



# Taipei: an example of Integrated e-Ticketing to favour intermodality

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## Abstract

The Taipei City Government decided in 1999 to invest in an ambitious integrated contactless card system (EasyCard) with the political objective to provide “one card for all”, including the payment of car park in connection with the public transport network, and therefore to attract people “out of their cars”.

The EasyCard is a stored value card enabling its holder to travel all over the Public Transport network: each operator deducts the appropriate fare to be paid in relation with relevant transfer rules to encourage the use of public transport.

The system now includes the 6 metro lines, 5 000 buses operated by 15 companies, 92 city owned parking lots and 3,000 on street parking spaces.

EasyCard has been successful: there are now 13 million cards in circulation for a population of 6.4 million inhabitants. The benefits of EasyCard concern the passengers, as well as the Taipei City Government and the Public Transport Operators.

*La municipalit  de Taipei a d cid  en 1999 d’investir dans un ambitieux syst me billettique (EasyCard) dans l’objectif politique de promouvoir “une carte unique”, incluant le paiement de parking de liaison avec les transports publics, et ainsi d’extirper les habitants de leur voiture.*

*L’EasyCard est une carte dot e d’une r serve d’argent permettant   son porteur de voyager sur l’int gralit  du r seau de transport : chaque exploitant d bite le tarif appropri  en fonction des r gles applicables en mati re de correspondance intermodale, afin de favoriser l’usage des transports publics.*

*Le syst me couvre maintenant 6 lignes de m tro, 5.000 bus, 92 parkings et 3.000 places de stationnement sur voirie.*

*EasyCard a rencontr  un vif succ s : 13 millions de cartes en circulation pour une population de 6,4 millions d’habitants. Les b n fices de l’EasyCard concernent aussi bien les voyageurs que la Ville de Taipei et les entreprises exploitantes.*



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### 1. Background and objectives

Taipei is the capital of Taiwan ROC and its political, economical, financial and cultural centre. The city itself has a population of 2 630 000 inhabitants, whilst the metropolitan area including the whole Taipei County reaches 6 390 000 inhabitants.

The public transport network is made of

- 6 metros (MRT) lines operated by Taipei Rapid Transit Co (TRTC). The first line opened in 1996 and its automatic fare collection system was based on recyclable plastic magnetic cards.
- 5 200 buses operated by 14 bus companies (The Taipei City Bus Administration and 13 private) working in a United Operating System (UOS) controlled by the Bureau of Transportation of Taipei City Government.

For years, fares and concessions had been standardised within the UOS, including pre-purchased zone tickets valid in any bus : in order to register transactions and apportion the revenues, the bus companies had set up a disposable magnetic card system in the nineties.

It has to be noted that the magnetic cards were not interoperable between the MRT and buses.

In 1994, with the rapid development of Taipei, a White Paper for Transport Policies expressed the strong objective to “create a civilised transport system for Taipei people”. Among the guidelines that directed the actions to be taken were:

- a humanistic transportation environment with people as first priority, cars as secondary,
- a computerised transportation service and an integrated transportation system of high efficiency,
- a fair traffic environment and implementation of user fees.

These guidelines led the Taipei City Government to decide to invest in an ambitious integrated contactless smart card system with the political objective to provide “one card for all”, including the payment of parking lots in connection with the Public Transport network: the EasyCard system.

### 2. The business model

To meet that goal, the Taipei City Government launched an invitation to tender in September 1999 to supply such a system and early 2000 awarded the contract to the Mitac consortium which Thales-Transportation Systems is part of.

It has also organised a private style IC Card Ticketing Company TSCC (Taipei Smart Card Corporation), now EasyCard Corporation, responsible for the implementation and operation of the Contactless Smart Card Integrated Fare Management System.



This company that owns the EasyCard system and issues the EasyCard incorporates :

- Taipei City Government: 12%
- Taipei Rapid Transit Co (TRTC): 28%
- Bus operating companies: 25%
- Banks: 15%
- System operators: 20%

EasyCard Corporation bought this new system through its equity and bank loans; operation and maintenance are performed under a concession agreement signed with the transport operators, based on fares collected per type of transaction.

### 3. The original content of the project

The first stage of the project included the implementation of EasyCard in the MRT (64 stations), the 4 000 urban buses operated within the UOS and 44 city owned gated parking lots (among which 12 were MRT car parks):

- All fare gates in the MRT stations were upgraded with a contactless card reader.
- All buses were equipped with a stand alone contactless card validator that replaced the former magnetic card validator; fareboxes remained to enable occasional passengers to pay with cash (coins).
- All public car parks entry and exit gantries were upgraded with a contactless card reader.

After public tests that proved satisfactory (90% positive), the first phase started in the MRT in June 2002 and reached full scale in urban buses and parking lots at the end of September 2002.

Early 2002, the percentage of journeys undertaken using public transport was 46% whilst private vehicle represented 54% of the motorised journeys (excluding the scooters). The aim of Taipei City Government is to raise it to 60%.

**The EasyCard is a contactless smart card loaded with a NT\$ value enabling its holder to travel all over the network:** each Service Provider deducts the appropriate fare to be paid from the EasyCard stored value used by the passenger in relation with a relevant transfer policy for to encourage the use of public transport.

The cards can be reloaded at MRT sales outlets or at AVM (Add Value Machines) or in convenience stores equipped with point of sale terminals.



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All the transaction data stored in the various card accepting devices are downloaded into the related Central System to ultimately feed the Clearing House which every night apportions the revenues between the Service Providers.

The system is organised according to the following chart :





EasyCard Corporation manages the card administration and the customer service and operates the Central Clearing House to settle the accounts and apportion the revenues in relation with the registered transaction data.

**For occasional passengers who still want to pay on a single journey basis**, each operator has kept its legacy fare collection system :

- Magnetic tickets, now replaced by contactless smart tokens, for the MRT lines,
- Coins dropped into a farebox in buses,
- Typical ticketing in parking lots.

#### **4. Incentives for usage**

In the MRT, EasyCard grants a significant discount on single journey fares:

- 20% for adults, students and concessionaires,
- 60% for seniors, disabled residents and escort passengers

For transfers from bus to MRT or MRT to bus, EasyCard grants a 20% discount as well.

#### **5. The architecture of the system**

The system is organised with 4 tiers.

Each transport mode (MRT, buses, public car parks) has its own Central Processing System (CPS) that collects transaction data from the card accepting devices through Station (SPS), Depot (DPS) or Parking (PPS) Processing Systems.

Besides, all the Points Of Sale Terminals (POST) have their own Central Processing System, as well as the Add Value Machines (AVM) connected to the Bank Processing System.

#### **6. First year of revenue service**

It is interesting to analyse how a new system may have a quick influence on passenger's behaviours.

All the following figures were provided by EasyCard Corporation.

At the opening and until mid September 2002, the EasyCard could only be used in the metro whilst the existing magnetic stored value card was still in use: therefore, the EasyCard was not attractive because it did not give any specific advantage. Furthermore, there was a 200 NT\$ (6.29 US\$) deposit to pay to cover the cost of the media.

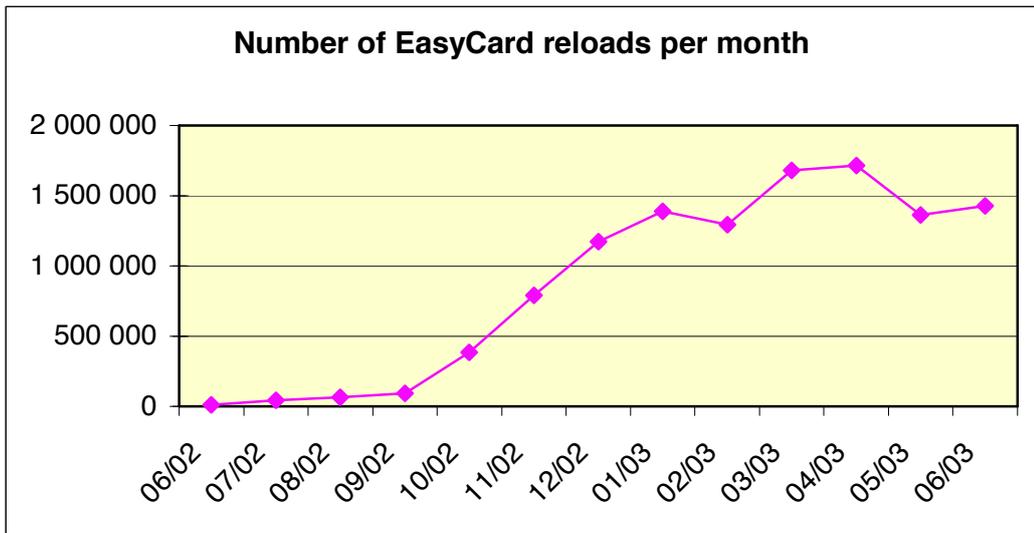
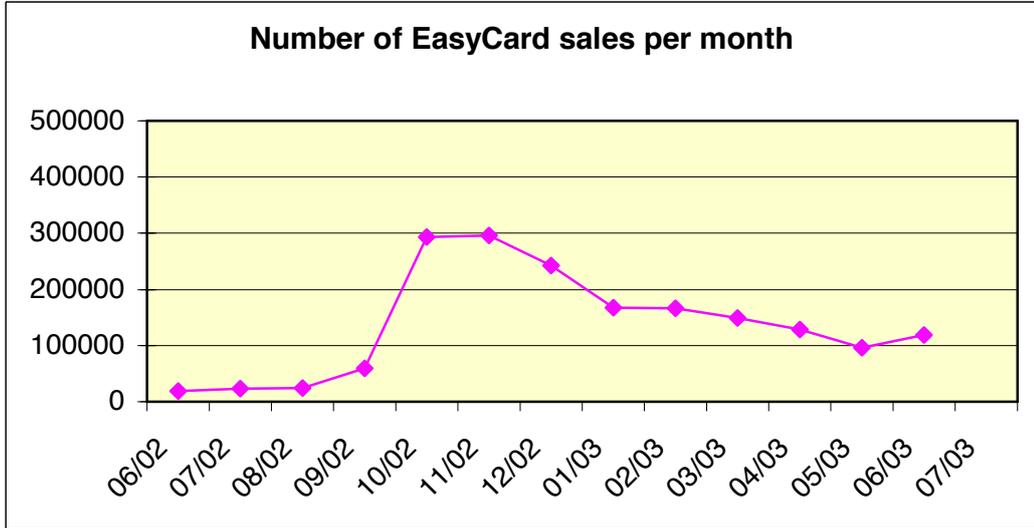
When the EasyCard started to be accepted in buses and in public car parks, the card sales suddenly increased from 24 000 in August to 59,000 in September and 293,000 in October.

After that launch, the EasyCard sales stabilised around 120,000 cards a month, with increasing numbers of card reloads.



In June 2003, the target of 2 million EasyCards in circulation was reached, 6 months ahead of TSCC objective (end of 2003).

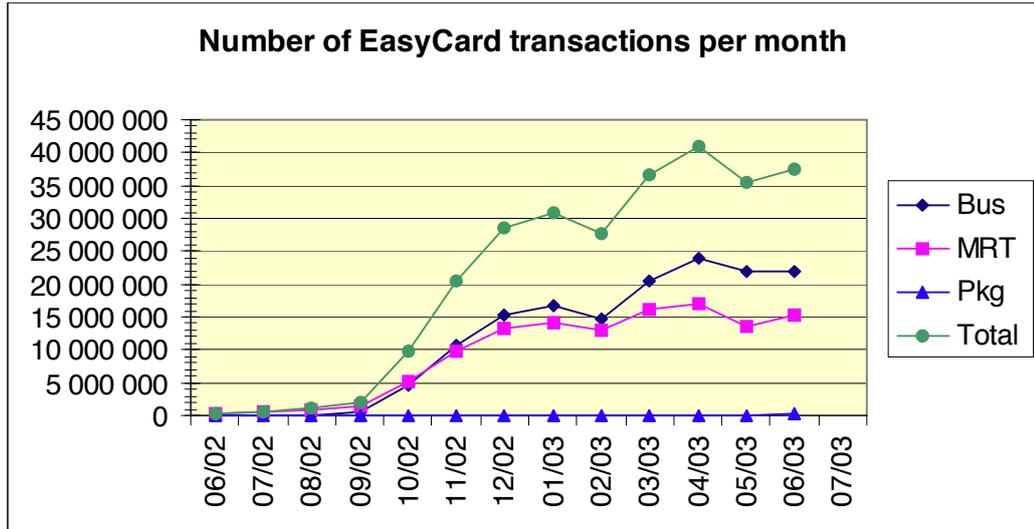
The two following graphs show the evolution of card sales and reloads during that initial period of time.



As to usage, the last normal month before SARS impact on public transportation (April 2003) showed over 41 million transactions, with the following split:

- 24 million in buses
- 17 million in the MRT,
- 192 000 in car parks.

The increase of the number of Easycard transactions is shown on the following graph:



In April 2004, EasyCard was used for 75% of the overall number of transactions for usage of buses, MRT, public off-road car parks and MRT/car park transfers.

The growth of usage of the EasyCard was quite spectacular in all transportation modes:

	April 2003	April 2004	April 2008
<b>MRT</b>	63%	82%	89%
<b>Buses</b>	44%	72%	85%
<b>Public car parks</b>	20%	56%	65%

The average transaction values are:

- 14 NT\$ in buses (0.44 US\$)
- 22 NT\$ in MRT (0.69 US\$)
- 52 NT\$ in regular parking lots (1.63 US\$)
- 29 NT\$ in MRT car parks (0.91 US\$)

To increase the attractiveness of EasyCard, the original 200 NT\$ deposit was lowered down to 100 NT\$ (3.14 US\$). The market share in buses increased significantly when concessionary cards were launched.





As of today, 13 million EasyCards have been issued, producing around 3 million daily transactions.

The benefits of EasyCard concern the passengers (one card for all, speeding passage, decreasing usage of coins) as well as the Taipei City Government (transport improvement, operation integration, credibility for fare and subsidy policy) and the transport operators (management improvement, operator co-ordination, cost reduction).

## 7. EasyCard extensions in the transportation sector

As aimed by the Taipei City Government, the use of the EasyCard extended to other transport modes such as

- **Interurban and county buses entering Taipei** (around 1,000 buses),
- **On street parking**: after a pilot test, parking payment terminals have been installed to manage 3,000 roadside spaces.
- **Taxis**: A 6-month trial was done in 2005 with 300 taxis to accept the EasyCard as a payment means, but there was no positive outcome. A new approach is undergoing looking for 1,000 taxis, mainly aiming to provide service to senior citizens and physically challenged passengers.

The next target was the use of EasyCard for the use of the **High Speed Rail** between Taipei and Kaohsiung. Thales has provided the fare collection system together with its partner Mitac and designed it with that provision. Now the Transport Authorities have agreed that common use.

During that period, Taipei has been extending its existing MRT lines and adding 2 new ones. Two additional lines are already scheduled

- the long-awaited Xinyi Line that will travel the congested Xinyi Road to Taipei 101 tower, the world's tallest building,
- A circle line around the city.

## 8. EasyCard: a tool for the City Government for its policy

The EasyCard keeps supporting the policy of the Taipei City Government to favour the use of public transport and decrease the use of motorised individual modes: private vehicle and scooters and motorcycles as well.

The latest statistics show the following modal split:

- Public transport : 46.1% (25% for the MRT, 22,1 % for the buses)
- Scooters and motorcycles: 28.8%
- Private cars: 22.1%
- Taxis: 2.0%

The high increase of the price of gasoline and the will to boost the use of Public Transport induced the Mayor of Taipei to decide to increase the discount granted to the EasyCard holders during the summer time.

- 25% for adults and students, instead of the current 20%
- 72.5% for the elderly citizens and the disabled travelers, instead of 60%.



The aim of this measure is to encourage commuters to use Public Transport, rather than an individual mode. Since the gas price hike, the number of scooter drivers has increased sharply, posing a negative impact on traffic and air quality.

The question is now whether a 3-month incentive will be sufficient to change the travelers' habits or whether this high discount should be extended to a more significant period of time. The 3-month fare adjustment will cost the budget of Taipei City 70 million NT\$ (2.2 million US\$).

## References of the author

Gerard Najman is a graduated engineer from Ecole Centrale of Paris and has a HEC Executive MBA.

**The first part of his career was dedicated to consulting in Public Transport for local and regional authorities.**

Among his missions, he developed in 1976 a traffic management scheme for Sfax, the second city in Tunisia, based on the optimisation of the coexistence of the various modes of transportation, helping the 2-wheel vehicles to survive and to challenge the growth of the use of private cars. This program was selected by the World Bank to be financed and implemented. Gerard Najman was appointed by the World Bank and the Tunisian Authorities to supervise the execution of the works, set up a municipal service for traffic management and train the local staff (1980-1982).

**This successful achievement was presented in CODATU II in Caracas:** How to manage the coexistence of three motorised transport modes in Sfax (Tunisia). .

**In 1983, he moved to the fare collection industry** and worked for several international companies such as Camp, Scanpoint Technology and now Thales, and for the French Keolis group as well. In that role, he advised operating subsidiaries and their local Transport Authorities.

His responsibilities in sale and marketing and his experience in operation led him to study issues related to fare collection in various developing countries with different institutional and cultural backgrounds.

He gave contributions in that matter in several CODATU conferences:

- **CODATU III in Cairo:** A social and economical evaluation of a new fare collection system in Libreville buses based on one-man operation.
- **CODATU IV in Jakarta:** A comparison between various fare collection methods in developing countries.
- **CODATU V in Sao Paulo:** A comparison of 5 different cases of fare integration between transport modes and operators (Caracas, Fort de France, Sao Paulo, Hong Kong & Taipei)

Aside of CODATU, he has been speaking for years in various congresses or dedicated conferences such as UITP, APTA, ENPC, Le Rail. etc ...

His large experience covers concrete achievements in nearly all parts of the world.