THE PAYMENT REVOLUTION

- In 2011 we are still in the middle of a payment system revolution
- Electronic payments are taking the place of cash and checks
- In 2003 electronic systems surpassed the use of cash and checks in stores
- Similar trends occur for recurring payments, more then 75% in 2001 were made by electronic systems
The cashless society has been discussed for a long time.
The demise of cash and checks is not imminent

Many individuals *can* live without them

In the B2C online world, we already do

Credit cards plays a major role

In most countries, it is difficult to start a business without supportgin credit cards
E-PAYMENT FACTORS

- The short history of e-payments is littered with remains of companies that tried to introduce new payment systems.

- Difficult: chicken and egg problem.

- When planning or evaluating a new payment system, a span of factors must be taken into consideration.
INDEPENDENCE

- Most payment systems require the buyer to install additional hardware, or the seller to use specific software.
- The most expensive/difficult are the hw/sw requirements, the less likely is the e-payment to succeed.
An e-payment system must mesh with existing systems and applications

Must be supported by standard platforms
SECURITY

- The money transfer *has* to be secure
- Usually the risk for the customer must be lower than the risk for the seller
ANONIMITY

- Some buyers prefer to be anonymous
- Cash is anonymous, credit card is not
DIVISIBILITY

- Credit cards have problems addressing low or high payments
- Any method is likely to be address if you can buy both a candy and an airplane with it
EASE OF USE

- In B2C credit cards have become the standard also for their ease of use
- Ease of use is important for customers
TRANSACTION FEES

- The lower the transaction fees, the better
- For both customers and sellers
- Credit cards have high transaction fees (up to 3%)
INTERNATIONAL SUPPORT

- E-Commerce is worldwide, so any e-payment method must be easily adopted in different countries.
Any new payment system must adhere to a number of national and international law regulations
PAYMENT CARDS
PAYMENT CARDS

- A payment card is a plastic card containing information that can be used for payment purposes.
- Usually emitted from a financial institute.
- In general, payment cards offer:
  - Getting cash from ATM (bancomat in Italy)
  - Pay directly to sellers with POSs
  - Pay online
Credit cards allow the user to buy products and services

Bases on the holder’s promises to pay for the goods

The issuer grants a line of credit to the user

Credit cards allow the user to be in debt, but the debt is subject to interest
DEBIT CARD

- The funds are withdrawed directly from the user bank account
- Used for both direct payments of for cash withdraw
- In Italy are known as “carte bancomat” from the name of the first issuer
STORED-VALUE CARDS

- Stored value cards works similarly to debit cards, but the funds are not withdraw from the user’s bank account
- The funds are taken from a pre-paid monetary value
- One major difference with credit and debit cards: stored value cards can be anonymous
- Major player in Internet payments
TYPES OF SVC

- Stored value cards come in two types
  - closed loop: issued by a specific merchant or merchant group (i.e. Ikea Gift Card)
  - open loop: used to make any kind of transaction (Postepay)
PROCESSING CARDS ONLINE

Two major phases

Authorization: determine if the buyer’s card is active and if there is enough money in the account

Settlement: transfer of money from the buyer’s to the merchant’s account
ONLINE PAYMENTS PARTICIPANTS

- Acquiring bank (Banca Sella, ...)
- Credit card association (Visa, Mastercard, ...)
- Customer
- Issuing Bank
- Merchant
- Payment processing service
- Processor
CARD FRAUDS

- In the online world, merchants are held liable for fraudulent transactions
- Managing online frauds continues to be a significant problem for online merchants
ANTI-FRAUD TOOLS

- **Address Verification**: compare the entered shipping address with the card address; possible false positives
- **Manual review**: staff to manually review some orders
- **Automatic decision models**: rules to determine if a transaction is fraudulent
- **Card verification number**: CVN/CCV ask for the number on the back of the card
ANTI-FRAUD TOOLS

- Card association additional verification services: Verified by Visa, SecureCode, etc.
- Negative lists: maintain a negative list of IPs, names, addresses, etc.

- In 2003 the rejection rate was about 4%.
- Problem: a number of rejected orders are valid (lost revenue).
A smart card is a payment card with an embedded chip

Can be a microprocessor or just a memory chip

The chip is activated/read by some other device (i.e. ATM)

Can be contact or contactless

Can need a PIN before being used

You *can* hack into a smart card, but it is a “class 3” attack (the costs exceeds the benefits)
E-MICROPAYMENTS
E-MICROPAYMENTS

- Scenarios
  - buy a song from iTunes: 0.99$
  - buy an archived newspaper in digital form: 1.50$
  - play an online game for 30 minutes: 2.00$
  - buy an image for your website: 0.80$
Credit cards are not well suited for payments under 5$

Merchants have a fixed per-transaction fees of ~0.20$ (other than the ~3%) 

Moreover, small payments are often made by young customers (< 18) that do not own a credit card
Apple’s iTunes, for instance, sell songs at 0.99$ each.

Also applications are often prices under 3$.

To reduce fixed costs, Apple aggregate multiple purchases (24h span) to charge the customer card only once.
MICROPAYMENT SOLUTIONS

- Since 2000 a number of companies attempted to address the problem of micropayments
  - Digicash, First Virtual, Cybercoin, Millicent, Internet Dollar
  - all went bankrupt during the dot-com crash
- Bitpass had some success, but shut down in 2007
Currently, there are 5 micropayment models that do not depend directly/solely on credit cards that have some success.
AGGREGATION

- Payments from a single customer are batched together and processed after a period of time of a monetary threshold
- Well suited for vendors with high repeating purchases
- Apple iTunes
DIRECT PAYMENT

- Micropayments are added to the bill of an existing service, like the mobile phone monthly bill.
- PaymentOne, Paymo, allow to add purchases of any size to the phone bill.
- Model used to sell ringtones and other services by phone companies.
STORED VALUE

✦ Upfront payment to a debit account

✦ Used recently by Steam, and also offline by Starbucks, music-download services, etc.
A single payment is made for a period of time of access to a service

Used by online gaming companies and a small number of online newspapers
À LA CARTE

- Vendors negotiate for lower credit or debit fees
RESPONSE TO MICROPAYMENTS

- In response to the growing of micropayments alternatives Visa and Mastercard lowered their fees in 2005
- Also Paypal entered the mp market with an alternative fee structure for payments under 7$
PAYPAL
Paypal is an online payment processor

Now owned by eBay

The first successful Internet-based e-commerce payment system
HOW PAYPAL WORKS

- Trusted third-party between sellers and buyers
- Securely stores credit cards data
- Process both one-time and recurring payments
PAYPAL NUMBERS

❖ Growth from an handful of users in 1999 to 87Millions in 2010 (active accounts, in 190 nations)

❖ In 2009 Paypal processed $71 Billion in payments (roughly half from eBay)

❖ 15% share on e-commerce payments in USA, 9% outside
PAYPAL SUCCESS

- Viral effect
- Commissions are more or less the same of credit cards
  - $0.30 + 1.9% - 2.9%
- Merchants do not have to own a bank account
- Consumers are not charged directly
PAYPAL INCOME

- Transaction fees
- Interests on stored values
PAYPAL COMPETITORS

❖ Google Checkout
❖ Amazon Payments
❖ Twitter, Facebook, Apple are also planning new services
MOBILE PAYMENTS
MOBILE PAYMENTS

 располагает аппаратным обеспечением в кармане!

Instead of using cash or cards a consumer can use a mobile phone to pay for a wide range of services and goods.

You already have the hardware in your pocket!
MOBILE PAYMENTS - II

- There are 5 billions of cell phones around the world
- More prevalent then smartcards
- Major payment system in Japan
- Embedded RFID chips for contactless payments with PIN
- Smartphone can be equipped with NFC (Near Field Communication) to communicate with readers about 4cm away
MOBILE PAYMENTS - III

- Other approaches
  - Freecash: make the payment from your phone, show a barcode to the merchant (does not require new hardware)
  - Paypal Mobile
  - Obopay
  - Google gPay, based on text messages
MOBILE PAYMENTS - IV

- Mobile payments will be probably growing fast in the next years
- Japan is the leading country
PAGAMENTI MOBILI IN ITALIA

- PosteMobile di Poste Italiane: associare un conto Bancoposta o carta PostePay con la SIM del cellulare
- ATM SostaMilanoSms: parcheggio via sms
- Sky e Mediaset Premium: pay-per-view via sms
- Trenitalia, CartaSi, Movicon, ...
CONCLUSIONS

- We are in the middle of a payment revolution
- Smartphone could have a major role