Smart Park
ICT Re-engineering Initiative

Organization:
Ministry of Science and Technology, R.O.C.
- Hsinchu Science Park
- Central Taiwan Science Park (Taichung)
- Southern Taiwan Science Park (Tainan)
Challenge 1: Traffic Demand

The 3 science parks in Taiwan have attracted more than 800 businesses with a total of 270,000 employees, posing serious traffic problems during rush hours.
Challenge 2: Threats

The use of private vehicles over public transportation caused traffic jam, air pollution, and CO2 emission.
## Observation 1: Global Trends

<table>
<thead>
<tr>
<th>Trends</th>
<th>Results / Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology Breakthroughs</td>
<td>• Smart everything – smart park, governance, living economy, environment, mobility, etc.</td>
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<td></td>
<td>• Application of open data</td>
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<td>Green Planet Awakening</td>
<td>• Sustainability challenges</td>
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<td></td>
<td>• Emphasis on eco-responsibilities</td>
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<td>• Environmental protection</td>
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<td>User-Centered, Citizen Participation</td>
<td>• Public-Private-People-Partnership</td>
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<td>• Transparent governance</td>
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<td>• Civic engagement</td>
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Observation 2: Carbon Footprint

Comparatively, the use of bus emits the least amount of CO2 while automobile generates the most.

**CO2 Emission (kg/100 km)**

- **Automobile**: 23.6 Kg
- **MRT**: 16.31 Kg
- **Motorcycle**: 6.05 Kg
- **Train**: 6 Kg
- **High Speed Rail**: 5 Kg
- **Bus**: 3.52 Kg

Source: Hsinchu Science Park Bureau
Hierarchy of Synergies

“Smart Park ICT Re-engineering Initiative” is under national “Asia Silicon Valley Development Plan”.

1. Smart Transportation
2. Smart Sustainability
3. Smart Governance

1. Smart Traffic Control Center
2. Smart E-Shuttle
3. Smart Parking
4. Smart Digital Traffic Signage
5. iLive Pro App (Science Park Mobile Wizard 2.0)

1. Traffic Jam
2. Air Pollution
3. CO2 Emission
4. Limited Parking Space
Smart Park Digital Platform

To enhance management and efficiency

- Smart Traffic Control Center
- Smart E-Shuttle
- Smart Parking
- Smart Digital Traffic Signage
- Smart App

Application

- Scheduling Algorithm
- Path Analysis
- Traffic Flow Prediction

Platform

- Multilayer network transmission
- Network Security Management

Network

- Sensor IP
- IoT Standards
- Networked Devices

Perception

- 3G/4G/NB IoT (Future) (WAN)
- NFC/BT/WiFi (LAN)
- Cell Phone
- CCTV
- LED
- Sensors

Cloud
(National Center for High-Performance Computing)

Data Center
(3 Science Parks)
Smart Transportation Solutions

The Core Values of Smart Transportation

1. Save Energy
   - Smart E-Shuttles
   - Smart Parking

2. Ensure Safety
   - Smart Signage
   - Smart Traffic Center

3. Save Money

4. Save Time
   - Smart App
   - Smart Science Park Platform
Solution 1: Smart Traffic Control Center

**Tasks**
- Data Collection (eTag, CCTV)
- Dynamic Traffic Management (Active Traffic Management System)
- Traffic Signal Control (Real-Time)

**Synergy**
- Cross-Department Integration (City Government, Taiwan Area National Freeway Bureau)
- Enhancing Efficiency and Safety
- Local Accessibility (Science Park Mobile Wizard App 2.0)

**Results**
- Driving time in the park reduced from 30 minutes to 20 minutes during peak hours
Solution 2: Smart E Shuttle

Benefits of Smart E shuttle:
- Environmental Protection
- Sustainable Resources
- Energy Optimization
- Free WiFi Access

<table>
<thead>
<tr>
<th>Science Park</th>
<th>Hsin-Chu Science Park</th>
<th>Central Taiwan Science Park</th>
<th>Southern Taiwan Science Park</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO2 Reduction Per Year</td>
<td>45,605 Kg</td>
<td>8,938 Kg</td>
<td>21,645 Kg</td>
<td>25,396 Kg</td>
</tr>
<tr>
<td>Fuel Consumption Saved Per Year</td>
<td>17,491 Liters</td>
<td>6,500 Liters</td>
<td>8,300 Liters</td>
<td>10,764 Liters</td>
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</table>
Solution 3: Smart Parking

- The time for entering the parking lot is 3~5 seconds per car.
- The average time for a driver to locate a vacant parking space is 3 minutes.
Solution 4: Smart Signage

Contents
- Warning, priority, information, directions, notice, etc.

Synergy
- Synchronizing with Taiwan National Freeway Bureau’s dynamic traffic database every 3 minutes

Effects
- Traffic Route Engineering
- Route Planning Assistance
- Traffic Congestion Avoidance
Solution 5: Smart App

©SP Mobile Wizard 2.0

Route Schedules

Maps

Information

Location-Based Service

Traffic Planner

Best Route Navigation

Real-Time Video
Potential Impacts

The initiative promotes overall synergy and performance of the science parks and orchestrates various solutions to enhance the efficiency of science park management.

- Quantifiable results:
  - A total of **960,000** kg CO2 emissions reduced and **119,100** liters of fuel consumption saved.
  - A total of **21,662** hours of traveling time saved every year.
  - A **5%** reduction of travel time with the growing traffic demand (increase of cars every year).
  - The entering time to the parking lot is **3~5** seconds per car., and the average time to locate a vacant parking space is **3** minutes.
Conclusions

• Under the guidance of Ministry of Science and Technology (MOST), “Smart Park ICT Re-engineering Initiative” is launched to transform Hsin-Chu, Central Taiwan (Taichung), and Southern Taiwan (Tainan) Science Parks into smart and sustainable parks.

• The initiative will ensure science parks’ sustainable development and ultimate advocate as “the best Energy Smart Communities”.
Thank you!