



# TECHNOLOGY-DRIVEN GROWTH OPPORTUNITIES IN THE PAYMENTS INDUSTRY: AN INTERNATIONAL SURVEY OF RETAIL BANKS

EFMA / Edgar, Dunn & Company Report,  
September 2005







## ■ Preface

Over the past two decades, retail banks have contributed to a radical change in the payments industry of many developed economies, making payment cards, ATMs and Point of Sale (POS) devices part of the daily life of most consumers. This has resulted in a significant shift in the mix of payments: from heavily paper-based (cash or check) to increasingly electronic.

Such a dramatic shift has had many impacts on banks' businesses – depending on the bank's focus, payments can represent 10-40% of total revenues. Furthermore, new payment options, technologies, and business models are creating new market opportunities – for traditional as well as non-traditional payments providers. The adoption of emerging payment technologies has been receiving significant press and market attention over the past year, including EMV, 3-D Secure, micropayments, P2P payments, mobile payments, contactless cards and biometrics.

Against this backdrop, technology innovation is one of the key drivers of change that will impact the retail bank payment business. To better understand current bank perspectives on, and planned investments in, these new payment technologies, EDC and EFMA recently completed a survey among payment executives from more than 40 banks in 14 countries.

We would like to thank each of the participants for generously giving their time and sharing their perspectives and plans; we believe their insights will be beneficial to other payments executives as they evaluate the impact of these technological innovations on their organisations and customers.

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## ■ 1.0 Executive Summary

The global technology evolution is impacting every aspect of our world – our businesses, our customers, our lives. One of the most dynamic realms within this evolution is payments. Whether we are paying for services using our mobile, buying goods with the tap of a chip-based smart card, or authenticating payment transactions with our voice print, developments in emerging payments-related services are announced daily – some with profound implications for our businesses, and the way our customers conduct their business.

Many of these significant developments in payments-based technologies are vying for focus and investment funding of major financial institutions worldwide. To understand banks' perspectives regarding growth opportunities that are driven by new technologies in the payments industry, the European Financial Management & Marketing Association (EFMA) and Edgar, Dunn & Company (EDC) completed an international survey of retail banks, the results of which are reported in this paper, "Technology-Driven Growth Opportunities in the Payments Industry, An International Survey of Retail Banks". More than 40 payments executives at banks across four continents (with primary focus in Europe) provided their perspectives on emerging payments-related technologies, and their bank's plans to implement the solution.

The focus of this study was new and emerging payment-related technologies. As shown in the chart below, these selected technologies range from payment options to end-user interfaces and authentication technologies. The seven emerging payments technologies addressed in this paper are: EMV, 3-D Secure, Micropayments, P2P Payments, Mobile Payments, Contactless Cards, and Biometrics.



Payment-Related Technology Landscape				
Payment alternatives	End-user Interface	Authentication	Acceptance interface	Payment networks
Pay Before - Prepaid cards	Platform - Magnetic Stripe - <u>EMV chip</u> - <u>Contactless (RFID, NFC)</u>	- Signature - PIN - Chip - <u>Biometrics</u> - Internet security (token, digital signature, PC finger-printing, multi-factors)	Card-present - Traditional POS - Wireless  Card-not-present - Mail Order / Phone Order - PDA - PC	- Bankcard associations  - EFT networks  - Clearing houses  - <u>Mobile carriers</u>  - <u>P2P</u>
Pay Now - Cash - Debit cards - Check - Funds transfer - Electronic check - <u>Micro payments</u>	Form factor - Card - Check - <u>PDA/mobile</u> - Key fob - PC - <u>Virtual</u>			
Pay Later - Credit card				

Underlined: included in the scope of the EDC-EFMA survey

Source: EDC analysis

## → 1. Key findings from bank interviews

Our discussions with banks confirmed that payments are an important and growing area within major banks today. For European banks, payment-related revenues typically account for 10% of total revenues; in the U.S., this figure is closer to 40%. Banks are employing a variety of structures to manage these payments businesses, including product-focused, market segment focused, functional silos, and matrix management approaches. However, very few of the banks we interviewed have a dedicated payments strategy unit within the bank.

Nearly all banks expect continued annual growth in payments revenues (typically 3-12% annual increases), but margin pressure is expected due to pressures on pricing and fees. This downward pressure is affecting investment budgets and appetites; most banks appear reticent to invest in new technologies, and payments-related technological innovation does not appear to be a high priority for many retail banks.

This attitude is reflected in the number of banks that have evaluated and implemented these technologies. As shown below, few banks have implemented the technologies we studied, and some of the technologies, such as P2P payments and biometrics, are not even being considered by half the banks.



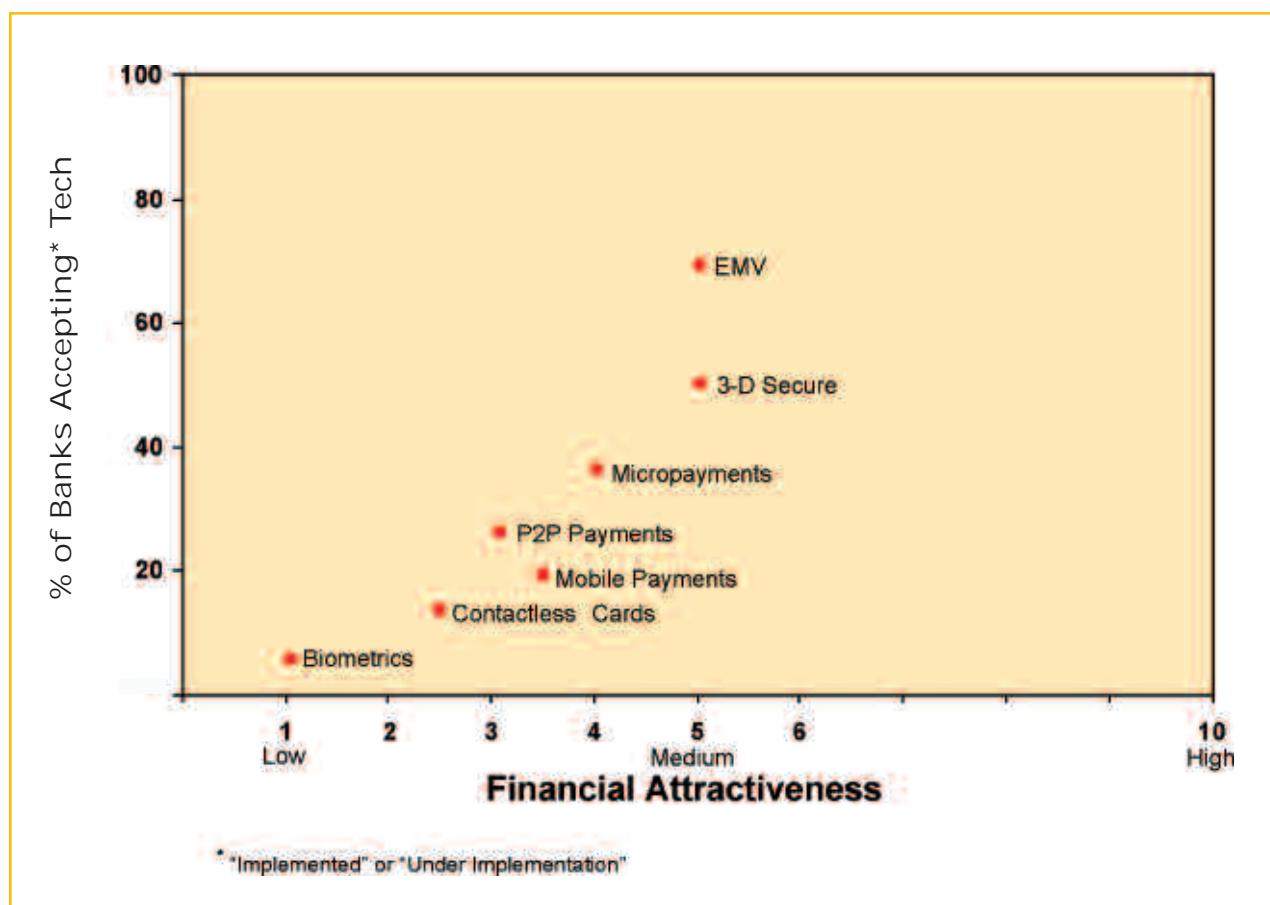
Technology	Not in Consideration	In Consideration	Under Implementation	Implemented
EMV	16%	9%	35%	40%
3-D Secure	33%	16%	14%	37%
Micropayments	33%	35%	2%	30%
P2P payments	49%	28%	9%	14%
Mobile payments	28%	56%	2%	14%
Contactless cards	35%	51%	9%	5%
Biometrics	63%	28%	9%	0%

This low level of implementation to-date is not surprising, given the perceptions of banks regarding the attractiveness of these technologies. As shown below, banks do not assign high marks to any of the seven technologies across any of the four assessment criteria: financial attractiveness, ease of implementation, market appeal, and strategic fit.

Technology	Financial Attractiveness	Ease of Implementation	Market Appeal	Strategic Fit
EMV	5	N/A	3.5	5
3-D Secure	5	6.5	4	4.5
Micropayments	4	N/A	5	3.5
P2P payments	3	N/A	5.5	5
Mobile payments	3.5	3.5	5.5	6
Contactless cards	2.5	4	6	4
Biometrics	1.0	N/A	3.5	3

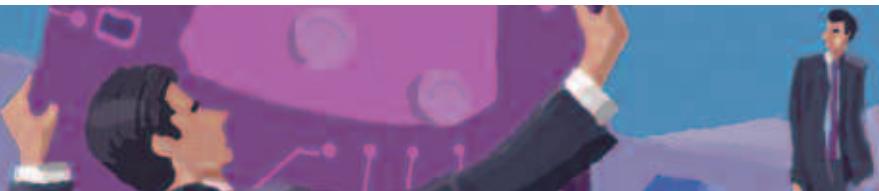
(Scale based on Low=1; Medium=5; High=10; N/A when marginal responses)

As illustrated below, for the banks in our study, the level of acceptance of a technology (as indicated by being in implementation or in production with a service) is highly correlated with the bank's perceived financial attractiveness of the solution. The business case is the primary driver of acceptance by the bank, rather than strategic fit or customer demand.



There are a variety of factors driving the banks' priorities:

- Following the internet 'boom and bust', many financial institutions have disbanded technology incubators and tend to be less pro-active in investing in unproven technologies (particularly where business cases are uncertain);
- A large number of financial institutions (especially in Europe) are allocating the vast majority of their investments to initiatives that are required for regulatory or payment scheme compliance (e.g., EMV); this leaves very limited resources for discretionary investments;
- Many new technologies are not generating traction: despite considerable press coverage and financial institution discussions on technologies such as mobile payments or contactless/smart cards, the business remains embryonic with limited customer adoption so far.



Although some banks are pursuing innovation as a way to differentiate and increase profitability, many of the banks that we spoke with are pursuing a "fast follower" strategy. They are waiting until a clear business case emerges or a competitor attracts valuable market share before investing in the deployment of new payment technologies or innovations.

As banks think about future initiatives in new payments technologies, they do not see significant opportunities for new revenues from these services. Their views are that, if effective, these technologies are more likely to reduce costs than contribute top line growth.

### Key Objective for Investment in Technology

Payment Technology	Recruiting New Customers	Cross-selling to Existing Customers	Retaining Existing Customers	Reducing Costs
EMV				✓
3-D Secure				✓
Micropayments				✓
P2P payments	✓	✓		
Mobile payments	✓	✓		
Contactless cards			✓	
Biometrics				✓

If the banks were to invest in a new technology, they much prefer to build or partner to develop the solution, as opposed to buying a solution. This enables customisation to fit with their customer base and strategic goals, as well as retention of ownership.



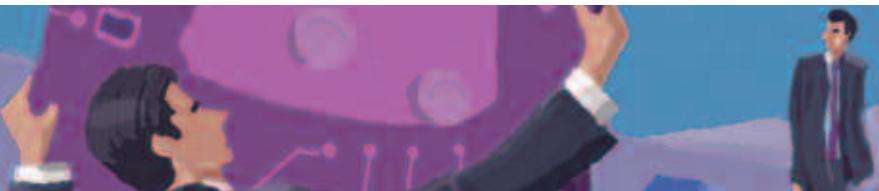
Deployment Strategy	Build	Buy	Partner
EMV	#1	#3	#2
3-D Secure	#1	#3	#2
Micropayments	#1(tie)	#3	#1(tie)
P2P payments	#1	#3	#2
Mobile payments	#1(tie)	#3	#1(tie)
Contactless cards	#2	#3	#1
Biometrics	#2	#3	#1

In summary, most banks are optimistic about the outlook of the payments industry for the next 2-3 years, but they are wary of the economic impact of emerging payment technologies on their organization and their business, and the risks of investing in technology which is still evolving in the face of significant external shifts due to regulatory and competitive changes.

## → 2. EDC perspectives

We see six overarching themes related to new payment technologies:

1. There is not a single payments-related technology focus for the future; various technologies are competing for retail bank attention, global adoption, and investment funding.
2. Typically, technology adoption has become a by-product of more critical strategies relating to the achievement of profitable growth in the financial services industry or to Point of Sale (POS) development within the retail and transport sectors.
3. Technology adoption in payments is an evolutionary, rather than revolutionary, process.
4. The appetite for investment in new payments-related technologies is not high for many banks.
5. New technology applications have yet to fundamentally change the retail payments model.
6. Whilst the banking sector procrastinates, others are driving change. Major non-traditional providers are investing ahead of the curve to learn, adapt, create, and find their best competitive niche for the future.



A key question that banks are addressing is which technolog(ies) to bet on? The emerging payment-related technologies discussed in this report are all in various stages of development and adoption. There are a plethora of solutions, as is to be expected in the early stages of the life cycle of these technologies, with issues such as:

- Lack of standardisation inhibits a single solution from gaining momentum
- Significant economic and technological barriers to adoption
- Scarce IT resources and lack of prioritisation within banks and technology shops to implement new technologies
- Potential for decreased brand strength due to increased number of co-branding relationships on a single payment type

To summarise our perspectives on each technology, we believe banks should be watching each of the seven technologies studied as part of this report. Several of the technologies are believed to be nearer-term opportunities or threats to the banks, and we would recommend a more active role in evaluation and pilots.

Technology	Summary of EDC Perspective
EMV	Revenue opportunities for specific segments, but not straightforward
3-D Secure	Merchant adoption is the key to success
Micropayments	Large opportunity but hard to penetrate
P2P payments	Worth investigating potential opportunities and threats associated with P2P players
Mobile payments	A long-term potential to disrupt the payments industry
Contactless cards	Might be worth placing a strategic bet
Biometrics	Need to keep a watching brief

In any case, allocating resources to assess or deploy some of these new technologies will remain a bet, and as usual, the art and science required from payments executives will be to know when and where to make these bets.



## ■ 2.0 Study Objectives and Methodology

A recent article in the business press<sup>(1)</sup> provided the following list of the “top 20 innovative companies in the world”:

Top 20 innovative companies in the world	
1. Apple	11. Virgin
2. 3M	12. Samsung
3. Microsoft	13. Wal-Mart
4. GE	14. Toyota
5. Sony	15. eBay
6. Dell	16. Intel
7. IBM	17. Amazon
8. Google	18. Ideo
9. P&G	19. Starbucks
10. Nokia	20. BMW

Source: BusinessWeek, August 1, 2005

It is interesting to note that this list does not include any of the traditional payments industry players: no major payment brands (e.g., American Express, MasterCard, Visa), no major banks, no major payment processors. However, for many of these companies, payments is an area of increasing focus in their future strategic direction.

Why are these companies perceived as being innovative? Some reasons were provided, including:

- Apple: Great consumer experiences with outstanding design
- 3M: Internal culture of creativity with formal incentives
- Microsoft: Management pushes continuous improvement of products
- GE: Management practices that are ahead of competition, along with strong training
- Google: New tools and services provide simple solutions to complex problems

(1) : August 1, 2005 BusinessWeek, BCG poll of 940 executives in 68 countries



- P&G: Continuous product innovation based on understanding of changing consumer lifestyles
- Virgin: Takes risks, attacks weak spots of traditional service providers
- Wal-Mart: Data mining tracks customer preferences on a daily basis

## → 1. Study Objectives

Given the plethora of new payment technologies receiving media attention today, how do banks' innovations measure relative to these innovative leaders? The European Financial Management & Marketing Association (EFMA) and Edgar, Dunn & Company (EDC) conducted a world-wide survey of banks to understand the growth opportunities that are driven by new technologies in the payments industry.

The goal of the study was to provide input to decision-makers in banks, card associations and other stakeholder organisations in the payments industry who are seeking to understand the current state of new and emerging payment technologies based upon banks' investment plans and perspectives. As such, the objectives for the survey were to:

- Assess which technologies are being considered and/or implemented by banks, and the drivers of these decisions
- Analyse banks' planned initiatives to leverage growth opportunities
- Provide an outlook for the payments technology marketplace over the next five years.

This survey focused on understanding what banks are planning to do and why; it was not our objective to collect detailed revenue, cost or investment data from the banks, or to offer technical evaluations of these payments-related technologies. The results from our findings are reported qualitatively, focusing on key themes and directions, rather than providing detailed financial analyses, business cases, or technical evaluations for the technologies under consideration.

## → 2. Methodology

### 2.1 Main survey tool: one-to-one interviews with payment executives

Our primary source of input for this report was a series of interviews conducted by EDC with senior payments executives at major financial institutions around the globe, with primary emphasis on European banks. Between May 2005 and August 2005, EDC surveyed 43 banks across 14 countries in Europe, North America, South Africa, and Asia-Pacific. The institutions surveyed were all major financial institutions in their respective countries; typically we surveyed the three or four largest retail banks in the country.

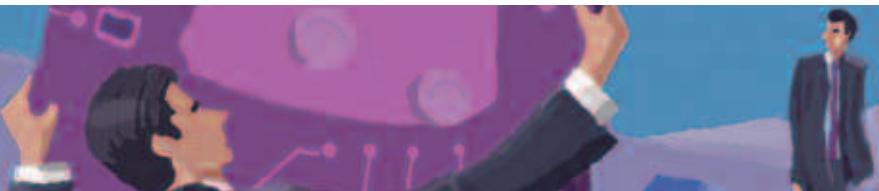
EDC team members in San Francisco, New York, London, Frankfurt, and Sydney conducted the interviews. Each interview was approximately one to two hours in length; most interviews were conducted in-person, with the remainder being via telephone. Each interview was conducted under strict confidentiality: the agreement was that EDC could use and report findings in aggregate, but could not name individual banks as the source for a specific response.



Bank Interviews Conducted		
Region	Number of Bank Interviews	Countries Represented in Survey Sample
Europe	33	Czech Republic, France, Germany, Italy, Netherlands, Poland, Spain, Sweden, Turkey, UK
North America	5	United States, Canada
Africa	2	South Africa
Asia Pacific	3	Australia
Total	43	

## 2.2 Secondary research

To provide additional background on the technologies being reviewed along with some case studies, EDC supplemented the interview findings with secondary research (desk research), interviews with selected industry players, and findings from other surveys conducted by EDC in the payments industry.



## 2.3 Scope of bank interviews

Each bank was asked to provide their perspectives about, and plans for, seven emerging payment-related technologies.

Technology	Definition
EMV	Standards mandated by Visa, MasterCard, and Europay (now part of MasterCard) for smart (chip) cards; requires compliance for plastic cards, ATMs, and POS terminals
3-D Secure	Authentication methodology for online card purchases; examples include Visa's Verified by Visa and MasterCard's SecureCode services
Micropayments	Set of technologies to enable low-value purchases (e.g., less than five euros) to be made with an electronic form of payment (e.g., credit card); can apply to online, mobile, or physical purchases
P2P payments	Set of technologies that enable the transfer of value from one person to another person (including micro-merchants that engage in sales activities such as online auction sales)
Mobile payments	Corresponds to the usage of a mobile phone as the device to generate a purchase or other payment-related transaction
Contactless cards	Also referred to as proximity cards; enable cardholder to wave payment card (or other form factor) within 10 cms of a card reader to initiate a payment transaction
Biometrics	The usage of biometrics-related technology such as finger-print or voice print recognition as an authentication methodology

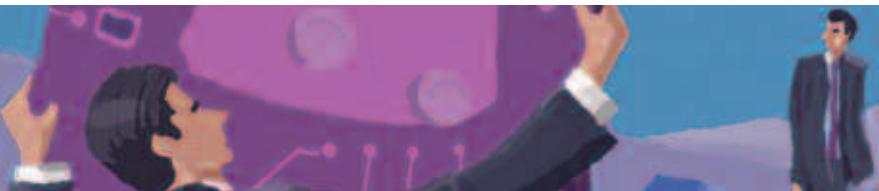
For each of these technologies, a series of questions were asked, covering the following topics: (see Appendix for the complete discussion guide)

- Internal management of the payments function
  - Importance of payment products (cash, check, card issuing / acquiring, all other electronic payments) for the bank



- Organisational structure and process to manage "payments" within the bank
- Process used to assess new payments-related growth opportunities
- Key metrics used to assess the bank's payments performance
- Assessment of new payments-related technologies / innovation
  - New technologies / innovations that are (1) under consideration, (2) in implementation, or (3) fully deployed
    - "Under Consideration" refers to a technology that is being evaluated by a bank, including business cases or assessment of the technology; following the assessment phase, the bank may or may not decide to implement the technology
    - "In Implementation" refers to a technology that is in the process of being implemented by a bank. In the case of 3-D Secure, 'in implementation' does not refer to the implementation of 3-D Secure by other parties such as merchants
    - "Fully deployed" refers to a technology that has been implemented, is in production, and is available as a service to the bank's customers
  - Key hurdles and benefits
  - Assessment of each technology against the following four criteria on a scale of High, Medium, and Low:
  - Description of potential threats from non-Financial Institutions (FIs)

Criteria	Definition
Financial Attractiveness	Is it likely that deploying this technology will generate a positive financial impact for the bank? For instance, the deployment of a new technology that is perceived as strategic but without a positive business case would be ranked as "low"
Ease of Implementation	Can the bank implement this technology within a short time-frame and without significant investments? For instance, a technology that can be deployed within a short time-frame such as one year would be ranked as "high"
Market Appeal	Does this technology appeal to consumers (buyers) and/or merchants (sellers)? For instance, a technology requiring significant upfront investment from merchants would be ranked as "low"
Strategic Fit	Does this technology fit with the overall business objective of the payments business? For instance, a technology that would appeal to younger consumers would have a "high" strategic fit for a bank that identified younger consumers as a target segment



- Planned initiatives

- Investment plans / amounts
- Key objectives for individual investments
- Plans to build vs. buy vs. partner
- Timelines for the introduction of these new technologies / innovation
- Expected financial impact of these new technologies / innovation

- Views on future outlook

- Projections for payment volumes and revenues
- Potential changes in buyer behaviours
- Potential changes in merchant-bank relationship
- Views on other key external factors such as payments regulations and SEPA



## ■ 3.0 Technology Landscape

This chapter considers the global technology landscape for the payments business, and is based on EDC secondary research and market observations. It provides a contextual, non-technical background for some of the new payments developments within Europe, especially the status of technology developments and utilisation when compared with the rest of the world.

### 1. EMV

EMV (Europay MasterCard Visa) is a standard for credit and debit payments using chip-based payment cards, or smart cards. Agreed by Visa and the merged Europay and MasterCard, it aims to ensure interoperability between smart cards and terminals worldwide. The intent is to provide a reliable global framework for the growth of smart card payment applications.

To drive its adoption, the payments associations have set implementation deadlines. Visa EU, which guides financial institutions in Western Europe, has mandated that all new smart card payment devices be EMV-compliant by January 1, 2005. Visa CEMEA has declared that financial liability for losses due to fraud in the CEMEA region will be shifted from the card issuers to the banks that have not implemented EMV starting January 1, 2006. In addition, MasterCard has set a variety of conversion deadlines in the various regions of the world and, after those dates, any banks that issue smart cards or acquire transactions will assume full financial liability for fraud or other losses that could have been avoided by using an EMV-compliant smart card solution.

These implementation deadlines have already had an impact in markets like France where local banks have achieved (as of the summer of 2005) EMV compliance rates as high as 95% for ATMs, 60-70% for POS terminals, and 30-40% for payment cards. See table below for EMV progress as at the end of 2004:



Country	Debit cards converted (%)	POSS converted (%)	ATMs converted
Austria	80.00	0.00	37.00
Belgium	4.00	48.00	100.00
Denmark	100.00	4.00	80.00
Finland	68.00	0.00	70.00
France	5.50	35.00	75.00
Germany	37.00	0.00	0.00
Greece	0.15	16.50	12.00
Ireland	4.00	20.00	20.00
Italy	0.10	0.10	0.10
Luxembourg	100.00	100.00	90.00
Netherlands	0.00	0.00	0.00
Portugal	0.00	0.00	19.00
Spain	0.41	4.00	15.00
Sweden	34.00	0.00	86.00
United Kingdom	70.00	70.00	81.00

Source: Erste Bank, European Payments Council

EMV migration costs have been the main investment in payments technology within some countries in Europe in recent years. One of the underlying principles for card businesses within SEPA (Single Euro Payments Area) is that cards will incorporate chip technology. Assuming SEPA principles are mandated, these migration costs will extend across Europe and card technology will finally move from magnetic stripe to chip. Even in countries implementing EMV chip, a positive business case for such an investment has been difficult to demonstrate. Now, a number of financial institutions are trying to assess how to derive more value from their chip implementation, including applications such as loyalty, prepaid and transit.

One estimate has put the EMV investment cost across Europe at € 3.2bn (excluding cost of training of staff, merchants and cardholders). Other estimates are even higher (€1.1bn in France and €1.7bn in the UK) when all migration costs for both the banking and retail industries are taken into account. It is not clear to-date, and it is possibly too soon to say, whether any of that investment has actually generated profit improvement for card businesses. Some countries have taken a wait-and-see attitude, having done little to adopt EMV chip standards as they observe the roll-out in other countries.



The slow adoption of EMV by the banks has created challenges for technology companies and suppliers to the card industry as they strive to develop smaller, cheaper and faster solutions for chips, cards, terminals and software. Some companies believe that new technology adoption, like contactless, multi-applications or stronger security algorithms will be significant. However, there are significant barriers that need to be overcome, resulting from (a) the weak investment appetite of banks, (b) the slow decision making of large financial institutions and card issuers, and (c) the conservatism of consumers.

One critical area for potential development has been the use of smart cards for on-line verification and, in particular, PC-based smart card readers to validate the cardholder making the transaction. For example, several UK banks are now planning to offer cardholders a service to perform secure e-transactions, while using the same PIN and the same card as they use for their face-to-face transactions and money retrievals from an ATM.

Also, recently, new EMV-based products have become available; as an example, Raiffeisen was the first bank to announce potential implementation of V-Pay, Visa's pan-European EMV chip and PIN debit product.

## → 2. Mobile payments

**Despite the phenomenal growth in mobile telephony and mobile payments for data services around the world, physical world mobile payments have yet to take off**

The development of mobile payment capabilities is evolving as a natural consequence of the phenomenal growth of mobile call technology and mobile phone usage over the last decade. However, the growth in mobile payments is being led by the mobile phone service providers, rather than bank payment service providers. Mobile payments have been driven by mobile operators that have sought to generate more revenue through the sale of data based services, and to retain their customer base. Whilst the sale of data was 8.5% of mobile revenues in 2002, The Yankee Group forecasts that data will be 25.9% of revenues by 2007. This is due to a combination of the increasing demand for and usage of mobile data services, as well as the continuing downward pressure on the profitability of basic mobile service. Since data is becoming increasingly important to mobile phone service providers, they are seeking to protect the revenue stream and are providing billing and payment services to third party providers of data services to customers. At this time, providers of data services are largely dependent upon the mobile service providers to manage their payment facility. Whilst some content is being sold directly online using traditional payment instruments, the vast majority is sold through the mobile service provider using an approach called "Bill-on-behalf-of" or "BOBO". The dependence of content providers on the mobile service providers for payment services has created a de facto payment system that the mobile service providers are wary of relinquishing. They will be equally resistant to allowing banks to participate in their payment scheme.

There have been a range of developments by the banking industry and mobile operators to exploit mobile technology. The main areas of adoption are highlighted in the table below:



PROPOSITION	ADOPTION	PURPOSE
Banking Support e.g. balance enquiries, transfers, alerts	Undertaken by many institutions in various markets, e.g., Rabobank; Strategy driven by FI, potentially in conjunction with a mobile operator <sup>33</sup>	To enhance underlying banking value proposition and improve customer service
Transaction Support e.g. SMS message to support on-line transactions	Employed by a number of banks, e.g., NAB, Rabobank; Strategy driven by banks	To support online transactions, reduce internet fraud
Mobile Transactions  1) Internet and telecom content-ring tones, logos, etc requiring low value transactions  2) Cash replacement strategies	Mainly driven by the mobile companies; Strongest customer take up has been where there is real convenience (e.g. London congestion charge) or evident customer demand (e.g., Japan and Korea to a lesser extent)	STo increase traffic and content and enhance customer retention. They could also enable operators to defray some of the costs of Third Generation (3G) mobile licence purchases (3G enables high volume data transfers (e.g. data streaming, conferencing), and licenses were acquired by operators in multi-billion Dollar auctions by European and Asian operators)  To establish an additional revenue stream for mobile operators  To enable cash replacement through convenient alternative
Integrated Entertainment e.g. i-Mode FeliCa, PIA	Includes payments, ticketing, ID and access; Driven by mobile operators	To increase traffic and content (e.g. defray costs of 3G) and enhance customer retention  To establish an additional revenue stream for mobile operators

Most mobile payments initiatives are at the national level; there remains little coordination and cooperation between the principal stakeholders: mobile operators, banks, and merchants



There are several impediments to strong growth in mobile payments, including:

- Lack of convenience and consistency
- Insufficient customer utility
- Inadequate support and investment from financial institutions

Collaborative initiatives such as SIMPAY and Mobicash have failed to fuel mobile payments growth and interoperability. SIMPAY was the mobile phone payment brand created by four mobile operators – Orange, T-Mobile, Vodafone, and Telephonica Movile – to enable customers to make purchases via their handset either cross-border or across networks. The recent demise of SIMPAY indicates that Europe's mobile payments systems will remain fragmented for the foreseeable future, without interoperability and coordination. This allows the mobile service providers the opportunity to further cement their relationships with content providers, and it increases the likelihood that the existing de facto payment system will achieve a dominant position with mobile payments.

**Most projections for the growth of mobile payments have been optimistic relative to actual transaction volumes, although there is now momentum for expansion, especially in Asia.**

Global mobile payments are estimated to amount to US \$3bn (2003). Ring-tones and logos are still the biggest sector in mobile payments, but there is also emergence of payments to third party accounts – using the phone as a payment device itself and/or to support payment authentication. Key drivers in future growth will include:

- Continued global expansion of mobile telephony ownership and mobile networks: the global mobile handset market is estimated to be 2bn by the end of 2005 (including 350m headsets in China), with 720-750 m shipments in 2005. According to the Gartner group, 2Q 2005 sales were 191m units, a 21% increase on the corresponding period in the previous year.
- Expansion of payment for content: content can only be sold if there is an effective mobile payments mechanism.
- An extension of payment for content usage to payment for goods and services
- Mobile payments have also emerged as a mechanism for the youth market who often have no alternative means of payment other than cash
- The 'war on cash' although banks will need to develop a business case to justify investment in mobile as a cash alternative
- The increasing richness of high value content offerings being delivered through the mobile channel.
- Increasing use of SMS to drive mobile payments. For example, in the U.S., Verizon Wireless enabled customers to make a donation via SMS to Hurricane Katrina victims (a \$5 donation is automatically debited on the monthly cell phone statement after the SMS has been sent by the user)

One development attracting interest amongst acquirers and merchant groups is the mobile terminal. The mobile terminal should not be confused with the portable terminal, seen in restaurants where the waiter brings the device to the table. (Typically these devices communicate via Wi-Fi or Bluetooth to a base unit on the premises and that base unit is usually attached to a land line). Mobile terminals, on the other hand, have no base station and generally use the GSM wireless communication protocol and are part of a wider area network. EDC believes the mobile device can open up new merchant sectors



more effectively than portable devices. Examples include emerging markets where landline telecommunications are poor, transport, market stalls, and payments in the home.

### → 3. Contactless chip

Whilst contactless chip technology has been available for several decades, it is contact chip technology that has been adopted more generally in the payments world. This is because there have been both consumer and merchant concerns surrounding the use of contactless cards. For example, fears that payments could be made unknowingly due to proximity but without cardholder knowledge.

However, recently there have been several significant developments which could provide catalysts for the growth of contactless or proximity cards in the next few years. These are:

- The need for faster transactions at the POS in existing card accepting environments such as supermarkets and petrol stations
- Associated with this, the growth in unattended payment environments, such as self-scan locations
- The need for cash replacement technologies that allow payments that are extremely quick in locations where at present cash is the only or main form of payment, e.g. transport systems
- The need for cash replacement technologies in low value payment environments, e.g. fast food outlets
- The need to combine two related applications in some closed environments, e.g. payment and access/entry (as in metro systems)
- The capability of combining mobile telecommunications and contactless chip technologies

There are two main drivers for the growth in contactless payments:

**1. Migration of mass transit** Near Field Communication (NFC) into low value payments. NFC, developed by Philips and Sony, securely links wireless connectivity with contactless smart card technology, enabling consumers to access information, entertainment, and payment services via their mobile phones. To date transit has been the key contactless application. These applications are driven by the transit authorities, with the financial institutions typically playing a support role.

**2. An addition to the payment card** to increase acceptance into lower transaction value merchant categories and reduce transaction time. This driver is predominately in the U.S., and has focused on payment scheme solutions such as MasterCard PayPass, Visa Wave, and American Express ExpressPay. Contactless cards allow U.S. issuers chip capabilities without the need to migrate to EMV standards. Some card issuers appear to be preparing to launch contactless applications more widely despite merchant acceptance remaining relatively low. In mid-2005, two key announcements have fuelled U.S. interest in contactless cards: Chase's launch of 'blink' cards with a contactless chip embedded in normal magnetic stripe credit cards, and American Express' conversion of its Blue cards to contactless chip.

Projections regarding the growth of contactless chip technology vary significantly; recent estimates suggest more than 600 million chip cards in 3 years.



Contactless Usage	2004	2008 Projected
Payments	11 million chips	73 million chips
Mass transit	144 million chips	204 million chips
Travel documents, e.g. passports / licenses	NIL	240 million chips
Access control and ID	16 million access cards	105 million access cards

Source: Dreifus Associates Ltd

Contactless technology has advantages over conventional contact chip cards in that it can enable faster transaction times and is suited to a low transaction value environment.

However, widespread consumer adoption requires a critical mass of merchant acceptance points as well as the confidence that a contactless card is secure against unwitting transmission to fraudsters. Currently, tests are being conducted in various countries as part of the development of electronic passports. This, combined with the development of electronic ID, could encourage wider usage and acceptance of NFC payment devices. Also Nokia, a member of the NFC forum established with Philips and Sony, is rolling out mobile phones with NFC chips and antenna.

Perhaps most significant, however, is the challenge of generating a positive business case for this technology. With the chip and antenna costing about \$1.50, and the add-on reader about \$150, plus the cost of crypto technology, the payments industry could be faced with costs similar to the introduction of EMV contact chip.

Whilst a number of financial institutions are presently working hard on the business case, it will need to be attractive for issuers and acquirers to introduce contactless after all the expense of EMV contact card migration in Europe. Also there has been little apparent analysis of the issuer risks associated with non PIN/signature authenticated transactions. In the U.S. all transactions will continue to be on-line authorised, but this could be a challenge in other markets.

Despite the above issues, the card associations remain buoyant about the future of contactless technology. MasterCard claims that PayPass will cut 12-18 seconds off a typical transaction, and is now looking to expand the technology into Europe. American Express claims it has reduced cash transactions by 53% where contactless is used and that it is 64% quicker than a usual card transaction. Visa has recently predicted that by end 2006 there will be 100,000 – 200,000 contactless merchants and “tens of millions of cardholders” in the U.S.

Future growth of contactless cards will be significantly enabled by global standards. Lack of interoperability between systems has been a major hurdle, but MasterCard and Visa have now agreed to interoperable communication standards for RFID contactless payments based on MasterCard PayPass ISO/IEC 14443. Despite the existence of such a standard, the underlying issues of compatibility of different varieties of contactless cards must still be addressed.

The Appendix outlines some examples of the use of contactless chip technology from around the world.



## → 4. Cardholder verification - biometrics

Globally, cardholder verification for card payments has relied on signature checking and, more recently, on PIN verification. Now biometric forms of cardholder verification are receiving increased attention. However, several challenges remain with biometrics:

- Technology status: for most biometrics the levels of accuracy and reliability fall short of the requirements for a robust payments system
- There are no accepted (even in-country) standards for biometrics in payments environments and no economic payments models for biometric usage, limiting international interoperability
- The issue is compounded in the online world with regard to Public Key Infrastructure (PKI). PKI is a system of digital certificates, Certificate Authorities, and other registration authorities that verify and authenticate the validity of each party involved in an internet transaction. There is at present no single PKI or single standard for setting up a PKI internationally. A robust PKI system will need more costly DDA (dynamic data authentication) cards rather than SDA (static data authentication) cards
- There remain concerns about the impact of biometric verification on transaction speed
- With the adoption in many countries of EMV chip technology, there are conflicting views as to whether biometric data should be stored on a chip in the card or within a card reading device.
- Consumer acceptance of biometric checking has raised both privacy and hygiene issues in some countries. There is also a negative perception of biometrics such as fingerprinting because of the association with criminality
- The business case for chip introduction has proved to be a challenge in many countries. Implementation of additional biometric checks to supplement or replace PIN would not be supported by a positive business case in the medium term

Please refer to the Appendix for some examples of the use of biometric technology today, including broader security applications of the technology.

## → 5. Micropayments

Micropayments refers to a range of technologies that enable buyers to use an electronic form of payment (instead of cash) for small value transactions, usually less than 5€ per transaction. There are typically three channels that are targeted for these micropayments technologies:

- Online: for digital content items such as newspaper articles and music downloads
- Mobile phone: for example to pay for premium Short Message Services (SMSs)
- Physical world: to replace low-value cash transactions

Banks have historically focused on introducing new products to target low-value purchases in the physical world. Mondex was introduced over a decade ago, and followed more recently by nation-wide electronic purse schemes such as Moneo in France (see below) and Chipknip in the





Netherlands. New entrants such as BitPass in the US or w-HA in France seem to have focused so far on other segments such as low-value online purchases.

This technology opens the largely untapped opportunity to migrate cash to electronic forms of payments among low-value transactions: the success of this technology will depend largely upon the ability to drive a significant behaviour change among consumers and merchants.



## ■ 4.0 Findings from Bank Interviews

This chapter describes the key findings from the bank interviews; it addresses banks perspectives in the following areas:

- How banks manage their payments business internally
- Assessment of the seven technologies covered in the survey
- Planned initiatives in payment-related technologies
- The future outlook for emerging payment technologies

### 1. Internal management of payments

Survey respondents were asked to describe the internal management of the payments function at their financial institution, including:

- Importance of payment products for the bank;
- Organizational structure and process to manage payments within the bank;
- Process used to assess new payments-related growth opportunities; and
- Key metrics used to assess the bank's payments performance.

Payments products are certainly important to the banks in our survey. On average, banks report that payments revenue represented from 10-20% of total bank revenues for 2004, with some respondents quoting as high as 40-50%. Most banks also report that they expect an increase in payments revenue in coming years, although expectations regarding growth vary considerably. About one-third of respondents report an annual percentage increase of 3-12%; several banks report increasing volumes/revenue but decreasing margins (due to pressure on fees and other factors); and many banks report particularly strong growth in certain segments, such as credit cards or Internet payments.

A traditional product-centric model is still the most common payment organisational structure among respondents; about one-third of banks state that their payments businesses are organized by product. The second most common organizational approach to payments is by customer segment, such as Small Business or Large Corporate customer segments. Several respondents report that their businesses are organized functionally. Although functional organizations is not a common approach to payments today, there appears to be some shift in models being employed as several banks are transitioning from product-centric to functional organization along functions such as Marketing and Risk.

Another trend noted is the increasing number of banks with a matrix organizational structure, combining a product-based approach with a segment-focused structure. For instance, Marketing and Customer Service might be organized by segment and back-office functions such as Collections or Dispute Management might be organized by product.

Most banks report that their entire payments business (issuing/acquiring, debit/credit, or card/non-card) is managed in a single combined business unit. Only about a quarter of banks, however, confirm having an overall "payments strategy" group to evaluate new technologies and innovations and drive the future direction



of the payments business. Typically payments strategy is driven at the Board level or through some other very senior executive body and developed through steering committees of managers. This results in management providing only a part-time focus on this key area as there are other day-to-day responsibilities and objectives competing for management time.

Both formal and adhoc processes are prevalent among banks for assessing new payments-related growth opportunities, although many respondents who report that an adhoc process is standard also state that a more formal process is used for larger initiatives. A number of banks explained that cross-functional committees are assigned to identify, review, and assess new payments-related growth opportunities. According to the banks in our survey, the most important metrics used to evaluate performance are:

# 1. : Profitability

# 2. : Revenue and transaction growth

Despite the important role that the payments business plays in banks' profitability, only a handful of banks report participation in any formal benchmarking as a way to assess the merit of new payments technologies or innovations.

## → 2. Bank assessment of technologies

One of the key elements of the survey relates to bank plans for each new technology. The two technologies with the highest level of implementation (either completed or underway) are EMV and 3-D Secure. This is not surprising, given the card associations have been promoting or mandating the technologies in multiple countries.

Technology	Not in Consideration	In Consideration	Under Implementation	Implemented
EMV	16%	9%	35%	40%
3-D Secure	33%	16%	14%	37%
Micropayments	33%	35%	2%	30%
P2P payments	49%	28%	9%	14%
Mobile payments	28%	56%	2%	14%
Contactless cards	35%	51%	9%	5%
Biometrics	63%	28%	9%	0%

(See Chapter 2 for a definition of the response categories)

Another key part of the survey was to understand the drivers for the decision to implement or not implement these new technologies. The table below summarises the banks' assessment of each technology against four key criteria:



Technology	Financial Attractiveness	Ease of Implementation	Market Appeal	Strategic Fit
EMV	5	N/A	3.5	5
3-D Secure	5	6.5	4	4.5
Micropayments	4	N/A	5	3.5
P2P payments	3	N/A	5.5	5
Mobile payments	3.5	3.5	5.5	6
Contactless cards	2.5	4	6	4
Biometrics	1.0	N/A	3.5	3

(See Chapter 2 for a definition of the response categories: Scale based on Low=1; Medium=5; High=10; N/A when marginal responses)

No single technology scores highly in any of the four criteria. Some technologies have a wide range of ratings. For instance, contactless cards and mobile payments score highest as "market appeal", but score low for financial attractiveness. At the other extreme, banks' assessment of biometrics is low across the four criteria.

The following parts of this section explore the findings for each technology in further detail.

## 2.1 EMV

EMV (Europay MasterCard Visa) is a standard for credit and debit payments using chip-based payment cards, or smart cards. Agreed by Visa and the merged Europay and MasterCard, it aims to ensure interoperability between smart cards and terminals worldwide. The intent is to provide a reliable global framework for the growth of smart card payment applications.

Of all the payments technologies and innovations reviewed with banks in our survey, EMV is the most prevalent in the respondents' current payments technology adoption activities. Three quarters of the banks surveyed have either already deployed or are actively in the process of implementing EMV technology.



Plans for EMV	
	Bank responses
Not in consideration	16%
In consideration	9%
Under implementation	35%
Deployed	40%

However, despite the bank activity, there is limited enthusiasm on the part of banks for this technology due to a perceived lack of market appeal. Bank respondents give moderate-to-low rankings to the technology on three criteria

Bank assessment of EMV			
Financial attractiveness	Ease of implementation	Market appeal	Strategic fit
5	N/A	3.5	5

(Scale based on Low=1; Medium=5; High=10; N/A when marginal responses)

Many respondents rank EMV as low for "market appeal" and share the concern that the market "is not ready" for the multiple applications that EMV could enable. The majority view seems to be that the multi-application concept is a technology looking for a problem to solve, but a minority of banks (for instance, in markets like Turkey) have conducted pilots or introduced products with functionalities such as award redemption at POS, membership card for sport clubs and e-ticketing for airline tickets.

Banks worldwide have already made significant financial and resource commitment to the deployment of EMV technologies and this investment is expected to continue for a number of years. While EMV will help achieve reduction in fraudulent transactions (and therefore achieving other objectives such as governmental objectives of cutting funding for drug related organised crime from card fraud), banks are challenging whether it will provide an acceptable commercial banking return (ROI).

It is clear, however, that interviewees still see an extensive list of potential business benefits for EMV beyond just compliance. Key benefits cited by survey respondents include the following:

- Fraud/risk reduction across multiple applications;
- Increased security for banks and customers;
- Opportunity to develop new EMV-based applications, such as remote authentication;



- Potential to use as a tool for internal cross-selling;
- Potentially lower overall costs in the long-term; and
- Competitive necessity.

Key hurdles regarding EMV that banks report in our survey include the following:

- Significant investment in time, resources, and money required to deploy EMV. For instance, banks in countries like Spain reported that up to 70% of their investment budgets were allocated to mandatory changes such as EMV, and in most cases, actual EMV expenses are exceeding budgets
- Lack of a positive business case given investment cost and relative benefits;
- Cost to deploy the POS terminal infrastructure required to process EMV payments;
- Phasing out existing POS terminal technology and bringing merchants online with the new; and
- Overall complexity of the implementation.

Potential ways of offsetting the investment cost for banks from EMV include multi-application cards, leveraging EMV to provide new services, or the role EMV could play in managing credit risk. Even with these additional opportunities, banks are finding EMV challenging both in terms of meeting implementation timelines and in finding a viable long-term business case.

In general, in markets where EMV is being deployed, banks are focusing their investment and project resources on migration, rather than other new technologies. In markets where EMV implementation has already occurred, such as in the United Kingdom, the focus now is driving benefits from the new platform to help justify the sunk cost in EMV technology, but there has been little achieved so far.

## 2.2 3-D Secure

3-Domain (3-D Secure™) technology is not just a payment authentication method or a technology definition, but a model that isolates the responsibilities of various parties associated with a payment transaction cycle. Visa developed 3-D Secure, a key component of the Visa Authenticated Payment Program, in response to fraud risk concerns as electronic commerce purchase volumes have continued to increase.

Visa deployed 3-D Secure for its Verified by Visa product and MasterCard also adopted the 3-D Secure Protocol for its SecureCode programme. Both the Visa and MasterCard schemes require the consumer to enter a password, unique to each credit card before a transaction is approved. As a result, 3-D Secure is an authenticated payment environment that requires the issuer to be participating, the merchant to be participating, and the cardholder to have registered for the process with their issuer. In essence, each of the involved parties must be enabled to support 3-D Secure transactions.

The banks in our survey state that 3-D Secure technology is playing an important role in their current payments strategy activities.. More than half of the banks surveyed have either already deployed or are currently implementing 3-D Secure, and an additional 16% of banks surveyed are considering the technology. Of the seven technologies within the scope of our survey, only EMV is being implemented by more banks.



Plans for 3-D Secure	
	Bank responses
Not in consideration	33%
In consideration	16%
Under implementation	14%
Deployed	37%

In general, banks rate 3-D Secure as a relatively attractive new technology across the four criteria of financial attractiveness, ease of implementation, market appeal, and strategic fit. Bank respondents report "Ease of implementation" as the most attractive aspect of 3-D Secure. Despite a number of bank respondents listing increased consumer confidence in card usage for Internet purchases as a key benefit of 3-D Secure, the banks in our survey rate "Market appeal" as its least attractive aspect. This might be due to the varying level of merchant adoption from one segment to another: although some merchants have deployed 3-D Secure, other online merchants do not plan to deploy due to the concern of adding one extra step in the online buying experience.

Bank assessment of 3-D Secure			
Financial attractiveness	Ease of implementation	Market appeal	Strategic fit
5	6.5	4	4.5

(Scale based on Low=1; Medium=5; High=10; N/A when marginal responses)

A key driver for 3-D Secure is the need to mitigate fraud risk from increasing e-commerce purchase volumes. Banks' viewpoints on the benefits and hurdles associated with 3-D Secure are driven to some extent by their perspective on the importance of e-commerce transactions. Some respondents comment that they do not see a strong enough demand to create a positive business case for the technology, while others cite 3-D Secure as an important part of their vision to build a more secure solution for Internet payments.

The banks in our survey report both fraud reduction and increased cardholder confidence as benefits from 3-D Secure, along with the following:

- Competitive necessity as Internet usage grows
- Additional security for e-commerce businesses of corporate customers
- Increased card usage due to trust and security provided to cardholders

- Increased revenue (from increased card usage)

In general, high investment cost is cited by the respondent banks as the greatest hurdle for implementing 3-D Secure. Although on average the banks rate “ease of implementation” as a strength of 3-D Secure, there are concerns for some banks regarding the complexity of deploying 3-D Secure vs. the relatively low volume of transactions involved.

Other issues cited by the banks surveyed include the following:

- Lack of appeal and process complexity for the cardholder;
- Need for a global standards;
- Concern on the lack of transaction acceptance by some issuers (particularly US) that will not respond to the 3D- Secure transaction request;
- Merchant acceptance is hindered and acquiring cost increases; and
- Uncertain demand/usage and business case to support investment.

## 2.3 Micropayments

Micropayments refers to a range of technologies that enables buyers to use an electronic form of payment (instead of cash) for small value transactions, usually less than 5€ per transaction.

Based upon our survey results, micropayments have a relatively high level of actual deployment by banks in the study, primarily driven by the fact that banks in countries like France or the Netherlands have been involved in the deployment of nationwide electronic purses.

Plans for Micropayments	
	Bank responses
Not in consideration	33%
In consideration	35%
Under implementation	2%
Deployed	30%

Despite the high activity around this technology, most bank respondents are skeptical about the success of electronic purses, and of micropayments in general. Overall, bank respondents give low-to-moderate rankings to micropayments as a new technology across the four criteria:



Bank assessment of Micropayments			
Financial attractiveness	Ease of implementation	Market appeal	Strategic fit
4	N/A	5	3.5

(Scale based on Low=1; Medium=5; High=10; N/A when marginal responses)

Many respondents rank micropayments as relatively low for "financial attractiveness" and share their concern that it is likely to take a significant upfront investment in order to set up a successful micropayments service, especially for the physical world. However, a minority of players are interested in setting up new products (or turning existing electronic purse pilots or schemes into mass-market ventures) because of the sheer size of the opportunity. For instance, low-value cash transactions are estimated to be close to \$1.3 trillion in the US and less than 1% of these transactions take place on a payment card. In the UK, consumers conduct about 17 billion cash transactions below £5 each year.

Some of the surveyed banks believe that there is an opportunity to migrate cash to electronic payment, using a micropayments capability to help with cardholder retention. Other benefits cited by survey respondents include the following:

- Incremental revenues for issuers and acquirers (compared to cash that typically generates little, if any, fee income for financial institutions)
- Cheaper way of handling the transaction for the bank and cheaper for the merchant. This assumes that (1) merchants have quantified the actual cost of accepting cash (including fees paid to banks as well as other items such as fraud losses, labor costs associated with cash handling), and (2) micropayments are priced competitively to cash
- Offering a new product that will appeal to the "youth" market
- Appropriate solution to reduce cash handling costs for niche markets, such as non-attended devices accepting cash (e.g., parking meters, vending machines, jukeboxes, slot machines)

However a majority of respondents are skeptical about these benefits. Key issues raised were the large investment cost associated with providing an alternative to cash for physical transactions, and the relatively small market opportunity related to online and mobile transactions. For instance, market opportunities for micropayments are estimated to be approximately \$5 billion for the online market, and less than \$1 billion for the mobile market in the US. Another concern is that most micropayments solutions tend to be a difficult concept for consumers to comprehend compared to the ease of using cash for low-value transactions.

Other hurdles of micropayments reported by interviewees include the following:

- Unclear economics: Because of the low value of each transaction, micropayments players have to get the right balance between a merchant pricing level that is attractive whilst still generating



enough revenue for the micropayments operator / bank

- Acceptance among merchants and consumer adoption: Because of the ingrained preference for using cash for small value transactions, there is a real consumer inertia that micropayments providers will have to overcome. A fundamental issue with merchants is the fact that most financial institutions do not charge the full cost of cash handling to merchants, thereby making the business case for some alternative payment types incorrectly appear to be less attractive than cash
- In some markets, there are regulatory requirements to produce statements for electronic transactions; this additional expense can make micropayments uneconomic
- There are also concerns about fraudulent activities and for the costs associated with setting up the fraud prevention tools and business processes
- Limited success of prior implementations of electronic purse

## 2.4 P2P Payments

P2P (Person-to-Person) payments is a payment-related technology that enables a wide range of services, including online P2P payments (e.g., PayPal), the introduction of card-to-card transfers (e.g., Visa Direct), and money transfer networks enabling domestic and international remittances (e.g., Western Union). These services already represent a significant volume of payment transactions. For instance, the cross-border remittance market is estimated to be close to \$160 billion in 2005, and the top 10 "sending" countries include the United States, Germany, France, and Spain.

The definition of P2P payments becomes even broader as the players in P2P payments expand from a pure Person-to-Person model to other types of transactions, such as facilitating the payment of a transaction from a buyer to a very small (micro) merchant, or even to large merchants. For instance, PayPal currently handles approximately \$20 billion in annual sales volume, and a significant number of these transactions are driven by micro-merchants selling via eBay.

In general, the banks surveyed are not offering P2P payments solutions, nor are they in the process of implementing the technology; less than one-quarter of our interviewees have deployed, or are in the process of implementing, some form of P2P payments product.

Plans for P2P Payments	
	Bank responses
Not in consideration	49%
In consideration	28%
Under implementation	9%
Deployed	14%



Some banks are implementing P2P as a cross-border remittance solution. One large retail bank in our survey is about to leverage their branch network to collect money transfer orders from senders that want to initiate a cross-border remittance. This bank is developing relationships with foreign banks (that also have a large branch network in their respective local markets) to enable receivers to collect their funds from a local bank branch. However, this seems to be an exception rather than a widespread trend as the vast majority of banks surveyed believe that the P2P payments opportunity has already been captured – e.g., by PayPal for online transactions, and by Western Union for money transfers in the physical world.

Bank respondents have a moderate level of enthusiasm for P2P payments technologies, tempered by a perceived lack of attractive financials, and the significant market share lead of a few competitors.

Bank assessment of P2P Payments			
Financial attractiveness	Ease of implementation	Market appeal	Strategic fit
3	N/A	5.5	5

(Scale based on Low=1; Medium=5; High=10; N/A when marginal responses)

Many respondents rank P2P payments as low for “financial attractiveness” and share their concern that it is likely to take a significant upfront investment in order to set up a new and competitive P2P payments service.

From a benefits perspective, certain banks cite the ability for P2P payments to generate incremental cardholder satisfaction and differentiation by offering a P2P payments service. (It should be noted, however, that a majority of respondents are skeptical about these two potential benefits.) Other benefits cited by survey respondents include the following:

- Responding to customers’ expectations for a convenient, fast and safe way of transferring funds to friends and family
- Taking the technological leadership in their local market

Most surveyed banks are skeptical about the P2P payments opportunity because of the uncertainty related to market demand and the large investment cost associated with setting up the equivalent of a new payment network. Other hurdles regarding P2P payments that banks report in our survey include the following:

- Abandoned because of regulation: some European markets have domestic banking laws that either prevent or make it difficult to introduce a robust P2P payments service
- Pricing: Banks are unclear about the level of pricing that senders (or receivers) are willing to accept for this type of service
- Unclear business case

- Difficult to offer a simple and easy solution to use by customers
- Fraud concerns, especially in the context of (1) organized crime and terrorist activities, and (2) increasing levels of phishing activities targeting banks and P2P players

## 2.5 Mobile Payments

Mobile payments and commerce can be divided into two broad categories:

- Payments for mobile-related services (e.g. purchase of ring tones) and for data provided through a mobile or device connected through a cellular network (e.g. Premium SMS)
- Payments for purchases in the physical world (e.g. using a mobile phone as a payment device at a retail outlet or in a vending machine)

The banks in our survey identify mobile payments as being among the most active technologies that is being reviewed, with 56% of the banks having mobile payments in their consideration. However, only 14% of the banks surveyed have actually deployed a mobile payments solution.

Plans for Mobile Payments	
	Bank responses
Not in consideration	28%
In consideration	56%
Under implementation	2%
Deployed	14%

Banks in our survey characterize mobile payments as a technology with slightly above-average market appeal (although certain niche segments would find it more appealing). Their biggest concerns with the technology are the ease of implementation and the lack of financial attractiveness

Bank Assessment of Mobile Payments			
Financial attractiveness	Ease of implementation	Market appeal	Strategic fit
3.5	3.5	5.5	6

(Scale based on Low=1; Medium=5; High=10; N/A when marginal responses)

The potential for mobile payments to reduce cash payments and the technology's ability to differentiate the bank's payments product offerings – and thereby increase customer retention and satisfaction – are



two benefits cited for this technology. Other benefits noted by the banks include:

- Increased loyalty from clients in certain niche markets;
- Opportunity to differentiate product offerings and display technological leadership;
- Enables the bank to migrate payments from more expensive devices; and
- Ability to build closer relationships with telecommunications operators.

Among the challenges for mobile payments technology, banks consider implementation to be potentially difficult, particularly since so many parties must be involved in delivering the system to the customer and the merchant. Other issues noted by the respondents include:

- Negotiations with telecommunications companies may be challenging as telecommunications companies will see banks as a threat to their revenue stream;
- No standards set, and no consensus on the direction that mobile payments will evolve;
- Uncertain future regulatory environment;
- Concerns regarding fraudulent transactions; and
- No broad market demand from customers.

## 2.6 Contactless Cards

Contactless cards are based on technologies (e.g., RFID) that enable a cardholder to make a purchase by waving their card in front of a POS device (i.e., without swiping their card through a traditional POS device).

Contactless cards are on the radar screen of the majority of banks; 51% of the banks surveyed are considering the technology. However, it is worth pointing out that most respondents (that indicate they are considering contactless cards) adopt a very passive assessment of contactless cards. We have found very limited evidence of active assessment such as detailed business cases or participation in pilots (note: all of the findings in this section are heavily influenced by the large representation of European banks in our survey; banks' assessment and plans for contactless cards are very different in North America).

Plans for Contactless Cards	
	Bank responses
Not in consideration	35%
In consideration	51%
Under implementation	9%
Deployed	5%

This passive approach to contactless cards is also reflected in the banks' rankings of this technology



across the four criteria. Banks do not see a compelling business case for the technology, despite an above-average rating for market appeal.

Bank assessment of Contactless Cards			
Financial attractiveness	Ease of implementation	Market appeal	Strategic fit
2.5	4	6	4

(Scale based on Low=1; Medium=5; High=10; N/A when marginal responses)

Many respondents rank contactless cards as low for "financial attractiveness" because of the significant investment required upfront, especially the upgrading of plastic cards, of POS devices, and the consumer and merchant education activities. The majority view seems to be that contactless cards is a technology that will be widely adopted but not in the near future; mass-market adoption is still more than 2-3 years away.

Banks see the benefits of contactless cards in their ability to generate incremental cardholder satisfaction and to help migrate cash to electronic payments. This migration to electronic payments will generate incremental revenue for issuers driven by incremental card spend. Other benefits cited by survey respondents included the following:

- Increase in card activation (and usage) as cardholders can use their card at new merchant locations
- The opportunity to become the cardholder's preferred card (with a higher share of wallet): the assumption is that cardholders with multiple payment cards in their wallet (as is typical in markets like the US or Japan) are more likely to choose their contactless card as their preferred card due to the enhanced speed and convenience
- Perceived high value for specific cardholder segments (e.g., youth segment). A number of survey respondents believe that younger consumers are more likely to be attracted by a product like a contactless card. The high level of adoption of American Express' Blue Card among younger consumers is an example of how technology can be perceived as a valuable feature by this segment
- Increased migration from cash to electronic payment
- Reduced fraud
- Increased competitiveness for issuers
- Increased customer retention
- Opportunity to work with local councils / municipalities to penetrate micropayments
- Opening new merchant segments (e.g., QSR, transit) to card acceptance

Offsetting these benefits, however, are significant cost hurdles which need to be overcome when developing the business case for contactless cards. Migrating to contactless cards will require a substantial investment to upgrade the actual plastic cards with a chip and an antenna that are embedded in the card (see below an example for a PayPass card).



On the merchant side, there is an incremental investment for the merchant in purchasing (or leasing), installing, and training on a new device that will connect to its existing POS terminal. In addition to increased costs, the banks cited concerns as to whether cardholders will understand and adopt this technology. Merchants might see the benefits of a faster transaction as it helps their business, but will consumers value the faster transaction compared to cash or traditional payment cards? Anecdotal evidence mentioned during the interviews indicated that consumers did perceive the value of a faster transaction, especially in circumstances where delays are likely to occur (e.g., when renting a video over the weekend, when buying a movie ticket, etc.).

Other hurdles regarding contactless cards that banks report in our survey include the following:

- Lack of common standards (e.g., banks are waiting for ZKA rules in Germany)
- Chicken and egg problem (need for simultaneous adoption by both merchants and cardholders). In markets such as the US, this is partly being addressed by card association promotions, and by banks that have both large issuing and acquiring businesses (e.g., Chase with 95 million cards on the issuing side, and a 17% market share on the acquiring side in the US)
- POS equipment not ready
  - Note: this might change rapidly as contactless POS device manufacturers such as ViVOtech are now offering contactless devices that can be linked to existing POS terminals, and typical prices are 100-150 euros per device
  - Cardholder concerns of inadvertent transactions occurring, i.e., by walking in front of the device
  - Incremental back-office costs for issuers such as handling of disputes (based on the concern that there might be a higher level of disputes on contactless transactions)
  - Low incremental profitability for banks due to the low-value of incremental transactions generated by contactless cards
  - Not a mass-market application, only relevant for niches such as parking meters, hence limited potential for incremental transactions



- Contactless cards are still an unproven technology but the types of merchants that seem interested in adopting this technology include Quick Service Restaurants, petrol stations, drugstores, movie theatres, and so forth
- Need association level coordination for standards / rules and also to avoid consumer confusion with the proliferation of new sub-brands such as Chase Blink, MasterCard PayPass, Visa Contactless, and so forth

## 2.7 Biometrics

Biometrics are technologies used to authenticate payment transactions by identifying the customer through some physical characteristic of the person – a fingerprint, voiceprint (voice recognition), hand geometry, signature verification, retina eye scan (iris recognition), and the like.

Despite biometrics' growing impact and hype in the public sector, biometrics was among the least active technologies of those reviewed with banks in our survey. None of the banks surveyed reported a live deployment of biometric authentication technology and only 9% report being in implementation with a biometric solution. Only 28% of the banks are evaluating the technology, indicating that biometrics could be on the back burner for financial institutions for a while.

Plans for Biometrics	
	Bank responses
Not in consideration	63%
In consideration	28%
Under implementation	9%
Deployed	0%

Not surprisingly, survey respondents do not perceive biometrics to be an attractive opportunity in the short term in terms of "Strategic fit", "Market appeal", and "Financial attractiveness." Overall, biometrics is viewed as an unclear opportunity and with no immediate tactical actions required.

Bank assessment of Biometrics			
Financial attractiveness	Ease of implementation	Market appeal	Strategic fit
1	N/A	3.5	3

(Scale based on Low=1; Medium=5; High=10; N/A when marginal responses)

The banks in our survey generally recognize some benefits that could be generated from biometrics. Survey respondents cite fraud/risk reduction as the most attractive benefit, followed by client



retention/satisfaction and efficiency in processing payment transactions. The primary benefits for biometrics, such as fraud reduction and higher security, are reported by banks in the context of benefits that would be realized in the future. Several banks do express that they see value in the "wow" factor and being perceived as a customer-driven technology leader, especially given recent consumer concerns over identify theft.

Banks report waiting for a standard in biometrics to emerge and several survey respondents say they are "waiting for a decision as to what to use and what standard to follow." Other banks cite concerns about the reliability of the existing technology and consumer acceptance, such as "chatter about false positives" and "people do not like to touch what someone else has touched." Customer privacy is also cited as a sensitive issue for consumer acceptance of biometrics. In general, the banks surveyed do not see biometric authentication technologies as mature enough to justify the high investment required for its implementation.

### → 3. Banks' planned initiatives

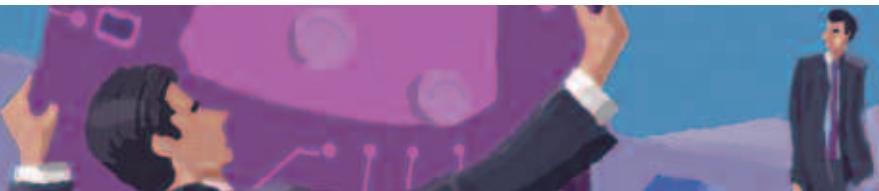
As part of the survey, banks were also asked to comment on their planned new payments technology initiatives, including:

- Investment plans and amounts for 2005, 2006, and beyond;
- Key objectives for investments in individual technologies;
- Plans to build vs. buy vs. partner to implement new payments technologies;
- Implementation timelines; and
- Expected financial impact.

Less than a quarter of respondents provided any specific information regarding financial investments planned for 2005 and 2006, but some themes did emerge. Several banks report considerable planned investment in EMV technology in 2005 and 2006 ranging from €1 million to as much as €20 million each year. Several other banks report significant investments in other new technologies (e.g., €200,000 on 3-D Secure, €5 million on Micropayments). Although the data is incomplete, it is clear from our interviews with European banks in particular that deployment of EMV technology has captured a significant enough share of banks' resources to impact their ability to invest in other new payments technology initiatives over the next 24 months.

Based on our interviews, it appears that most banks do not provide specific information about financial investments for three reasons: (1) need to protect confidentiality, (2) lack of availability of the appropriate management and investment information, and (3) the very marginal (if any) budgets allocated to technology-related investments.

Survey respondents were asked to comment on the relative importance of potential objectives for investment in new payments technologies, as follows: 1) Recruit new customers, 2) Cross-sell to existing customers, 3) Retain existing customers, and 4) Reduce costs. As shown in the chart below, cost reduction was the most frequently cited investment objective.



## Key Objective for Investment in Technology

Payment Technology	Recruiting New Customers	Cross-selling to Existing Customers	Retaining Existing Customers	Reducing Costs
EMV				✓
3-D Secure				✓
Micropayments				✓
P2P payments	✓	✓		
Mobile payments	✓	✓		
Contactless cards			✓	
Biometrics				✓

Banks cite a variety of strategies for implementing new payments technologies in terms of 'Build' vs. 'Buy' vs. 'Partner'. EMV technology, where most of banks' investment money is being utilised in the short-term, is primarily being implemented via either solutions developed in-house or through external partnerships; less than 10% of respondents cite a 'Buy' approach to EMV. As shown below, 'Build' or 'Partner' approaches are always preferred to buying a solution for these emerging technologies.

Deployment Strategy	Build	Buy	Partner
EMV	#1	#3	#2
3-D Secure	#1	#3	#2
Micropayments	#1(tie)	#3	#1(tie)
P2P payments	#1	#3	#2
Mobile payments	#1(tie)	#3	#1(tie)
Contactless cards	#2	#3	#1
Biometrics	#2	#3	#1



In terms of timeline, EMV is the most immediate concern for most banks, which is consistent with the banks' responses regarding current financial investment in new payments technology. Nearly all respondents report that EMV is either already up and running, as is the case with all U.K. banks and several other banks in other markets, or provided an implementation timeline with expected live dates for EMV within 2 to 5 years. Following behind EMV, 3-D Secure is the technology which is either live or planned for implementation; more than half of banks are already live with 3-D Secure or have implementations planned over the next 18 months.

Implementation of Contactless Cards was the third most active with about one-third of bank respondents reporting implementation plans for the next 2 to 3 years.

Outside of EMV, 3-D Secure, and Contactless Cards, very few banks report firm implementation timelines for new payment technologies. However, a number of banks are keeping a "watching brief" in order to determine when either a clear business case emerges or another player has moved and is taking valuable market share.

More than half of bank respondents chose not to estimate the financial net impact of new technologies for their bank, citing long-term business cases and too much uncertainty. Of the banks which do provide an estimate, most (but only by a small margin) report the financial net impact of new technology to be somewhere between 1% and 10% of the bank's total net revenue.

The remaining responses are evenly split between:

- The long-term and optimistic view that new technology will account for more than 10% of the bank's total net revenue in coming years; and
- The more conservative and perhaps short-term view that new technology will represent less than 1% of the bank's total net revenue.

## → 4. Banks' views on future outlook

Finally, survey respondents were asked to share their views on the future outlook for new payments technologies and their payments businesses overall, including:

- Projections for payment volumes and revenues;
- Potential changes in buyer behaviour;
- Potential changes in merchant bank relationship; and
- Views on other factors such as payment regulation, SEPA.

Banks responded to our questions regarding projections for payments volumes and revenues with both quantitative and qualitative responses. In general, it is clear that banks are optimistic about the future growth of their payments businesses. On average, respondents project continued sustained double-digit annual growth in transaction volume for both card issuing and merchant acquiring over the next four years. Banks also project growth in the transaction volume for other electronic payments transactions but at a somewhat slower pace than cards. Interestingly, banks



project cash/check volumes to remain relatively static, decreasing only slightly (or even to increase slightly) despite their goals to decrease cash/check volumes over the next four years. Most banks report that they project total revenue from payments transactions to grow over the next four years despite a number of factors that are compressing margins, including increased competition, regulatory changes, and merchant lobbying groups.

The next topic of our survey is banks' view related to potential changes in buyer behaviors developing over the next several years. The first theme that emerges from the responses is an anticipated shift of payment volumes across a number of dimensions, particularly: from cash to card; from offline to electronic; and from credit to debit. Banks in most markets expect transaction volume increases for all card products and increased adoption of electronic payments, particularly for recurring bill payments. One respondent also projects that the increase in electronic bill payment will also produce greater acceptance of electronic bill presentation.

Another recurring theme from the banks' responses is that consumers increasingly accept new technology, particularly (1) younger, and (2) affluent consumers, but they are also becoming more and more impatient. One respondent describes this phenomenon as "the fickle customer" who has no patience with technology, wants to be able to access their money, and is increasing their transaction volume along with their acceptance of various payment methods and channels. Another bank respondent expressed concern over the potential scenario that an increasing number of low-value transactions could result in large expense for not much reward.

Several other bank respondents take the position that they will look to influence changes in buyer behavior through pricing and other means. One reported that they hope to influence the next generation into moving from cash to electronic payments. Most banks agree, however, that influencing consumers' paying behavior is very difficult and that correctly segmenting the customer base is the key to developing a successful marketing and product strategy.

When asked about potential changes in the merchant-bank relationship, survey respondents provide a number of interesting observations. Most banks anticipate merchants having stronger and more active control of the relationship. The banks report that the consolidation of the major high-volume merchants will continue to apply pressure on their bank's acquiring revenue, and that the smaller merchants will lobby the banks and the regulators to make the acceptance of cards cheaper. The banks in our survey also recognise that merchants are becoming aware of the cost of cash and are therefore looking to partner with banks to improve cash management. The overall theme from most responses is a need for strong cooperation and partnership between banks and their merchant customers. One particular challenge with new payments technology is the burden it places on merchants to replace infrastructure, and therefore banks are recognising the need to think of new business models to introduce new technology in partnership with merchants.

On regulatory matters, banks are quite vocal in their views regarding the Single Euro Payments Area (SEPA). The intent of SEPA is to ensure that, wherever the euro is used as the transaction currency, any customer within SEPA gets the same service at the same price for euro credit transfers, direct debits and so on, irrespective of where, in SEPA, the counterparty to these payment transactions may be located. It is intended that SEPA principles will be implemented in stages in 12 countries up to 2010, affecting the broader European Union later. Many respondents in our survey, however, express concern about the impact that SEPA will have on payments revenues and their businesses in general, with some banks reporting that they have already experienced losses in revenue in cross-border payment transactions. Several banks express the view that "SEPA will never work" and that "SEPA will be extremely expensive and ineffective." Banks also note that SEPA has created a requirement for significant investment to ensure compliance.



Regulation is not perceived by banks entirely as a bad thing, however. One respondent notes that regulation can have a positive effect in that it can be "a prompt to move banks along." The general view is that regulation will always be there, and not necessarily any more in the future than at present, but that the regulators need to be sensitive to business issues – regulation should "educate and create." In some cases, however, banks report that regulation can hinder investment in new products and slow the growth of new payments technologies and innovations, especially if regulators keep "changing the rules of the game".

In summary, most banks are optimistic about the outlook of the payments industry for the next 2-3 years, but are increasingly concerned about the longer-term due to changes in the environment such as regulatory reviews and the potential impact of new players.



## ■ 5.0 Conclusions and EDC Perspectives

Based upon our interviews with the participants in this study as well as our knowledge of the industry, this chapter provides conclusions and perspectives on new and emerging payment-related technologies. These views are presented in two sections:

1. Overarching themes relating to technology in the payments business
2. EDC's perspectives on the technologies covered in this report

### 1. Overarching themes

We see six overarching themes emerging related to new payment technologies:

1. There is not a single payments-related technology focus for the future; various technologies are competing for retail bank attention, global adoption, and investment funding.
2. Typically, technology adoption has become a by-product of more critical strategies relating to the achievement of profitable growth in the financial services industry or to Point of Sale (POS) development within the retail and transport sectors.
3. Technology adoption in payments is an evolutionary, rather than revolutionary, process.
4. The appetite for investment in new payments-related technologies is not high for many banks.
5. New technology applications have yet to fundamentally change the consumer payments model.
6. Whilst the banking sector procrastinates, others are driving change.

#### #1. There is not a single payments-related technology focus for the future; various technologies are competing for retail bank attention, global adoption, and investment funding.

In the last five years, the emergence of digital commerce has been a major driving force in the financial services industry. It has contributed to the creation of new channels and corresponding devices, new markets, new products, increased competition and changing consumer requirements. New advances and capabilities in the technology sector have effectively forced banks to commit to significant investments to enable them to remain competitive in this new world.

Now the digital explosion has subsided, however, there is no overarching theme or single technology focus for the future – no identified “next winner” in terms of technology development and innovation in the world of payments. Also, with the possible exception of EMV chip in Europe, banks feel no pressure to adopt some of the technologies as perhaps they have done with the e-commerce furor a few years ago.



#2. Typically, technology adoption has become a by-product of more critical strategies relating to the achievement of profitable growth in the financial services industry or to Point of Sale (POS) development within the retail and transport sectors.

The principal generic strategies leading to technology adoption and utilisation within the financial services sector are:

1. Product differentiation to obtain competitive advantage
2. Customer Value Management and Development (CVM) to build customer profitability and retention
3. Operating cost reduction
4. Fraud / risk management
5. Channel and distribution

The table below shows the relationship between these key generic strategies of financial services institutions and examples of how these have been implemented within the payments sector with the utilisation of evolving technologies.



Generic strategy	Payments sector focus	Underlying technologies
• Product differentiation for competitive advantage	• New payment forms for different types of payments, e.g. micropayments, low value payments, business to business / account to account across the internet • Customer convenience	• Chip (EMV) for card use (multi-applications, multi-function) • Electronic purse (value transfer, stored value) • Mobile • Web-based
• Customer Value Management and Development (CVM) for customer profitability and retention	• Loyalty schemes linked to payments	• Chip cards • Database / CRM systems
• Operating cost reduction for P/L enhancement	• Authorisation cost reduction • POS device cost reduction • Clearing and settlement systems	• Telecommunications • Modular configuration of EFTPOS terminals
• Fraud / risk management for P/L enhancement	• Card authentication (CAM), Customer verification (CVM) • Risk tools, customer profiling	• Chip cards • Neural networks / customer profiling • Biometrics • Verified by Visa etc • Credit bureaux development
• Channel and distribution for customer convenience and marketing efficiencies	• Extended payments acceptance – Card not present environments, mobile, internet banking / buying and selling • Customer access strategies • B2B marketplaces	• Mobile telecoms • Internet / web • Contactless chip cards

### #3. Technology adoption in payments is an evolutionary, rather than revolutionary, process

For many years, we have tracked the development of some of the technologies discussed in this report, and have observed that this is an evolutionary, rather than a revolutionary, process. Most have resulted from incremental change and real technology innovation for payments alone has been rare. Even EMV chip on cards is still not universal owing to different views from market to market on long term benefits and the underlying business case.

Perhaps the most innovative approaches to payments in recent years have occurred in two main areas.

1. In the second half of the 1990's a plethora of electronic purse schemes emerged around the



world, some based on innovative technology. Mondex was a case study example of how difficult it can be for a new technology-based payment system to become established. Most purse schemes have now disappeared or failed to reach critical mass, make money or attract consumer interest.

2. By the late 1990's the focus shifted to the internet and an explosion of internet-based solutions attracted high levels of investment funds and employee resources at most major financial institutions around the world. Payments were an integral part of the internet revolution, yet few of the payments companies operating at that time have survived, due in large part to the challenges of demonstrating profitable business models.

#### #4. The appetite for investment in new payments-related technologies is not high for many banks

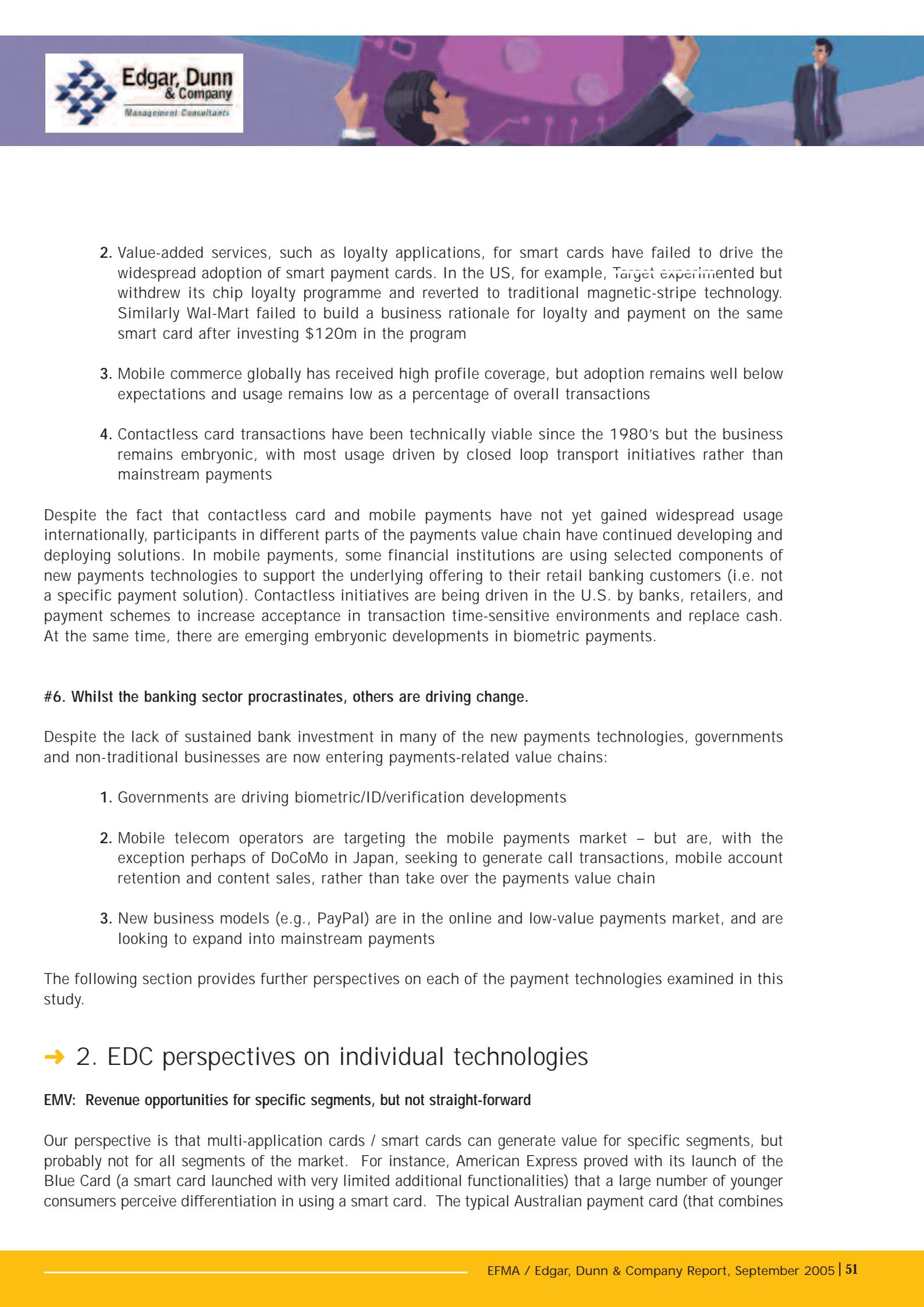
After the internet boom/bust, financial institutions are increasingly reluctant to invest in new technologies (e.g. most have disbanded incubators) for the following reasons:

1. For any new technology to work in payments, there must be a critical mass of users and acceptors. This implies international standards and interoperability are a prerequisite. No one institution can usually drive or guarantee that standards will be adopted by competing institutions without the existence of a rules authority and intermediary such as a payments scheme
2. Real consumer demand and potential adoption of new technologies is often very uncertain. The fact that the captive transport commuter in London will use an Oyster card does not imply that the same card will be as popular for day to day purchases where other cards are used
3. The business cases for technology-based payment systems are at best uncertain, especially in terms of revenues generated. Consumers in many countries in Europe receive subsidised payments services, especially for cash payments and the value proposition for new payment types has to be markedly superior for the consumer and/or merchant to accept higher fees (or any fees at all) for those payment options. Business cases based only on cash substitution economics (lower operating costs) and / or value added solutions tend to be unattractive now to financial institutions
4. Most financial institutions prefer to be technology 'fast followers' than pioneers. This has led to slower adoption of new technologies, as can be seen, for example, in the reluctance to embrace EMV except where the fraud business case has been over-whelming.

#### #5. New technology applications have yet to fundamentally change the consumer payments model

For many of the aforementioned reasons, no new technology business model has yet generated a fundamental shift in the payments model or in associated functionality or services. For example:

1. Even in markets where EMV chip is being deployed, banks are focusing their investment and project resources on migration and fraud reduction, rather than on the potential that chip technology offers in terms of multi-application and product differentiation. In markets where implementation has occurred (e.g. the UK), the focus is intended to drive benefits from the new platform. However, implementation has been on the minimum-sized chip to manage payment transactions; there is very limited capacity for extra functions or applications

- 
2. Value-added services, such as loyalty applications, for smart cards have failed to drive the widespread adoption of smart payment cards. In the US, for example, Target experimented but withdrew its chip loyalty programme and reverted to traditional magnetic-stripe technology. Similarly Wal-Mart failed to build a business rationale for loyalty and payment on the same smart card after investing \$120m in the program
  3. Mobile commerce globally has received high profile coverage, but adoption remains well below expectations and usage remains low as a percentage of overall transactions
  4. Contactless card transactions have been technically viable since the 1980's but the business remains embryonic, with most usage driven by closed loop transport initiatives rather than mainstream payments

Despite the fact that contactless card and mobile payments have not yet gained widespread usage internationally, participants in different parts of the payments value chain have continued developing and deploying solutions. In mobile payments, some financial institutions are using selected components of new payments technologies to support the underlying offering to their retail banking customers (i.e. not a specific payment solution). Contactless initiatives are being driven in the U.S. by banks, retailers, and payment schemes to increase acceptance in transaction time-sensitive environments and replace cash. At the same time, there are emerging embryonic developments in biometric payments.

## #6. Whilst the banking sector procrastinates, others are driving change.

Despite the lack of sustained bank investment in many of the new payments technologies, governments and non-traditional businesses are now entering payments-related value chains:

1. Governments are driving biometric/ID/verification developments
2. Mobile telecom operators are targeting the mobile payments market – but are, with the exception perhaps of DoCoMo in Japan, seeking to generate call transactions, mobile account retention and content sales, rather than take over the payments value chain
3. New business models (e.g., PayPal) are in the online and low-value payments market, and are looking to expand into mainstream payments

The following section provides further perspectives on each of the payment technologies examined in this study.

## → 2. EDC perspectives on individual technologies

### EMV: Revenue opportunities for specific segments, but not straight-forward

Our perspective is that multi-application cards / smart cards can generate value for specific segments, but probably not for all segments of the market. For instance, American Express proved with its launch of the Blue Card (a smart card launched with very limited additional functionalities) that a large number of younger consumers perceive differentiation in using a smart card. The typical Australian payment card (that combines



a credit card and a debit card - EFTPoS - functionality), and the migration of Octopus from a transit-only card to a card that can be used to make broader retail purchases are two examples of a card combining two applications.

However, introducing the appropriate applications on an EMV platform will require additional investments in order to bring different value propositions to market, learn from pilots, and fine-tune the delivery of the appropriate applications for the right segment. As a large number of European banks have little additional investment funding outside of the mandated EMV investments, we do not believe that multi-application cards will achieve mass market status in the next 2-3 years.

### **3-D Secure Merchant adoption is the key to success**

Based upon our survey interviews, it appears that banks are split between perceiving 3-D Secure as a useful fraud prevention tool for online transactions, and doubting whether online merchants will adopt 3-D Secure en masse. It appears that some large merchants have deployed 3-D Secure, resulting in reduced chargebacks and incremental revenues. However, there is a concern (especially among online merchants) that 3-D Secure adds an extra step in the buying experience for the consumer.

Many banks have responded to the card associations' mandates and to the financial incentive for doing so. We believe the success of this technology will depend mostly upon the adoption among merchants, and whether the cost reductions and incremental sales more than offset merchants' concerns about lengthening and complicating the buying experience.

### **Micropayments : Large opportunity, but hard to penetrate**

Our perspective is that it is very difficult to convince (a) consumers and (b) merchants to migrate away from cash for low-value transactions. Based on survey interviews and on market observation, we believe the more difficult of the two is changing consumer behaviour. Furthermore, our perspective is that successful deployment of micropayments technologies need to focus on merchants that have a real "pain point" to address, thereby maximising the case for change by the merchant and the consumer.

For instance, merchants that utilise unattended POS devices such as vending machines, parking meters, or slot machines tend to realise the actual costs associated with handling cash, and are more likely to perceive potential revenue enhancement opportunities. It is therefore likely that these merchants might be more attracted to micropayments solutions, which will contribute to changing consumer behaviour. For instance, one city council deployed parking meters with a micropayments solution enabling usage of standard payment cards and is providing an incentive (2 hours of free parking) for users to pay by card.

In conclusion, we believe that there is an opportunity for micropayments, in both the online and the physical world, as long as there is a strong value proposition for merchants. However, it is likely to take multiple years in order to penetrate this cash migration opportunity.

### **P2P Payments : Worth investigating the potential opportunities and threats associated with P2P players**

Despite the challenges of establishing a new payment network, we believe the opportunities and threats are significant enough from this new technology and its providers that banks should be investigating the technology. There may be profitable opportunities for the bank using these services. For instance, a bank with a large portfolio of cardholders or a bank with a large branch network might have a market position



that would facilitate the introduction of a P2P payment service.

On the threat side, it might also be important for banks to be involved in this specific payment segment as existing P2P players are expanding and might become a threat to traditional bank services. Two examples to illustrate this point:

- Western Union is leveraging its network of retail locations to enable online merchants to accept cash as a form of payment. For example, Continental Airlines offers Western Union as a payment option online; following an Internet booking, customers have 48 hours to make a cash payment at a Western Union location
- PayPal is expanding its merchant acceptance by enabling large online merchants to accept PayPal as a payment method. Large online retailers including Apple's iTunes, the online travel agency Hotwire, and the consumer electronics retailer TigerDirect now accept PayPal as an additional form of payment

In conclusion, we would recommend that, at a minimum, banks conduct an assessment of the opportunities and threats associated with P2P payments, and whether they can leverage their existing assets and competencies to maximise these opportunities. Interestingly, this might involve competing with, or cooperating with, an existing P2P player.

#### **Mobile Payments : A long-term potential to disrupt the payments industry**

Payments for phone-related services, such as ring tones and web content, is an area that is growing quickly, and some projections show data could be as much as one-fourth of cell carrier revenues by 2007. Services that will be delivered through this channel will expand as cellular/mobile technology expands and younger, high-volume cell phone users come of age in the marketplace. The evolution of mobile devices will impact adoption of mobile payments as phones evolve into vehicles for instant messaging, e-mail, MP3 music files, video, and the like.

The dynamic between mobile payments and traditional payment mechanisms, such as Visa and MasterCard, will continue to evolve and will be key to developing the role that mobile payments plays in the marketplace. European carriers are getting pressure to lower costs, which may open the door for other solutions such as Visa and MasterCard. The mobile carriers, however, will need to be part of any mobile payments solution; and since they own the channel, they will resist penetration from third parties unless they are compensated.

Mobile payments for purchases in the physical world – in other words, using a cell phone as a payment device – is much less mature in the marketplace, but is emerging in some markets. There is no clear winner in terms of the methodology that will ultimately create the market, although it appears that RFID will play a critical role in this technology. A corollary to RFID, Near Field Communications (NFC), will create the opportunity for financial institutions to download payment capabilities directly into a handset, which can then be used in a contactless RFID transaction. This has the potential of being a unifying force in physical world mobile payments.

#### **Contactless Cards : Might be worth placing a strategic bet**

Based upon the survey interviews and our market observations, we believe contactless cards are a new technology that might be worth a "strategic bet". This probably involves piloting this technology and developing a detailed business case.



One interesting development to follow will be the adoption of contactless cards in the US following the introduction of contactless cards by players such as Chase's high-profile launch of Blink, as well as the recent announcements by Citibank and HSBC USA. Historically, the US market has shown no sign of migrating towards an EMV / chip platform: it will be interesting to see whether the contactless card technology could become EMV-compliant and therefore help bring the US market in line with (or at least closer to) the EMV migration pursued by a majority of European banks.

#### **Biometrics : Need to keep a watching brief**

Biometrics has been in use for several years in high-risk, closed-loop environments (e.g. building security and high security network access). However, in general we see biometrics to be five or more years away from potential widespread use in open payment networks because of several factors, including the following:

- Relatively high false acceptance and false rejection rates at the point of interaction (e.g. misread of a fingerprint);
- Cost to store the digitised representation of the biometric on a secure token such as an EMV chip;
- Perceived invasion of privacy by consumers to have such personal data stored for use (e.g. concern about having retina scanned); and
- No standard for a single biometric that would enable broad roll-out in an open payment network – merchants risk having to implement multiple biometric reader devices.

Banks should watch developments in biometrics technology closely, given its potential impact in the marketplace.

To summarise our perspectives on each technology, we believe banks should be watching each of the seven technologies studied as part of this report. Several of the technologies are believed to be nearer-term opportunities or threats to the banks, and we would recommend a more active role in evaluation and pilots.



Technology	Summary of EDC Perspective
EMV	Revenue opportunities for specific segments, but not straightforward
3-D Secure	Merchant adoption is the key to success
Micropayments	Large opportunity but hard to penetrate
P2P payments	Worth investigating potential opportunities and threats associated with P2P players
Mobile payments	A long-term potential to disrupt the payments industry
Contactless cards	Might be worth placing a strategic bet
Biometrics	Need to keep a watching brief



## ■ 6.0 Appendix

### → 1. Discussion guide

#### Interview details

- Bank name:
- Bank size: (number of retail customers, and/or size of total assets):
- Representative name:
- Representative title:
- Date:

#### 1. INTERNAL MANAGEMENT OF THE PAYMENTS FUNCTION

##### 1.1 Importance of payment products (cash, check, card issuing / acquiring, all other electronic payments) for the bank

- Estimate of payments revenue compared to total bank revenues in 2004
- Estimate of increase / decrease in payments revenue over the past 2-3 years

##### 1.2 Organisational structure and process to manage "payments" within the bank

- Primary factor driving the payments organisation structure
  - Product (e.g., debit card, credit card)
  - Customer segment
  - Geography
  - Function (e.g., marketing, risk)
- Organisational structure for card issuing vs. merchant acquiring, debit cards vs. credit cards, cards vs. non-card products
  - Combined / single business unit
  - Silos
  - Joint Venture with external parties
- Existence or not of an overall "payments management / strategy" group
  - Key roles and responsibilities of this group

##### 1.3 Process used to assess new payments-related growth opportunities

- Adhoc / informal process



- Formalised process conducted by a dedicated group within the bank

#### 1.4 Key metrics used to assess the bank's payments performance

- List of metrics (e.g., volume, gross revenue, net revenue, credit risk, fraud risk) used by the bank to assess the performance of the payments business
- Order of importance for these metrics
- Participation or not to any on-going benchmarking program

## 2. ASSESSMENT OF NEW PAYMENTS-RELATED TECHNOLOGIES / INNOVATION

### 2.1 List of new technologies / innovations that (1) are considered, (2) are in implementation phase, or (3) fully deployed

New technology / Innovation	In Consideration	Under Implementation	Deployed (live)
3-D Secure (issuer, acquirer)			
Biometrics (POS device, ATM)			
Contactless cards (issuer, acquirer)			
EMV (issuer, acquirer)			
Micropayments			
Mobile payments			
P2P payments			
Innovation in new card products / marketing / distribution (to be specified)			
Other (to be specified)			



## 2.2 Key hurdles and benefits

New technology / Innovation	Key hurdles for bank	Key benefits for bank
3-D Secure (issuer, acquirer)		
Biometrics (POS device, ATM)		
Contactless cards (issuer, acquirer)		
EMV (issuer, acquirer)		
Micropayments		
Mobile payments		
P2P payments		
Innovation in new card products / marketing / distribution (to be specified)		
Other (to be specified)		

### 2.3 Ranking of least / most attractive growth opportunities offered by new technologies / innovation

New technology / Innovation	Financial Attractiveness	Market Appeal	Ease of Implementation	Strategic Fit
3-D Secure (issuer, acquirer)				
Biometrics (POS device, ATM)				
Contactless cards (issuer, acquirer)				
EMV (issuer, acquirer)				
Micropayments				
Mobile payments				
P2P payments				
Innovation in new card products / marketing / distribution (to be specified)				
Other (to be specified)				

### 2.4 Description of potential threats from non-FIs



### 3. PLANNED INITIATIVES

#### 3.1 Investment plans / amounts

New technology / Innovation	Upfront Investment (in millions of euros) for 2005	2006
3-D Secure (issuer, acquirer)		
Biometrics (POS device, ATM)		
Contactless cards (issuer, acquirer)		
EMV (issuer, acquirer)		
Micropayments		
Mobile payments		
P2P payments		
Innovation in new card products / marketing / distribution (to be specified)		
Other (to be specified)		

- Percentage of total payments investments spent on compulsory initiatives (e.g., mandated by the card associations) vs. spent on discretionary initiatives

### 3.2 Key objectives for individual investments

New technology / Innovation	Recruit new customers	Cross-sell to existing customers	Retain existing customers	Reduce costs
3-D Secure (issuer, acquirer)				
Biometrics (POS device, ATM)				
Contactless cards (issuer, acquirer)				
EMV (issuer, acquirer)				
Micropayments				
Mobile payments				
P2P payments				
Innovation in new card products / marketing / distribution (to be specified)				
Other (to be specified)				



### 3.3 Plans to build vs. buy vs. partner

New technology / Innovation	Build	Buy	Partner
3-D Secure (issuer, acquirer)			
Biometrics (POS device, ATM)			
Contactless cards (issuer, acquirer)			
EMV (issuer, acquirer)			
Micropayments			
Mobile payments			
P2P payments			
Innovation in new card products / marketing / distribution (to be specified)			
Other (to be specified)			

### 3.4 Timelines for the introduction of these new technologies / innovation

### 3.5 Expected financial impact of these new technologies / innovation

- Increase in net income (bottom line): below 1% of the bank's total net income, or 1-10%, or above 10%



## 4. Views on future outlook

### 4.1 Projections for payment volumes and revenues

Projections	2005	2006	2007	2008
Annual increase (or decrease) in: - card transactions (issuer) - card transactions (acquirer) - other electronic transactions - cash / check transactions				
Annual increase (or decrease) in: - card issuing gross revenues - merchant acquiring gross revenues - other electronic payments revenues - cash / check-related revenues				

### 4.2 Potential changes in buyer behaviours

### 4.3 Potential changes in merchant-bank relationship

### 4.4 Views on other factors such as payments regulations, SEPA

## → 2. Mobile payments examples

Outlined below are some examples of the use of mobile payments technology from around the world.

### 2.1 The Japanese Experience

Japan is the most active market in mobile payments development, driven largely by the activities of mobile operators, and the apparently insatiable demand for mobile applications. A profile of the main activities and operators within the country follows.

#### 1. NTT DoCoMo (see case study)

- Japan's leading mobile operator with 49m subscribers
- Perceives mobile as the "consumers' gateway to the network society of the future", accessing entertainment, credit card/wallet, keys, tickets and gateway to in-home/office/car appliance and computer products



- Launched i-Mode FeliCa mobile wallet in July 2004 - 'third wave of mobiles'
- DoCoMo is also taking 33% stake (veto power) in Sumitomo Mitsui Card Co for \$1bn to enter credit card market in support of i-Mode
  - Sumitomo 13m cardholders; DoCoMo 49m mobile subscribers
- Also considering taking a 10% stake in JCB card
  - JCB have rolled out QuicPay m-payment on i-mode FeliCa platform
  - DoCoMo launched mobile payments operation in Thailand (8/05) in conjunction with local mobile operator
- 2. **KDDI** (the 2nd mobile network) – in conjunction with Vodafone will market handsets incorporating FeliCa platform (autumn 2005), having abandoned using infrared technology.
- 3. **VISA** is starting an i-mode application – VISAPPI – credit card-less payments service – proximity payment
  - Subscribers pre-register and gain a service number and pass code from Visa i-mode – and download the i-appli with credit card information
  - To make a purchase subscribers reactivate the i-appli at PoS and input a pass code
  - Card information is passed to the infrared receptor at the PoS from the handset and on to the authentication system
- 4. **Air Nippon Airways** reward frequent flyers who use Mobile Edy wallet (using i-mode FeliCa) – flyers with e-tickets who check in via i-mode can get their boarding pass by waving their mobile
- 5. **PIA Corp.** Japan's largest distributor of entertainment and sports events launched a Electronic Tickets and Coupon Service in 2003 and has attracted over 300,000 members
  - Service allows customers to order and pay for tickets on the Electronic Ticket-i-mode site
  - Electronic ticket is downloaded and can be authenticated via infrared at a terminal at the venue
- 6. **Coca Cola (Japan)** also leverage i-mode mobiles to provide Cmode which allows subscribers to buy beverages, ring tones, screen savers etc and printable content (e.g. horoscopes)
  - Is seeking to expand Cmode to issue coupons for purchases at compatible vending machines (CMO)
  - CMO communicates with mobile phone via 2 dimensional bar codes and infrared, and/or via FeliCa



## 2.2 The Korean Experience

In Korea mobile banking initially was driven by LG Telecom's Bank on-chip initiative, Korea First and Kookmin, which resulted in about 4 million mobile payments users. Now, with around 34 million mobile phone subscribers, the Korean operators have developed a range of mobile payments and mobile banking solutions. Subscribers can gain direct access by pressing a hot key on their mobile and are offered two types of service:

1. Online services - Balance checks, transfers, loans, cheques and Mobile Bill Presentment and Payment
2. Offline services – receipt/withdrawal/transfer using an ATM, mass transit
  - Kookmin/LG Telecom is to offer Bank ON service – a dedicated phone with customers' banking details pre-installed on the chip
    - SK Telecom the leading telecom operator has launched a mobile banking service M-Bank with Shinhan, Chohung Bank and Woori Bank
    - SKT has rolled out expensive infrared readers but consumers are handing back cards to avoid any problems with their phones
  - Kookmin bank combines mobile banking services with credit/debit card payments and public transport payments on a single mobile payments chip
  - Overall, even more than in Japan, take up remains slow, with consumers rejecting offers that are complex and/or increase perceived risk

## 2.3 Other Recent Developments

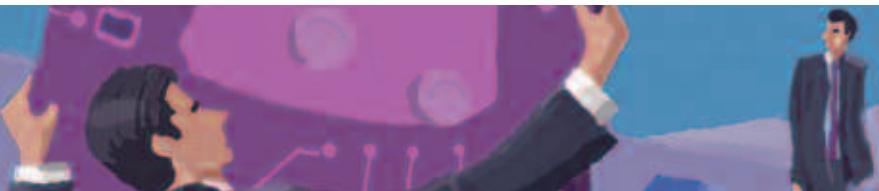
Outlined below are a number of other selected developments of note with regard to mobile payments.

1. In 2003 the organisation **Simpay** was established to create a pan-European mobile solution. It was based on T-M and Vodafone co-operation (Amena (Sp), Proximis (Bel), Telfonica, Moviles, T-M and Vodafone). However, earlier this year, the vision of long term international interoperability was seriously impacted by the withdrawal of T-Mobile. This major blow to mobile payments will delay the development of a standard multi-national payments system and could lead to fragmented markets driven by local requirements. Whilst there is a risk of markets becoming closed to external competition, the opportunity exists for emerging players like PayPal and Upaid to fill the gap.
2. **Mobipay** International was founded in December 2000 to develop and promote an international mobile payments solution. It became jointly owned by Banco Bilbao Vizcaya Argentaria (BBVA) and Telefónica Móviles after international carriers (including Vodafone were bought out). Mobipay was forced by the Spanish competition authorities to include all the agents from the sectors involved in the ownership of the company: the three Spanish mobile phone operators, almost all the banks and savings banks except La Caixa and the three card processors, Sermepa, Euro 6000 and 4B. The influence of the different shareholders impacted



momentum for Mobipay with the result that there have been only about 1 million transactions. Across Spain Mobipay is usable in over 3,000 stores, 2,500 taxis and almost a thousand outlets, online.

3. **Upaid** is a Visa CEMEA supported initiative to pay by mobile and/or top up from Visa Card (launched in Jordan and Serbia). With this facility a text message from a supplier is received saying payment is due, the mobile user then keys in a password to confirm and the amount is charged against a pre-agreed account
4. **Vodafone** offers M-Pay in markets like the UK and Germany – aggregating internet and mobile-net small value transactions onto a Vodafone bill
5. **T-Mobile** launched in June 2005 Star Money T-Mobile, enabling web access to bank accounts to check balances and make transfers. Transactions data from several accounts can be reviewed and saved on one mobile and access is via a PIN entry
6. **Rabobank** announced in October 2004 an integrated bank strategy offering a hierarchy of transactional services on a mobile. Aimed at computer literate customers and based on i-mode, for premium pricing it enables money transfers, balance enquiries, stock/brokerage details and news messages. The concept is banking “anytime, anywhere” with the mobile phone “your personal financial remote control”.
7. In Australia **Citibank and Telstra** enable customers to do banking without the need to go on-line, by using their phone to make payments (via BPAY) transfer funds, and check balances and share prices – all structured from the i-mode platform
8. **NAB** in Australia launched SMS for internet payments in June 2005: NAB sends a randomly generated one-time only code via SMS at the time when a consumer initiates an online payment, and the consumer has to enter this code into the payment confirmation in order to complete the payment transaction
9. **Bank of Asia** (Thailand) and Visa launched an m-payment service in April 2005. Designed to leverage increased mobile phone usage, this is the first Thai mobile payments service that uses Verified by Visa (VbV) cardholder authentication. Credit card transactions can be made over the mobile phone, and SMS bill payment alerts are enabled. The initial target is to gain 15,000 users (10% of VbV customers)
10. **Unified card** is a card based wireless e-payments and e-banking service launched by China Industrial and China Unicom banks. Amongst facilities offered is the ability to pay utilities using SMS and ticket booking.
11. **NCS Mobile Payment Bank GmbH** is the first bank in Germany to receive an E-Bank license from the Bundesanstalt fur Finanzdienstungsaufsicht (BaFin). They are now the sole independent mobile payment provider in Germany. Their consumer product, Crandy, enables full banking AND payment services through a mobile device.



### → 3. Contactless cards examples

Outlined below are some examples of the use of contactless chip technology from around the world, although the region moving most rapidly into this technology is Asia Pacific.

#### Transit based models:

Mass transit contactless payment cards have been introduced in major cities across the globe such as Paris, Brisbane, San Francisco, Hong Kong and New York. Some selected examples of developments are shown below.

#### Octopus-Hong Kong

- The pioneer for contactless payments
- An e-purse pre-pay stored value card, used mainly for transit
- 95% of 7m residents have card, making c9m transactions per day, value: US\$2.2bn pa
- Accepted at 130 merchants, and 3,000 locations (including 7-Eleven McDonalds, cinemas), plus 6,000 vending and 17,000 parking meters
- Non transit accounts for 15% of transactions
- Average purchase is HK\$16 (US\$2) – very low value – positioning below optimal minimum debit purchase
- Can only hold a maximum of \$999HK (\$125); able to automatically top up if the balance falls below a set amount – otherwise reload is through ATMs and Octopus terminals
- Speeds up transaction time (especially for vending) and reduces cash handling

#### Issues

- Need more merchants before it becomes more widely used to replace cash
- Security concerns for larger transactions (no PIN or signature)
- No recovery if the card is lost (unless have signed up for a personalised card)
- Little perceived added value beyond credit/debit card
- Have looked at a mobile phone offering – but no demand at present
- Customer view positive, but acceptance still an issue



## Edy

- Contactless electronic purse card carried by 4.7m Japanese commuters and accepted at 9,200 merchants
- But only 4.8m transactions per month
- Being added to the DoCoMo FeliCa mobile product

## PiTaPa

- Japan's Kansai region have introduced a post-paid transit card
- Contactless card records all transit activity and some non-transit locations (300 stores) spend, and then debits an account at the end of the month

## Oyster

- In London, for use on London transport but now expanding into other small value payments (paper, car parking) environments
- 2.2m cardholders
- 3,900 merchants currently sell Transport For London passes
- Pilot in several London boroughs to enable the cards to be used at libraries and leisure centres

## Singapore

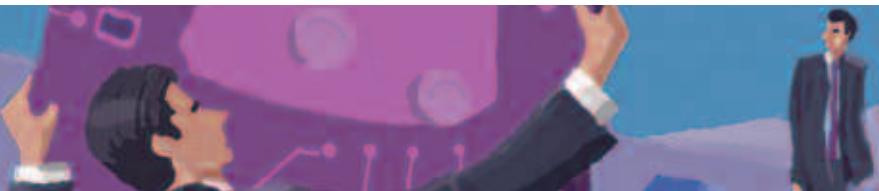
- Ez-link transit card – merchant acceptance is just starting

## South Korea

- Hana Bank has been issuing Visa Cash cards combined with local transit authority cards – expanding into non-transit locations

## Malaysia

- Zing MasterCard: 30% smaller than a standard credit card so that it can be attached to a key ring and used to pay via a contactless chip that stores value for parking, tolls and transit fees as well as functioning normally as a magnetic stripe credit card
- Visa Wave – first fully EMV compatible combination card has been tested by MBF Cards in Malaysia; this is a combination of contact and contactless EMV chip. Cards use DDA cryptographic processors for authentication



## Taiwan

- The TaiwanMoney card is scheduled for launch under the Kaohsiung City Government transportation project in September 2005. It is a combi-card combining e-ticket transit application, pre-authorised debit and ticketing based on PayPass and credit, debit and stored value features

## Card application extension:

### PayPass

- Following trials in Orlando and Dallas, it has been introduced by MBNA as a payment system in American football stadiums - Baltimore Ravens, NY Giants, NY Jets and Philadelphia Eagles.
- Sheetz is the first merchant to introduce PayPass into all of its 305 stores

### America ExpressPay

- Pilots in Phoenix and Singapore

### Blink (see case study below)

- JP Morgan Chase has launched the 'blink' contactless card in the US
  - Around 2m cardholders
  - Target locations are QSR's, cinemas and specialty retailers, e.g. 7-Eleven
  - Focus on speed and convenience for purchases <\$25
  - With magnetic stripe for all standard credit card purchases
  - Will not work within a wallet, only outside the wallet

One of the unusual applications of RFID technology in the payments world comes from Barcelona with an experiment involving a capsule that can be implanted into the skin which holds a social security number and bank details.

## → 4. Biometrics applications

There is now considerable global investment in biometrics as part of government security and ID concerns. The US is at the forefront of these initiatives with a number of biometric trials in progress and some roll-outs. Various US government agencies are developing applications, (e.g. pilots at NASA and the Department of Homeland Security). The largest current operation is probably the Department of Defense where 4.6m PKI cards have been issued. Interestingly there have been significant problems with PKI as computers hang up for 10 minutes as certificates are validated using a digital email; each person gets three certificates, one for email, one for identification and one for encryption. This means that 40mb has to be downloaded on the computer.



Going forward, US citizens when born will be issued a Social Security Number that will be included on their Birth Certificates, along with DNA biometric markers. All birth certificates will also be registered in a Federal Government database maintained by the Department of Homeland Security. No child will be allowed to enroll to schools or be entitled to either State or Federal Government benefits programs without first presenting a certified Homeland Security registered Birth Certificate.

Drivers Licenses will also contain DNA biometric markers and include the holders Social Security Number and be required for receiving and applying for all State and Federal benefits programs.

Other Government driven applications worldwide include a biometric ID card in Hong Kong and fingerprint ID for regular customers of the Bornholmstraffiken in Denmark, the ferry between Denmark and Sweden, to avoid passport control. Also a European multi-biometric visa pilot programme is underway to test processes and the interoperability of systems.

The use of biometrics within payments, and card payments specifically, has been limited to date. Selected examples are shown below.

- Japan has implemented limited biometrics in ATMs to support anti fraud measures. In late 2004 Bank of Tokyo-Mitsubishi launched a biometric based ATM card in Japan to deal with the problem of high value ATM fraud. A palm vein database is registered to the credit/debit card. The palm veins are read by infrared (preferable in Japan where hygiene is very important) and PIN entered. If a card is defrauded the cardholder will receive compensation of up to \$950,000. There are sign up fees of \$100. Mizuho Bank and Sumitomo Mitsui Bank also intend to launch a similar card, using finger vein pattern.
- Elsewhere there has been no significant rollout of biometrics for payments.
  - There are on-going trials of applications, as in Spain, but a business case has still not been achieved. Spanish banks including BBVA and Santander are investing in prototypes for applications for biometrics for ATMs
  - There have been a few pilots involving Pay by Touch (see case study below) with grocery chains such as Piggly Wiggly

## → 5. Case studies

In this section, five case studies are provided, illustrating solutions for several of the new technologies studied in this report:

- Peppercoin – micropayments
- PayPal – P2P Payments
- DoCoMo – mobile payments
- Chase Blink Card – contactless cards



- Pay by Touch – biometrics

### 5.1 Peppercoin Case Study

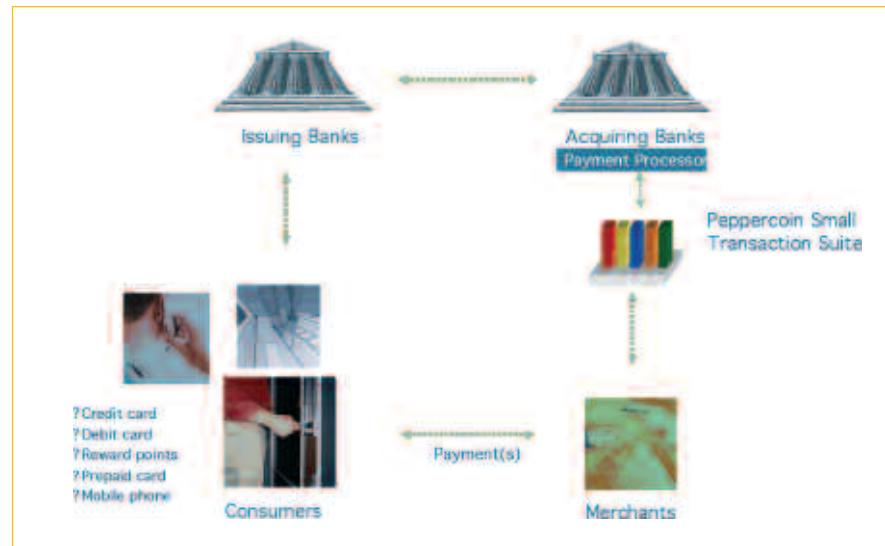


#### Objectives / Rationale

Founded in 2001, Peppercoin offers the Small Transaction Suite, a package of products for processing small payments targeting online and offline merchants and financial service companies to grow revenue through the sale of low-priced offerings. With this service, Peppercoin addresses the digital, mobile, and physical point-of-sale markets.

More specifically, Peppercoin targets the needs of several segments:

- Merchants that are looking for a flexible way to reduce transaction costs associated with the use of credit cards and customer service costs for low-value transactions, and to generate incremental revenue. They also want to satisfy customers by providing them with a wide range of payment methods. A micropayments solution might help in three ways
  - The cost per transaction of a credit card consists typically of a fixed amount plus a percentage of a transaction. By aggregating many small transactions into one transaction for each merchant, a process called "Intelligent Aggregation," Peppercoin aligns the cost of small transactions with that of a regular-sized transaction. Small Transaction Suite also enables the merchant to customise the way sold items are aggregated
  - Merchants do not need to spend money on customer service because they can refer their consumers to a dedicated website that allows to research on the specifics of the aggregated charges: they can see the original merchants and the actual purchase activity. If a customer wants to dispute over a charge, they can use a self-service available on the website
  - Customers find it convenient to pay with a credit card while making small purchases and therefore are more likely to purchase more often from a particular merchant
- Consumers that would like to use their credit cards to purchase low-value items and they do not want to change their purchasing experience
  - Consumers do not need to register for the service, and they will see little change in their current habits. The only difference is that the aggregated transactions will appear on the credit card statement at the end of the month under each specific merchant
- Issuers that are interested in converting current cash and check transactions into card spending
  - If merchants allow the consumers to use their credit cards for small payments, consumers will use the card more often because of the convenience factor. In this case, the transactions made in cash are converted to credit card transactions, therefore allowing the card to become "top of the wallet" for the consumer



### Customer experience

- Consumer purchases a low-value item using their preferred credit card
- Consumer receives a credit card statement at the end of the month from the issuing bank where all of the small items purchases purchased at Peppercoin's participating merchants are aggregated. For example, instead of having five \$0.99 purchases listed from a particular merchant, \$4.95 will appear next to the merchant's name
- In case of a dispute, a customer goes to a merchant's website, enters the transaction identifier, and can initiate a dispute

### Development approach

Peppercoin is focusing its development on a couple of initiatives:

- Increase the number of merchants accepting Peppercoin
  - Online and offline merchants, specifically merchants that are currently accepting micropayments, defined as \$0.01 to \$4.99, and small payments, defined as \$5.00 to \$20.00
- Increase the number of banks interested in Peppercoin as a way to penetrate merchant segment with high level of low-value transactions

### Learnings / results to date

Peppercoin has achieved the following milestones:

- With its first version concentrating on the online world only, Peppercoin has moved into mobile and



physical worlds with its second version, and has now expanded even further by adding pre-paid, subscription, and post-paid services to its consumers

- Has signed a Third Party Processing Agreement with First Data and Vital
- Was approved by Visa Cardholder Information Security Program (CISP) and MasterCard's Site Data Protection (SDP)
- Visa and MasterCard have approved Third Party Processing application
- Has established relationships with Chase Merchant Services, SunTrust, and Moneris
- Has a partnership with an infrastructure leader Ingenico
- The following merchants have adopted Peppercoin solutions: Wurl Media, MyMPO, and Mashboxx
- On August 31st, Las Vegas began accepting payments made with cards and mobile phones for the parking meters run by mPark and Reino Enforcement Technology using Peppercoin's solution
- On September 14th, Peppercoin and Rowe International started to deploy new jukeboxes that accept credit cards as a payment to play music. (Rowe's 230,000 jukeboxes represent 65% of U.S. jukebox market share and accept in aggregate payment more than \$1 billion annually)

There is an opportunity for banks and card associations to penetrate the \$1.3 trillion dollar market of cash transactions under \$5 which currently has less than 1% penetration rate in the US, and the equivalent segment in other countries.

Peppercoin's success (and the success of micropayments in general) will depend upon two key factors: (1) whether enough merchants require a flexible tool to lower their processing costs while providing their customers with the ability to use an electronic form of payment for low-value transactions, and (2) whether consumers are interested in using their preferred card for all their purchases including low-value transactions

## 5.2 PayPal Case Study



### Objectives / rationale

PayPal was founded in 1998 with a vision to facilitate the exchange of value on the Internet in a secure, convenient and low-cost manner compared to traditional payment methods (e.g., credit cards).

More specifically, PayPal focused on generating benefits for two segments:

- Buyers that wanted to make an online purchase without releasing their credit card details or bank account details to the seller
  - PayPal enables a buyer to make an online purchase by entering the seller's email address, and without releasing any financial data to the seller



- Sellers (e.g., trading on eBay or micro merchants selling via their website) that could not accept credit cards for online sales because it was too difficult or expensive to set up a merchant account with an acquiring bank
  - PayPal enables a seller such as a micro-merchant to become able to accept payments within minutes at a cost for the merchant ranging between 1.9% and 2.9% (plus 30 cts)

### **Customer experience**

The buyer / sender can make a payment by:

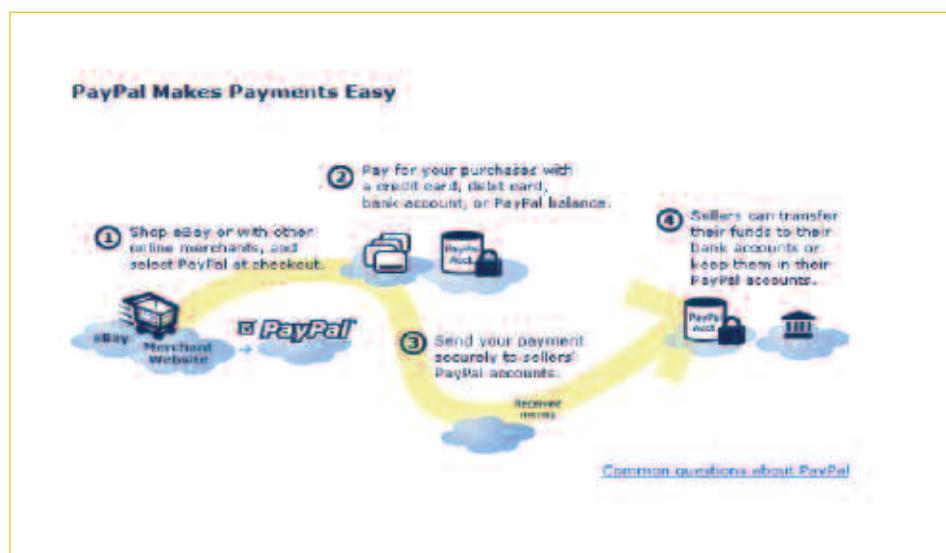
- Logging into their PayPal account (requires an email address and password)
  - Entering the receiver / seller's email address, and the payment amount

Once the buyer / sender has initiated a transaction, PayPal processes the transaction by:

- Debiting the funds from the buyer / sender's PayPal balance (if there is any), or from their credit card, or from their bank account
  - And crediting the funds instantly to the receiver / seller's PayPal balance

The receiver / seller can then:

- Make in turn a payment to another party via PayPal
  - Or withdraw their funds from the PayPal's balance via electronic funds transfer into a bank account, or via a PayPal-branded debit card or via check (in the US)





## Development approach

PayPal is focusing its development plans on two key initiatives:

- Increasing PayPal's penetration of eBay transactions
  - This has mostly meant setting up international sites to enable PayPal users to transact in local language and currency. As of December 2004, PayPal was offered in the local language and currency in: Austria, Belgium, Canada, France, Germany, Switzerland, the United States and the United Kingdom
- Expanding PayPal's merchant services business
  - PayPal has been developing the acceptance of PayPal as a payment mark (i.e., as an alternative form of payment alongside the likes of MasterCard, Visa, American Express) on websites of large merchants. Online merchants like Apple's iTunes, TigerDirect, Hotwire already accept PayPal as a payment mark
  - In parallel, PayPal introduced a package called Payments Pro in June 2005 that enables small and medium-sized businesses to accept credit card transactions just as they would with a traditional merchant account.

## Learnings / results to date

PayPal has and still is experiencing significant growth:

- The number of accounts grew by 58% in 2004 to reach 63.8 million accounts as at the end of 2004 (note: it exceeded 78 million as at the end of Q2 2005)
  - In other words, PayPal has been able to generate 64,000 new accounts per day
- The total payment volume grew by 55% to reach \$18.9 billion in 2004
  - PayPal generated revenues of \$697.7 million in 2004 compared to \$437.6 in 2004 (+60%), representing over 20% of eBay's total revenues (note: eBay acquired PayPal in October 2002)

## EDC's perspective

PayPal is an interesting example of three key success factors for introducing a new technology :

- Focus on the customer experience: PayPal leveraged the web browser and email technologies to enable a convenient and fast payment transaction
- Providing a payment solution that was needed by buyers and sellers: PayPal managed to provide a payments solution to a new and active group of buyers / sellers that were missing a convenient and secure form of payment, namely the community of eBay traders
- Strong fraud prevention approach: one of the key success factors is that PayPal developed fraud



prevention processes and tools to manage the high risk of fraudulent transactions

- For instance, PayPal developed an innovative idea to verify the validity of the bank account details of a new user by depositing two random amounts into user's bank account (e.g., 12 cts and 23 cts) and asking the user to provide these two sets of numbers back to PayPal in order to confirm their identity

Based on its success to date, it is likely that PayPal will carry on its fast-growth expansion driven both by (1) the international expansion of eBay because a significant amount of eBay transactions are settled via PayPal, and (2) the high-level of interest among online merchants to add an alternative form of payment such as PayPal on their website.

However, there are a number of hurdles for PayPal to overcome, including:

- eBay and PayPal are a target for phishing activities so it is critical for PayPal to carry on preventing any successful phishing attack in order to maintain trust among PayPal's user base
- PayPal's adoption has been heavily dependent upon eBay's success. To the extent that eBay might or might not be successful in expanding its activities in new markets like China, PayPal's future success will be strongly related to eBay's successful entry in these markets

### → 5.3 DoCoMo Case Study

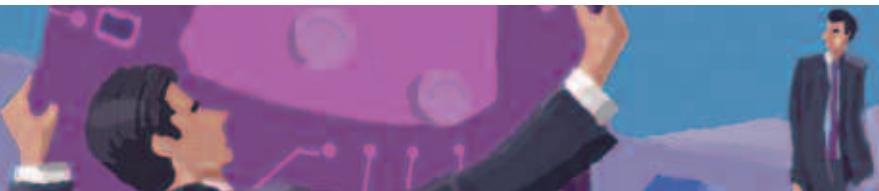


#### Objectives / rationale

NTT DoCoMo is the largest Japanese mobile phone company with 49 million customers in Japan, representing more than half of the market, and a market capitalisation of more than \$80 million. The 13-year old company currently has a prepaid card service on its mobile phones and has recently announced its plans to launch a new phone-based credit card service.

DoCoMo has structured its benefits around four segments:

- Consumers that do not want to carry multiple devices and do not want to spend time waiting in line
  - DoCoMo allows the consumer to pay by waving a cell phone next to the reader, which shortens the time spent waiting in line
  - The phone enables the user to make payments because it can function as:
    - A prepaid card (currently)
    - A credit card (piloting stage)
- Merchants that are interested in a faster throughput through the lanes that reduces their operational costs



- Contactless transaction that takes place using a FeliCa cell phone takes less time than a card swipe
- DoCoMo is looking for a new profit centre for the company because the mobile phone market in Japan is saturated
  - DoCoMo is interested in payments as a new source of revenue
- Credit card issuers that are interested in turning some of the transactions that are currently made with cash and debit into credit card transactions
  - DoCoMo's mobile phone makes it easy for the customers to make small payments by waving their phone in front of the reader
  - Credit card issuers are also trying to increase credit card penetration and usage in Japan, which is traditionally a debit market

#### **Customer experience**

- Prepaid account (currently)
  - Buy the i-mode FeliCa 3G handset that contains the IC chip
  - There are two ways to increase the value in the account:
    - Consumer comes to a kiosk (affiliated outlet), plugs in a cell phone, inserts cash into the machine, and the kiosk takes cash and credits the handset
    - Consumer inputs the money into an online account, and the balance is updated on the cell phone
  - To pay for goods:
    - Customer waves the phone in front of the reader
    - The amount of purchase is deducted from the amount stored on the phone
- Credit (piloting stage)
  - Consumer waves the phone near the payment terminal
  - The credit card account on the phone is charged
  - Consumer gets a message sent to user's mobile phone confirming the transaction



### Development approach

DoCoMo's key initiatives:

- DoCoMo is currently cooperating with JCB-Visa, Mitsui-Sumitomo Card, UC Card, Toyota Finance, and KDDI to further expand its credit card services
- Sumitomo Mitsui Card will:
  - Establish an infrastructure for mobile credit-card payments ranging from small to large amounts
  - Install terminals at member retail shops nationwide
- Visa International is working together with NTT DoCoMo on proximity payments, using the Visa proximity payment technology
- Goal of boosting Japan's credit-card usage from 8% (now) to 20% of total purchases, and debit cards to 30% of purchases
- The company plans to introduce the new phones with its own branded credit card within the next two years
- Starting January 2006, users will be able to pay for Tokyo trains using their cell phones
- DoCoMo plans to replace and upgrade its existing cell phone with 3G phones that enable payment transactions within the next three to five years

## Learnings / results to date

- NTT DoCoMo started a pilot programme in April of 2003
  - Credit card data was downloaded and stored onto the phones
  - Payments were made with "Visa Proximity Payments Messaging Specification"
  - During this five-month Tokyo trial, 2,300 participants made 1,900 payments totaling \$8.2 million
- In April 2005, DoCoMo has paid nearly \$900 million for 34% stake in a major Japanese credit-card company
- As of today,
  - Near 60% of customers with FeliCa phones use the service at least once a week
  - DoCoMo has sold five million FeliCa wallet phones
  - About 22,000 retailers in Japan have installed devices at their cash registers
  - There are over 20 IMode banking partners, including Coca-Cola, AM/PM convenience stores, and Sega
- In July 2004, DoCoMo introduced the first version that could store up to \$450 cash on the handset chip
- DoCoMo's new payment service enhances the device's transaction capabilities:
  - Can serve as a house key
  - Can store loyalty/rewards points earned at different stores
  - I-mode barcode reader that allows to purchase straight from a catalogue
  - "Electronic Ticket + Coupon" where a cell phone can be used to buy a ticket online and store its information in the memory. To enter the event, one simply needs to tap the phone against a reader
  - Attraction reserve and pay service in LaQua, an entertainment complex in Tokyo



Based on its success to date, it is likely that DoCoMo's new cell phone feature will grow in popularity driven by

- Consumer demand for a faster and more convenient way to make payments



- DoCoMo's need for a new source of revenue
- Merchant's desire to satisfy the customer and to reduce operating costs through faster transaction time

## → 5.4 Chase Blink Card Case Study

### Objectives / rationale

Chase is the first bank in the US to issue new Visa- and MasterCard-branded contactless credit cards called 'Blink' that allow consumers to pay for their purchases by bringing the card within four inches of the payment terminal.

'Blink' is targeted at meeting the need of three key stakeholders:

- Consumers that are looking for a faster checkout at the store and do not feel safe when they hand the card to the sales representative
  - According to a survey conducted by Chase, customer's time in the checkout line will be reduced by 30% to 40% because they simply hold the card near a point-of-sale terminal instead of swiping it or handing it to the store cashier
  - Contactless payment will enable a more secure transaction since consumers retain the possession of the card, while the merchants see only the last four digits of the credit card number
- Chase, as an issuing bank, is looking for an increased usage of its credit card to increase its profits by making its credit card "top of the wallet."
  - Chase expects increased revenue driven by incremental card spend because consumers prefer to pay with the credit card that is faster and more convenient than cash
- Merchants that want a faster checkout speed, a higher average ticket size, and increased customer loyalty:
  - 'Blink' allows for the merchants to serve customers faster: in a drive-through environment, the transaction time was reduced by 20 seconds as compared to cash
  - A typical consumer usually spending \$10 in cash at the pharmacy will spend around \$10.75 using the 'blink' feature (source: "Credit card purchases in a blink" by Kristin Arnold at Bankrate.com)





- Merchants can reduce the amount of cash-related costs because small purchases can also be made using 'Blink'.

### Customer experience

Consumer can purchase an item by:

- Bringing a contactless card close to the special point-of-sale terminal at the checkout
- The terminal flashes and beeps approving the transaction
- The 'Blink' credit card is charged with the amount of purchase

Consumer can also choose to purchase an item using the magnetic stripe that is featured on all of 'Blink' cards.

- Contactless payments are processed in the same way as traditional payments:
- The card is activated once it gets within a close distance to the reader
- The card authenticates the reader
- The account information is sent to the reader
- This information is processed by the merchant's processing partner
- An authorisation number is issued
- A signature is collected in line with the card association rules



### Development approach

- In 2003, Chase participated in MasterCard's PayPass trial in Orlando, Florida together with Citibank, and MBNA,
- Chase has issued 2 million contactless credit cards during the summer of 2005. The bank has focused on Atlanta and Denver population and has marketed "Blink" to merchants and consumers simultaneously within these metro-areas
- Launched a "blink lunch," "blink a drink," and "blink a movie" marketing campaign that will inform the customers of the new contactless features
- Developed an interactive website, [www.chaseblink.com](http://www.chaseblink.com), allowing to explore the new card
- Targeted quick-service restaurants as the early adopters of the technology because they benefit the most from a faster transaction time and reduced amount of cash-handling



- Targeted different groups of merchants where speed and convenience play an important role, such as gas stations, groceries, movie theaters, convenience and specialty retailers, and drug stores

### Learnings / results to date

- The pilot programme in Orlando, Florida, conducted in 2003 demonstrated a 20-second reduction in transaction time using contactless payments and a higher per-transaction spending as compared to cash
- One million "blink" cards were sent to Atlanta, Georgia customers on June 1st
- A week later, 500,000 more credit cards were sent to its customers in Denver, Colorado
- Chase currently enabled more than 400 merchant locations in 63 cities across the state
- 7-Eleven is accepting the card in 170 of its stores around Denver, with the expectation to roll out acceptance of these cards to 5,300 of its stores
- Sheetz, a convenience store and gas station, will start cobranding a blink MasterCard credit card, and starting January 2006 will accept contactless cards at its 300 locations
- Chase has issued United Airlines cobranded United Mileage Plus Visa with a 'Blink' feature to over 200,000 cardmember in Colorado on August 30, 2005
- The new credit cards are being accepted at Ritz Camera, Regal Cinemas, United Artist Theaters, and Edwards Theaters, Walgreen's, and McDonald's

Chase's Blink card (and contactless cards in general) will likely gain adoption in the US market because it allows:

- Merchants to reduce the checkout time, increase average ticket, bring more customers to the stores, and reduce the amount of cash handling
- Consumers to spend less time at the checkout lines
- Chase is the largest issuer with 95 million cards and the largest acquirer with 17% of the market share
- Other large banks such as Citibank and Key Bank are rolling out their contactless cards starting Q4 2005

## → 5.5 Pay by Touch Case Study



### Objectives / rationale

Pay by Touch provides a biometric authentication mechanism that can be linked to an e-wallet with a goal of making shopping experience more convenient due to a safer information transfer.



Pay by Touch's solution targets two segments:

- Consumers that are interested in protection against identity theft and might appreciate a more secure authentication method. As the same time, they would prefer not to carry their wallet because it can be lost or stolen
  - Consumer's identify is verified using an image of a fingerprint which cannot be copied or stolen. A consumer does not have to carry a wallet since all of the payment options are linked to his/her identity.
- Merchants that are looking for new ways to lower their transaction costs and to satisfy the customer in protecting him/her against possible fraud
  - Pay by Touch allows the merchant to set up Automated Clearing House (ACH) payment transaction as the first and possibly the only choice, which involves a lower fee for merchants compared to debit and credit card transactions.

#### Customer experience

Customers can register for this authentication method by:

- Providing personal information at one of the registering locations
- Scanning a fingerprint into the database
- Registering a seven-digit password that will be used to approve the transactions
- Setting up the electronic checking (ACH), debit and credit cards accounts that (s)he needs access to in order to pay
- Customers can also add their membership cards in different stores so that the points could be accumulated automatically



To make a purchase, a customer has to:

- Place a finger into a scanner a size of a computer mouse
- The scanner takes an image of a fingerprint and electronically links the result of the scan to his/her financial accounts
- Customer chooses from the payment options presented to him/her
- Customer enters a pre-registered seven-digit password to approve the transaction





## Development approach

Pay by Touch's key initiatives:

- Strategic partnerships:
  - VefiFone Holdings, a manufacturer of point-of-sale (POS) devices
  - Cogent Systems (COGT) will provide Pay by Touch users with the Automated Fingerprint Identification Systems, or AFIS, that enable customers to capture fingerprint images electronically, encode fingerprints into searchable files and accurately compare a set of fingerprints to a database.
  - StoreNext will help in marketing the new system to independent grocers
- The company has also opened an office in the United Kingdom hoping to expand internationally
- Pay by Touch plans to expand its product to the Virtual Wallet. This product combines information on several credit and debit cards and stores information on the different discounts that consumers can use while making a purchase

## Learnings / results to date

Pay by Touch's solution has been implemented by a number of merchants:

- Club Foods in Minnesota and Albertsons in Oregon launched a test
- Piggly Wiggly Carolina Co. has installed the finger-scanning payment systems in all 82 corporate-owned groceries in South Carolina and Georgia, and has planned to install the technology at the chain's remaining 38 franchisee-owned stores by the end of 2005
- Pick 'n Save food stores has launched a pilot programme
- The Pay by Touch's technology has also been implemented in the Cafeteria of Discover financial services headquarters in Riverwoods, Ill.
- Pay by Touch has entered the market with its credit and debit card payments, the company plans to provide its customers with the Virtual Wallet

Pay by Touch's success will depend upon (1) the levels of customers' demand for a safer information transfer and a more convenient way to pay (2) merchants' assessment of the business case and the enrollment process involved.



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