

Lecture 10

Application Domains III: M-Payment

Mobile Business II (SS 2010)

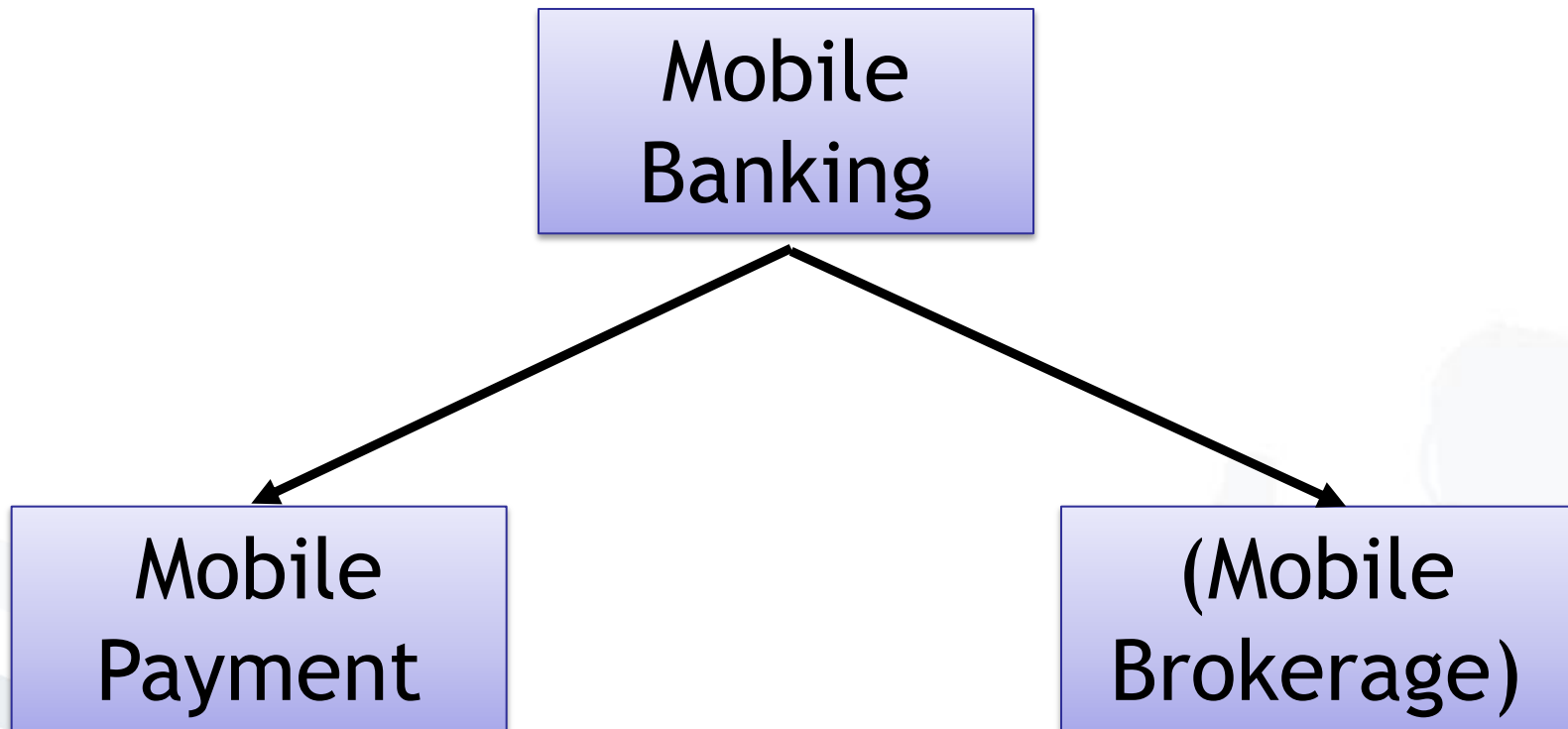
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Goethe-Universität Frankfurt a. M.



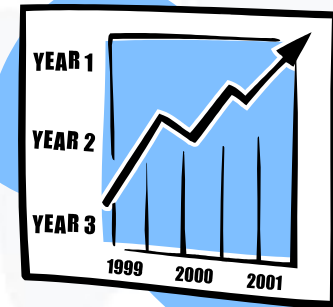
- Introduction
- M-Payment Parties
 - Different Interests & Conflicts
 - Consortia
- M-Payment Infrastructure Schemes
- An alternative M-Payment Application Design
- Conclusion

A Classification for Mobile Banking



- Frequently stated advantages for
 - **Operator:** More data traffic
 - **Financial Institutions:** New cash-flows, Cross-Selling
 - **Customers:** Independence from place and time, convenience, security
 - **Trade:** Electronic customer analysis (CRM) & decreasing of transaction costs

- Factors affecting the acceptance of mobile banking services:
 - Perceived usefulness
 - Perceived ease of use
 - Perceived credibility
 - Perceived self-efficacy
 - Perceived financial cost



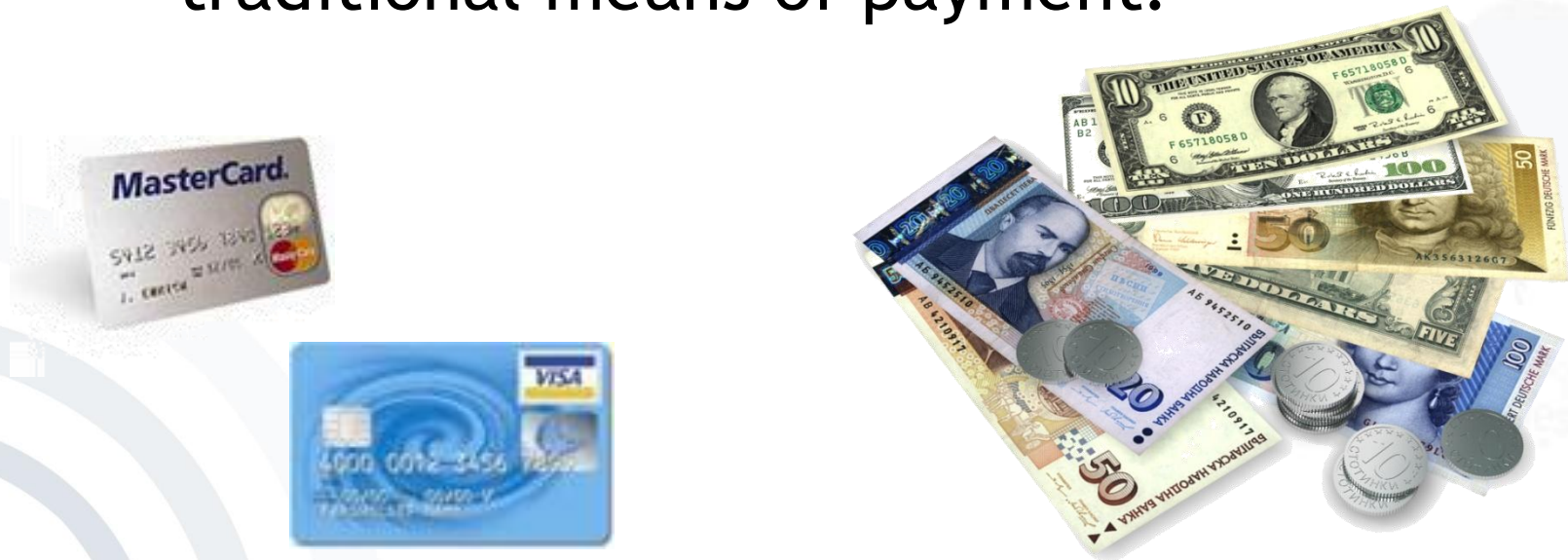
[Luarn and Lin 2004]

It is often argued that mobile payment services provide several advantages to customers such as:

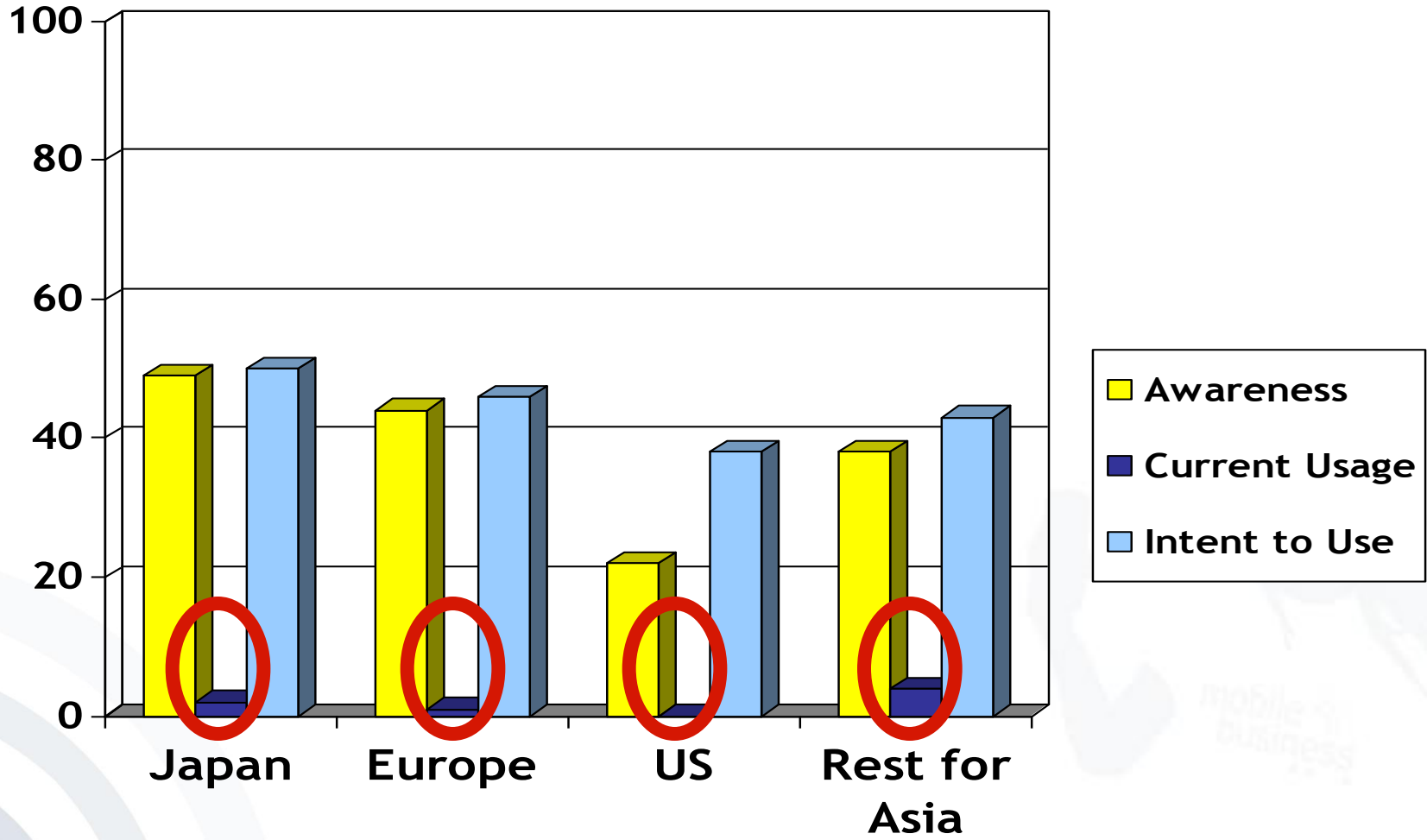
- Mobility properties enable the efficient utilisation of travel and waiting time.
- Increased comfort & user friendliness through the independence towards time and place (particular due to the fact that there are less and less branches).
- In conjunction with personalised offers, spontaneous, time-independent shopping & payment is enabled.
- Enhanced security with regard to payment transactions in the on- & offline-world.

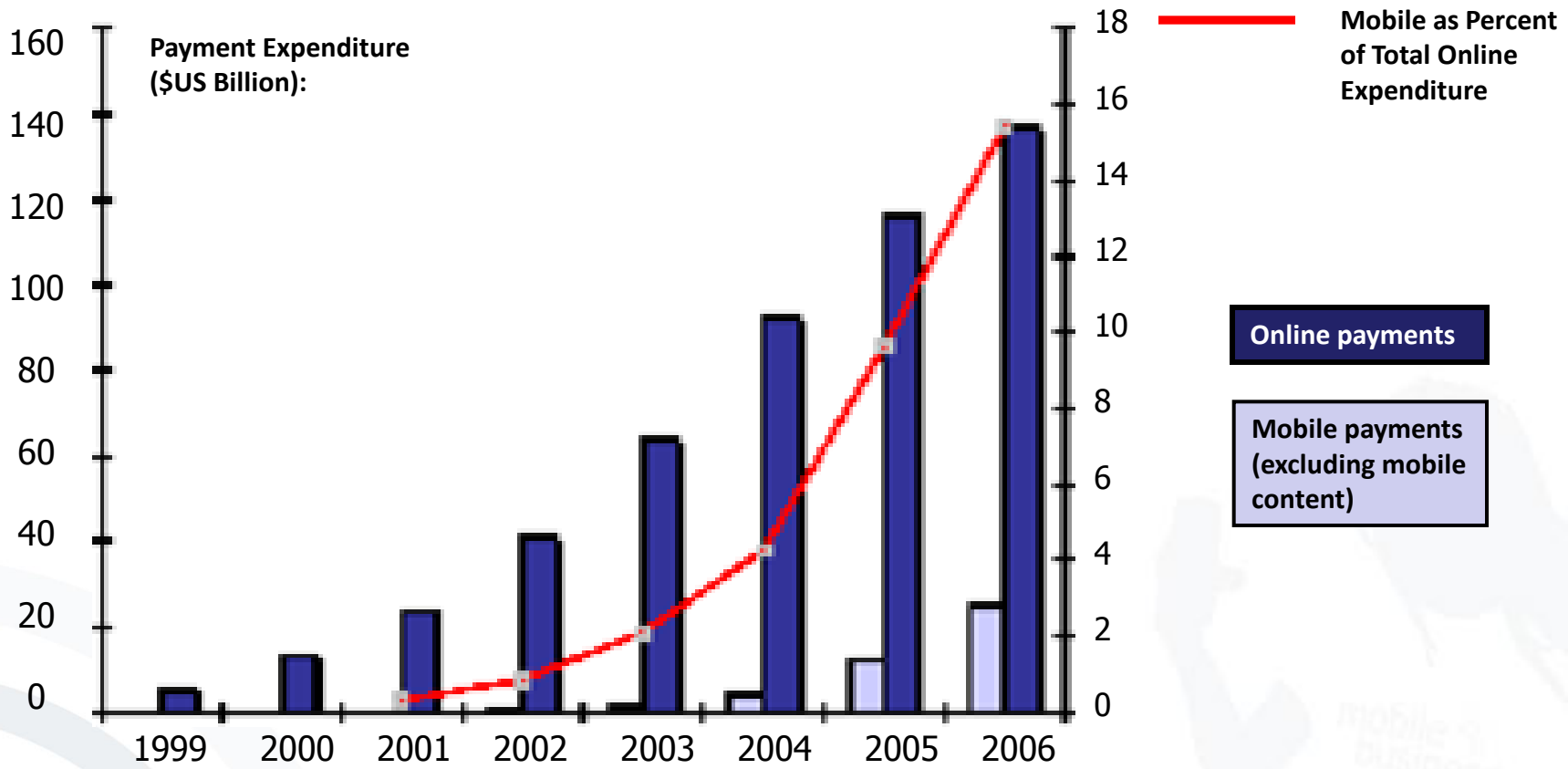
But: Are these “advantages” obvious to customers?

And: How do these “advantages” relate to traditional means of payment?



consequently...

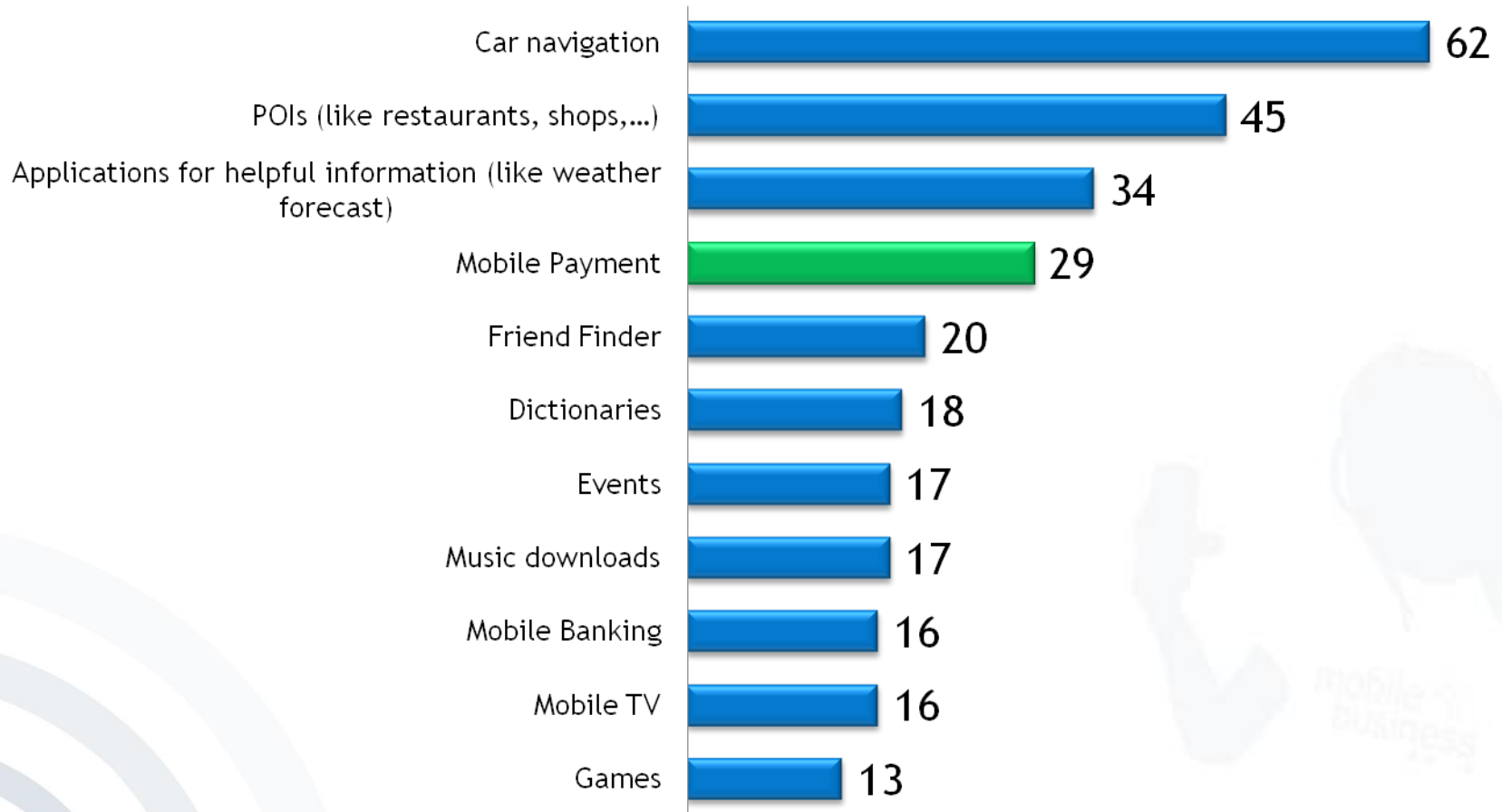




[Source: Frost & Sullivan 2002]

Studies on M-Payment | 3

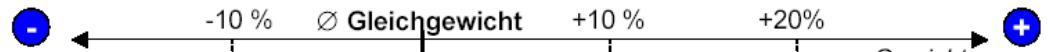
Practical future applications



[Source: Accenture - Mobile WebWatch 2010]

Größte Nutzungs-Hemmnisse liegen bei Mobilfunkunternehmen & Banken

Von verschiedenen Endkundengruppen gewichtete Probleme/
Schwierigkeiten bei der Nutzung von mobilen Finanzdienstleistungen



Mangelnde Sicherheit,
Missbrauch durch andere

+20,8%

Hohe Kosten für mobile
Endgeräte

+4,9%

Zusätzliche Kosten für
Datenübertragung

+0,3%

Zu kleines Display

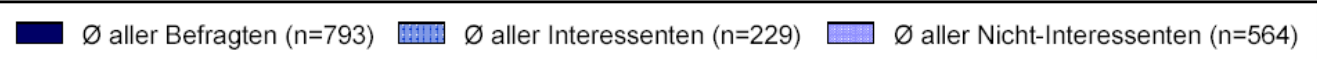
-4,8%

Komplizierte Bedienung

-10%

Fehlende Unterstützung
durch die Bank

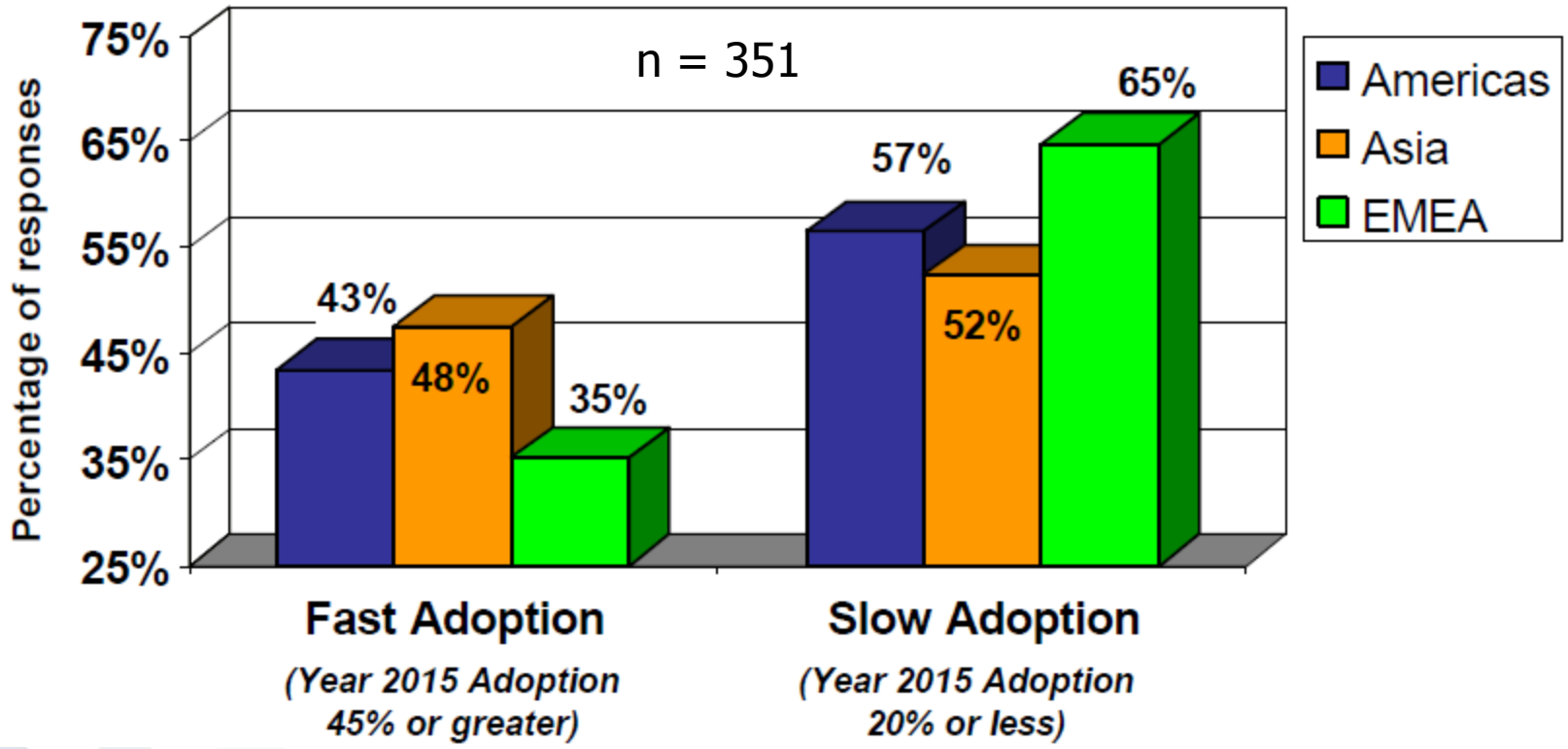
-11,3%



Quelle: e-comes 2002: Studie – mobiler Kommunikations-/ Vertriebsweg bei Banken

Studie mobile Finanzdienste
16_020704_Auswertung.ppt
© e-comes 2002

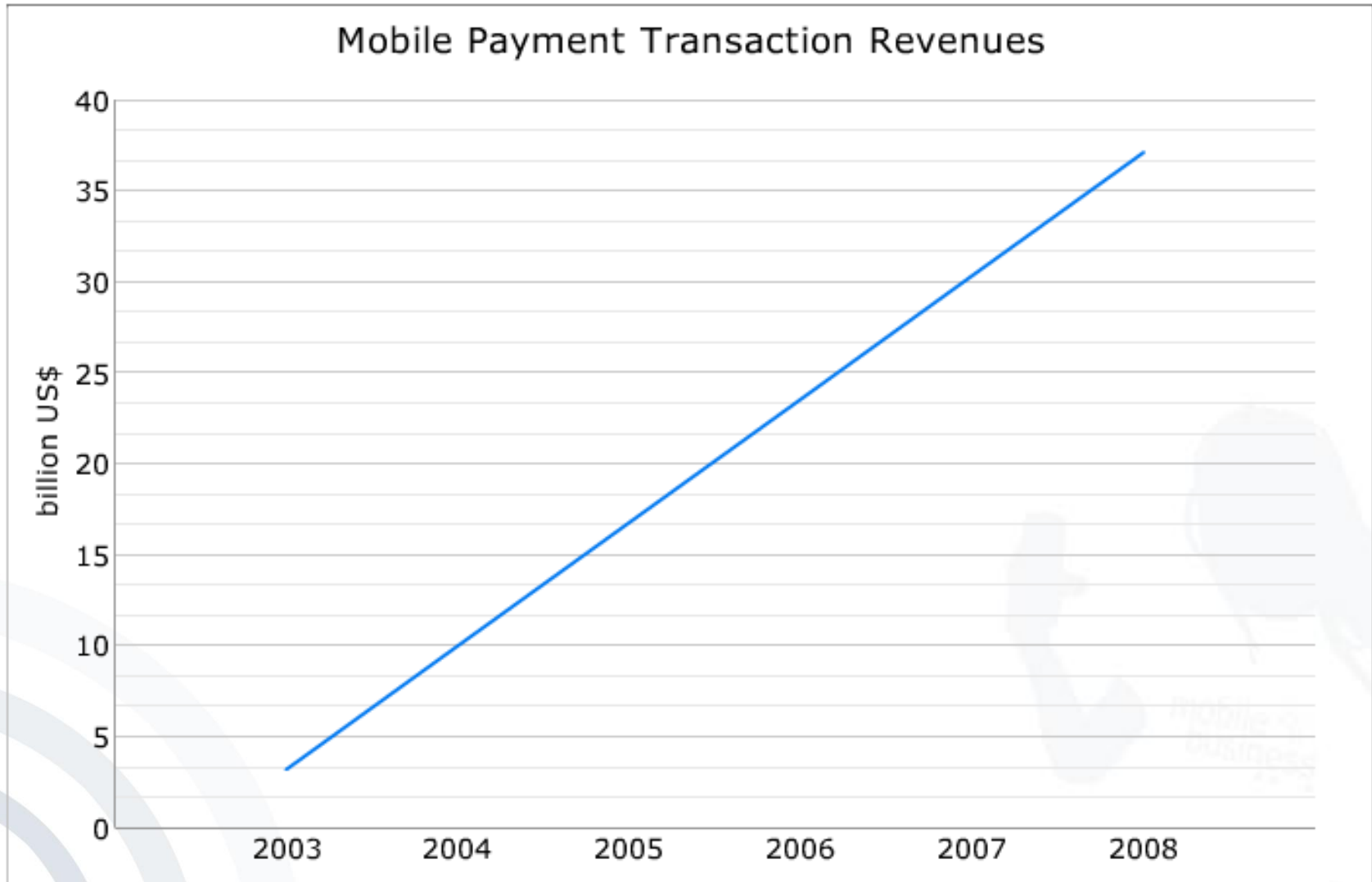
Perception of the Adoption Curve for Online Mobile Payments by Geography



[EdgarDunn2006]

- How about mobile payment for online transactions where less traditional payment schemes exist?





[Data: Arthur D. Little 2005]

- The absence of *a single* established standard for the mobile handling of payments results in several problems:
 - ➔ No (consistent) accustomed usage schema from the customers' point of view (perceived ease of use; perceived self-efficacy)
 - ➔ Lack of trust in the security (perceived credibility)
 - ➔ Lack of M-Payment opportunities offered by merchants (perceived usefulness)
 - ➔ Lack of obvious advantages (perceived usefulness, perceived financial costs)

M-Payment Standardisation Bodies and Consortia (Sample)

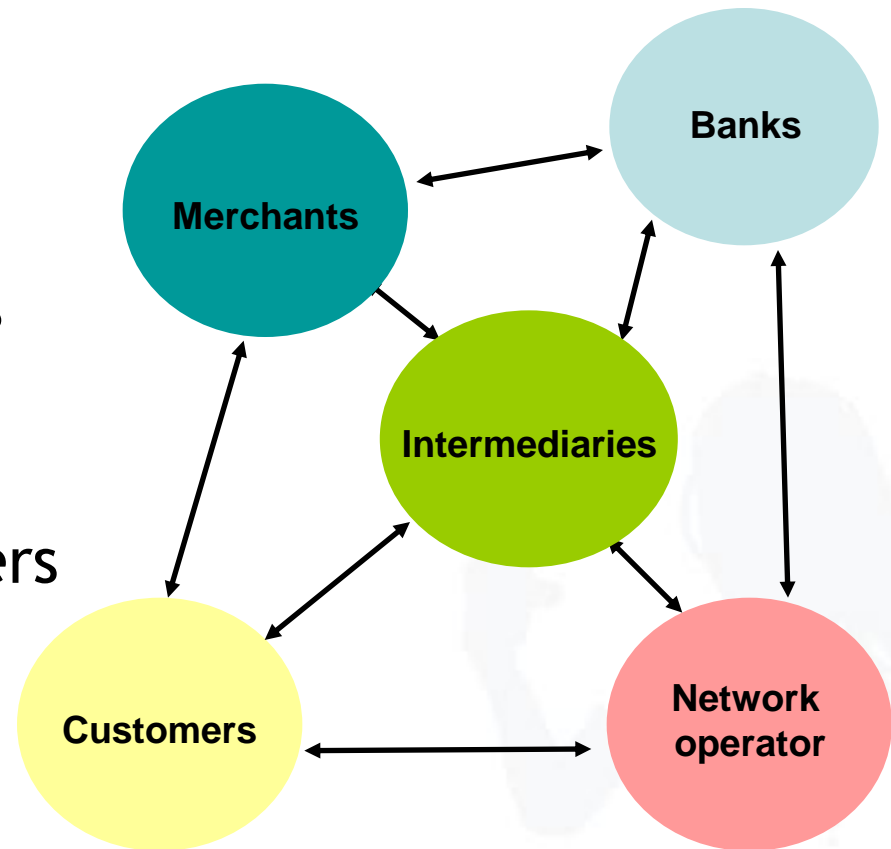


<i>Scenario</i>	<i>Description</i>	<i>Competing Payment Scheme</i>
Mobile Commerce Scenario	Mobile Applications and Services, e.g. context-sensitive information	- / -
Electronic Commerce Scenario	All kinds of B2C EC except MC - Purchasing goods, services and information on the Internet	Offline-Payment Eurocheque- / Credit Card E-Payment
Stationary Merchant Scenario (Person) (Vending Machine)	Traditional trade using transactions between a person (customer) and - a person (e.g. cashier) or - a vending machine	Cash Cashcard Eurocheque- / Credit Card
C2C Scenario	Money transfer between persons (customers)	(Cash) (Offline-Payment)

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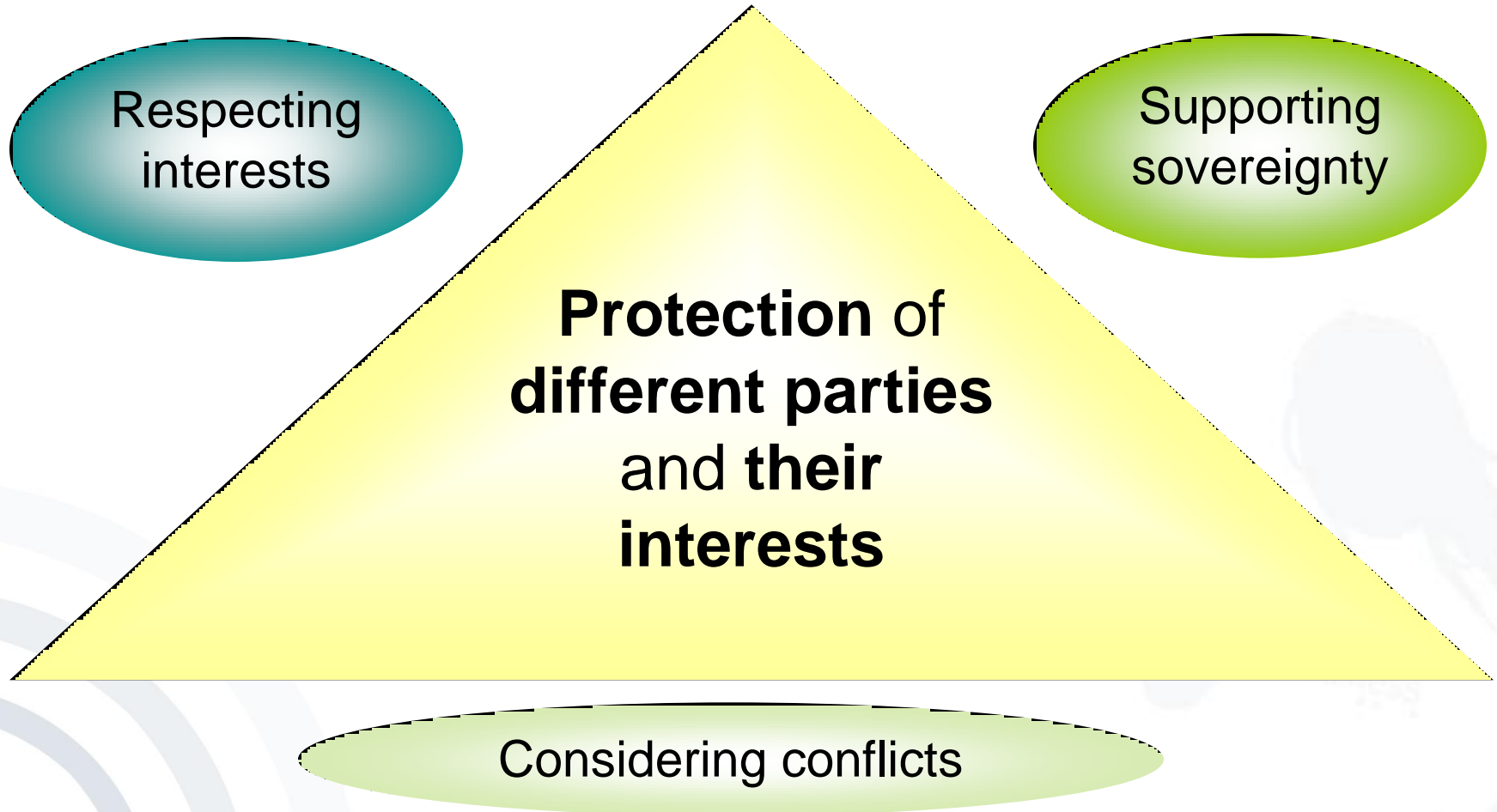
Different parties with different interests

- Customer and merchants
- Network operators
- Intermediary
- Financial Service Providers



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- ***Customers:***
Only a small number of (trustworthy) parties should have access to personal financial data.
- ***Merchants:***
Accepted payments should be enforceable.
- ***Network operators:***
Offering of new (security-relevant) services (e.g. billing-services)
- ***Banks: Controlling*** the payment-process
- ***Central Banks:***
No direct C2C payments to avoid a shadow currency



Respecting interests

- Parties can define their own **interests**.
- Conflicts can be **detected** and **negotiated**.
- Negotiated **results** can be **enforced**.

Supporting sovereignty

- Parties aren't forced to trust **other parties**.
- Parties only need a **minimum of trust** into the **technology** of others.

➔ Security of **different parties** and **their interests**

Multilateral Security & M-Payment?

- Trade-Off: On the one hand usage should be easy, on the other hand it should be secure, for example:
- TAN input vs. TAN storage on the telephone

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Any mobile payment scheme involving an **exclusive link to the operator would face serious challenges** in attracting merchants, since the absence of a national (or multinational) standard could lead to a situation where each operator is pursuing an own solution.

Most commonly, such alliances **will be between operators and the financial services industry.**

[Source: Frost & Sullivan 2002]

- **EMPS**, Finland (Nokia, Nordea, Visa International)
- **MobilMat**, Italy (Wind TLC, Banca Sella)
- **Obopay**, U.S. and India (Nokia and other investors)
- **Omnipay**, Italy (Omnitel, Visa International, BankAmericard)
- **Orange Mobile Payment**, Denmark (Orange Denmark, PBS, Gemplus)
- **Paielement CB Sur Mobile**, France (Orange France, CB, SFR)
- **Paybox**, Europe (Deutsche Bank, Debitel – till 2002)
- **Moxmo**, Netherlands (since beginning of 2002), Germany (since end of 2003), both till 2004
- **Mobipay**, Spain (Telefonica, Vodafone, Amena, BBVA, BSCH, Sermepa, Sistema 4B, Euro 6000)
- **mpass**, Germany (Vodafone, O₂)
- **Simpay** (T-Mobile, Telefonica, Vodafone, Orange, O₂, TIM, Debitel), till 2005

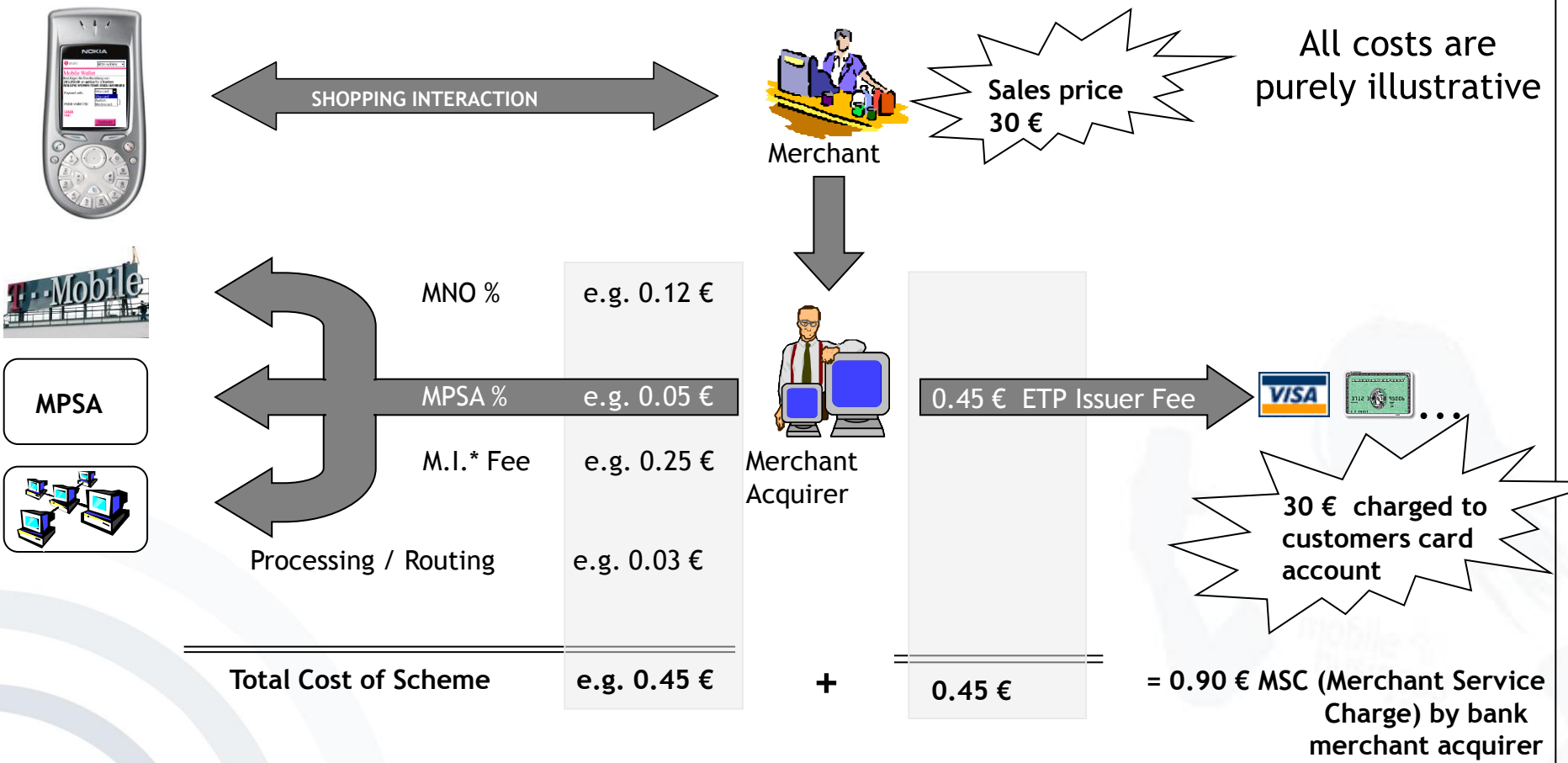


- Origin in Spain
- Participants: Amena, Telefónica Moviles, Vodafone and about 80% of Spanish banks
- Development up to now
 - 00-02: Project announced
 - 01-03: Mobipay founded
 - 02-09: Pilot trial in Madrid
 - 03-06: 54.000 merchants incl. > 10.000 taxis
 - 06-05: 6.500 merchants including 2.500 taxis
- Investment (total): 42 Mio. €
- Perspectives in South America (?!)

- Nonprofit company, founded by Orange, Telefonica, T-Mobile and Vodafone
- An open m-payment-standard, represented by one single brand with following advantages
 - A new mobile payment-standard which allows customers to do big or small purchases on a mobile infrastructure
 - An easy and secure mobile standard to use existing credit- and bank-cards.
- Therefore, a unified brand strategy and platform with open interfaces was implemented.



Simpay's business model



MNO: Mobile Network Operator

M.I.* Fee: Mobile Internet Fee

MPSA: Mobile Payment Solution Alliance

ETP: Enabled Third Party Payments



- Concept for Obopay occurred during a stay in the Democratic Republic of Congo in 2002
 - Interesting phenomenon: People carry mobile phones even if they don't carry a wallet
 - Combine the prevalence of mobile phones and the lack of much-needed financial services would be a great opportunity
- Two major markets (U.S. and India)
- Nokia invested \$70 million into the startup (March 2009)



- What can you do with Obopay?
 - Send, spend and receive money from mobile phone to mobile phone (P2P)
 - Obopay uses a prepaid model
 - 25 cent per transaction (sender pays)
 - No fees for receiving money
- Preconditions:
 - Obopay account
 - Existing bank account (needed for registration)
 - Any kind of mobile phone
- Transaction process is similar to PayPal mobile
 - But no additional authorization call, just the PIN
 - Money is send directly to recipients' mobile
- Obopay system is called “social money”



- Debit payment system of Vodafone and O2 (but not limited to customers of these providers)
- SMS-based
 1. User visits online shop
 2. User enters mobile phone number and mpass PIN
 3. User receives SMS
 4. Confirmation by replying to that SMS
- Security
 1. By mpass PIN
 2. By possessing the mobile phone
- mpass is limited to online shops

Example for a proprietary Payment Provider: PayPal Mobile

- Text message-based mobile payment system introduced by Paypal (an eBay Company) in April 2006.
- The service is available for the United States, Canada, and U.K. (other countries planned).
- Users need a regular PayPal account to use this service. Furthermore, to activate the mobile component, one has to sign up separately for the mobile payment service.
- The service is integrated into the eBay auction and clearance system.
- PayPal surpassed the 130 million account mark in 2006 (use of existing customer base important due to network effects).

PayPal[®]



Example: Sending money by text:

1. In the first step, a text message is sent to PayPal, containing the recipients phone number and the amount to be paid.
2. In the second step, the payment system calls the user, and the PIN is entered to authorised the transaction.
3. In the third step, PayPal notifies the recipient of the payment and tells him/her how to claim it.



Text to 729725
(PAYPAL)



Confirm with PIN

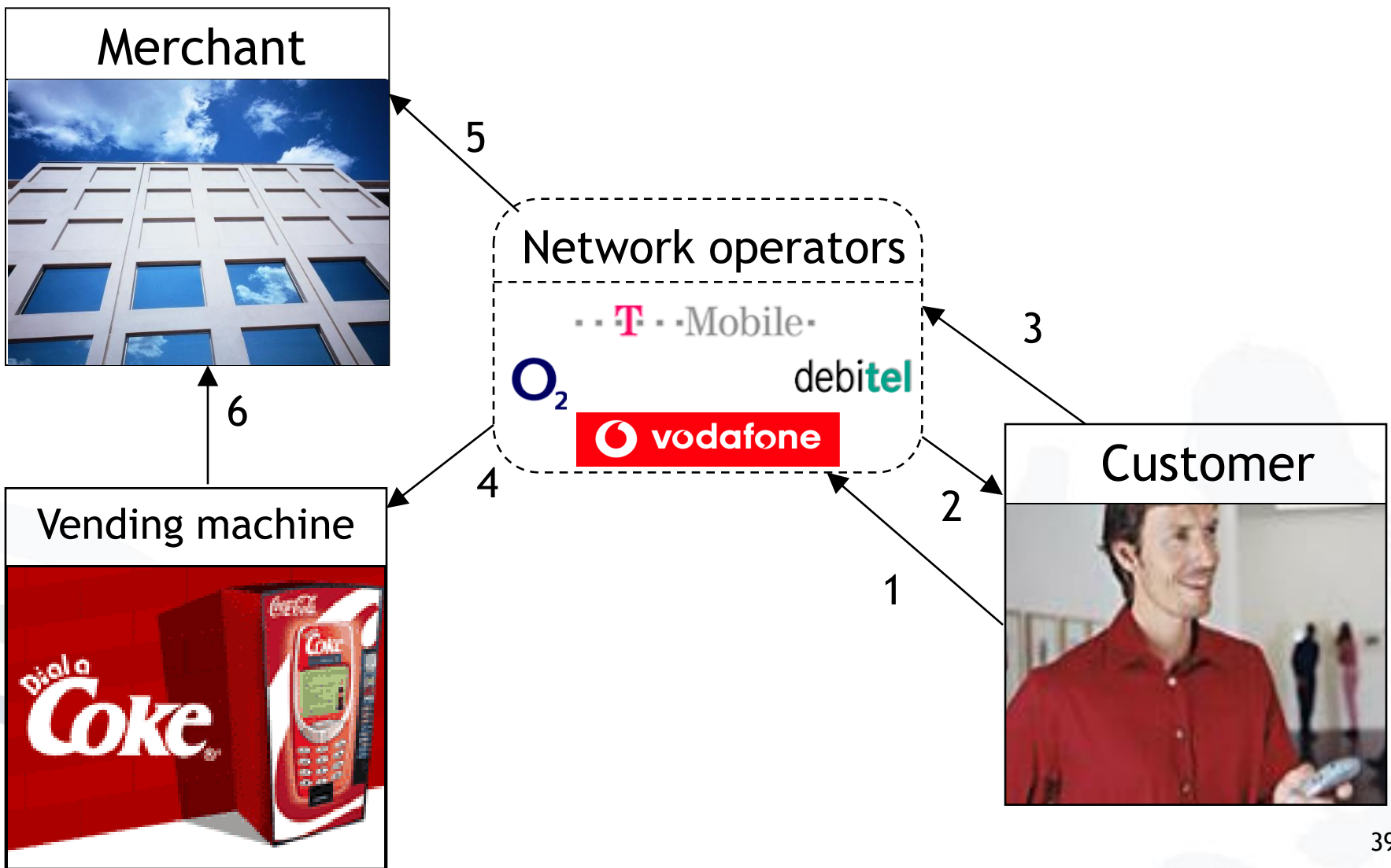


Recipient notified

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M-Payment Infrastructures

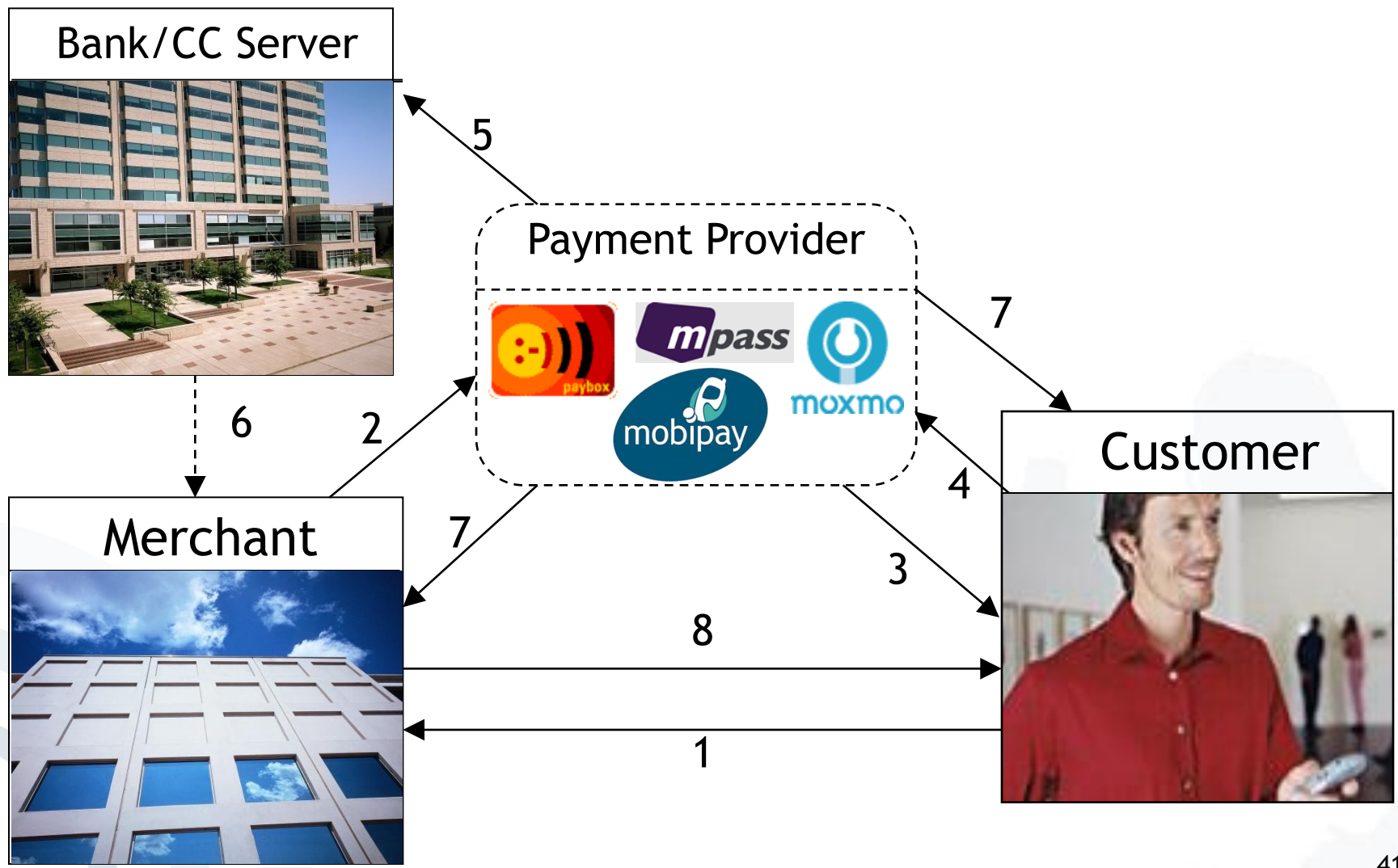
Transactions processed by Network Operators



- 1 Customer **requests a transaction** by calling a **product-specific number**, displayed on the vending machine.
- 2 Network-operator responds with transaction-details (product information, costs) and **asks for PIN**.
- 3 Customer **enters PIN** and **confirms transaction**.
- 4 Network-operator **verifies PIN**, checks details of the customer-account and **orders** the vending machine to **hand out** the product.
- 5 Network **operator informs** the **merchant** (in this case the owner of the vending machine) about the transaction.
- 6 Merchant receives **stock-level information** from the vending machine.

M-Payment Infrastructures

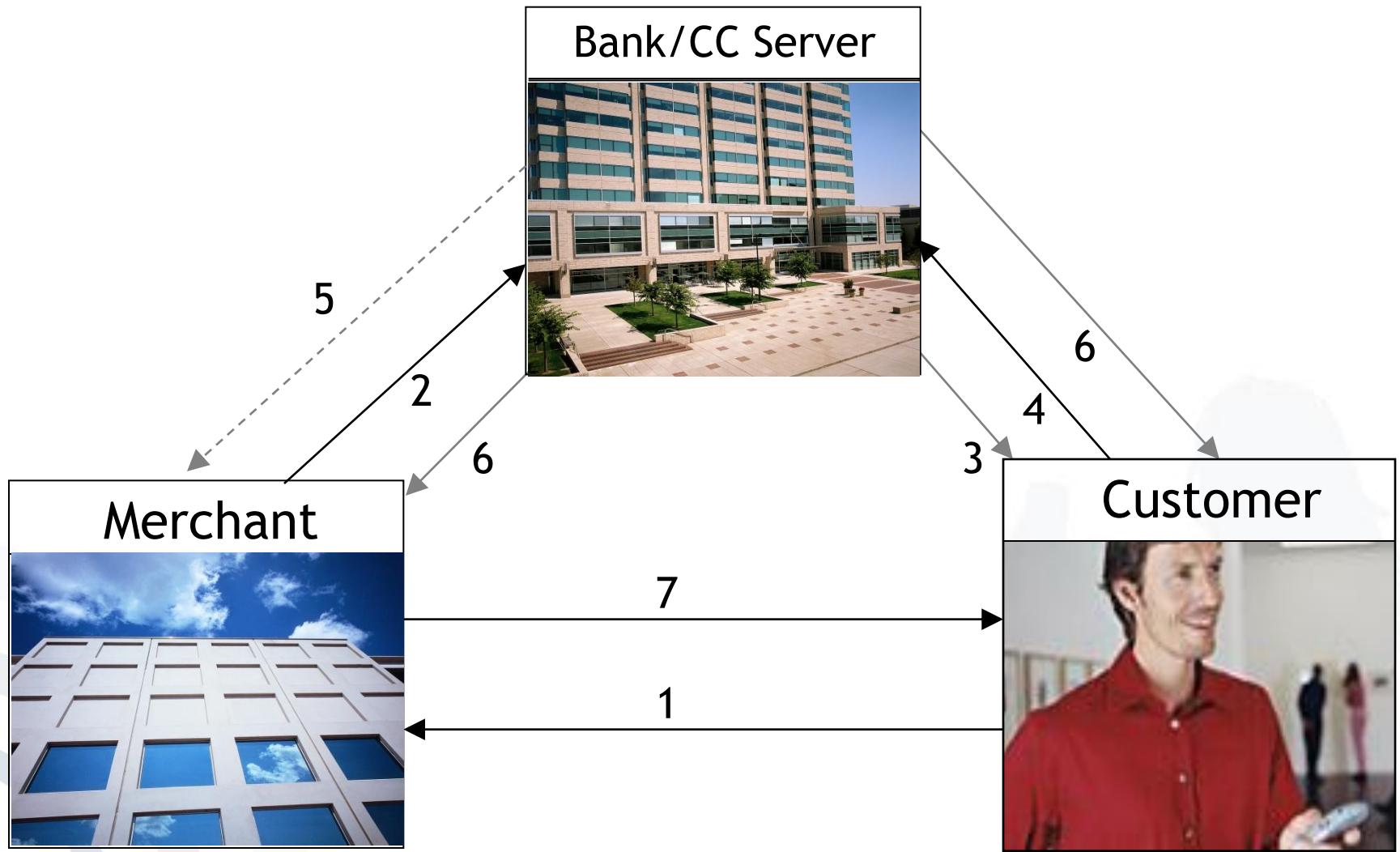
Transactions processed by a Payment Provider



- 1 Customer requests a transaction on the merchant's website by entering an identification-code (for example his mobile phone number (MSISDN)).
- 2 Merchant contacts the payment provider and passes details about the transaction (product information, price).
- 3 Payment provider contacts the customer and asks for PIN and confirmation.
- 4 Customer confirms the transaction and enters the PIN.
- 5 Payment provider verifies PIN and instructs the bank or credit institute to transfer the money to the merchant.
- 6 Bank or credit institute transfers the money to the merchant.
- 7 Payment provider sends transaction confirmation to customer and merchant.
- 8 Merchant executes transaction and sends a receipt to the customer.

M-Payment Infrastructures

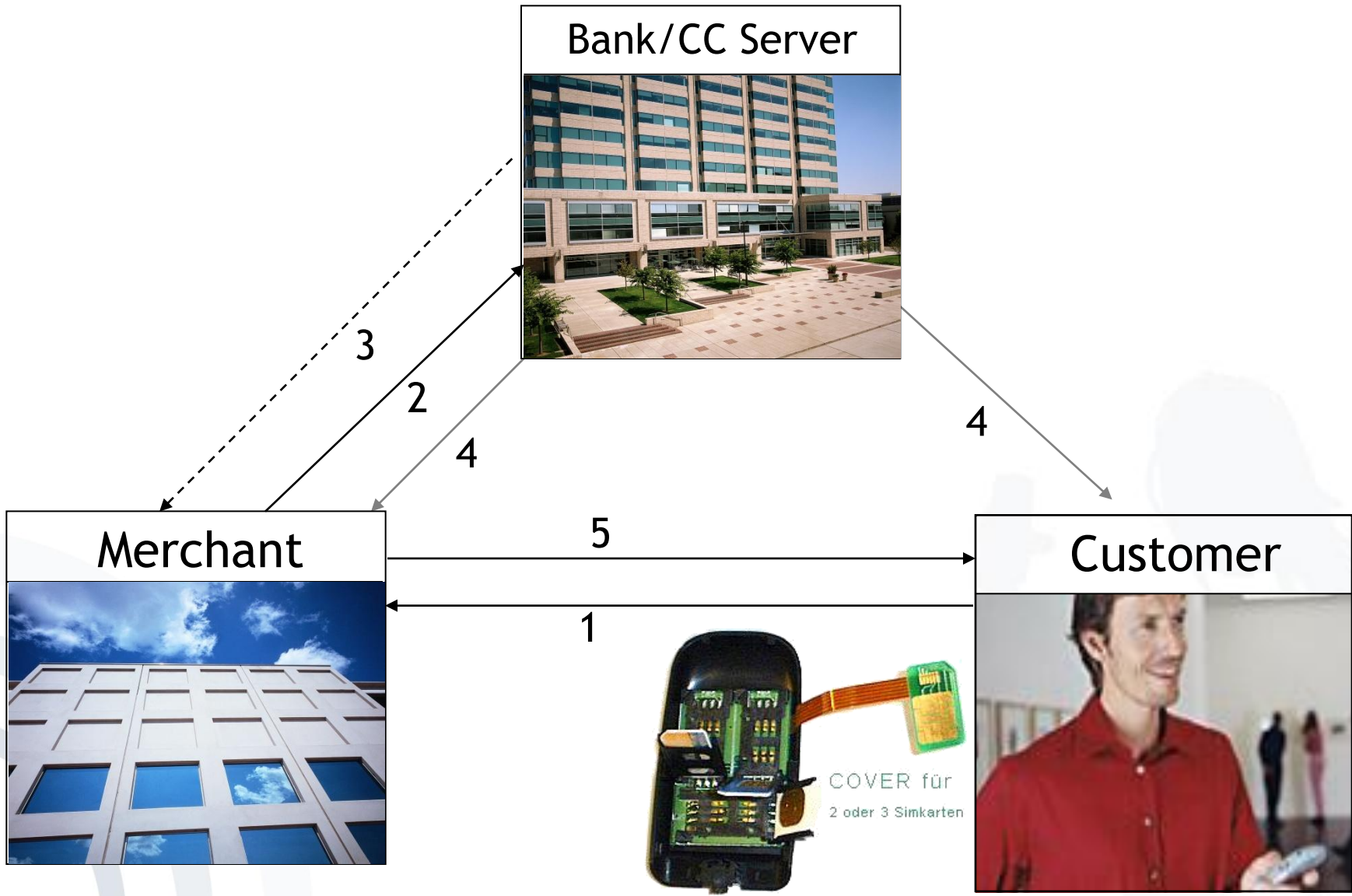
Transactions processed by Banks (Server Wallet)



- 1 Customer asks for transaction on merchant's web/WAP page and selects whether he wants to pay with credit card or bank card.
- 2 Merchant sends order details to the bank or credit card server.
- 3 Bank or credit card server sends order details to the customer and asks for confirmation.
- 4 Customer enters PIN and confirms the transaction.
- 5 Bank or credit card server verifies PIN, checks details of the customer account and authorizes the transaction. Then the server transfers the money to the merchant deducting service charge.
- 6 Bank or credit card server informs merchant and customer that the transaction was authorized.
- 7 Merchant confirms transaction & customer receives an "m-bill".

M-Payment Infrastructures

Transactions processed by Banks (Handset Wallet)



- 1 Customer asks for transaction on merchant's WWW/WAP page, selects whether he wants to pay with credit card or bank card and enters his PIN. Then information on purchase order, transaction information and details of the account and delivery address is transferred.
- 2 Merchant sends details on the order to the bank or credit card server.
- 3 Bank or credit card server verifies the PIN, checks details of the customer account and authorizes the transaction. Then the server transfers the money to the merchant.
- 4 Bank or credit card server informs the customer that the transaction was authorized and completed.
- 5 Merchant executes transaction and transfers the "m-bill".

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HTTP server (!) in the GSM SIM card

- A SIM based on the MS Smart Card can be programmed

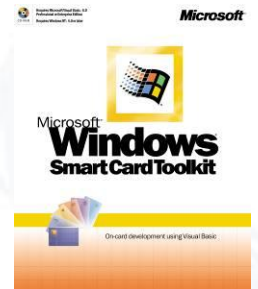


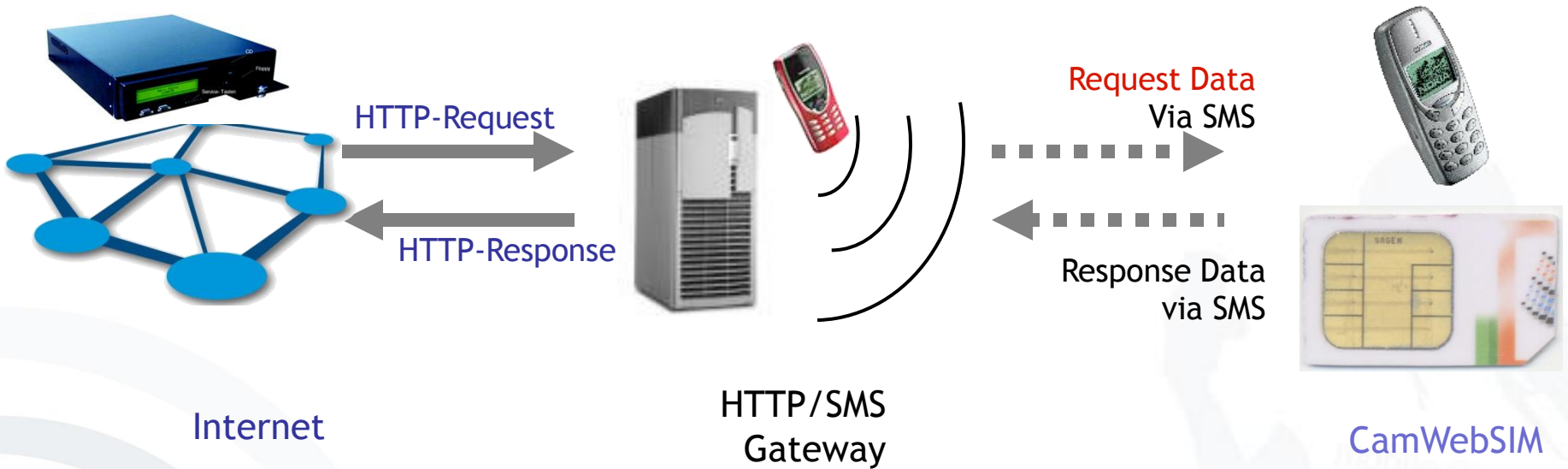
Connection between GSM and Internet

- HTTP Requests via HTTP/SMS Gateway to mobile phone

More than a cool demo ...

- Explore the relation between PDAs and Smart Cards
 - What can really be done on the Smart Card?
 - Can Smart Card encrypt info to be stored in the PDA?
- Explore the possibilities of extra interaction channels
 - SMS in parallel to Internet
- Research Authorization vs. Authentication vs. Identification





[**http://www.camwebsim.telco.com/+14253334711/dt=\(Hello World\)**](http://www.camwebsim.telco.com/+14253334711/dt=(Hello World))

- Website
 - <http://www.camwebsim.telco.com/>
- Tel-No.
 - +14253334711/
- Command (SIM AT V 2.0 ++)
 - dt=(Hello World!)
 - LOCATION INFO info
 - SELECT ITEM si=(title,item1,item2,...)
 - DISPLAY TEXT dt=(text)
 - GET INPUT gi=(text)
 - MAIL NOTIFICATION mail=(who,subj,phone)
 - SIGN CHEQUE cq=(who,amount)

Website

Tel.-No.

Command

.com.



WELCOME ADDRESS ITEMS WRAP SHIP **PAY** CONFIRM

si=(Toys.com 3 Gimmicks, Pay \$27.80, Cancel, Help)

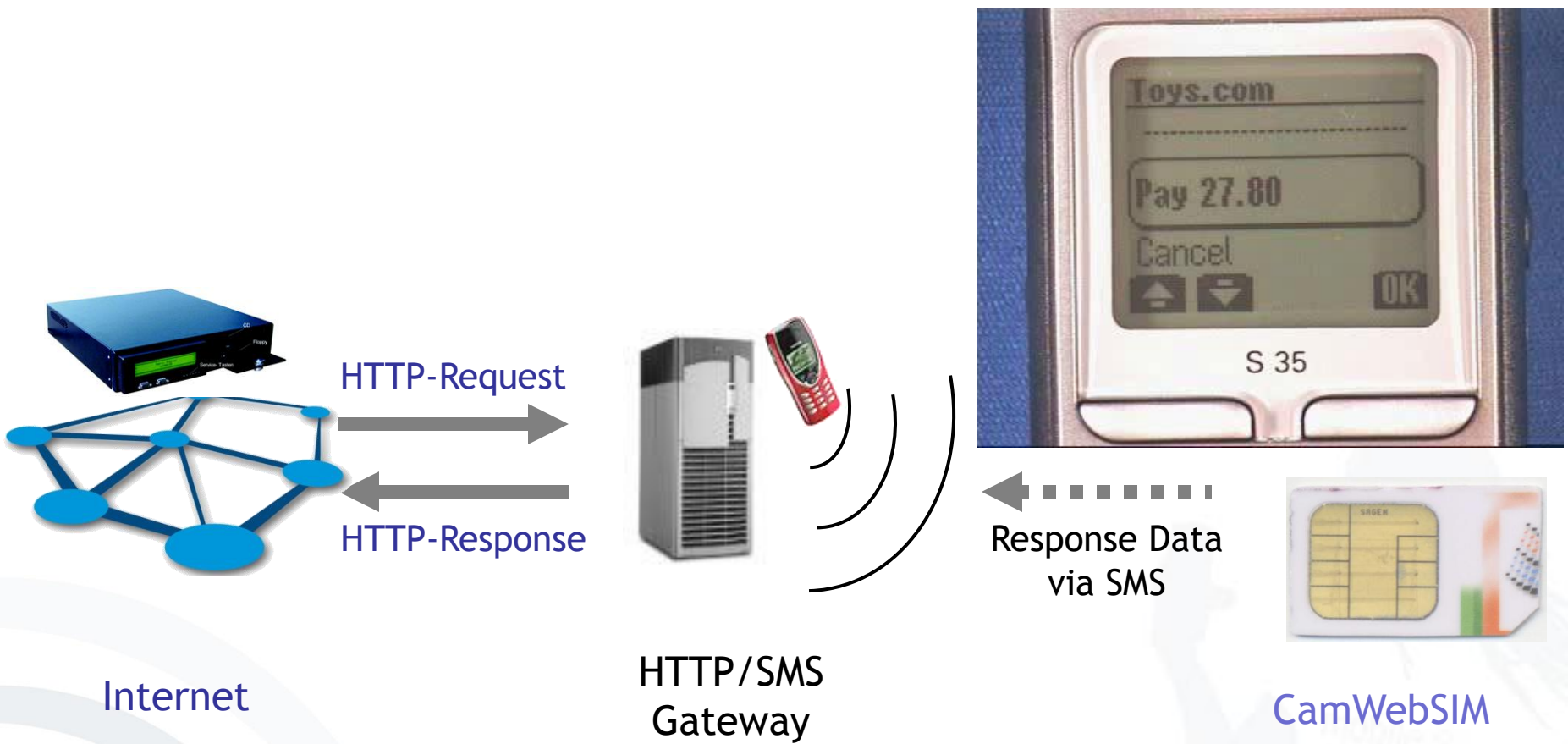
Toys.com
3 Gimmicks
▶ Pay \$27.80
Cancel
Help



Other means of payment:

- Telephone bill
- ...

CamWebSIM: Combines Infrastructures



Internet

HTTP/SMS
Gateway

CamWebSIM

<http://www.camwebsim.telco.com> / +14253334711 / **si=(Toys.com 3 Gimmicks, Pay 27.80, Cancel, Help)**

What have we done in this exemplary application design?

Technologywise

- Connected a smart card to the Internet
Goal: transparent, uniform access to smart card services
- Used the mobile phone as a trusted device
Assumed a secure path between SIM and display/keyboard
➔ *This might be (more) dangerous with more complex phones*
- Used the existing GSM infrastructure and security model for payment authorisation
User authentication key is stored in the SIM
- ...

What have we done in this exemplary application design?

Applicationwise

- ...
- Used the existing GSM infrastructure and security model for payment authorisation
User authentication key is stored in the SIM
- *Provided a telecom with a new revenue channel based on an existing process*
Telecoms as payment servers (the Teletext model)
- *Enabled cash-like payment for Internet services*
In countries where one does not need to register a name with a prepaid GSM account

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- M-Payment is ONE important factor for the success of mobile commerce.
- The successful use of m-payment-solutions requires explicit respect of customers' interests.
- Today it is still uncertain who will dominate the M-Payment market.
- Identification is not necessary for mobile payment.



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