Contactless Mobile Services

February 2010

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The next generation of telephones will provide "contactless" services.
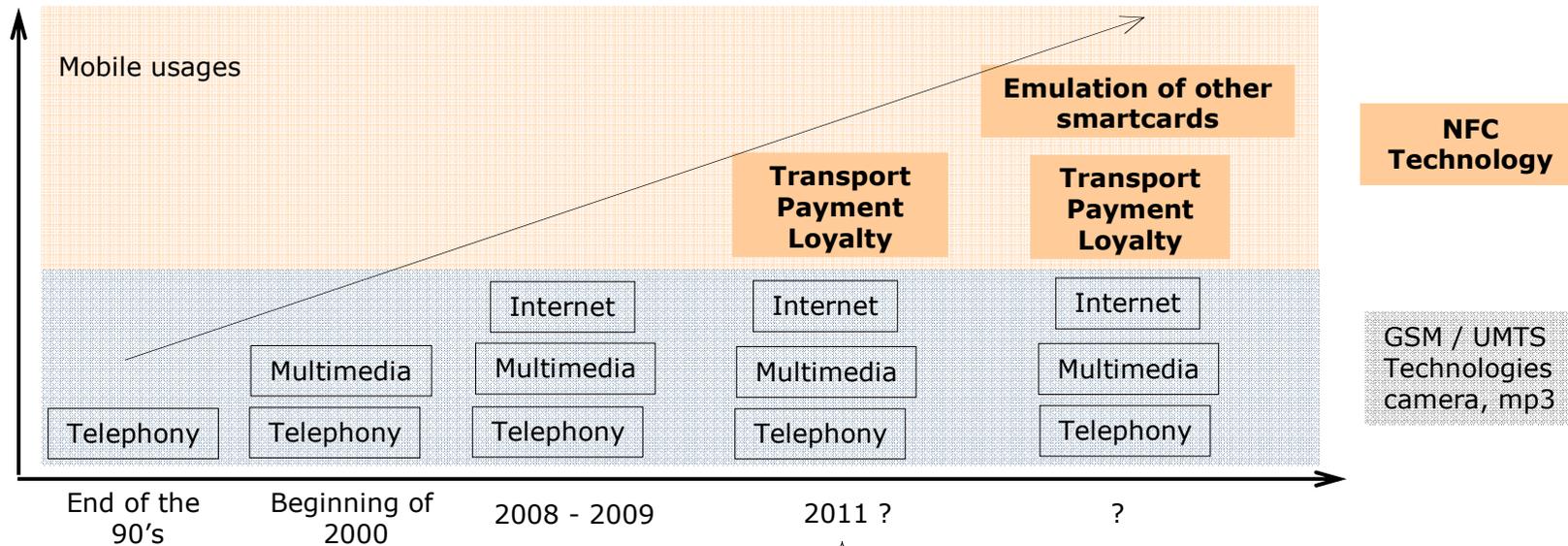
Mobile usages

Emulation of other smartcards

NFC Technology

Transport
Payment
Loyalty

Transport
Payment
Loyalty

		Internet	Internet	Internet
	Multimedia	Multimedia	Multimedia	Multimedia
Telephony	Telephony	Telephony	Telephony	Telephony

GSM / UMTS Technologies camera, mp3

| End of the 90's | Beginning of 2000 | 2008 - 2009 | 2011 ? | ? |

Transport

Payment

Loyalty

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NFC (Near Field Communication) technology integrates an RFID chip in the telephone and dematerializes smartcards, magnetic strips and barcodes.

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Summary

□ **Usefulness and usage of contactless services**
- Simplification of use
- Obstacles to adoption

□ **Economic Models**
- Ecosystems abroad and in France
- Revenues and investments
- Prospects for market penetration

□ **Annexes**
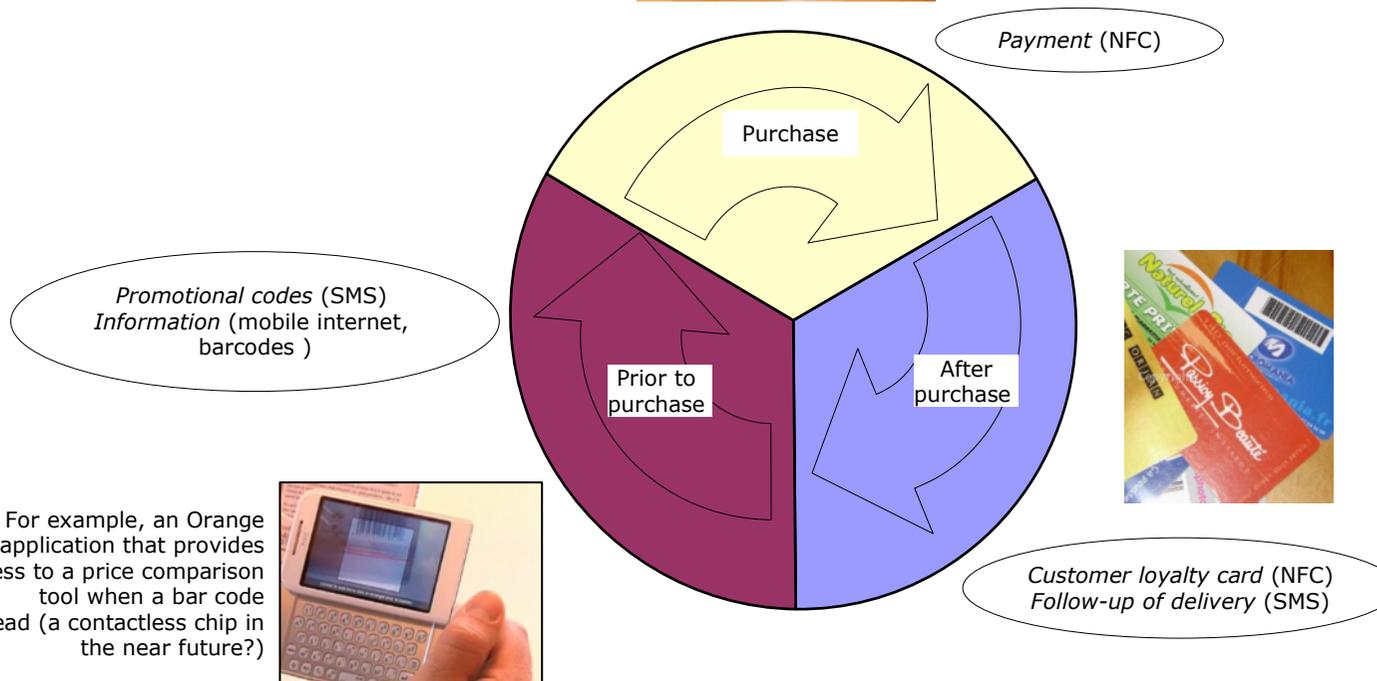- Supplement on Japan
- Supplement on the UK and the US
- Experimentation
- Diversification of credit card uses
- The telephone as a tool for securing online payment
- Money transfers via SMS

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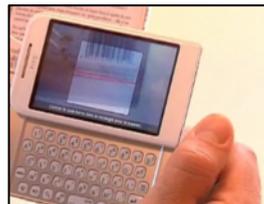 ■ Prospects for market penetration

Contactless telephones simplify usages (1/4):
by including a payment feature, the NFC telephone
encompasses the whole purchase cycle

The user can dematerialize several credit and debit cards with the NFC telephone and can select a card for each payment.

Payment (NFC)

Purchase

Promotional codes (SMS)
Information (mobile internet, barcodes)

Prior to purchase

After purchase

Customer loyalty card (NFC)
Follow-up of delivery (SMS)

For example, an Orange application that provides access to a price comparison tool when a bar code is read (a contactless chip in the near future?)

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Contactless telephones simplify usages (2/4):
for accessing transportation

- **Public transportation.** Contactless telephones allow transportation operators to:
  - Dematerialize magnetic tickets for occasional travelers
  - Dematerialize current contactless cards
- **Air transportation**. Several airline companies are testing solutions for dematerializing boarding passes via barcodes or the NFC technology.

Examples of usage:

Dematerialization of the contactless card for accessing public transportation

Dematerialization of the magnetic ticket for occasional travels (in any city)

Dematerialization of the Air France boarding pass for flights between Paris and Nice (trial phase)

Compared with current dematerialized solutions, contactless services are easier to use and do not require high-end telephones.

The telephone displays the 2-D barcode of boarding passes or train tickets (see SNCF iPhone application scheduled for 2010)

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Contactless telephones simplify usages (3/4): examples of interactive applications

● **Reading interactive files** (functioning in active mode): access to tourist, practical (bus schedules), or commercial information (a store address or detailed product description).

Research movie information (trial phase in Rotterdam) – download a virtual ticket into the SIM card.

● **Data transfer between users** (functioning in P2P mode): business cards, games with two or more players, money transfers.

> Money transfers via contactless telephone are easier than via SMS (there is no bank account information to enter, since a dematerialized credit or debit card is used).

Money transfers between individuals

● **Access to buildings: hotels, business premises, apartment buildings**.
Possibility of programming the authorization of visitor access (during certain time slots, for example).

NFC reader integrated in the door

Access to a hotel room with an NFC telephone (VingCard solution)

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Contactless telephones simplify usages (4/4): application for home services

Source: "The NFC mobile telephone serving local needs," Forum for contactless mobile services

In Oulu, simplified home delivery of meals

The city of Oulu, Finland, carried out several experiments for seniors over 80, specifically for ordering meals. Testers placed their NFC mobile telephones near a picture of their choice of meal. Smart tags in their menus transmitted the information to providers.
The experiment with shut-ins proved very successful, since tags are easier to use than keyboards for persons with problems with mobility.

Dematerialized home payment:

"NFC mobiles seem to lend themselves perfectly to remote production management. They permit communications, management of remote services, and dematerialized home payment" (such as the dematerialized voucher type).

Excerpt from the report "Home services: achievements and prospects," by Michèle Debonneuil (September 2008).

Facilitates home access:

In the near future, individuals will be able to equip their front door with a contactless lock and program access for service providers with a dematerialized key valid during certain hours and sent via mobile Internet.

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Consumer issues and management of practical concerns

Incidents or issues	Solutions and commentary
Loss or theft	The mobile operator could notify each service provider subscribed to by the user. It is potentially faster to provide a new telephone number than a new credit card (which takes several days).
Change of terminal	Applications stored in the SIM card should remain compatible with the new NFC telephone.
Change of operator	The new operator could handle the transfer of the NFC applications in the same way he manages the conservation of a number
Discharged battery	The identification applications (transportation, loyalty, access) continue to function. However, the applications that require a telephone screen for the user to interact no longer function: payment (validation of a purchase via a PIN code).
No network coverage	Applications requiring a mobile Internet connection no longer function: certain interactive tags (if the NFC tag generates an Internet connection), certain P2P applications requiring connection to a server (payment between individuals, for example).
Security levels of payment and transportation applications	Identical to those for existing services, if not superior, as in the case of payments (no imprint possible of the credit card's number).
Read without the user's knowledge	A third-party terminal can potentially communicate with any NFC telephone placed near it (a few centimeters) and access the data of non-secured applications. But the user should have the possibility to deactivate the NFC transmitter.
Traceability of all the user's actions	The very frequent use of the contactless telephone multiplies information on users. The history of the users' actions must be recorded in secured files.

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Abroad, contactless services are diversifying in successive stages but remain organized around a limited number of players.

Large city / Contactless Services	Tokyo	London	New York
Multimode transport (bus, subway)	Suica card (FeliCa technology) for the network of JR East operator (2001)	Oyster card for public transport services within the Greater London area (2003)	Citybank's MasterCard combines the MTA transport card and contactless payment (July 2006 exp.)
Multi-operator transport	The Suica card is used by the three transport operators in Tokyo (2003)	Oyster card for London-bound trains (Jan 2008)	Multi-operator MTA card, Port Authority, New Jersey Transit (2007-2016 program)
Electronic wallets	The Suica card is accepted in stores close to stations (2003)	Barclays' credit card combines the Visa card, Oyster card, and an electronic wallet (Sept. 2007)	-
Services platform	NTT DoCoMo's FeliCa telephones (2004)	Trial of the O2 operator (2007)	MTA/MasterCard's trial with the AT&T operator (Sept. 2008)
Main players	NTT DoCoMo, Sony, JR East	TFL (Transport For London), Visa, Barclays, O2	MasterCard, Citybank (externalizing the payment platform)

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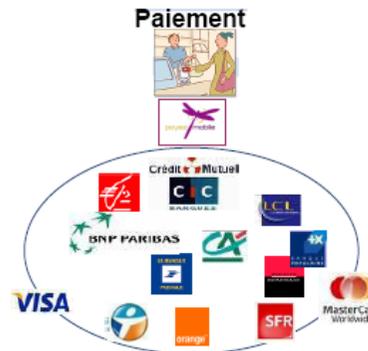Autorité de régulation des communications électroniques et des postes

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The French model is open and interoperable: the various NFC applications function on all NFC telephones, with all operators and for all brands.
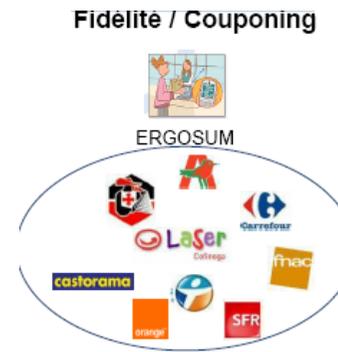
Interoperability of services between competing brands is guaranteed by the sector's organizations
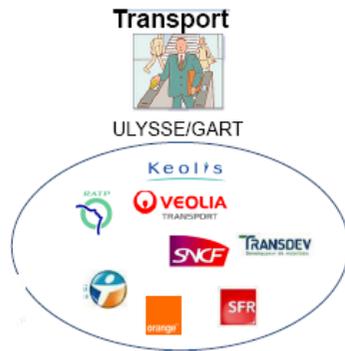
Define the conditions necessary for the inclusion of a transportation application in mobile telephones.	Implement means of mobile payment. Deployment announced at the end of 2009 or early 2010.	Define a common and intuitive customer itinerary at the point of sales, regardless of the number of embedded applications.

The AFSCM is a French technical specifications organization

Definition of interoperable software interfaces (between terminal and SIM, between mobile operator and service provider), in compliance with the international standards of the NFC Forum.

"Cityzi" label of NFC services:
-Compliance with the AFSCM's interoperability specifications
-Hosting in the SIM card
-Management implemented by the mobile operators.

The Forum on contactless mobile services

Created in 2008 at the government's initiative, the Forum coordinates between public and private players. Commitments n° 66 to 70 of the 2012 Digital France Plan for the creation of contactless mobile services package.

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Expertise of the French industry in electronics and contactless services–a few examples

Services	•Competitive in secured electronic transactions: dematerialized employment service vouchers (for domestic and temporary work), testing of contactless payment in Caen. •"Proxima mobile" portal: public mobile Internet platform for home services, "ProxiProduit" information services platform for consumption products (smart tags, "Internet of things").

Hardware/software integration	•Inside contactless: small and medium-sized French businesses specialized in integrating contactless chips in telephones. •Sagem Orga and Twinlinx: NFC sticker integrated in the telephone via bluebooth link.

Contactless chips	•Innovatron: a French company founded by Roland Moreno holds many patents for smartcards (1974) and contactless smartcards. •Gemplus (currently called Gemalto) and Oberthur: principal world builders of smartcards and SIM cards.

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Mobile operators recommend that each service has its own economic model (in development phase).

Service \ Value chain	Mobile operator	Service provider	Bank
Payment	•Space rental in the SIM card of new clients	•Increase number of transactions.	•Increase banking commission revenues (by increasing the number of transactions)
Customer loyalty cards	•The business intermediary is remunerated for each new customer loyalty card and on the number of transactions.	•Increase average customer spending	-
Public transportation	•Each download of the application and each transportation ticket purchased is remunerated	•Reduce distribution costs of transportation tickets (10% to 15% of the ticket's price). •Increase appeal and use of public transportation.	-

Each year, there are in France over:
- 6 billion credit card transactions;
- 13 billion cash purchases.
=> Replacement of a portion of cash payments with contactless payments represents significant additional income potential for banks

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Deployment of contactless services (1/4): transitional solutions while anticipating the availability of NFC telephones

Contactless cards
distributed by Carrefour
and Intermarché
supermarket chains
(integrated customer
loyalty cards)

Note: for purchases requiring validation via a PIN code, insertion in a standard payment terminal.

RFID stickers

Note: Stickers allow only low-value payments without PIN code validation (unlike NFC telephones, the RFID chip and the SIM card do not communicate)

RFID modules

iPhone solution by Wireless Dynamics (Nov. 2009)
Note: Apple launched a call for tender to integrate contactless technology in the next generation of iPhones.

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Deployment of contactless services (2/4): Appeal of the telephone as the medium for contactless mobile services

Service	Appeal to the telephone user compared with other mediums (contactless cards, non-communicative stickers)
Transportation	Gain of time: no waiting in line to purchase a ticket (dematerialization of the transportation ticket)
Payment	Payment more secure: impossible to imprint the credit card number
Loyalty	The customer loyalty card cannot be forgotten

Compared with other mediums the telephone is:
-More practical: the various cards are contained within the telephone.
-More integrated: the user can access interactive data (to consult a bank account, for example)
-More progressive: the SIM card is a multiservice medium. New applications can be downloaded.

There is no incompatibility between the development of contactless cards and contactless telephones.

The development of cards anticipates the development of NFC telephones. The availability of NFC telephones is not an obstacle for the ascendance of the contactless market.

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Deployment of contactless services (3/4):
Development prospects of contactless cards

Yearly sales of contactless smartcards in the world (Eurosmart figures):
• 2009: 110 million credit and debit cards, 40 million transportation cards (respectively +16% and +33% of annual growth).
• 2010 (forecast): 130 million credit and debit cards, 50 million transportation cards.

In the US
2005: Introduction of contactless debit and credit cards in the US.
2007: 30 million cards in circulation.
Services are focused around payment and the integration of customer loyalty cards in debit and credit cards.

Visa PayWave card

MasterCard
PayPass card

PayPass payment terminals are deployed in partnership with certain brands (fast food chains: McDonald's, Subway, and Sheetz).

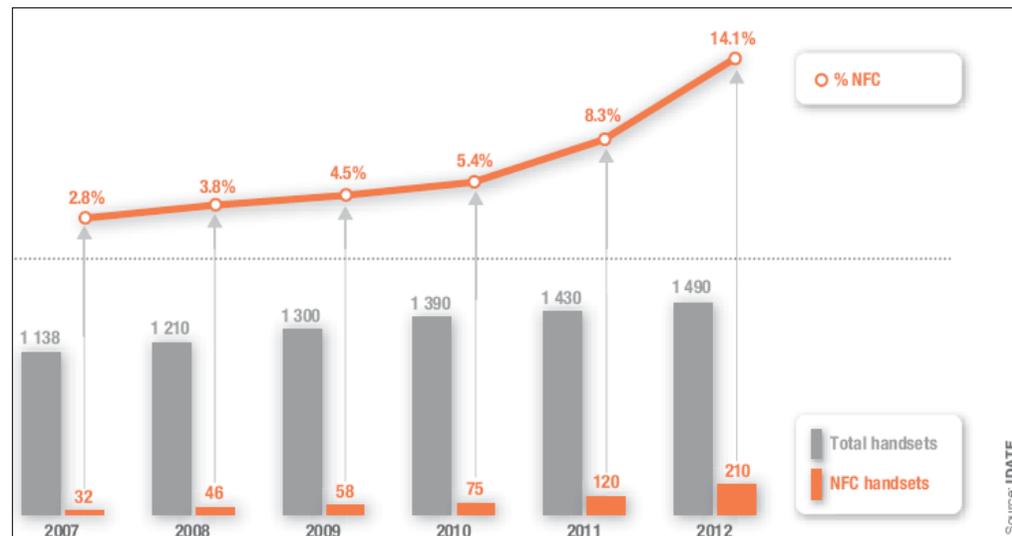First deployment of contactless payment terminals in France :
•Les Mousquetaires group: 1,800 points of sale (Intermarché and Ecomarché) are equipped with contactless electronic payment terminals (EPT).
•The Crédit Mutuel CIC group plans to replace the 200,000 EPTs rented to small businesses with contactless EPTs.

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Deployment of contactless services (4/4): Development prospects of contactless telephones

- IDATE estimates that contactless telephones will represent 14% of telephone sales in 2012 (including Felica telephones).
- Juniper Research and IMS research estimate a 16% penetration of total handsets in the world by 2014 (including Felica telephones).
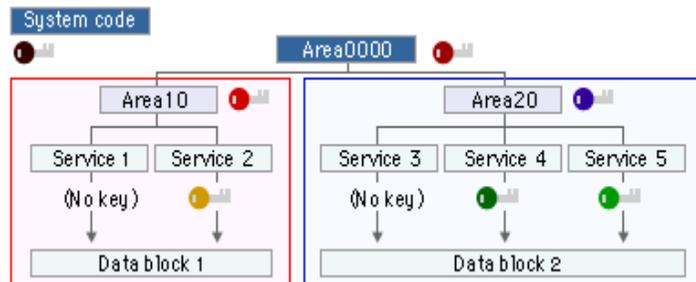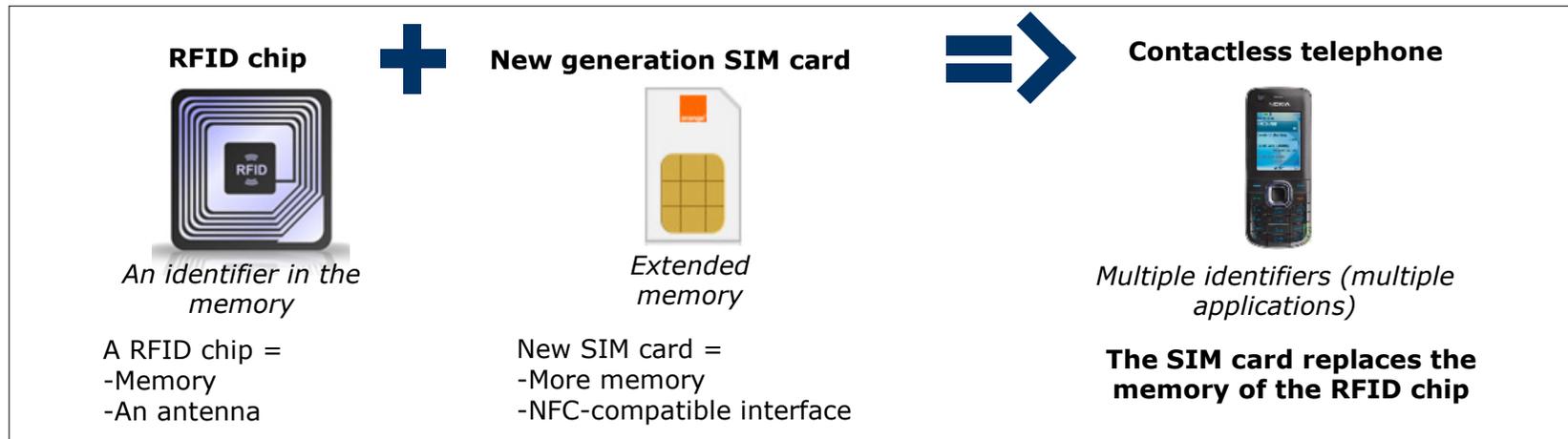

source: Idate

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Conclusion

- **Contactless mobile services are not a revolution in terms of:**
  - Technology: the underlying technologies have existed for a long time;
  - Service: flagship services already exist.

- **They potentially constitute a major evolution in terms of:**
  - Usage: the mobile telephone is an increasingly useful tool in our daily lives (access to product information, price-comparing tool, payment, transportation, home services);
  - Economic model: mobile operators are positioning themselves on new value chains (transportation, banking, etc.).

- **In the medium term, contactless technology could:**
  - Facilitate the development of new services: the NFC is not an economic model in itself but an open system designed to integrate new economic models, like the Internet;
  - Be integrated in the next flagship marketing product, like the iPhone?

- **The involvement of powerful players presents the risk of:**
  - A vertical integration of mobile telephony and banking services;
  - Complicating the consumer's change of service provider.

- **Main obstacles:**
  - The maturity of the value chains;
  - User confidence concerns (privacy protection, after-sales service);
  - Availability of terminals, consumers' potential preference for contactless cards.

- **Main motivators:**
  - "Coopetition" between operators, distributors, and banks in implementing the ecosystem;
  - Appeal of mobile services to the consumer.

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Annex – Mobile operators recommend storing some of the applications on the SIM card. All of the players have adopted this solution, at least for the first generation of NFC telephones.

RFID chip **+** **New generation SIM card** **⇒** **Contactless telephone**

An identifier in the memory

A RFID chip =
-Memory
-An antenna

Extended memory

New SIM card =
-More memory
-NFC-compatible interface

Multiple identifiers (multiple applications)

The SIM card replaces the memory of the RFID chip

NFC applications are organized generically in the SIM card's memory. The security level of data access can be parameterized for each service.

Operators highlight the following advantages:
-Interoperable technical solution compatible with a multiplicity of terminals;
-Commercial solution: mobile operators simplify and centralize the distribution of contactless mobile services (and can facilitate conservation of services in case of a change of operator).

In late January 2010, the European Payment Council and the GSMA finalized the specifications regarding:
- Hosting the baking application on the SIM card;
- Management in case of theft, change of operator or terminal.

Annex – In Japan, the ecosystem of contactless services is vertical and integrated

Payment of FeliCa license

FeliCa Network

Company created by NTT DoCoMo, Sony, and JR East for managing contactless platform convergence

Rental of their application on the secured component

Payment of FeliCa license

Telecom operator

Participation in the network's deployment

Transportation operator JR East

Retailers

Transfer of a commission on the users' purchases

Usage and payment of a subscription

Users

- Characteristics of the Japanese model:
  – Its success is due essentially to three powerful players: Sony, NTT DoCoMo, and JR East (which subsidizes payment terminals in shops)
  – There are multiple payment networks in Japan (several distinct payment terminals in shops)
- FeliCa contactless technology (Felicity Card – similar to NFC but owned by Sony) covers multiple services.
- Integrated in contactless cards and subsequently in telephones (since July 2004).
- Around 1/3 of FeliCa mobile terminal owners use it on a regular basis (almost all telephones sold in Japan are FeliCa compatible).

Total number of FeliCa mobile terminals in circulation in Japan (March 2007)	30 millions
Including NTT DoCoMo's FeliCa i-mode (February 2007)	20 millions
KDDI's Felica EZ (February 2007)	10 millions
Forecast of the FeliCa mobile terminals at end of March 2008, by FeliCa Networks	47 millions

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Annex – Monobank systems under development:
examples in the UK (London) and the US (New York)

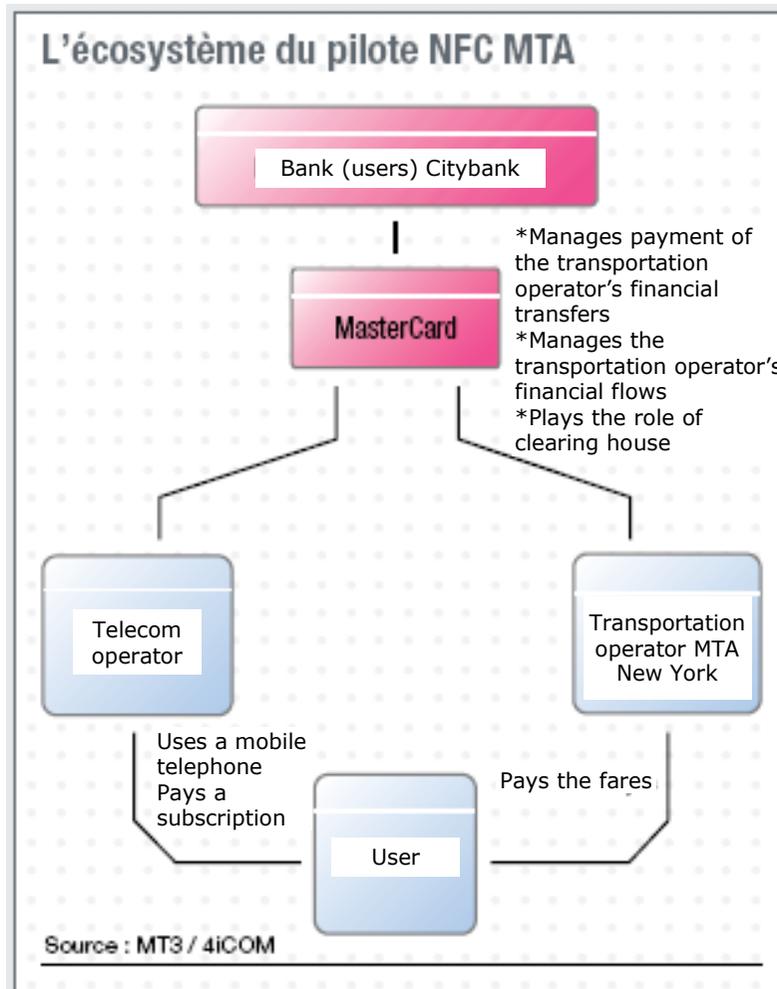In the UK, Barclays Bank offers the "OnePulse" card that combines:
-A debit or credit card (Visa);
-A contactless transportation card (Oyster): 5% rebate on fares;
-A contactless electronic wallet.

Currently (2009), 1,000 shops accept the OnePulse card (Greater London area).

Barclays has begun talks with Orange UK to offer the OnePulse system on NFC mobile telephones.

In New York, Citybank manages the transactions for ticket purchases.

L'écosystème du pilote NFC MTA

Bank (users) Citybank

MasterCard

*Manages payment of the transportation operator's financial transfers
*Manages the transportation operator's financial flows
*Plays the role of clearing house

Telecom operator

Transportation operator MTA New York

Uses a mobile telephone
Pays a subscription

Pays the fares

User

Source : MT3 / 4iCOM

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Entities	Association Européenne Payez Mobile	Forum SMSC	China Mobile	TFL, Barclays, O2
Places	Caen and Strasbourg	Nice	Shanghai	London
Dates	2008-2009	2010	2010 (World's Fair)	2012 (Olympic Games)
Services	Payment, interactive billboards	Transportation, payment, interactive billboards	Mobile ticketing	Mobile ticketing
Number of users	1,000	3,300 : (1,000 Orange, 1,000 SFR, 1,000 BYT, 300 NRJ)	-	-
Results	90% of satisfied clients (including technophobes) 59% intend to subscribe to this service when it is available Satisfied retailers (82%)	Trials not yet begun	Faster waiting lines?	Faster waiting lines?

Annex – Use of credit and debit cards is intensifying and diversifying

Debit and credit card payments are increasingly used for household spending (in excess of 25%).

source: groupement des cartes bancaires
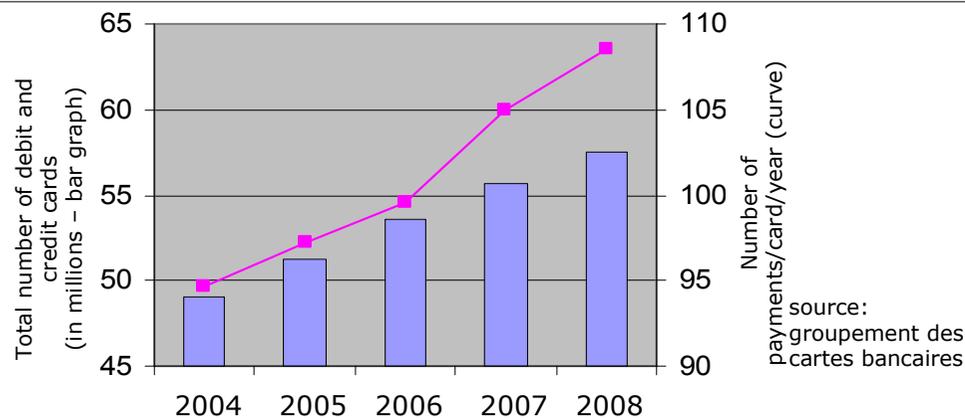
Internet sales are rapidly increasing. If the turnover is still limited (7% of debit and credit card purchases), most consumers are already accustomed to this new purchase mode (2/3 of the 18-39 year-olds, 41% of the total population - Credoc 2009 survey).

source: fédération de l'e-commerce et de la vente à distance (Fevad)
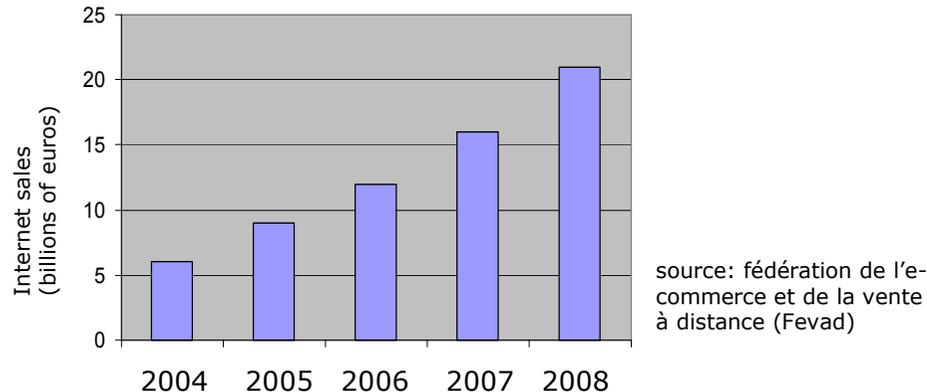
The consumer seems willing to adopt new payment modes

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While the contactless telephone can integrate an electronic wallet, it is essentially a technological tool that allows a multitude of service providers (supermarkets, large brands, transportation, etc.) to reinforce marketing relations with their clients.

Means of payment used according to the type of commerce
en % Télécom Paris survey for the Groupement des Cartes Bancaires – March to May 2005 -
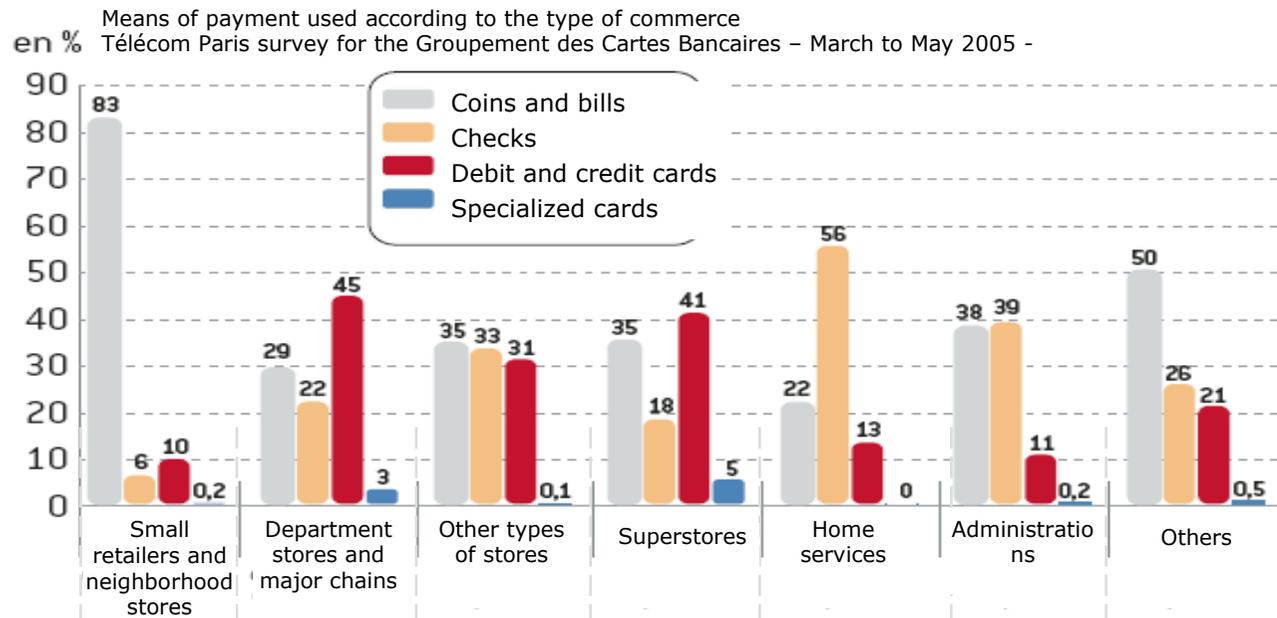
	Small retailers and neighborhood stores	Department stores and major chains	Other types of stores	Superstores	Home services	Administrations	Others
Moneo targets	++	0	0	0	0	0	0
NFC targets	+	++	+	++	+ (dematerialized employment service vouchers)	0	0

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Annex – For the security of Internet payments, the telephone is an additional security tool.

- Online payment fraud represents 44% of fraud on debit and credit cards, thus around 50 million euros per year in France (source: Atos Worldline)
- Reinforcing the security of transactions (enhanced authentication) by adding a step in the validation of an online payment (in addition to the card's number and the visual cryptogram):
  - Password sent by SMS (One-Time Password)
  - Electronic signature: digital certificate store in the computer (simple signature) or in the SIM card (qualified signature) in the form of an NFC application.

Examples of reinforced security solutions:

With the new Visa cards (June 2008), the visual cryptogram changes for each Internet transaction. The user enters his pin code via a keyboard embedded in the card and the screen displays the code to be used (the battery integrated in the card has a three-year life).

FeliCa chip reader with USB connection to validate Internet purchases on ones computer ("PaSoRi" product marketed by Sony in Japan).

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Annex – Money transfert via SMS

Statistical data:
- World population: 7 billion
- Number of mobile subscribers: 4 billion
- Number of persons using bank services: 1 billion
Several billion people could potentially want SMS payment.
Mobile operators and banks share the transaction commissions (premium-rate SMS).

Country	Operator	Payment service (money transfer via secured SMS)	Service's opening date	Number of clients
Kenya	Safaricom (subsidiary of Vodafone)	M-Pesa	2007	6.5 million (May 2009), thus half of the operator's clients. Two transactions per month, per client.
South Africa	MTN	Fundamo (Yellow Money)	March 2009	-
Ivory Coast	Orange	Orange money	December 2008	-
France	all	Movo (caisse d'épargne)	End 2006	Service terminated in 2009
France	all	Pay2You (Crédit Mutuel Arkéa group)	May 2009	-

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