



Digital Infrastructure for Smart Mobility City

Dr. YC Chang, Managing Director

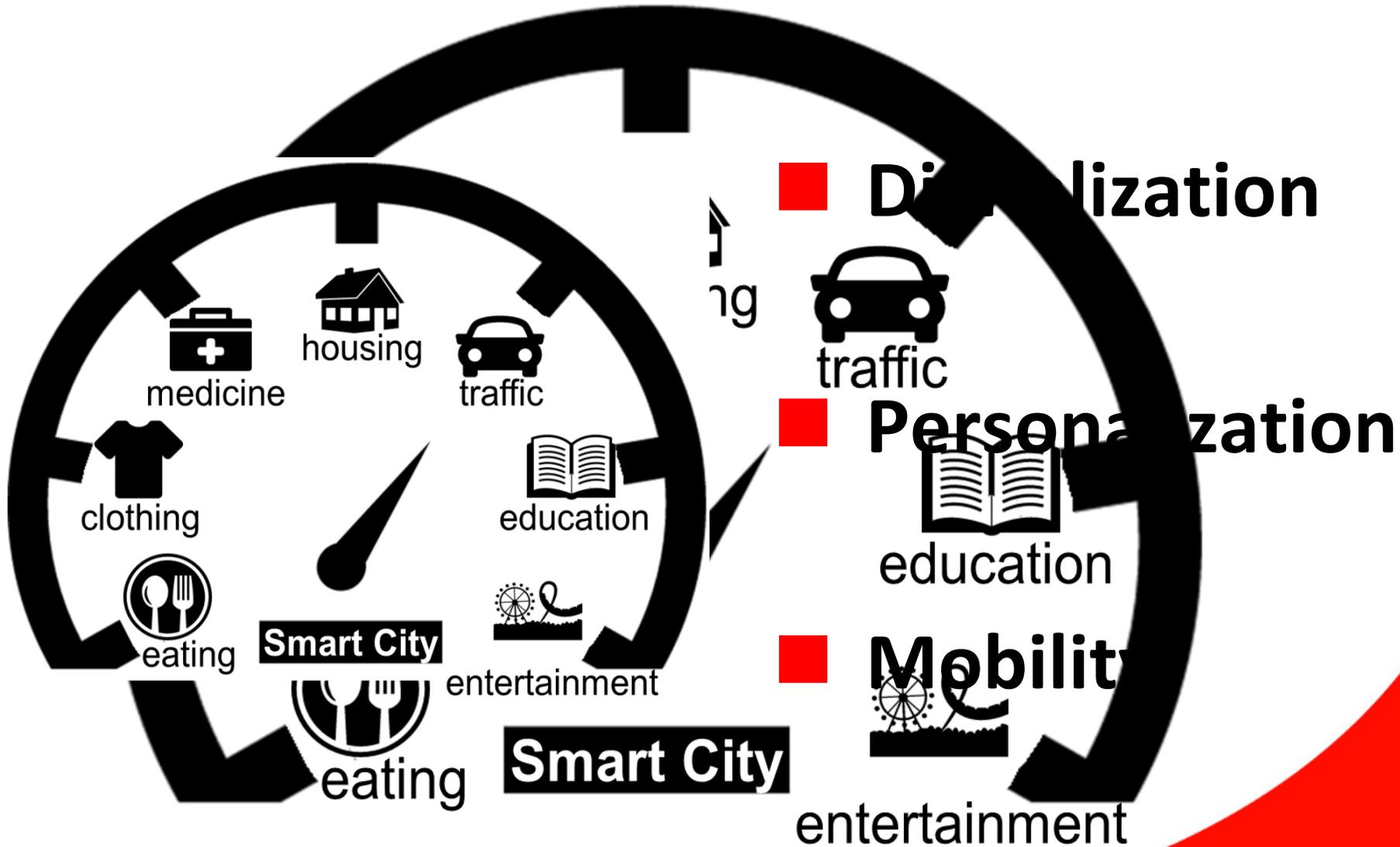
Oct 2nd, 2017

**Far Eastern Electronic Toll
Collection Co., Ltd.**

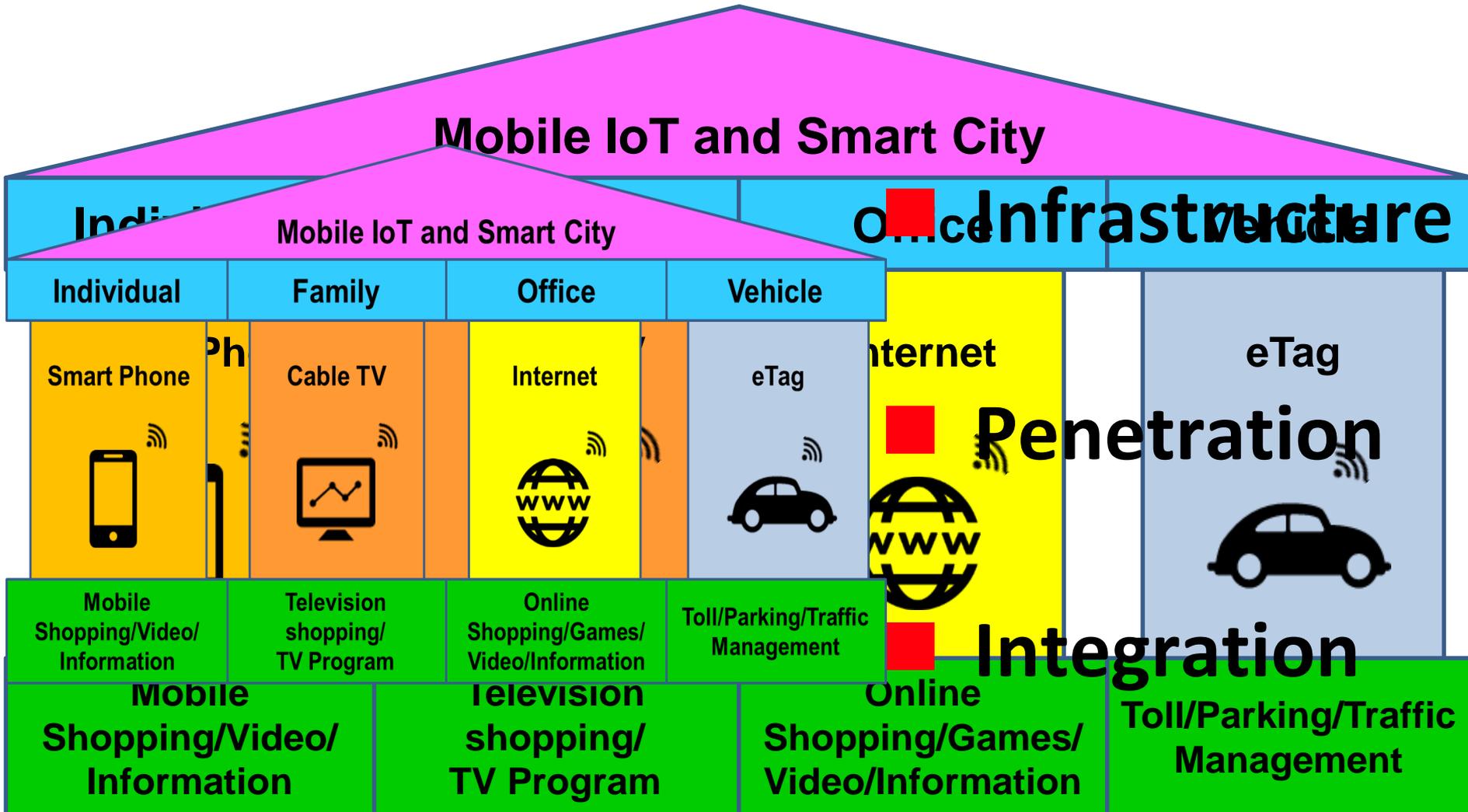
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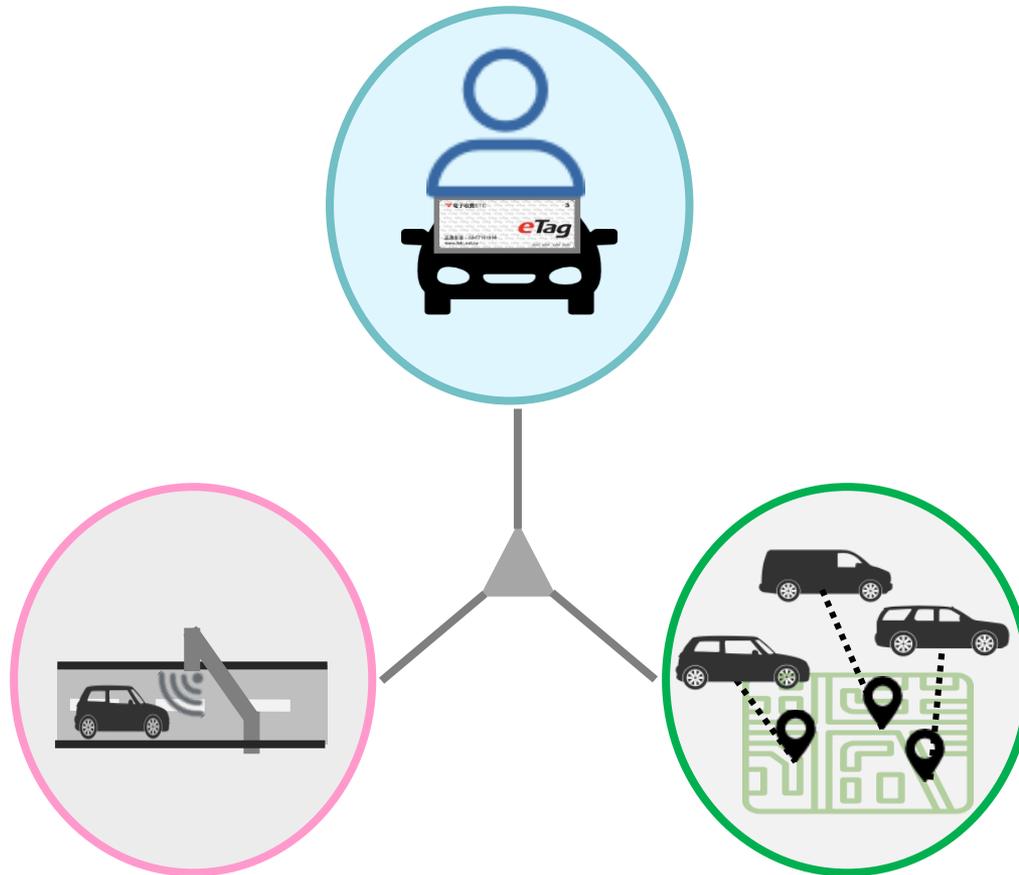
- **Mobile IoT and Smart City**
- **Taiwan ETC Overview**
- **Digital Transformation Opportunities**
- **Road to the Future**



Mobile IoT and Smart City



Identity Validation



Transaction Validation

Location Validation

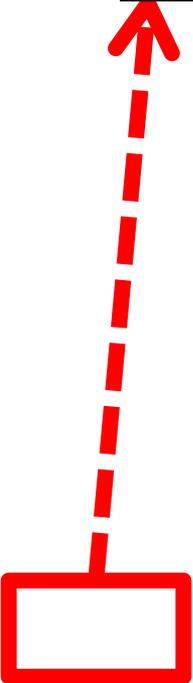
Taiwan ITS 5S Strategies

■ Taiwan ITS provides the “seamless, sharing, safe, smooth and sustainable” intelligent transportation.



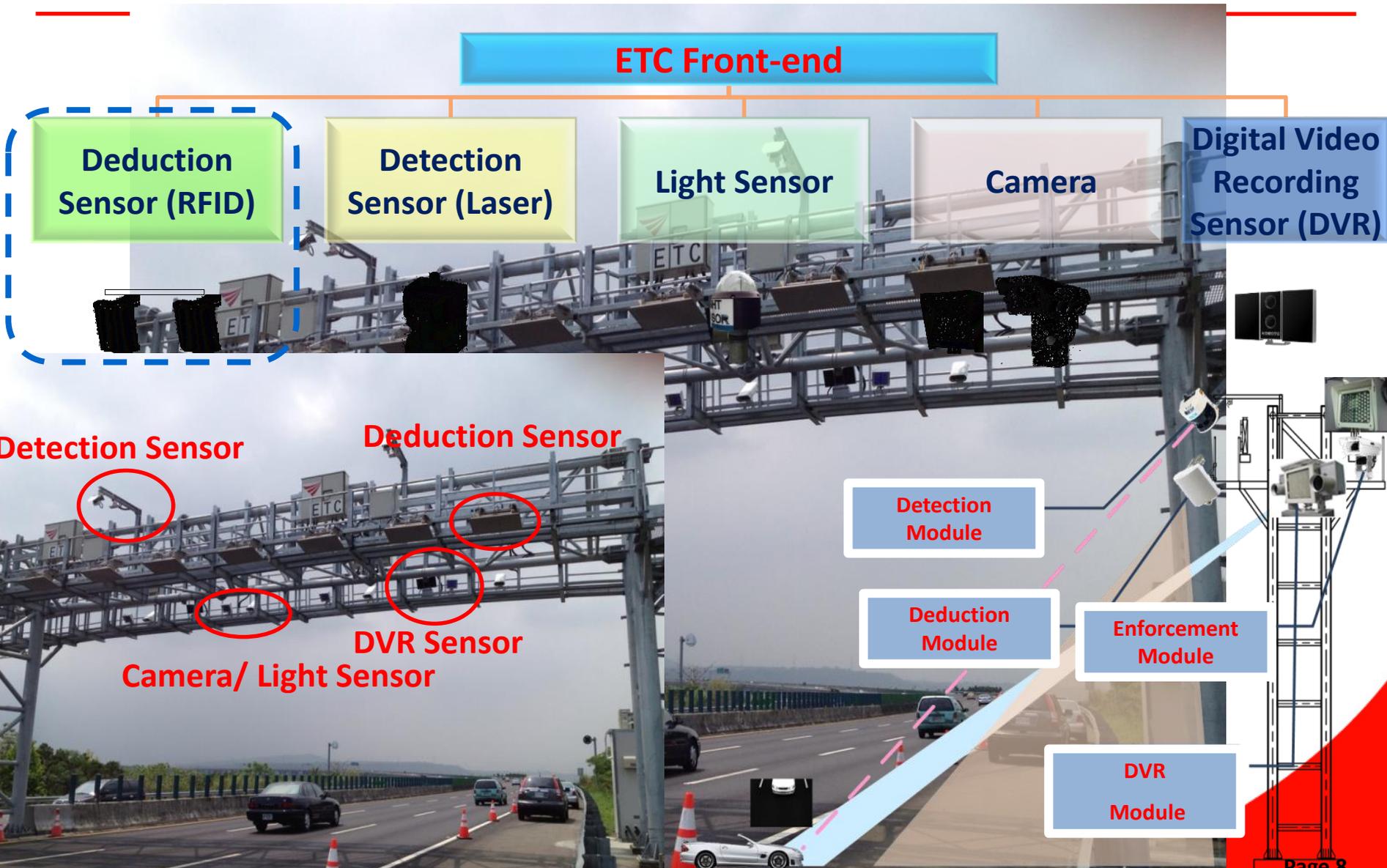
Digital Transformation in ITS

Identity Validation (e-ID)



Digital Transformation in ITS

Transaction & Location Validation



Evolution of Taiwan ETC 1.0 – 4.0



▶ Manual toll



▶ Phase I: Y2006 SLFF ETC



▶ Phase II: Y2014



Manual → Phase I

- ▶ Manual toll & ETC toll
- ▶ Extend ETC Lane by usage



Phase I → Phase II

- ▶ Construct 319 new gantries
- ▶ Full ETC without manual toll

Evolution of Taiwan ETC 1.0 – 4.0



■ IR DSRC OBU system started in Feb 2006

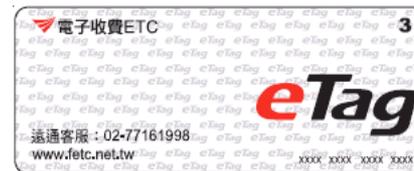
- IR OBU was paid by vehicle owner (\$40 USD)
- Only accumulated 1.2M of vehicles until 2012

■ Passive RFID system introduced in May 2012

- eTag (RFID) for free
- IR OBU and eTag co-exist operation
- Reach 5M of vehicles by only spending 16 months
- 100% eTag and full distance-based MLFF started from Jan, 2014



ETC Card + IR OBU



Virtual Account = License Plate + ID of Car Owner

Each eTag links to a Virtual Account

Evolution of Taiwan ETC 1.0 – 4.0



ETC Customer	6.6M
ETC Daily Transactions	Daily Average: 16 M Historical Daily High: 22.7 M
eTag Usage Rate	94%
ETC Usage Rate	100%
Successful Tolling Rate	99.97%

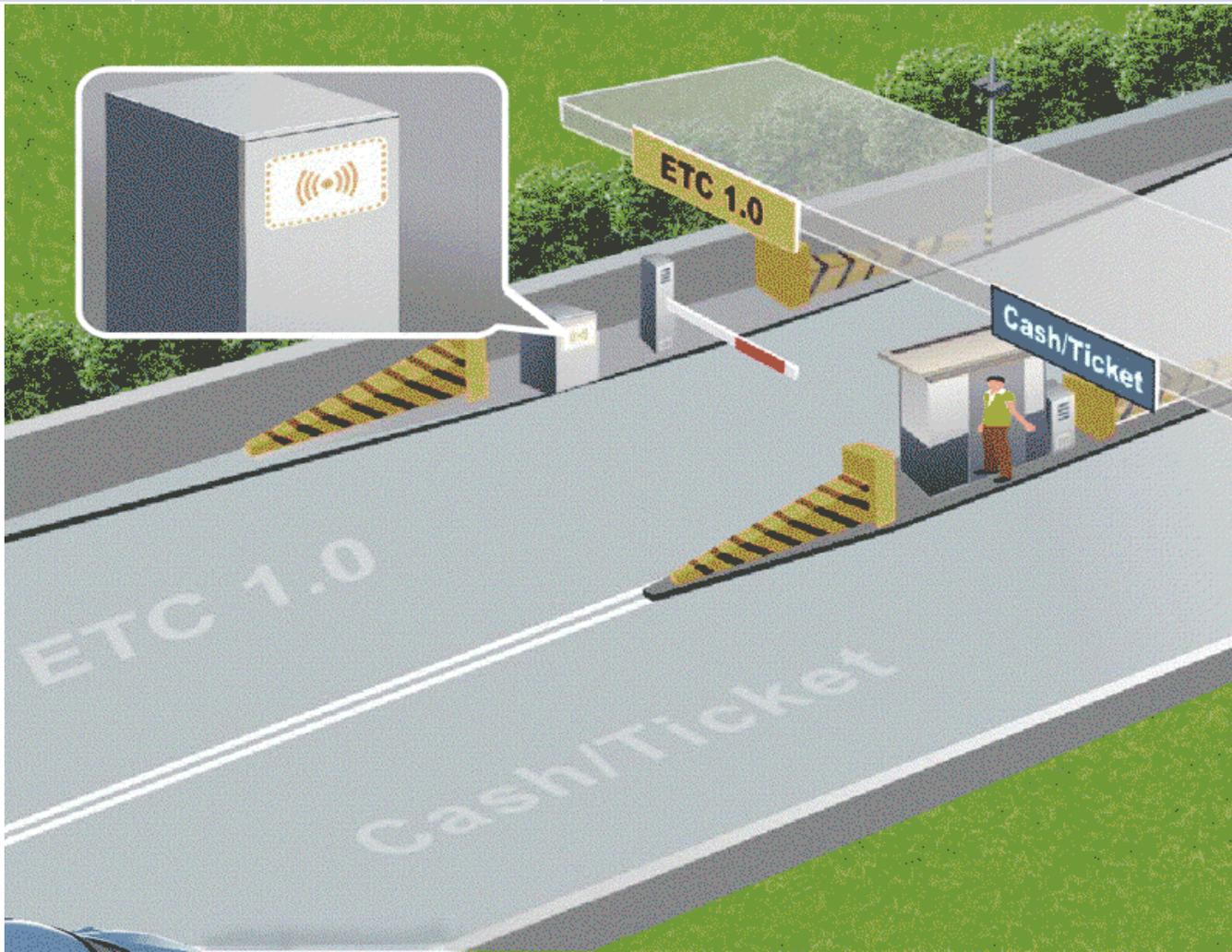


Evolution of Taiwan ETC 1.0 – 4.0

ETC 1.0 (Speed 0km)



Barrier	Toll Detection	Country/Application
yes	stop and go to pay tolls	Malaysia ETC, Taipei MRT (easycard)

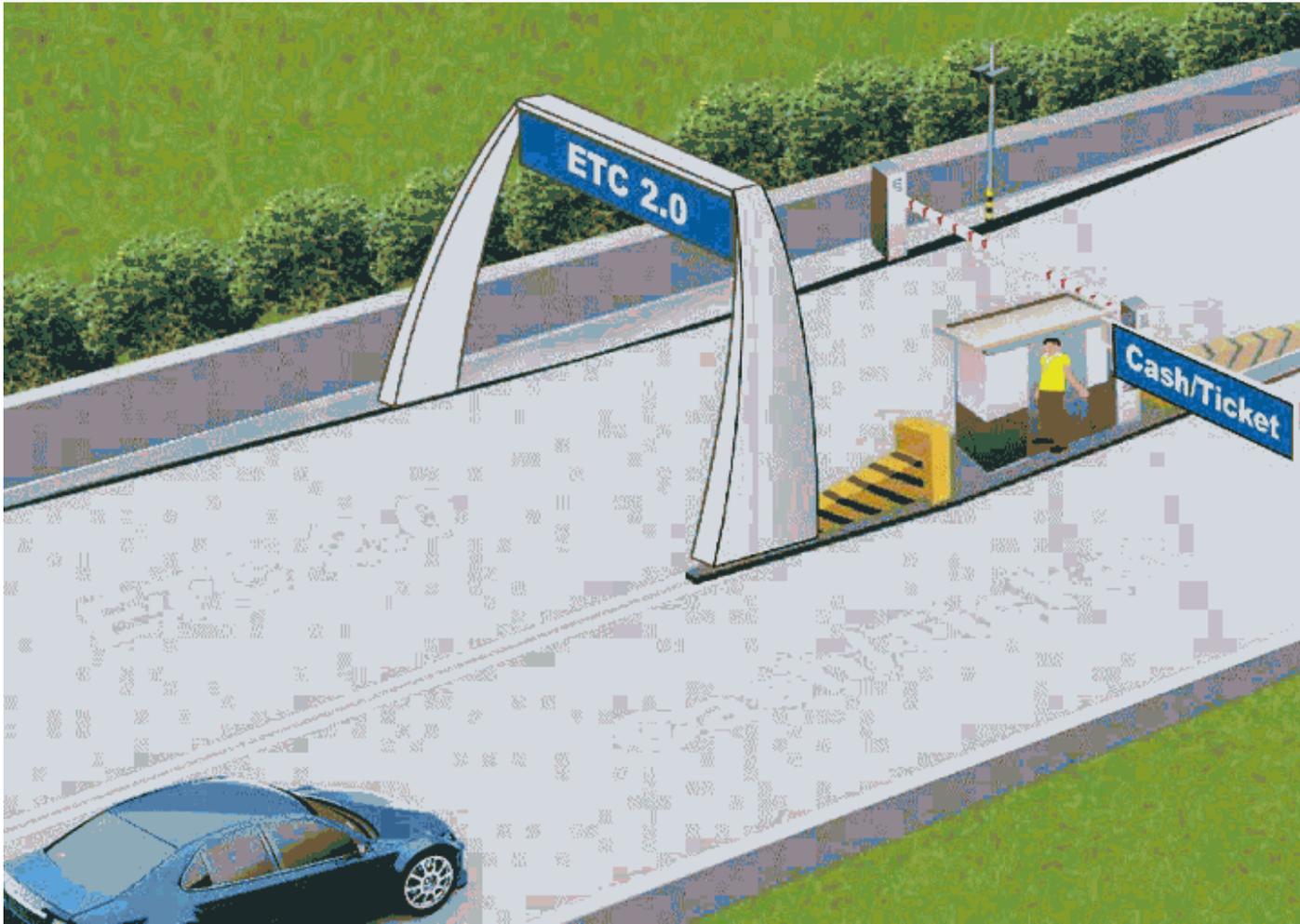


Evolution of Taiwan ETC 1.0 – 4.0

ETC 2.0 (Speed 20km)



Barrier	Toll Detection	Country/Application
yes	slow down to pay tolls	Malaysia, Japan, Korea, Hong Kong, China/ETC



Evolution of Taiwan ETC 1.0 – 4.0

ETC 3.0 (Speed 70km)



Barrier	Toll Detection	Country/Application
no	single lane free flow	Taiwan per-entry-based ETC



Evolution of Taiwan ETC 1.0 – 4.0

ETC 4.0 (Speed $\geq 110\text{km}$)



Barrier	Toll Detection	Country/Application
no	multi-lane free flow	Taiwan distance-based ETC



■ MLFF single-gantry solution

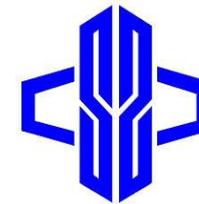
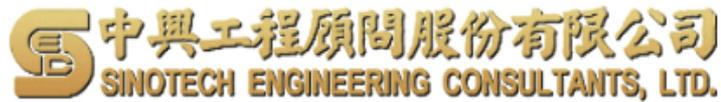


Technology Innovation of Taiwan ETC



■ MLFF single-gantry solution

■ Industry collaboration



..... hundreds more vendors

- MLFF single-gantry solution
- Industry Collaboration
- Open Standard Technology (ISO 18000-6C)

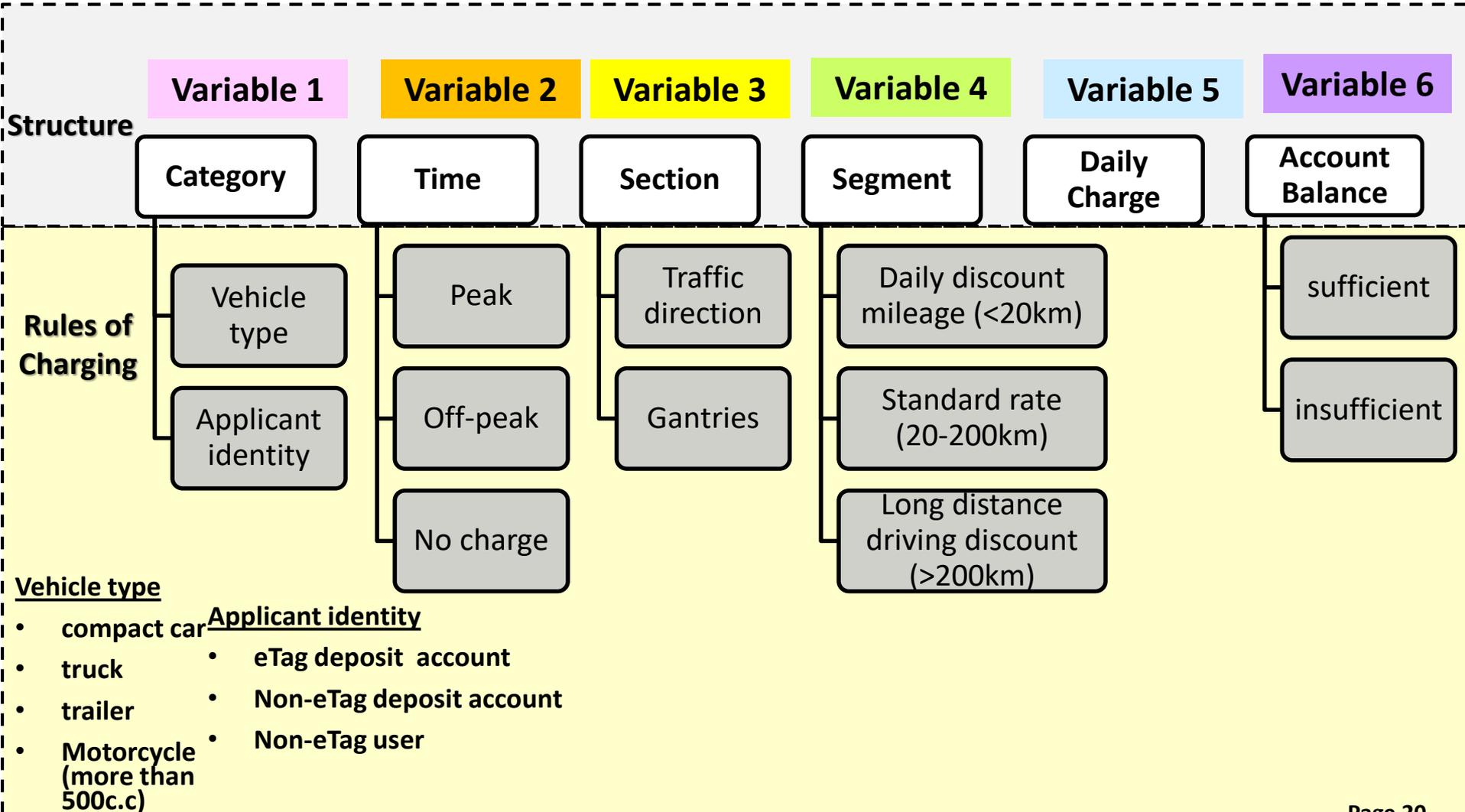


永奕科技
YEON TECH



- MLFF single-gantry solution
- Industry Collaboration
- Open Standard Technology (ISO 18000-6C)
- Flexible Charging Services

Flexible charging services



Service Model Innovation (PPP)



Service Channel



(activation, top up, payment, inquiry)



Quality Monitor & Enforcement

Government (TANFB)



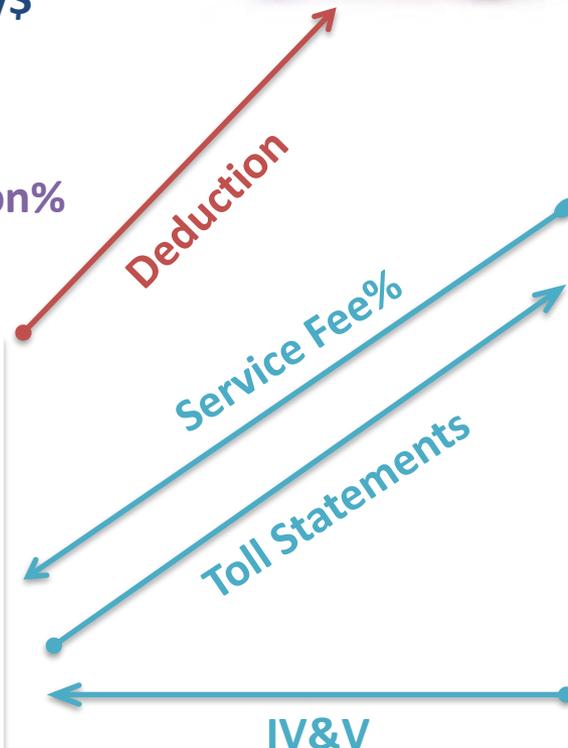
3rd Party Auditor

Account & Tag Mgmt. ↑
Cash\$ ↓
Commission% ↓

Bank Account



ETC Operator

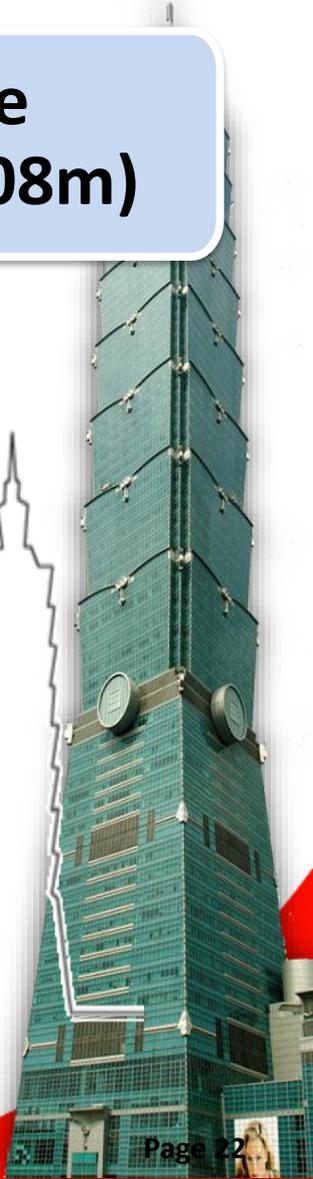
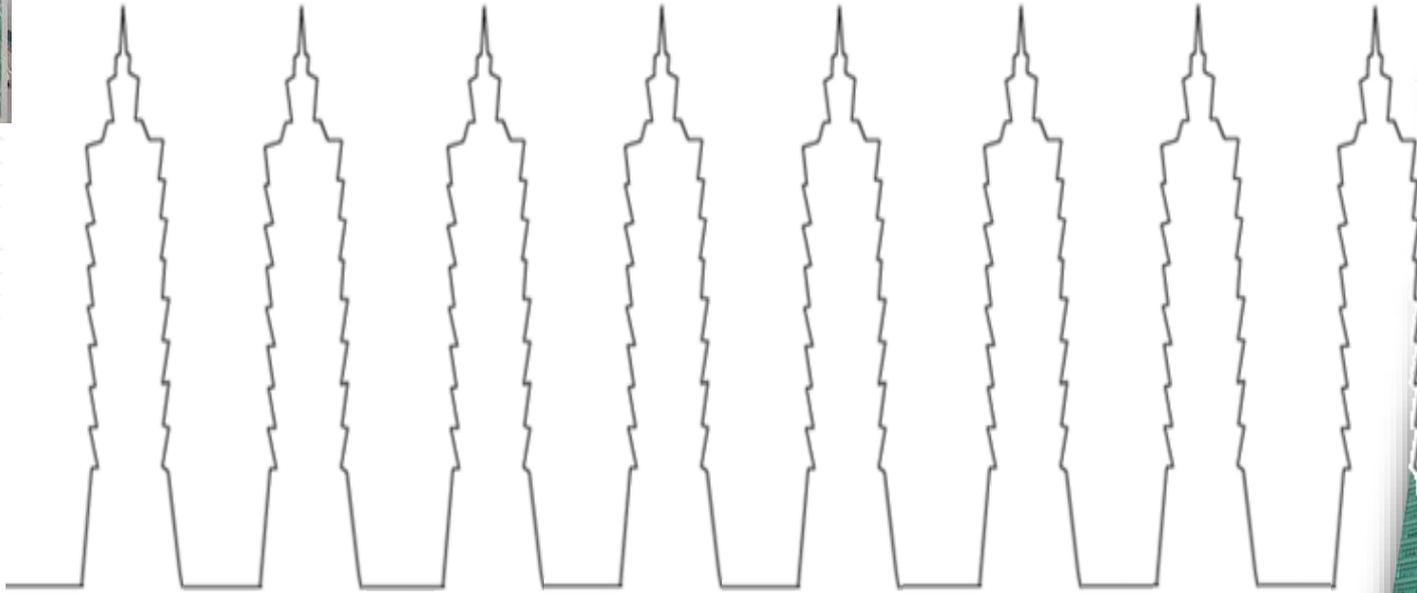


Social Benefit (2013/12/30 till to date)



Paper Tickets
Reduced

10.6 billion cm^3 of paper tickets are
equivalent to **3,477** Taipei 101s (508m)



Social Benefit (2013/12/30 till to date)



Carbon Emissions

720 thousand metric tons of CO₂ are equivalent to the CO₂ captured by trees of **151** New York's Central Park



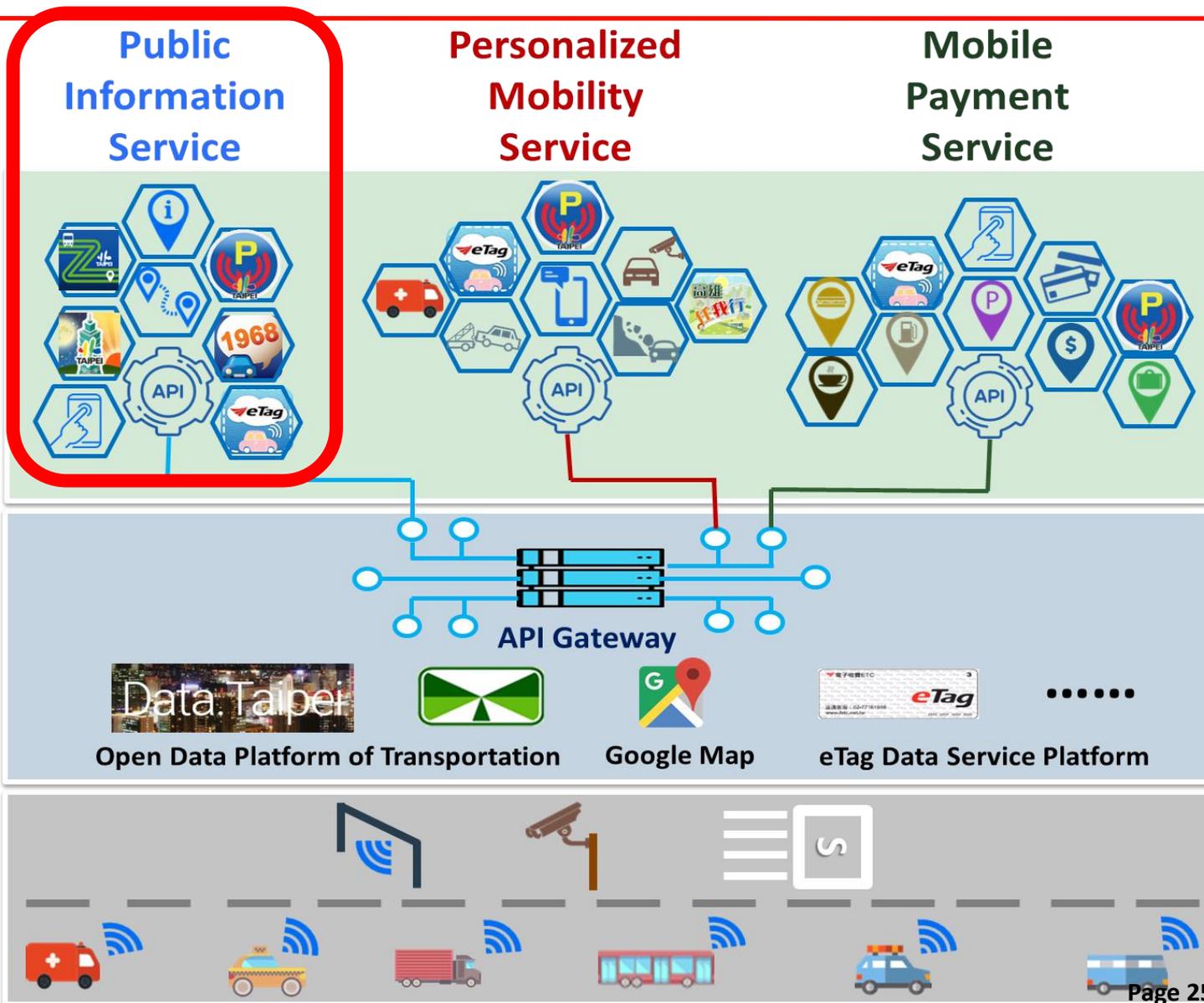
Social Benefit (2013/12/30 till to date)



Fuel
Saving

310 million liters of fuel are equivalent
to **124** Olympic swimming pools





Business Sphere I.
Smart City
Service
(SaaS)

Public
Information
Service

Personalized
Mobility
Service

Mobile
Payment
Service

Business Sphere II.
Application Platform
(PaaS)

API Gateway

Open Data Platform of Transportation

Google Map

eTag Data Service Platform

Business Sphere III.
Sensor Network
(IaaS)

Digital Transformation - Public Information Service

Smart Traffic



Digital Transformation - Public Information Service

Smart Traffic



Digital Transformation to Smart Nation

MaaS Infrastructure based on ETC



Public Information Service

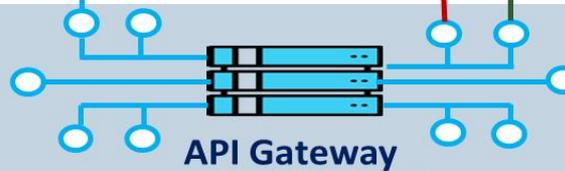
Personalized Mobility Service

Mobile Payment Service

Business Sphere I.
Smart City Service (SaaS)



Business Sphere II.
Application Platform (PaaS)

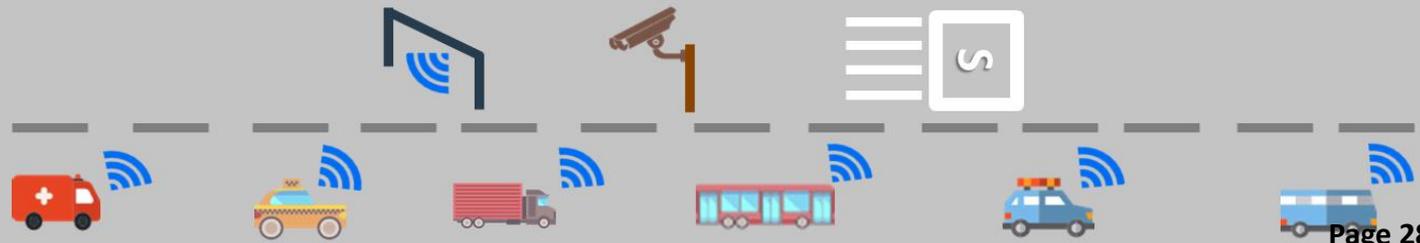


Open Data Platform of Transportation

Google Map

eTag Data Service Platform

Business Sphere III.
Sensor Network (IaaS)



Digital Transformation – Personalized Mobile Service

Smart Safety



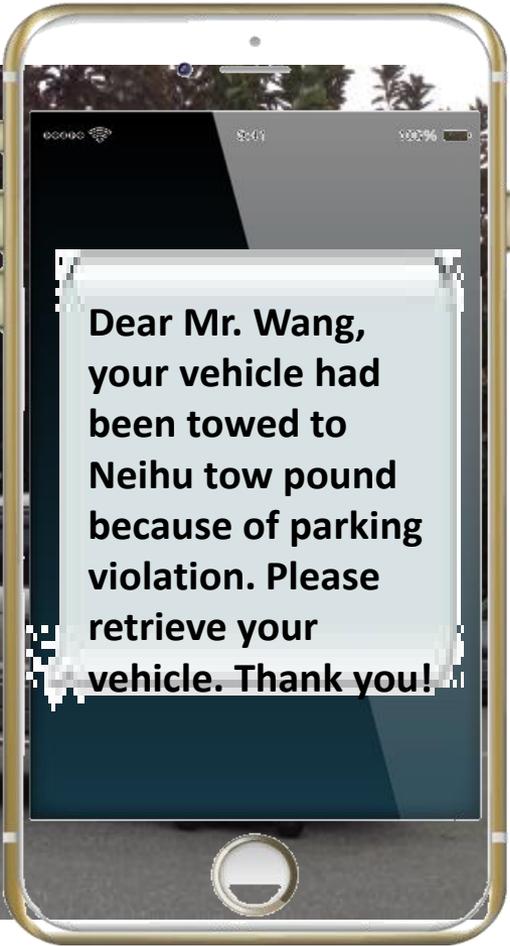
Digital Transformation – Personalized Mobile Service

Smart Safety



Digital Transformation – Personalized Mobile Service

Smart Safety



Digital Transformation to Smart Nation

MaaS Infrastructure based on ETC

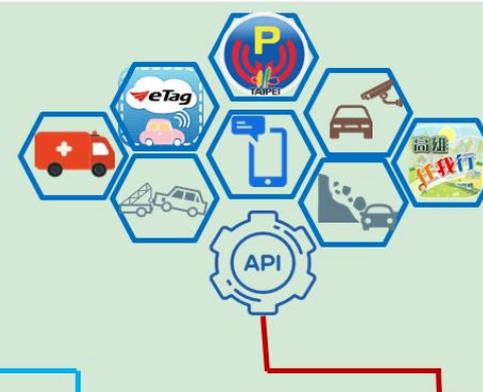


Public Information Service

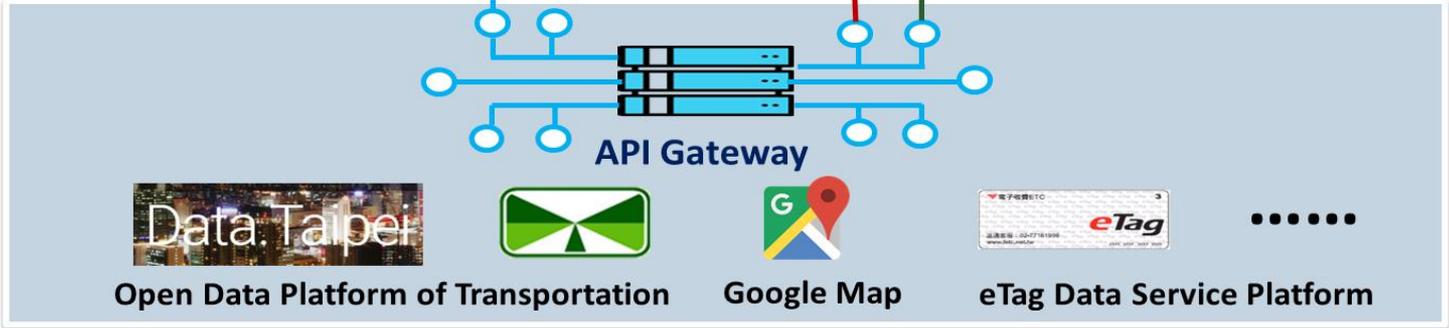
Personalized Mobility Service

Mobile Payment Service

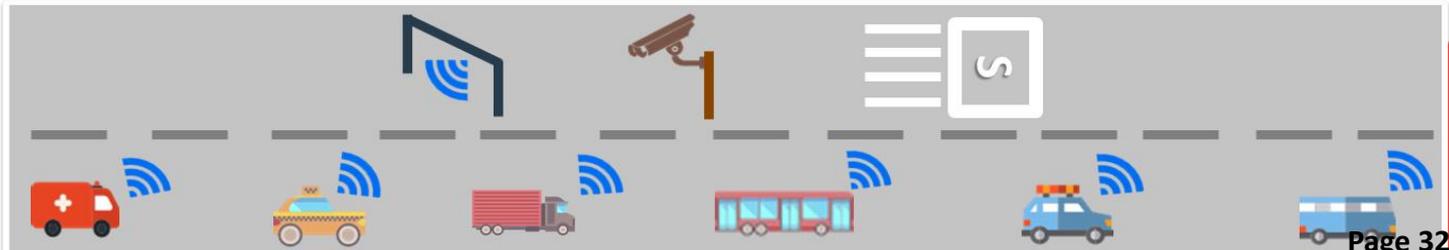
Business Sphere I.
Smart City Service (SaaS)



Business Sphere II.
Application Platform (PaaS)



Business Sphere III.
Sensor Network (IaaS)

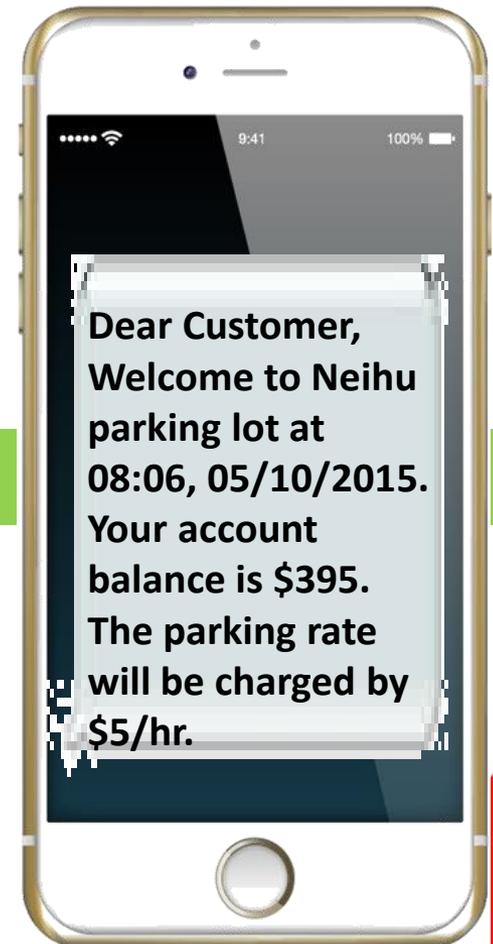


Digital Transformation – Mobile Payment Service

Smart Parking



Entrance



Exit

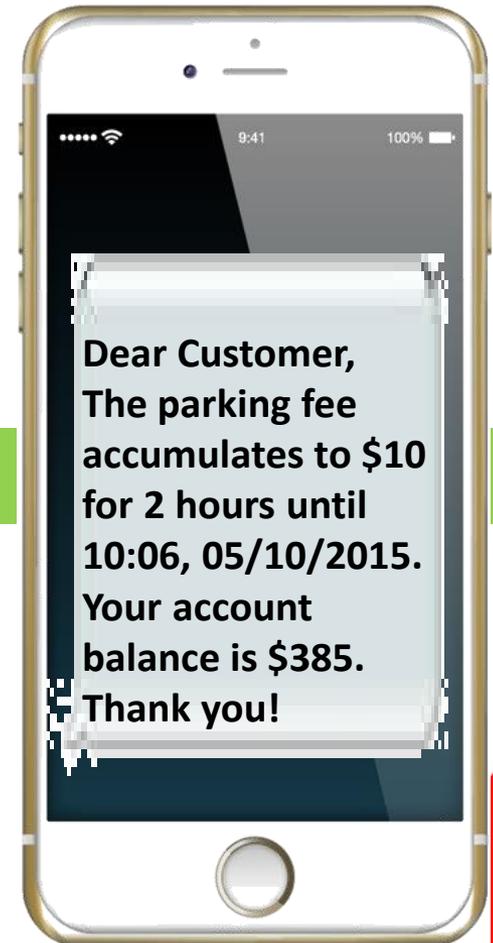


Digital Transformation – Mobile Payment Service

Smart Parking



Entrance

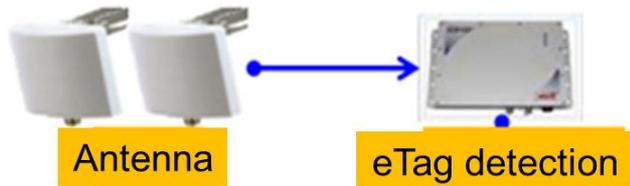


Exit



Digital Transformation – Mobile Payment Service

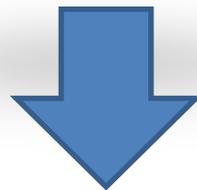
Smart Payment



+



+



eTag Payment Platform

Digital Transformation – Mobile Payment Service

Smart Payment (ERP)



The image displays five award logos arranged in two rows. The top row contains WITSA (World Information Technology and Services Alliance), IRF (International Road Federation), and IBTTA (International Brotherhood of Tolling and Tolling Association). The bottom row contains BORDEAUX 2015 and eASIA Awards. Each logo is framed by a golden laurel wreath. The background is a solid blue color, with a photograph of an ETC gantry structure visible in the bottom left corner.

- Taiwan ETC, Winner of 2017 WITSA Private Sector Excellence Award
- Taiwan ETC, Winner of 2016 IRF Global Road Achievement Awards
- 2015 Toll Excellence Award Winners Customer Service & Marketing Outreach
- Taiwan ETC, Winner of 2015 ITS World Congress Hall of Fame-Industry Award
- Taiwan ETC, Winner of 2015 eASIA Awards in private sector

Road to the Future



Implementation of eTag, 4G, Cloud Computing, Big Data, IoT to **Smart City**

Embedded eTag to a **new business model**

Engaged eTag and smart city toward **DIGI+ (Digital Nation & Innovation Economy)**

eTag based ETC is a **sustainable PPP model**



Thank you

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