Do contactless cards or mobile phones have a roll in tolling?

Willy Dommen
Agenda

- Introduction
- Overview and Applications
- Case Studies
We are going to cut through the media hype around contactless and mobile payments

- Look at the key trends in the payment market
- Identify the decision drivers
  - Card based model versus Over-the-Air
  - Stored value versus account based
- Discuss the key elements of closed loop stored value systems in public transport
Payments landscape continues to evolve

1. Cash/Checks
2. Magnetic Stripe
3. Contactless Chip
   - Plastic bank cards
   - Exxon Speedpass fob
   - PayPass enabled chip in Mobile Phone
4. Over the Air
   - Car parking
   - Vending machines
   - Peer-to-Peer payment
   - Entertainment Ticketing
Consumers are looking for substitutes to cash and checks

<table>
<thead>
<tr>
<th>Service</th>
<th>% of Consumers willing to use cards to …</th>
<th># of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Convenience Store</td>
<td>51%</td>
<td>~111M</td>
</tr>
<tr>
<td>Quick Serve Rest.</td>
<td>47%</td>
<td>~102M</td>
</tr>
<tr>
<td>Transportation</td>
<td>38%</td>
<td>~83M</td>
</tr>
<tr>
<td>Coffee</td>
<td>35%</td>
<td>~76M</td>
</tr>
<tr>
<td>Parking</td>
<td>32%</td>
<td>~70M</td>
</tr>
<tr>
<td>Video Game</td>
<td>27%</td>
<td>~59M</td>
</tr>
<tr>
<td>Vending</td>
<td>22%</td>
<td>~48M</td>
</tr>
</tbody>
</table>

Actions taken by various markets
- Electronic Toll collection
- Contactless fare payment cards
- Stored-value coffee cards
- SpeedPass for fuel payment
- Public and private parking payment

Closed proprietary payment mechanisms

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Electronic payments framework for mobile and contactless devices

<table>
<thead>
<tr>
<th>Card Based Stored Value (device memory)</th>
<th>Closed Loop System</th>
<th>Open Loop System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional Transit Payment Cards</td>
<td></td>
<td>Visa Cash</td>
</tr>
<tr>
<td>– Oyster</td>
<td></td>
<td>Mondex</td>
</tr>
<tr>
<td>– Octopus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Suica</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– SmarTrip</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Merchant stored value cards:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Starbucks Card</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Gift Cards</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electronic Toll Collection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– E-ZPass</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– FasTrak</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bank issued credit and debit cards:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– PayPass</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Visa Wave</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Express Pay</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Discover Zip</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
There are fundamental differences between the card-based and account based payment that will need to be considered.

<table>
<thead>
<tr>
<th></th>
<th>Contactless Card-Based (write to chip)</th>
<th>Contactless Account Based (off-line)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Calculation</strong></td>
<td>Card to reader to back-office</td>
<td>Back-office only</td>
</tr>
<tr>
<td><strong>Transaction Record</strong></td>
<td>On-Card and in-reader memory</td>
<td>In-reader memory</td>
</tr>
<tr>
<td><strong>Value Storage</strong></td>
<td>On-card and shadow account in back-office</td>
<td>Account in back-office</td>
</tr>
<tr>
<td><strong>Susceptibility to Fraud</strong></td>
<td>Detected at point of sale</td>
<td>Detected during processing</td>
</tr>
<tr>
<td><strong>Transaction Visibility</strong></td>
<td>Immediate visibility on hand-set</td>
<td>Not visible in an off-line environment</td>
</tr>
</tbody>
</table>

FUNCTIONALITY ⇔ VERSUS ⇔ SIMPLICITY
The Trusted Service Manager approach address key operational and business needs

- Interconnection with Intellidrive network operators and service providers
- Guarantees end-to-end security
- Application management
- Enroll new users
- Activate and de-activate payment services
- Manage customer data base
- Deliver value added services
Trusted Service Manager role for mobile payment application management
Case Study BART-Sprint mobile pilot:

- Customer registers with Sprint.
- Sprint then assigns customer with unique ID.
- From phone, customer requests transit application using ID.
- Sprint sends transit application to phone.

1. Phone is presented to fare gate and gate opens.
2. Transaction data is sent to BART back office.

Fare payment transaction:

[Diagram showing the flow of information between NFC Enabled Phone, Fare Gate, BART Back Office.]
Case Study BART-Sprint mobile pilot:

1. User wants to check his transaction history on the NFC phone via Sprint
2. Sprint requests history from BART back office
3. BART back office sends user’s history to Sprint
4. Sprint sends history to phone

Inquiry transaction history

- NFC Enabled Phone
- Over-the-Air Server
- Cell Phone Tower
- BART Back Office

IBTTA
The difference between the two mobile payment models is how the merchant transaction is carried-out.
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Hong Kong's Octopus Card – This card was extended from a mere e-ticketing system to a multi-purpose payment card

- **At first** launch of a contactless Smart Card *for trams, underground, bus and ferry lines*
  - 9 million Smart Cards in circulation – about 10% of those personalised
  - 7 million Smart Card transactions per day

- **Expansion of payment functionality** to over 250 non-public-transport services, such as
  - Telecommunication businesses (pre-paid card)
  - Retail (supermarket chains, convenience stores, fast food)
  - Cinemas, public pools, schools, universities

- Initiation of a **customer retention program** providing incentives to using the card for retail purposes

- **Iterative advancement** of the system
  - Founding of a central project association for over-all coordination
  - Development of a central cash-clearing system and connection of individual providers
  - Processing and analysis of user data is seen as an essential benefit, aside from convenience and operational efficiency

Growth through “Multi-Purpose” driver

Migration of Octopus Card from an electronic ticket to an e-payment system for a whole region
London’s Oyster Card – the first successful SmartCard for a European transport system is moving toward open payments

- **Multi-purpose contactless** card with the objective: In 2006 only **cashless** payment
- Presently **mix of open and closed system**
- Strongly increasing transaction volumes
  - **Acceptance locations**: 280 metro- and underground stations, 8000 busses und 250 dealers
  - Currently **2 mio. customer** – until the end of 2004, 3 mio. customers are expected
  - More than **100 mio. transactions**
- **Funding via provider-consortium** (BPO-analogue model) with performance-based payback:
  - private investors (consortium consisting of IT-service providers) assure funding (capital requirements: about 500 mio. Euro over 17 years retention)
  - Payback via **annual fee** (performance-based) and **transaction fee** (per use of card)
- The objective is to develop Oyster Card in a multi-functional “e-purse” with a main focus on **billing and payment systems** – TFL is driving the acquisition of further acceptance locations and functionalities
# Technology Choice: Contactless vs. Over The Air

## Consumer Back:

<table>
<thead>
<tr>
<th>Category</th>
<th>Contactless</th>
<th>Magnetic Strip</th>
<th>Over the Air</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Security</strong></td>
<td>Stolen money is lost</td>
<td>Cards can be locked</td>
<td>Device can be locked</td>
</tr>
<tr>
<td><strong>Speed</strong></td>
<td>Fast and direct</td>
<td>Wait for authorization</td>
<td>“Touch &amp; Go”</td>
</tr>
<tr>
<td><strong>Convenience</strong></td>
<td>Needs to be picked up</td>
<td>PIN or Signature required</td>
<td>No PIN or Sig. required</td>
</tr>
<tr>
<td><strong>Ubiquity</strong></td>
<td>Universally accepted</td>
<td>Widely accepted</td>
<td>Potentially widely accepted</td>
</tr>
</tbody>
</table>

## Merchant Back:

<table>
<thead>
<tr>
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<th>Contactless</th>
<th>Magnetic Strip</th>
<th>Over the Air</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cost</strong></td>
<td>Handling &amp; Labor</td>
<td>Labor, Interchange, Infra.</td>
<td>Interchange, Infrastructure</td>
</tr>
<tr>
<td><strong>Speed</strong></td>
<td>Fast and direct</td>
<td>Wait for authorization</td>
<td>“Touch &amp; Go”</td>
</tr>
<tr>
<td><strong>Transparency</strong></td>
<td>No outside insight</td>
<td>100% outside insight</td>
<td>100% outside insight</td>
</tr>
<tr>
<td><strong>Risk</strong></td>
<td>Threat of robbery</td>
<td>Guaranteed payment</td>
<td>Guaranteed payment</td>
</tr>
</tbody>
</table>

### Illustrative Scoring:

0: n.a. 1: fair 2: average 3: good 4: very good

*Source: Booz Allen Analysis / Mobile Payment Forum*
To develop a mobile phone or contactless payment application

- Identify the quadrant where the payment application is located
- Identify the primary media used in the application
- Analyze technical architecture for any gaps in standards
- Define the actors in the payment application