomorrow should be Intermodal, Connected, Convenient, & Customized; and encouraging more sustainable modes of transport (public transport, cycling, walking) while integrating new mobility solutions and autonomous vehicles (AV).

Myths and “Missing” with Advanced Technologies

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

2019:
Taoyuan TOP 1

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)

Smart Cities?

95% of People Knew nothing about Smart City

Survey by Hsieh (2019)

Clear Policy and Roadmap

European Initiative on Smart Cities (2010~2020)

Strategic Objective

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**.

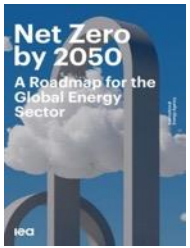
Building, Heating and Cooling, Electricity and Transport.

Smart Cities

Smart Technologies are applied for achieving Sustainable Cities

Concluding Remarks

- ITS Technologies for Sustainable Mobility and Livable City
- The 2 Zero Goals are Challenges and Opportunities.
- Preparing for the future sustainable mobility: People, Vehicle, Infrastructure, Governance, and Next Generation.
- Evidence-based Decision and Technology-based Approach for Enhancement of Service Quality, Operation Efficiency, Industry Development, and e-Governance.
- International Collaborations: Technologies + Investments.
- PPPP Alliance of stakeholders from Industry, Government, Operator, NGOs, and Academia.



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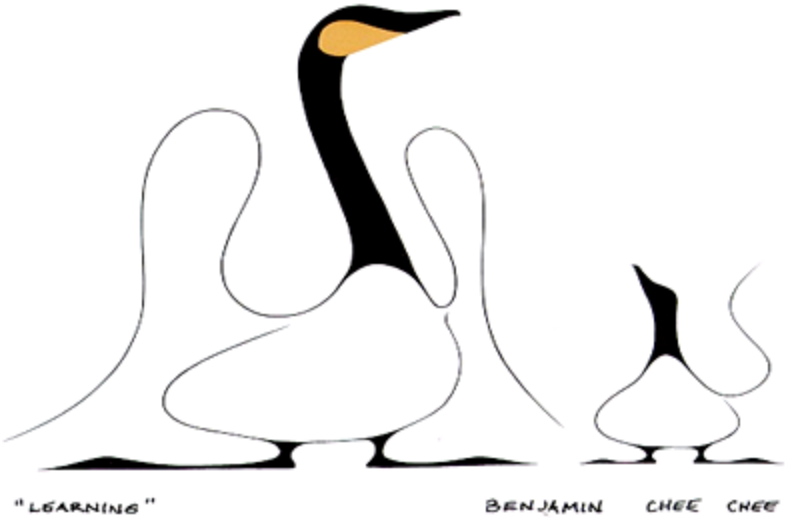

Thanks

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臺大先進公共運輸研究中心
Advanced Public Transportation Research Center