The Consumer Implications of the Use of Electronic and Mobile Payment Systems

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Executive Summary

In this paper we summarize the status of current electronic payment models, with a focus on mobile payment. In particular, consumer adoption and other issues related to mobile payment and its implications are reported.

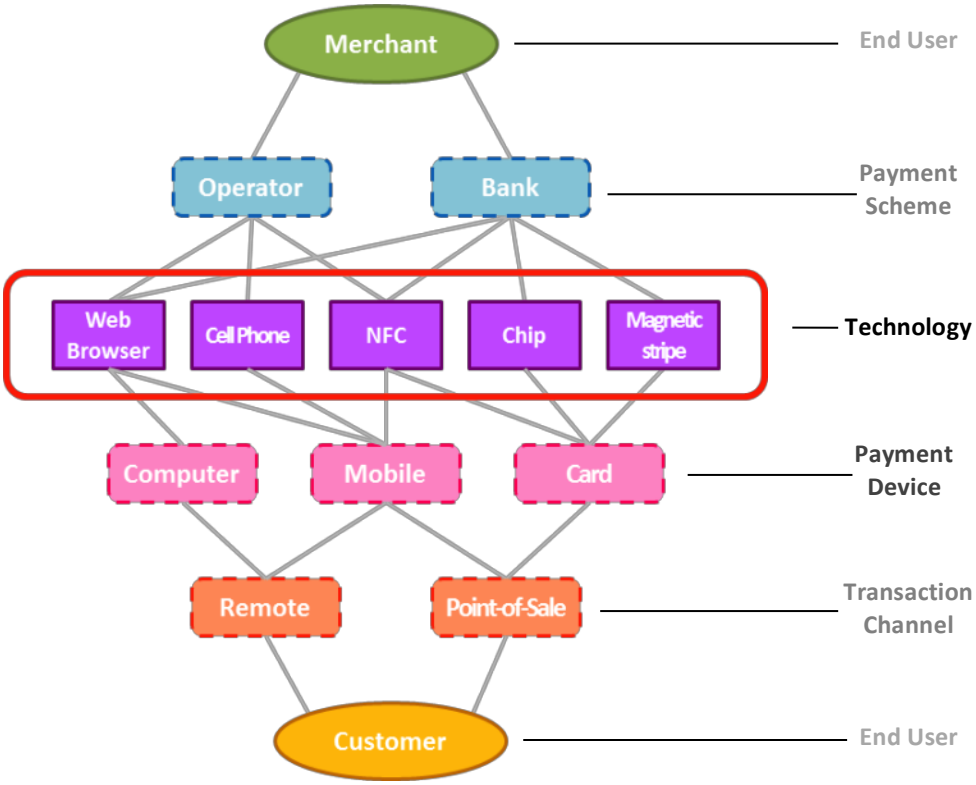
In Section 1, we build a Retail Electronic Payment Model that outlines how a payment transaction flows from a consumer to a merchant. In this model we identify five key elements including end user, transaction channel, device, technology, and payment scheme.

In Section 2, eight electronic payment systems are selected and developed as case studies. By investigating e-payment cases around the world with a focus on mobile payment, we attempt to determine and summarize factors that have influenced precedent adoption of electronic payments. A chart is presented at the end of Section 2 that analyzes the successes and failures of the representative payment systems. This part of the paper is based on secondary research.

For the next two sections, we apply the knowledge gained to the Canadian context and explore some anticipated benefit and adoption issues facing consumers. From this point on, the paper focuses specifically on mobile payment. These latter two sections are based on interviews with industry professionals at Visa, Rogers and HCL, and on secondary research about existing mobile-payment applications. As part of our discussion of the issues, in the last section, we make brief recommendations to address and overcome consumer difficulties through education and providing the right tools to help consumers better manage their spending.

1. A Model for Retail Electronic Payment

The model presented below summarizes the spectrum of retail electronic payment. There are many discussions on classifying payment systems, and each system has its own procedures and protocols. The focus in this model is retail payments. Therefore other aspects of payment systems, such as government to individual, individual to individual, and corporation to individual, are not included in this model.



1.1 Elements of the Model

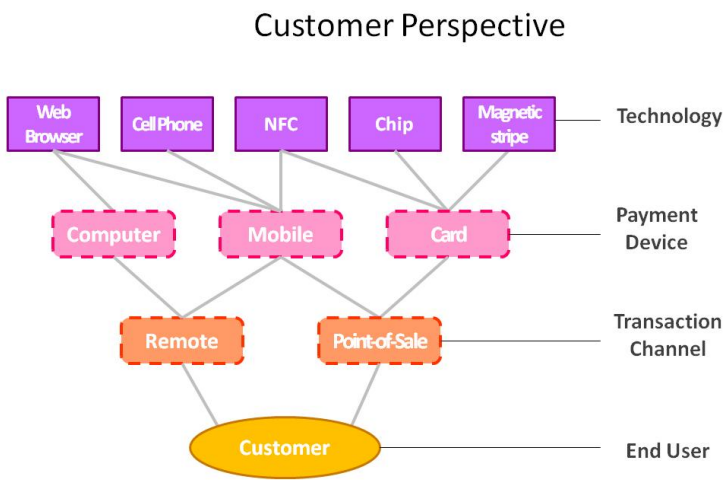
Ultimately, all retail payment systems provide a transaction pathway between consumers and merchants as the end users. The five key elements identified in our model are end user, transaction channel, device, technology, and payment scheme, shown here as a flow chart illustrating how a purchase is transacted from consumer to merchant. These are the factors most directly related to

consumers and which therefore influence a consumer's behaviors and choices. These key elements are discussed briefly below.

The first element is the end users, i.e., consumers and merchants. The payment market is a classic case of a two-sided market, where the payment provider needs to simultaneously serve and appeal to two end users—consumers and merchants. This fact will be important in discussions later on; but for now we want to highlight this property since it is the starting point of our model-building. The remaining four elements are addressed from two perspectives: a consumer perspective analyzing how a purchase is made, and a business perspective describing how a merchant receives the payment.

1.2 Consumer Perspective

The second element is transaction channel. From the consumer perspective, making a purchase of goods or services could be done remotely or at point-of-sale. We call this characteristic "transaction channel" because it describes how consumer and merchant relate and conduct business. Point-of-sales payment is the traditional way of conducting a transaction, where consumers pay and receive products or services in a store. More recently, consumers have been able to purchase items through a remote terminal, either a computer or a mobile phone. It is interesting to note that mobile payment could enable both remote and point-of-sales payment systems.



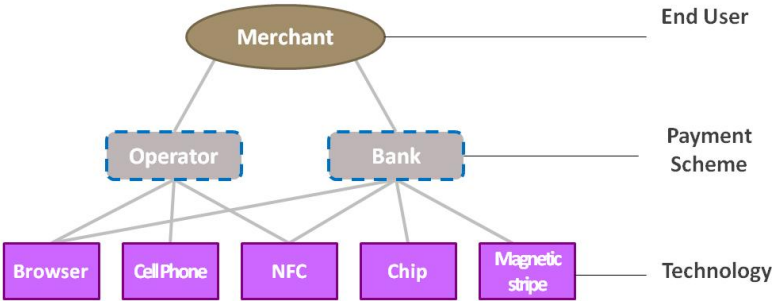
The third element is payment device. Payment devices are mainly card-based, web-based, or mobile-based. Consumers need to use a hand device or an account connected to a payment network in order to process an electronic payment. From the POS side, card payment is by far the most dominant means of electronic payment, and mobile payment has been brought into the spotlight recently. Remote payments could be accomplished by connecting an account to a remote server, through a computer, a mobile phone, or even a tablet.

The fourth element is technology. Computer, mobile, and card devices can be further categorized by the type of technology used. Types of card payment can be distinguished by their format—such as magnetic card, chip-and-PIN card, and RFID (contactless) card. Online payment computers provide account information to a retailer's or bank's web server. With advances in telecommunication, mobile phones could also be used to conduct both remote and POS payment. Purchasing small items through the carrier's network is the oldest form of mobile payment. In the near future, people could also access a web browser through their mobile phone, and they can make purchases in a manner similar to online payment via computer website. Very recently, mobile phones have begun to be used to make payment at POS terminals, using a close-proximity radio communication technology called near-field communication. This is a contactless technology very similar to that used for the RFID card.

1.3 Business Perspective

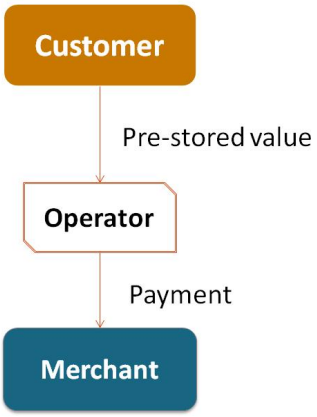
The fifth element is payment scheme. From the business perspective, there are two types of intermediaries between merchants and consumers. One is an operator, the other a bank. We define this dimension of the model as the payment scheme, which describes the intermediary through which the customer pays the merchant.

Business Perspective

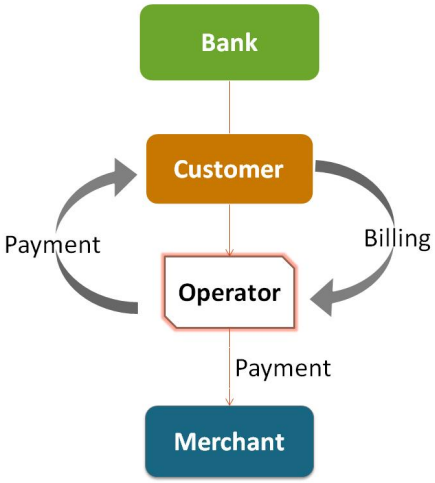


In an operator-centric model, consumers pay the merchant through an operator without interacting with a financial institution. The operator could be a mobile carrier, the merchant itself, or a third-party payment company such as Paypal. The operator-centric model could be further divided into a prepay system and a billing system. A Starbucks gift card uses a prepaid merchant-driven operator-centric payment model.[1] Octopus Card, Hong Kong's subway system, also deploys a prepaid operator-centric payment model in which customers pre-store value in their card or mobile phone and tap the handset device when going into the subway system.[2] An example of a billing system would be purchasing digital content with Rogers On Demand or subscribing to magazines with Rogers—the amount will be paid to Rogers through phone bills.[3]

Operator-Centric: Prepaid

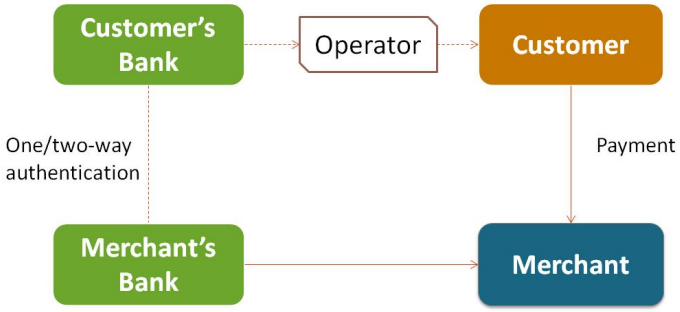


Operator-Centric: Billing



In a bank-centric model, the payment is transferred from the consumer's bank to the merchant's bank, through a one- or two-way authentication process. Credit card payment is the best example of a bank-centric payment model.

Bank-Centric



Often multiple parties involved in the process work together to create a hybrid payment system. Mobile payment systems usually require collaboration among mobile carriers, financial institutions, and other parties. Google Wallet is an example of a hybrid payment system.

2. Case Studies

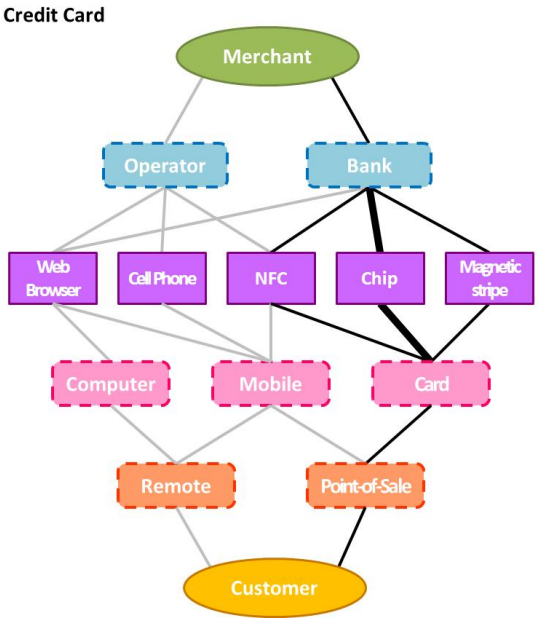
In this section we review eight cases of electronic payment systems that either succeeded or failed. A list of electronic payment systems around the world was gathered to be further selected for analysis (see appendix). Then eight cases were chosen according to the model previously outlined, with one or two cases representing each important transaction path. These cases range from relatively traditional card payment to recently emerging types of mobile applications.

Although mobile payment is positioned as a new payment method, some factors that have impacted more traditional forms of electronic payment may continue to affect newly emerging mobile-payment platforms. Therefore, while most of the selected cases focus on existing mobile payment systems around the world, two cases—namely MasterCard PayPass and credit card—are chosen to provide an overview of the broad spectrum of electronic payment.

For each case we identify its location in our model above and discuss the company background, technology involved, market adoption, and similar products. At the end of this section we present a table that summarizes the adoption and issues of these eight payment systems.

2.1 Credit Cards

Location in the context of the map



Company background

MasterCard was founded in the U.S. in 1966 and first introduced to Canada in 1973. Over the years, MasterCard and its biggest competitor, Visa, have largely penetrated the Canadian payment system.

At first, credit cards used magnetic stripes to communicate customers' account information to receivers at the point of sale. Later, Chip and PIN were introduced to enhance security after incidences of fraud on magnetic cards. And recently, contactless payment has also been added as way to execute credit-card transactions. As of 2012, both MasterCard and Visa are issuing cards with all three of these features.

Technology

Magnetic cards consisted of "one-way authentication" at the point of sale. Banking information is stored in the tiny iron particles in the stripe, and authentication is made when store terminals read the information stored inside the card. For Chip and PIN cards, information is stored in a micro-chip, and a PIN code must be inputted to the reader to authorize information release, creating a two-way authorization and a more secure interface.

As further evolution, contactless payment technology is now introduced for faster transactions. Payments can be made after a single tap of the credit card

onto the receiver at the point of sale. For security reasons, transactions allowed without a password have a very low limit. For instance, BMO allows only transactions below $50 to be executed without a password.[4] Also, "the newest generation of RFID credit cards transmits an encrypted, one-time security code alongside the card number and expiry date to authenticate each transaction."[5]

Market adoption

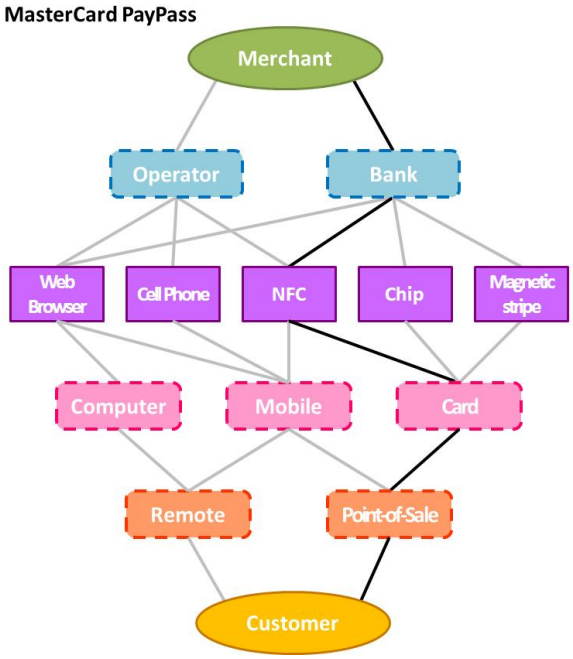
"Credit card acceptance in Canada is fairly high with over 670,000 merchants accepting 2.7 billion credit card transactions worth CAD 289 billion in 2009."[6] Credit card payments have been gaining popularity in the Canadian market, with 7-10% growth per year, mainly due to increased acceptance of credit cards at POS.

Similar cases

Visa, as the largest competitor for MasterCard, runs a credit-card business almost identical to that of MasterCard. The two credit cards use the same set of technologies and business model.

2.2 MasterCard PayPass

Location in the context of the map:



Company background

PayPass is a contactless payment system launched by MasterCard. RFID credit cards surfaced in Canada in 2006, when MasterCard started aggressively pushing its PayPass cards. As of 2010 about 90 percent of MasterCards in the country are RFID.[7]

Technology

RFID is a radio identification technology that can be used to release banking information through radio waves when contactless cards are waved near a payment terminal. MasterCard launched its PayPass program aiming to reduce transaction time and lineups at the point of sale. Because no authentication is needed other than a simple tap onto the terminal, both MasterCard PayPass and its competitor Visa PayWave are limiting transaction value to $50 before a password is requested to complete a transaction.[8]

Banks are also claiming that the information stored in RFID cards is extremely difficult if not impossible to duplicate. The encryption code released from the RFID cards is said to be valid for one single transaction, and the code expires afterward. However, some IT experts have pointed out the opposite, especially for the earlier generations of RFID cards. Although the cardholder's name was not leaked from the MasterCard card being tested during an RFID fraud demonstration, information stolen from an early-generation RFID credit card was said to be encoded onto a traditional magnetic-stripe card and used to make counterfeit purchases, a security expert says. (Canadian Press)[9] Lack of regulation for ownership of RFID card readers was also brought up against the security of contactless payment.

Market adoption

As of 2011, there are more than 22 million MasterCard PayPass-enabled credit cards and devices in use with more than 19,000 merchants across Canada.[10] PayPass is mostly used for small-value transactions. In 2007, MasterCard's PayPass transaction report discovered that over 70% of PayPass transactions were for purchases of $25 or less—a sign that PayPass is increasingly displacing cash.[11]

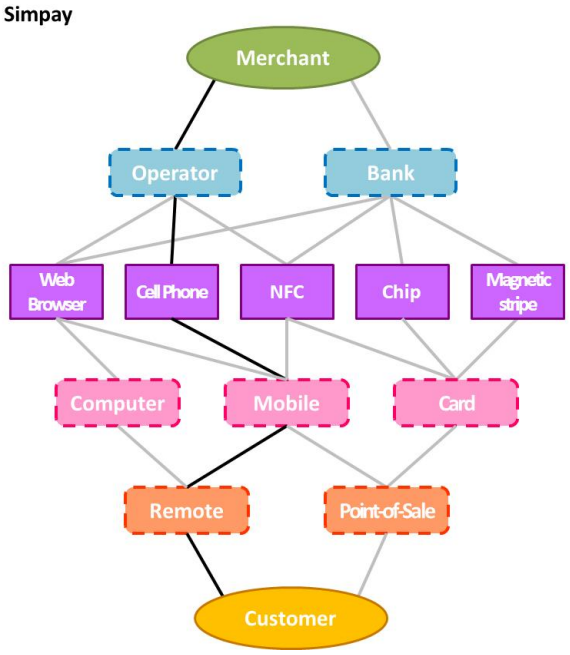
Similar products

Visa PayWave is the contactless payment program put in place by Visa. PayPass and PayWave are essentially the same type of product operated by competing companies. However, PayWave was only introduced in 2007[12] whereas MasterCard had its first nine-month market trial in 2003.[13]

2.3 Simpay

Web: No web address, as the company already ceased to operate.

Location in the context of the map:



Company background

Simpay was a joint venture launched in February 2003 among four leading European mobile carriers (Orange, Vodafone, T-Mobile, and Telefonica Moviles) aiming to develop a pan-European mobile-payments system focused on low-value digital content purchases less than 10 Euros. The operation was delayed multiple times and eventually collapsed before it was even launched, due to operational complexity and misalignment of interests. (CGPA, 2008)[14]

Before Simpay, mobile commerce was mainly driven by low-value digital content purchases (such as ringtones) through premium-rate SMS text messages. (CGPA, 2008) [15]"With the advent of new third-generation networks, operators saw much mobile commerce opportunities, such as in music downloads, Java games, video streaming, and TV over mobile, from data services." (CGPA, 2008) This is an operation-driven venture where mobile carriers were hoping to capitalize on the growing demand for mobile digital content, and to avoid the bank-telecom partnership that restricted the adoption of some earlier applications such as Mobipay and Moneta. (CGPA, 2008)

Simpay was supposed to start its operation in 20 European countries in 2004, but it was delayed several times. Ultimately the venture collapsed in June 2005 before it was even launched, as one of the major founding members, T-Mobile, withdrew from the collaboration.[16]

Technology

Each company has different payment platforms and specific technical interface requirements. In order to make the system work, mobile companies will have to adopt a single system, but an agreement was never reached. Under the Simpay Scheme, mobile purchase is billed directly under the mobile user's account--whether prepaid or postpaid. Simpay provides services for payment authorization, and for clearing and settling funds that flow between the mobile operators and mobile merchant acquirers.[17]

Market adoption

Despite their initial common intention, the mobile carriers undermined their collaboration by the complexity of creating an interoperable payment system. Simpay's initiative collapsed before having the opportunity to be tested out by customers.

The main problem Simpay faced was the misalignment of interests and strategic divergence among mobile carriers. First, they could not agree on which payment field to focus on, be it contactless payment or digital content. Second, each participant has its own mobile Internet payment services, so it was difficult to reach a common platform. Third, even though collaboration among multiple partners may increase the pie of mobile commerce at large, reluctance in cooperation comes from the fact that operators don't want to lose high margins on their existing premium SMS sales. [18]

Eventually the venture lost its momentum, and rather than trying to collaborate, some carriers chose to focus on developing their own mobile-payment system. After T-Mobile left, Simpay officially discontinued its operation.[19]

The CGPA article commented that the advantage of such a consortium was not clearly shown, either from a marketing standpoint or a business standpoint. In addition, because a great deal of content is of a local nature, observers were skeptical about the need for a pan-European interoperable system.

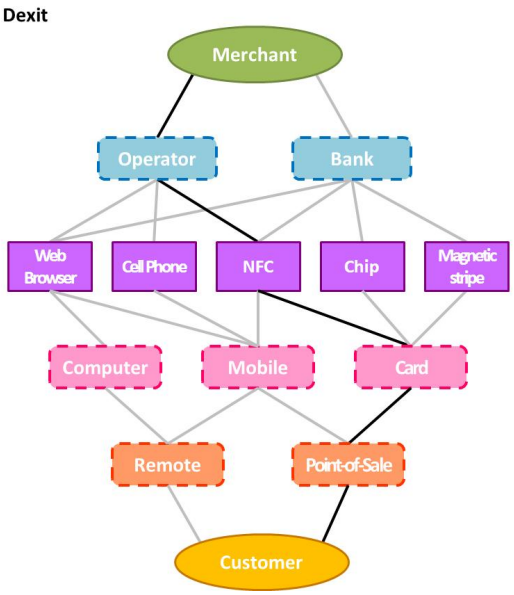
Similar products

Android In-App Billing

2.4 Dexit

Web: No website

Location in the context of the map



Company background

Dexit is a contactless preload smart key tag used for low-value transactions under $20, operating in Toronto from 2003 to 2006.

Dexit Inc. is a private company formed in Toronto in 2001. It partnered with small retailers, TD Canada Trust, National Bank of Canada, Telus, and Bell, hoping to pioneer an electronic point-of-sales payment system for retail stores that serves as an alternative payment to cash and chip card. The venture was launched in downtown Toronto in 2003 and planned to expand to the rest of Toronto in 2005; however, Dexit was removed from stores starting in 2006.[20]

Technology

Dexit uses an RFID-enabled key fob that could be pressed to a reader to pay. The preload amount could be refilled with funds transferred from a bank account. There is no link to access the accounts from the key tag, a feature to guard against the abuse of lost key tags. [21]

Consumer adoption

Despite the promising concept, Dexit had a low adoption rate since it was launched, and the venture ended in 2006. By 2004, there were 225 merchants on

board, and 25,000 consumers signed up. By 2006, there were 450 merchants and 50,000 customers.

The critical issue that this product faced is mainly associated with a "chicken-and-egg problem" in the payment industry: Dexit need to recruit consumers as well as convince merchants to install the payment terminals. Dexit faced restrictions on scalability. Since Dexit was only a local endeavor limited to retailers in the downtown Toronto area, national merchants had no incentive to participate this program.[22] Only a small number of merchants featured the Dexit card, which was not perceived as convenient for customers.

A successful micropayment example is the Octupus, which is a contactless store-cash payment system used in the Hong Kong Transit System. Info-Tech Research Group senior research analyst George Goodall said that the key to its success is the humongous scale of the endeavor. It was able to reach an 80% adoption rate. [23]In order for a micropayment system to work, there has to be a payment solution that can handle all types of transactions in the most convenient manner. Being a small, independent player in the payment industry, Dexit clearly was not able to achieve that.[24]

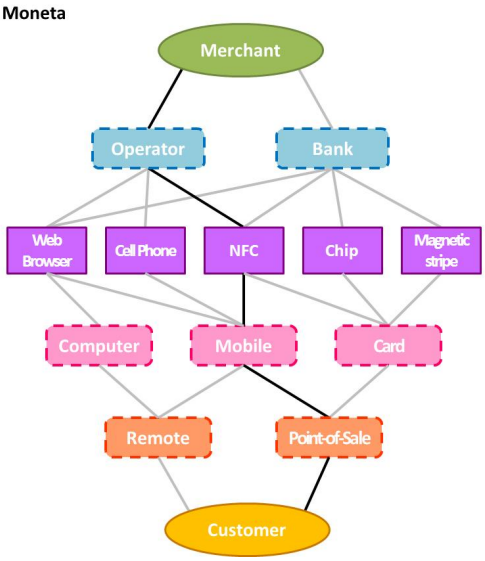
Another factor is that Dexit did not truly understand the needs of merchants and customers. On the merchant's side, there is the loyalty factor. Customers don't see any value added in this initiative: Dexit aims to replace cash, but its use is limited to a few stores in downtown. It also requires an additional step of reloading the card, which does not seem that convenient to customers. Merchants want to have their own cards that promote their own brand, as opposed to a card from a third party. It was also noted that the contactless card only became popular very recently. Gartner Research senior analyst Ben Pring said: "Dexit was probably ahead of the curve--there's always entrepreneurs who get the timing a bit wrong." [25]

Similar product

Octopus card, Hong Kong. A contactless store-cash payment system used in the Hong Kong Transit System

2.5 Moneta (S. Korea)

Location in the context of the map



Company background

Moneta was first introduced in 2001 by a large conglomerate company named SK Telecom. It initially supported mobile debit payment (*Moneta Cash*) and then evolved toward credit card payment through mobiles. SK Telecom is the third-largest conglomerate in South Korea. It boasts 50% market ownership in the mobile telephone industry, with a customer base of 20 million.[26] Because of SKT's large market presence, Moneta Cash eventually attained 3 million registered customers.[27] However, after sensitive customer information was leaked on the Internet, Moneta Cash was discontinued in 2004. On the other hand, Moneta itself has enabled credit card payments over mobile terminals. "Moneta cards were co-branded with Visa and issued by 5 major domestic credit card companies and banks."[28]

Technology

Moneta cards used the RFID contactless technology to communicate with the terminals installed at the point of sale. M-cash account balances were linked to a mobile account and maintained by an SKT server instead of in the card itself. For large-value transactions executed from Moneta credit cards, a text-message is sent to the user to confirm the transaction.

Originally, Moneta cards were used with specially designed mobile phones. These phones were equipped with a full-size smart card reader in which the

smart cards had to be inserted to execute transactions. In 2003, Moneta cards were stored in a SIM smart chip inside the phone. However, customers still had to use a specially designed cell phone and switch the chip card in order to use another credit card. Finally in 2007, SKT partnered with Visa International to create a platform where multiple credit cards could be downloaded and stored in a single chip inside the phone.

Market adoption

Moneta has achieved good market presence throughout the years. Nevertheless, actual usage lagged among the subscribers.

"By the end of 2003, SKT had placed approximately 400,000 dongles with merchants."[29]

Despite the large number of handsets installed, usage among the public was lagging. Only 40,000 users were reached, with the largest pool (29%) from the 30-39 age group. Besides, out of the registered users, only 21% had made purchases with their handsets.

As time progressed, SKT continued to attract new subscribers and develop handsets with credit card function enabled. "As of February 2007, there were 1.5 million registered users of Moneta services in Korea (Payment News 2007), and 80 percent of new third-generation-capable phones had the credit card functionality enabled. But according to uncorroborated sources, use is very low, and the future of Moneta is uncertain."[30]

In addition to the usual concerns over revenue sharing among the participating parties (banks and mobile carriers), Moneta faced stiff competition from other market players, namely Kookmin Bank supported by SKT's two mobile competitors (LG Telecom and KTF). The presence of rival systems and uncooperative parties resulted in incompatibility and inconvenience in the customer adoption of mobile payments.

SKT was among the first mobile-payment developers in the world. Therefore, the company had also encountered challenges due to its early engagement in an immature market. The advantage of carrying credit cards in a mobile phone was unclear. Mobile payments did not provide improved convenience when people still have to carry cash and electronic wallet at the same time. Also, in the absence of industry standards and successful precedents, market participants were slow in adopting the new payment system until they saw clear winners emerging from the race.

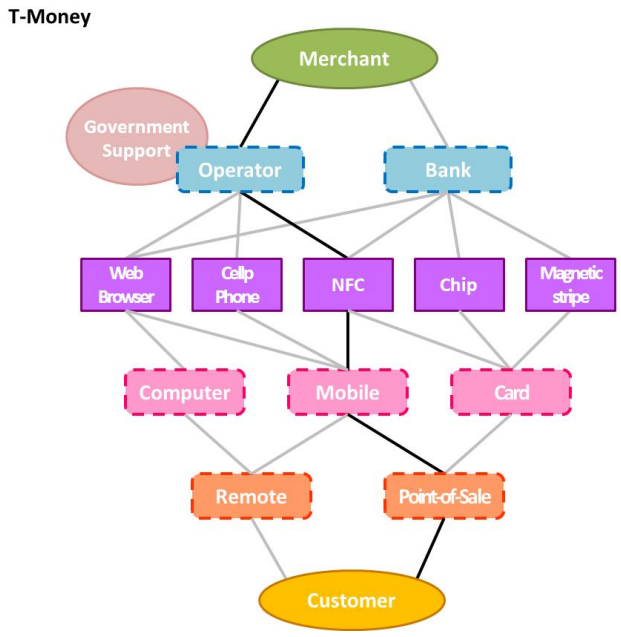
Similar products

See Osaifu-Keitai below.

2.6 T-Money (S. Korea)

Website: http://www.t-money.co.kr/

Location in the context of the map:



Company background

T-Money was first introduced in 2004 to improve South Korea's public transportation ticketing services. Because of the complexity of traffic routes in the city of Seoul, public transportation itineraries often involve multiple transfers. T-Money cards were launched with the main purpose of facilitating fare transfers. Later on, these smart cards expanded into other areas such as convenience stores, vending machines, and various businesses.

T-Money has been installed and operated by Korea Smart Card Co. (KSCC), a joint venture of Seoul Metropolitan City Government, LG groups, credit card issuers, and other financial investors. KSCC has made the T-Money system the first commercialization of the mobile money service in the world.[31]

Technology

T-Money smart cards operate with the RFID contactless technology. KSCC has developed an efficient and safe three-scheme system (issuer, infrastructure, clearing) for its T-Money services.[32] The issuer scheme controls card manufacture, issuance, loading, and other customer supports. The infrastructure scheme works closely with IT teams to oversee transportation routing, scheduling, and operation

management. And finally, the clearing scheme oversees data collection, transaction management, reconciliation, and other services to settle T-Money transactions. The separation of duties among the three schemes clearly defines the tasks that each department has to accomplish, and therefore this enterprise has achieved high efficiency for the entire payment system.

Market adoption

T-Money became widely used in the public transit system, as it responded appropriately to the need for a more integrated fare-collection system. Gradually these smart cards have vastly expanded into the e-money market. The system was installed in several metropolitan areas in South Korea, and then it was also established and began operating in Auckland and Wellington, New Zealand.[33]

KSCC has issued many types of smart cards for different customer needs: prepaid, bank alliance, post-paid transaction, and mobile T-Money. In addition, various forms of T-money cards (key chains, mobile chip, etc.) were introduced to provide better convenience for customers to carry the T-Money products.

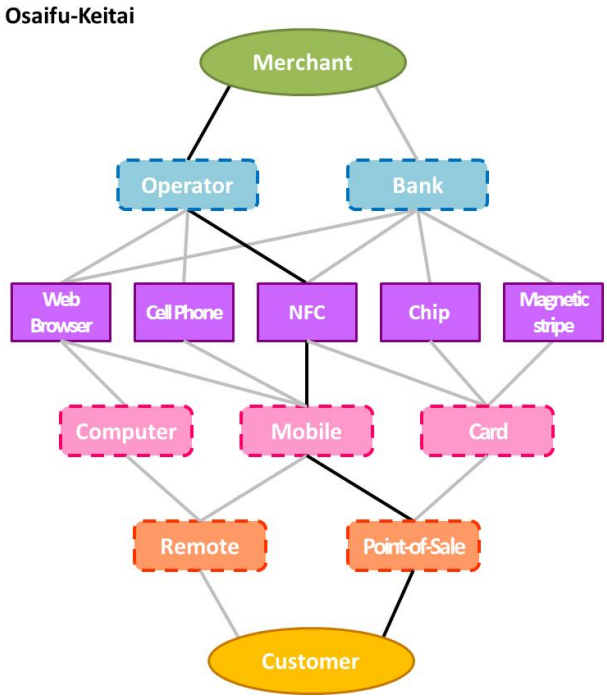
As a result, T-Money now handles more than 30 million transactions per day in South Korea, with an average annual growth of 200% from 2005 to 2009 in the retail sector.[34] Card validators and loading terminals have also penetrated well in the public transportation and retail businesses.[35]

Similar products

Hong Kong's Octopus operates under a similar framework as T-Money. Both Octopus and T-Money started up as payment systems for metropolitan public transportation. Payments were later extended to other commercial areas such as vending machines, convenience stores, and taxis.

2.7 Osaifu-Keitai (Japan)

Location in the context of the map:



Company background

Osaifu-Keitai (meaning "mobile wallet") was launched in 2004 by Japan's leading mobile-communication operator NTT DoCoMo. NTT DoCoMo represents half of Japan's cellular market and has achieved 100% population coverage for 3G service.[36]

Multiple services have been established along the mobile-wallet application, proving a wide range of payment paths. Osaifu-Keitai incorporates credit payment by issuing their own credit card in addition to providing a platform for other bank cards. Aside from credit payment, DoCoMo has formed a joint venture with Sony Mobile to offer prepaid accounts. Moreover, the company has partnered with East Japan Railways and created Suica, which focuses on transportation ticketing services. DCMX mini, an operator-billing feature, allows consumers to pay for small amounts directly charged to their phone.

Technology

Osaifu-Keitai runs on Sony's RFID platform FeliCa, which allows mobile devices to contain multiple forms of data (ID, credit cards, etc.) and enables mobile payments at the point of sale.

Market adoption

DCM has developed a very structured approach in order to entice partners onto its payment platforms and to foster further service innovation. The company stresses to retail agents the ways in which Osaifu-Keitai would increase both customer convenience and value for their businesses through (1) process speed, (2) versatility, and (3) security.[37] Meanwhile, DCM has purchased a bank and transaction processing company to drive economies of scope—efficiency achieved by integrating related services. In other words, DCM was able to reduce costs from banking and processing services that would otherwise be provided and charged by external agencies.

Osaifu-Keitai has achieved good recognition in the marketplace. As of January 2006, there were more than 10 million subscribers of Osaifu-Keitai with compatible handsets. As of 2008, there are more than 29 million subscribers (NTT DoCoMo 2008).[38] The mobile-wallet application is accepted at more than 640,000 stores. The prepaid system Edy handles close to 1 million transactions per day, accepted in 71,000 convenience stores, bookshops, vending machines, and coffee chains.[39]

Despite the high rate of recognition, usage of the mobile wallet is still lagging. Forty percent of DCM's subscribers had Osaifu-Keitai-enabled phones, and twice as many knew about the service. But of those with the capability to use Osaifu-Keitai, only 30 percent used it "sometimes" or "often."[40]

Similar products

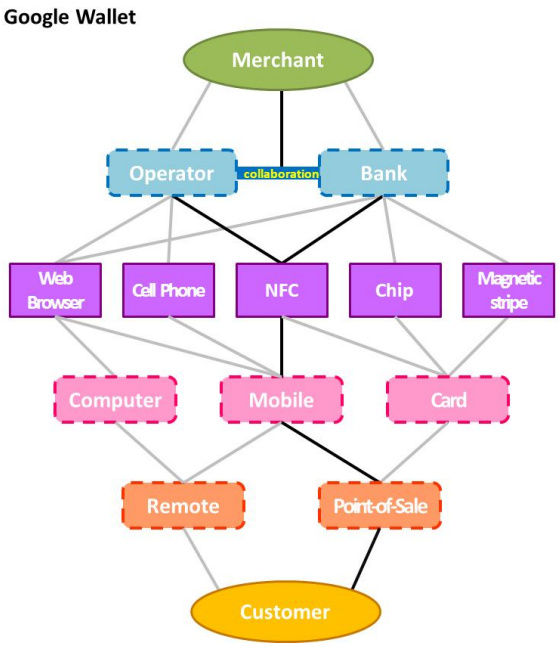
Moneta from South Korea operated under a similar framework as Osaifu-Keitai in Japan. Both platforms are launched by powerful mobile carriers in the country and competed against banks for their role in the payment market.

2.8 Google Wallet

Web: http://www.google.com/wallet/

Google Wallet is a mobile application/mobile payment system equipped with near-field communication technology that allows users to pay for merchandise, use a loyalty card, and redeem sales rewards all in a single tap.

Location in the context of the map:



Company background

Google Wallet is created by Google Inc., a public company that provides Internet-related products and services including Internet search, cloud computing, software, and advertising technologies. Advertising revenues generate almost all of the company's profits.[41]

Date of establishment: Google demonstrated the application at a press conference on May 26, 2011. The app was released on September 19, 2011, and it is currently used by U.S. retailers only.[42]

The rapid rise of smart phones since 2005 has brought in a new wave for mobile commerce. The mobile-payment market in particular has spurred intense competition, with players from startups to well-established companies all aiming to capitalize on the growth of smart phones.[43] Mobile payment transactions are

estimated to top $170 billion by 2015, up from about $60 billion last year, according to Juniper Research.[44]

Google is hoping to gain a foothold in the mobile-payment market and boost its share of mobile phone advertising by the introduction of Google Wallet, an application that runs mostly on an operator-centric model with some collaboration with banks. Google and mobile operators develop the application, process customer transactions, and share the revenue received from merchants. Customers pay Google by pre-storing value on their Google account or are billed through their mobile carrier. But the system also works with banks and a payment processing company to process transactions and support payment through a credit card issued by the partnering bank, Citibank.[45]

Technology

Google Wallet deploys SimpleTap, a NFC technology. Google Wallet supports two payment solutions, one through PayPass-eligible Citi Mastercard and the second via a virtual Google Prepaid card, which can be funded with any payment card. As of July 8, 2012, the Google Wallet app only works on certain devices from its solo carrier, Sprint.

Google Wallet can be used on any PayPass-enabled terminal at checkout. Consumers will be able to pay for an item using a credit card or gift card, take advantage of promotions, and earn loyalty points—all with a single tap of their Google Wallet.[46]

List of devices that offer Google Wallet app:

Samsung Nexus S 4G on Sprint, Samsung Galaxy Nexus on Sprint, Samsung Galaxy Victory 4G LTE on Sprint, Samsung Galaxy Nexus GSM/HSPA+, and Samsung Galaxy SIII on Sprint, MetroPCS, and US Cellular; LG Viper™ 4G LTE on Sprint, LG Optimus Elite™ on Sprint and Virgin Mobile, HTC EVO 4G LTE on Sprint, Asus Nexus 7 Tablet (WiFi only), Samsung Galaxy Victory 4G LTE on Sprint.

Note that Google Wallet only applies to devices purchased from the listed carriers; unlocked international versions would not work with Google Wallet.[47]

Market adoption

Launched just over a year ago, Google Wallet is still a relatively new initiative, so it is perhaps too early to draw a conclusion about its success or failure. But with that in mind, there are barriers it needs to clear in order to ensure a wider adoption.

So far, the adoption rate has been slow in the U.S. While 50,000 to 100,000 people have downloaded the software, only a small percentage use it, according to a Bloomberg article.[48] The main barrier to adoption is the lack of suitable devices: Google Wallet currently works with only one carrier and one card network. Sprint (the third-largest U.S. carrier) is the only partner carrier Google has, while the other three largest carriers, T-Mobile, Verizon, and AT&T, are backing their own mobile payment system, Isis. Google Wallet's NFC functions are limited to a few phones from Sprint; therefore not surprisingly its retailer partners haven't seen much traffic so far.

With the departure of two key managers and low adoption rate, Google has had to adjust its strategy, to either cooperate with other carriers or seek out various ways to boost customer usage. There is little incentive for other mobile carriers to cooperate: they are hoping to gain a larger share of the pie by developing their own payment system, so revenue sharing is not a feasible move. A better option is to rely on in-store terminals to complete mobile-payment transactions. Google is currently working on building a better ecosystem by partnering with payment system companies and retailers.[49]

Similar products

Isis Wallet (coming out Q3 2012)

Isis is a joint venture in the United States of AT&T, Verizon Wireless, and T-Mobile USA, the top three out of four telecommunications operators, and the credit card companies Visa, MasterCard, Discover, and American Express. The companies conducted a trial in Salt Lake City, Utah, and Austin, Texas, during the first half of 2012 that should make NFC-enabled devices widely available in those areas.

Sprint (coming out Q3 2012)

Sprint Mobile Wallet is a product that aggregates payment methods and makes them available as one-click payment options on a user's mobile phone. It allows customers to pay merchants directly with their registered payment information.[50]

Table 1. Summary: Mobile Payment Adoption Issues

Cases	Convenience	Security	Adoption Rate	Cooperation Problem	Government Intervention
Google Wallet	Combined functions all in one simple tab via mobile application	N/A	Low adoption rate to date, retail partners haven't seen much traffic.	Limited partners: Established relations with Sprint, but was not able to partner up with other 3 mobile carriers as they are designing a competing platform on their own. Developed alliance with many national retailers.	
Simpay	N/A	N/A	Never launched	Despite the hype at the beginning, founding members were not able to align their interests in the venue, nor could they agree on a single operating platform.	
Moneta	Speeds up POS transactions. Consumers needed to carry additional chips and manually change them if they wished to use multiple accounts.	There have been incidences of database information leaked on the Internet.	Gained good market presence; but low usage. Eventually discontinued.	Incompatible rival systems from banks and other operators made adoption difficult.	

Cases	Convenience	Security	Adoption Rate	Cooperation Problem	Government Intervention
Osaifu-Keitai	Combined functions all in one simple tap via mobile application.		High recognition, but low usage.		Low government regulation allowed DCM to purchase banks.
T-Money	Significantly speeded up transportation ticketing. Payment service extended to some other retail businesses.	Mainly used for low-value transactions.	Widely used in the public transportation business; growing usage in some retail businesses.	N/A	Government owned share of the company.
Credit Cards	Signature or PIN code slows down transaction speed.	Chip and PIN is a very secure process.	Widely used in all areas of retail business.		
MasterCard PayPass	Speeds up transactions for low-value purchases.	Only low-value transactions are allowed without PIN. Single-use encryption code. Possible fraud with poorly regulated card readers.			

3. Implications for Canadian Consumers/Enabling Factors

Research Method and Key Findings

Three experts were interviewed to provide their opinions on the consumer adoption issues of mobile payments in Canada. Professor Dilip Soman helped identify and provide contact for experts in the payment industry. The interviews were conducted through conference calls. Two research assistants, SiLu Liu and Yue Zhuo and Professor Min Zhao attended the interviews. Notes are organized by SiLu Liu.

- *Tomas Purves, Senior Business Leader, Product Innovation & Strategy at Visa.*
- *Madhav Mohan, Leader in the Insurance Business Vertical at Tata Consultancy Services and formerly Head of Payments & Cards at HCL Technologies.*
- *Susan McFadden, Manager, Strategy, at Rogers Communications*.

Common themes discussed in these three interviews include the rise of the near-field communication (NFC) mobile-payment system, consumer issues related to security concerns and ease of use, how innovative business models change consumer spending patterns, market issues (two-sided market issue), and the implication of Canadian-specific characteristics such as the Interac debit-card system.

Madhav Mohan discussed the rising opportunities with the new forms of point-of-sale systems—NFC technology being the dominant one. Mohan noted that customer experience and security are the two main areas of concern; and customer experience, including ease of use and a well-designed interface, is a more important factor in consumer adoption than security concerns. Second, a mobile payment system provides a new channel for the "unbanked"—those who do not have bank accounts yet. There is also a question of revenue sharing, as banks and telecom companies are both trying to attract those customers.

Tomas Purves emphasized that consumer implications of mobile payments have less to do with the payment system itself than with a change in consumer

commerce experience. Mobile payments encourage new business models and help merchants and consumers to transact in innovative ways that are outside the traditional Interac debit POS system. He noted that the introduction of mobile payment systems will expose Canadian retailers to international competition, which means that Canadian businesses need to invest more in e-commerce. He believes the consumer will win either way by getting better deals through e-payments. Mobile payment helps consumers make more informed purchases, and it provides many macroeconomic benefits such as transparency of payments.

Susan McFadden pointed out that the perceived security concern is a main barrier in consumer adoption. Consumers would prefer some sort of a physical switch, such as the process of entering a PIN number, to feel secure. She thinks a mobile payment system, such as Square, is able to roll out quickly in the U.S. because they do not have a Chip-and-PIN system. Canada has a very secure payment infrastructure in its Interac debit system. It would be tougher to convince consumers in Canada to switch from the Chip-and-PIN system to mobile payments.

For the rest of the analysis in this section, we have identified four enabling factors: integrated platform, convenience, enhanced security, and changing spending patterns. While all types of electronic payment systems will be examined, focus will be given to mobile payments because this format is potentially a major turning point for the payment market. What matters the most for consumer adoption is whether there is any value added in transferring from computer web payment and card payment to mobile payment. This section discusses the benefits of mobile payment, and Section 4 addresses issues of adoption. Wherever applicable, we offer brief recommendations on how to enhance the benefits and overcome the limiting issues, and we also summarize these recommendations in Section 5.

3.1 Integrated Platform

What sets mobile payment apart from other digitized payment systems is the integrated ecosystem it provides for consumers and merchants. Tom Purves from Visa explained in the interview that a mobile payment system should not be evaluated simply on its own merits, but rather as part of the whole mobile platform that provides many macroeconomic benefits.

Mobile payment can accelerate the digitization of payment record. From a macro perspective, digitized records could provide benefits including monitoring tax payments and increasing transparency of business transactions. From a micro perspective, it helps individuals with their record keeping and budgeting activities.

A mobile platform is a good way to bring connectivity to all places, and consumers are able to benefit from the convenience of having all transaction channels present on the mobile platform—both remote and point-of-sales payment. For example, a smart phone user in Toronto could pay her utility bills through the CIBC mobile banking app, buy groceries at a retailer by simply tapping an NFC-enabled mobile phone on the payment terminal, and order a camera on the eBay mobile app.

Mobile enables the convergence of remote and POS payment platforms. Purves indicated that the difference between remote and POS exists because of the lag in telecommunication systems in the 1980s and 1990s. Essentially all electronic payments are remote. Terminal software "lets consumers borrow the connection through retailers, such that retailers talk to banks on the consumer's behalf," notes Purves. Card-based POS terminals exist because telecommunication was expensive and required physical wires. However, with the advances in telecommunication systems and mobile devices, the various types of POS terminal software will soon be outdated.

In addition, the mobile platform encourages an innovative business model that helps merchants and consumers connect in an easier way. Take Starbucks' mobile payment[51] for example: Starbucks introduced its own app in January 2011 to enable customers to pay at the register by displaying a bar code on their mobile devices. By providing its own payment infrastructure, Starbucks enabled transactions to flow more easily between merchants and consumers, and the company is able to eliminate one chain of the previously developed payment model. The changing commerce experience will therefore increase the efficiency of the whole transaction.

3.2 Convenience

Mobile payment platforms could bring the consumer additional convenience by providing flexible payment increments, speeding up transactions, and increasing ease of use. During our interview, Madhav Mohan (who has 20 years' experience

in banking/consulting/outsourcing technology and runs a credit card system) said that convenience is more important than security when it comes to consumer adoption.

Consumers can make transactions in more flexible increments using mobile payment and mobile banking. Since mobile phones are carried around at all times, consumers could purchase an item on a mobile phone whenever there is internet access. This essentially opens up a shopping channel that will be available 24/7.

Mobile payment can make a consumer's life easier by simplifying the payment process and reducing transaction time. From the remote payment side, an easy-to-use interface can make mobile payment much more convenient to use than online purchases through a laptop. By accessing an app that is already linked to a bank or carrier account, purchase can be made as simple as a few clicks. From the POS payment side, NFC-enabled mobile devices allow consumers to make purchases and participate in loyalty programs at retail terminals with a simple tap, just like Google Wallet, which could significantly reduce lineup time. Mobile phones could also serve as a virtual wallet, so consumers could tap a phone instead of taking out different cards, which also makes the transaction more efficient.

3.3 Change in Consumer Spending Patterns

The adoption of mobile-payment platforms will change consumer behaviors in three main ways: where to spend, when to spend, and how much to spend.

Mobile payment platforms will change *where* consumers spend. We could expect spending to shift from physical retail stores to online stores. This might be caused by the showroom effect, which describes the phenomenon that consumers tend to go to retail stores as a showroom for the products they want to purchase, and then go online to purchase the item since they can usually get a lower price.

At the same time, mobile payments open up business opportunity in unconventional channels and could potentially change consumer buying patterns in unexpected ways. For example, Tesco, the second-largest supermarket chain in Korea, introduced a virtual grocery store in the Seoul subway station. It created billboards with screens displaying aisles of supermarkets; customers can stand in front of the poster and purchase items

using their mobile phone by scanning the QR code. Groceries would be delivered by the time they got home. This illustrates how an innovative business model working through a mobile platform could influence consumer spending in unexpected ways.

Finally, the introduction and widespread use of mobile payment will affect consumer spending levels. Consumers are expected to spend more with the aid of a more efficient payment system. According to the "PayPass adoption study"—a study conducted to discern the effect of the introduction of MasterCard PayPass—consumers were spending 30% more in their day-to-day transactions.[52] With more flexible payment increments and accessible sales promotions, consumers are expected to increase spending amounts and/or make spontaneous purchases more often.

While it is arguable that encouraging consumers to spend more is desirable, we suggest that certain apps can be developed to help consumers better manage their spending. For example, to facilitate saving, mobile devices can display the past 10 transactions whenever a purchase is being made. Or the apps can allow consumers to set their spending goal of the week/month, and the app reminds consumers of their goal and reports their remaining amount every time a purchase is made. Having such apps to help set target budget[53] and provide feedback[54] will help consumers pursue their financial goals more effectively

The purchase experience could be enhanced by the design of a mobile interface that provides concise and sufficient information for purchase decision making. Research has shown that although online reviews display no persuasive influences, a large number of reviews does generate an awareness effect. In a study where movie reviews were examined against box-office sales, results indicate that a large amount of reviews is generally associated with higher ticket sales, whereas the ratings themselves display no apparent trend with sales.[55] With the introduction of a mobile payment network, access to product information, reviews, and prices at any time would be likely to encourage customer spending in the same way that movie reviews influence box-office sales. Mobile payment therefore has strong potential to empower consumers to make more informed purchase decisions, and to increase purchases by making necessary information easily available.

3.4 Enhanced Security

With the wide adoption of microchip technology, debit card fraud in Canada is now relatively rare and is therefore not discussed here.[56] Similarly, on the credit card side, by switching from magnetic stripe cards to EMV smart cards, credit cardholders in Canada are able to benefit from enhanced security. Credit card fraud was a big concern with magnetic stripe cards and was usually "perpetrated by copying or stealing card-authorisation forms from restaurants, stores, or even a person's own trash. Hacking into a credit-card processor's database is another profitable approach for criminals."[57] EMV smart-card microchip technology is difficult to duplicate since personal PIN code is required, and "cryptography" is used for security checks at POS. EMV smart cards enable a two-way verification.

From the POS perspective, mobile payment to a large extent is more secure than credit card payment. NFC technology provides a one-time encryption code that makes identity theft almost impossible. Each time a customer makes a purchase, a one-time encryption code is generated, and this code expires when the transaction is completed. Furthermore, NFC technology transmits information through radio waves, requiring the card or mobile device to be located very close to the terminal reader, preventing third parties from accessing consumers' personal information.

4. Adoption Issues/Hindering Factors

As with any new technology, there are challenges for consumers in adopting mobile payment systems. Below we discuss security concerns, market problems, switching cost, and consumer readiness.

4.1 Security Concerns

Concern over security is the biggest consumer adoption issue that was brought up during the interviews and in secondary research. The main security concerns from the consumer perspective include identity theft and data breach. It is also worth noting that the main challenge with security is not security deficiencies from the technological end, but rather it is the security issues perceived by consumers.

The Problem of Identity Theft

The problem with card security was discussed in the previous section. As with other card payments, there are concerns about information leaking through NFC or similar proximity payment methods. For example, Google's Wallet faced a problem in February 2012 when an Android user claimed that he would expose a Google Wallet PIN on demand.[58] Similar concerns about identity fraud could discourage users from actively trying out new mobile payment systems. But for the most part, mobile payments are actually more secure than card payments because of the one-time encryption feature (as discussed earlier).

Unregulated Readers

Although RFID transaction systems have updated security features such as the one-time encryption code, security updates are more focused on third-party theft. Similar to NFC cards, NFC-enabled mobile devices will be better protected against traditional methods of third-party fraud. However, consumers are not properly protected against direct fraud from the terminal itself.

"Anyone can buy an RFID credit card reader online, where second-hand units sometimes sell for under $10, and start scanning cards in public—without cardholders knowing."[59] Because ownership of RFID card readers is largely unregulated, security of NFC-based card or mobile applications could be seriously challenged.

Perception

In reality, security problems from a technology standpoint are relatively easy to solve. However, the largest security concern from the consumer viewpoint is the "perceived" security issues that may not actually exist—for example, the fear of a security problem from the IT side, such as fraud and identity theft. Prior research has shown that perceived security often matters more to consumers than objective security.[60] Susan McFadden (Rogers) said that people are often irrational to think that there needs to be a physical feature to ensure security. For example, in Rogers' new mobile-payment initiative, entering a PIN number for mobile payment is unnecessary; however, it is still there because consumers need such a physical switch to feel secure.

Another security issue that might arise is the validity of a payment offer. A study from Opus Research points out that 52% of consumers are "not likely to use" mobile coupons "in part due to security worries people have over handing a cashier their phone, and in other part due to concerns over the validity of the offers. Some people are outright embarrassed."[61]

Based on the fact that mobile payment is actually more secure than credit card or debit card usage, and that it is mainly the perceived concern of the consumers that hinders them from adopting this new technology, we suggest that better education in terms of how the technology works for mobile payment (especially the one-time encryption code) would help reduce this concern. On the other hand, adding an irrelevant physical procedure to this payment (i.e., entering an unnecessary PIN) might help increase the perceived security of this technology.

4.2 Market Problem

As briefly mentioned in Section 1, the payment market is a classic case of a two-sided market, where a payment product needs to simultaneously appeal to two end-users—both consumers and merchants. This is a chicken-and-egg problem. Consumers want to adopt a new mobile-payment product only if many merchants adopt, and merchants are willing to build the payment infrastructure only if there is sufficient consumer adoption. Toronto's Dexit faced this two-sided market problem, in which the venture was not able to take off because the marketing effort was neither sufficient nor effective to persuade merchants and consumers to adopt. Persuading merchants and businesses to adopt new payment schemes is thus an important catalyst for consumers to follow suit.

Before exploring the next market problem, it is useful to introduce the concept of network effect, a phenomenon whereby a system becomes more valuable when more people use it. The EMV card is a good example of a payment network that became more valuable as more cardholders and merchants adopted the system.

The rivalry and incompatibility of existing and upcoming mobile-payment platforms could potentially aggravate the market problem. In addition to incompatibility, many systems are available only to customers of certain mobile carriers or banks. For example, Google Wallet and Isis Wallet illustrate how incompatibility among different platforms might cause inconvenience for consumers in their purchases since subscription to a particular company would deny access to terminals provided by a competing system. Google Wallet can only be used on phones provided by Sprint and to credit holders of Citi Bank, while the yet-to-be released Isis Wallet is backed by AT&T, Verizon, and T-Mobile. Rival systems would cause an inverse impact of the network effect. As a result, consumers might prefer sticking with or returning to a more conventional and familiar payment tool that is accepted by everyone (for example, by using credit cards as opposed to a mobile payment method). The Moneta case from Korea is another example of how rival systems could hinder consumer adoption of any mobile payment.

Given these problems, a better coordination between service providers is in order. Perhaps government intervention will also help alleviate this problem.

4.3 Switching Cost

The Canadian phone adoption rate is 85%, but only 45% of cell phone subscribers are using smart phones. In order to facilitate mobile payment systems, Canadians need to first accept a mobile that enables the functions discussed above. In reality, there are less than 10 types of phone with NFC technology, and not all smart-phone users can fully benefit from the payment apps discussed earlier.

For those who already use smart phones, making the transition into mobile payment will be relatively easy; the adoption issues will focus on features and security. Those users are clustered in urban areas where income level tends to be higher and the payment infrastructure is relatively mature. For consumers, merchant infrastructure adoption is also important.

For those who do not possess a smart phone that can utilize these newer applications, or the 15% who don't even have a mobile phone, phone upgrade cost will be very high. Purchasing a smart phone usually means paying an initial amount and locking into a three-year phone contract with a minimum monthly phone bill floor. The increased phone bills could be very high, therefore the switching cost is high, so consumers' willingness to adopt would then depend on how much marginal benefit outweighs the marginal cost that would be incurred if they switched to a "smart" mobile phone.

4.4 Consumer Readiness

Mobile Device Readiness

The differences in mobile usage rates among Asian/European countries and North American counties are also noteworthy. The Canadian mobile usage rate is currently 85%, and 45% of cell-phone users are Smartphone subscribers.[62] While Canada's Smartphone usage has been drastically increasing recently, it is still lacking compared to the Asian and European countries that have started the adoption of mobile payments. For instance, in Japan, where the RFID payment system FeliCa was developed, per-capita cell phone ownership has exceeded 100%,[63] with a 3G network covering the entire country.[64] Other countries such as the Netherlands and South Korea have also had extensive cell phone usage rates and vast wifi coverage in the country. Nevertheless, with a high adoption rate of card payment devices and a rising trend in Smartphone usage, Canada could potentially become a leader of mobile payment in the near future.

Payment Infrastructure

As of 2011, 30% of Canadian retail transactions are made via debit and credit accounts, with average annual growth of 5% and 7%, respectively. Cash, on the other hand, has been experiencing a decreasing trend in transaction volume with 46% in 2011, down from 50% in 2008.[65] These data indicate that Canada is already shifting towards a cashless economy, and therefore the readiness for electronic payments is quite high. As cash becomes less important in a consumer's wallet, further digitalization of payment platforms seems to be the right path. Meanwhile, with Canadian consumers carrying less cash, it is fair to say that the newer forms of electronic payment technologies will not actually replace cash, but they will potentially replace the stacks of bank and loyalty cards in the wallets.

When the Moneta mobile payment application was introduced in South Korea more than 10 years ago, its adoption was limited by the lack of value added from transferring bank cards to a mobile application because the vast majority of people still preferred cash to cards. Nowadays in Canada, where cash transactions are on the decline, implementation of mobile payment could in fact "virtualize" everyone's wallet, given the system's ability to store account information from banks and loyalty programs.

Concentration of Population

Another factor in the adoption of electronic payments is the presence of a sufficiently concentrated population. From case studies around the globe we can see that POS mobile payments and other forms of electronic payment have shown a greater presence in more populated areas such as some of the Asian countries. While North America is lagging in the adoption of mobile payment, Asian countries have seen much more advancement in placing mobile and other forms of electronic payment systems into the market. One of the remarkable differences between the two markets is the comparative population size and density.

Table 2. Types of Consumer Issues: Mobile Payment

	Challenges	**Opportunities**
Consumer	1. Perceived security problem 2. Security problems such as identity theft and data breach 3. Switching cost	1. Convenience including ease-of-use, ease-of-carrying, and faster transaction speed 2. Enhanced security 3. Better record tracking 4. Informed purchase 5. Greater functionality such as loyalty program
Market	1. Two-sided market problem (chicken and egg) 2. Rival system and reverse network effect	Integrated platform: 1. Greater connectivity 2. Convergence of remote and POS 3. Simpler transaction chain from merchant to consumer 4. Encourages innovative business model 5. Digitized system

5. Recommendations

Based on the issues identified in this report, the following recommendations are formed to address the current problems facing adoption of mobile payment systems. More specifically, we recommend overcoming these consumer issues through education and by providing the right tools to help consumers better manage their spending.

Consumer Education

It is important to let consumers know the various features of mobile payment and their implications. For example, some consumers are concerned about security. First of all, consumers feel insecure tapping their mobile phone on a payment terminal without typing in a password. It is therefore necessary for the service provider to introduce the security features and technical measures addressing the public's concern, including giving them an action to carry out such as entering a PIN. Another insecure feeling comes from consumers' fears of losing their Smartphone. Consumers need to know that in case they lose a phone in which their personal and financial information is stored, they should simply contact their mobile payment provider to block the information to the lost phone. On the other hand, Smartphone manufacturers should be required to build in necessary applications enabling mobile payment providers to remotely block confidential information from a lost cell phone.

Applications

Applications or add-on features that help consumers budget their spending should be provided along with the basic payment features. Since one of the predicted outcomes of the adoption of mobile payment is an increase in consumer spending, account balance and recent transactions should be conveniently available for customers to view. Other features could include a spending ceiling or warnings when periodic spending reaches a certain level. These recommendations are in accordance to prior research findings in psychology and marketing that that savings goals and target budgets can curb unnecessary expenditure[66]. At the same time, consumers should be encouraged to set goals that are specific and attainable to avoid back-fire of goal-setting[67]. Further, in providing consumers with feedbacks of their spendings, policy-makers should consider different types of feedbacks (e.g., positive vs. negative, amount spent or to be spent) to optimize the effect. For example, prior research has shown positive feedback motivates goal pursuit when it signals an increase in

goal commitment, whereas negative feedback motivates goal pursuit when it signals insufficient goal progress[68]. In terms of amount of spending vs. to be spent, research showed that at the beginning of goal pursuit, directing attention to accumulated progress increases goal adherence relative to directing attention to remaining progress (e.g., 20% completed is more impactful than 80% remaining). However, with closeness to the goal, directing attention to accumulated progress lessens goal adherence relative to directing attention to remaining progress (e.g., 20% remaining is more impactful than 80% completed)[69]. All these findings suggest that if designed appropriately, these applications should help consumers keep track of their spending and better manage their spending/saving.

Regulation

One of the major security flaws was identified to be the lack of regulation of NFC terminals. While current technological features—such as the single-use encryption code and close-distance data transmission—are able to prevent fraud from third parties of a transaction, few measures have been taken to prevent transaction terminals themselves from recording confidential information. As shown by hacking demonstrations, it is fairly easy to extract account details if the hackers are themselves owners of NFC terminals. Therefore, it is important for public agencies to tightly control the registration and ownership of transaction terminals.

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Appendices

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Appendix I: *Interview Questions*

(This is the list of questions we initially designed, but in the actual interview, the conversation naturally shifted towards topics that interviewees have expertise in.)

Interviewer: We have learned about and analyzed the broad categories of payment systems as a background investigation in our research. The next step of our research is to learn how the introduction of mobile and electronic systems will affect Canadian consumers. That's why we hope to get your opinions on some consumer-related issues in e-payments, and some successes/failures.

0. Introducing ourselves. what's your area of specialty related to our study?

1. Is there any remarkable factor of success or challenge that has surfaced in some earlier cases of mobile-payment adoption in other countries?

2. Would the factors described in the previous question apply to the Canadian market?

3. Was there any shift in spending habits among the consumers in the countries that have adopted mobile payments? What are the significant changes in consumer spending?

4. What are the consumer concerns in countries that have adopted mobile payments? How did the mobile-payment service providers in these countries respond to such concerns?

5. If an e-money system is put in place, what intervention/safeguard can technology put in place to protect consumers?

6. We've seen quite a few products involving mobile payments around the world. Such products and services include Google Wallet, Osaifu-Keitai, T-Money, Octopus, etc. What are some of the problems these models share, and what are some of the distinctive advantages or disadvantages of these products?

7. Do you think mobile payments would be similar to debit/credit cards? In what ways? What are some of the problems encountered with debit/credit payments?

Appendix II: *Interview with Tomas Purves (Senior Business Leader, Product Innovation & Strategy at Visa)*

Introduction and Tom's background

Tomas Purves has been working in electronic banking for 12 years. He co-invented money transfer for Visa Interac, a prominent payment system. He is currently working for VISA's digital wallet.

Overall comments

All payment channels are presented through the mobile payment platform. Mobile is a platform for innovation. It's a new environment. Payment is not a separate thing. When we look at electronic payments, we ignore the macro environment. Cash in itself has no macroeconomic benefit, but it's the transaction that has value. There are many good things about electronic record that are traceable, include an efficient taxation.

Mobile is a good way to bring connectivity to all places; it creates a way to make everything digital. It is the high-hanging fruits, for stuff that's been happening in the last decades.

Consumer implication

Mobile payments are more about changes in commerce experience, less with the payment itself. Fifty percent of consumers are using mobile devices to do product research in-store. It has strong potential to empower consumers to make more informed choices. Show-rooming is the phenomenon that customers go to physical retailers as a "showroom" for the items they want to purchase, and actual order them online. This phenomenon is disrupting existing retail models such as that of Best Buy. Physical retailers are seeing their business disrupted by online retailers.

Merchant implication

Best Buy is killed by Amazon, which accounts for 30% of e-commerce. It's growing at four times the industry average. E-commerce has winners-take-all markets. Apple, Facebook, and Amazon are big giants that control most market share.

Canadian businesses face a challenge because Canadian consumers are no longer restricted to buying from local stores. Retailers in Canada are losing business to international players. Canadian businesses need to be more competitive. They need to invest in e-commerce.

As for consumers, they win either way by getting better deals. Apple and Amazon are more competitive than mom-and-pop shops around the corner because they have all the customer's credit card information on file.

Payment theory

Ease of use

Network effect (scale). The more people own it, the more valuable it becomes. Payment is a very network-driven industry.

Chicken-and-egg problem: Need to persuade both merchant and consumer to adopt a new system.

Huge barrier to entry and economies of scale: Developing a new payment scheme is extremely expensive and takes a long time to pay off.

POS vs. remote payment

The distinction between point-of-sales and a remote payment system exists because some people don't have phones. This concept will not exist in the future. 1980s and 1990s telecommunication was expensive and require physical wires. But realistically all payments are remote. Consumers essentially borrow the connection at POS, and let the merchant talk to the bank on your behalf. But now communication is ubiquitous. Terminal software is going to be out of date. Merchants and consumers want to connect in an easier way. The "showroom

effect" is an indication of this trend. Uber, a taxi payment scheme, is another example.

People miss the point that POS and Remote will eventually converge.

Author's note: This point of view supports the design of our model in Section 1.

Payment schemes

Successful payment schemes should be built on already existing networks because it's expensive to start a new payment scheme.

Every country has different local payment schemes. Interac Card via CPA is a local payment scheme unique to Canada. Now many local payment methods are gradually being replaced by international schemes.

Change median: Changing from cash to non-cash

We expect that spending patterns will change with increased use of mobile payments. Before you had to go to the bank, but now there are no time constraints. Therefore we now have better access to liquid money and more flexible spending increments. This might mean there should be better financial literacy. A plastic card can't tell you about overspending, but mobile payments can. Because mobile payments are more interactive, they could empower consumers in making informed purchasing decisions.

Consumers are also paying in different ways and consuming in different atomicities. For example, Starbucks' preloaded card lets you pre-buy 10 cups of coffee as opposed to one. Merchants and consumers now have innovative ways to transact business.

What would they adapt? (Which payment model?)

Big retailers are able to afford to do the work themselves and come up with their own system—for example, Canadian Tire, Sobeys, and President's Choice. Small companies will need help building payment systems, and that's where a third-party payment delivery system is the key.

An open system would work better on a global scale, and be able to provide solutions.

Appendix III: *Interview with Susan McFadden (Manager, Strategy, at Rogers Communications)*

Rogers partnered with CIBC to create Mobile Wallet. It will be released in September Q4 2012. Mobile Wallet will be on Blackberry for CIBC specifically as a first step. All other banks will have something out there as well.

Security Issue

Surveys show that perceived security concerns are important. As a result, Rogers will require a PIN number, since having a barrier is what consumers what. PayPass: they haven't been hugely successful, because there is no [security] barrier. For Rogers, the Mobile Wallet application is stored in the SIM card, and one has to have SIM in order to have data. It's on a SIM card as opposed to on the phone because it is more secure and more portable. Google, on the other hand, has the mobile wallet function on the phone.

Other concerns

When Interac was developed, a standard was adopted. As for mobile payment, it is unclear whether the government would replicate a standard like Interac. From telecom's perspective, there is no ideal solution. It might be good for the nation. Right now there is no formal regulation; only a guideline published.

There will be a new balance between players coming in such as telecom companies and banks. It is unclear how the market will shape. Potentially banks have much to lose, since they will want control over the payment system. The only organization we need is the banks, and they might try to push everyone else out.

It is unclear how and when [Mobile Wallet] will hit the market—it isn't something that takes off immediately.

Successful mobile payment: NTT DoCoMo.

There are difference between Japan and here; they don't have Interac. We have good infrastructure [here in Canada] with Square, Google Wallet, Apple. Background with Firstdata, Visa, MasterCard.

Canadian advantage and challenge

The U.S. has an advantage in not using chip and PIN. Roll things out quickly, mobile to mobile. Square is able to succeed. In Canada there is a very secure system, it's harder to switch to M to M since now it's all chip and PIN. There isn't a complete environment so there is a need to engage consumers all the time.

Appendix IV: *Interview with Madhav Mohan (Leader in the Insurance Business Vertical at Tata Consultancy Services)*

Interviewee's Background

Twenty years in banking/consulting/outsourcing technology. Runs credit card system. Business leader. Before his current role at Tata Consultancy, he was in HCL, a consulting/outsourcing provider, offshoring services in eastern Europe and India.

Overall comments

The mobile payment system is a big area of investment for banks. A very tough area, for the following reasons:

First, mobile payment provides a new channel of payment. For those who don't have a bank, there is a fight between telecom companies and banks to try to

grab those customers. The question is where the money is driven among banks and mobile carriers. Within banking, a mobile payment system is the area of investment in the next five years.

Second, mobility is enhanced and supported. There is the distinction between Remote and Point-of-Sales payment systems. Remote payments have been going on for a while. Mobile POS systems emerged with the growth of mobility, and we see lots of POS-related activity outside North America. The U.S. is quite behind in POS systems, which mostly developed in countries like Japan and South Korea. There is also the question of adopting an open system or a closed system: GSM vs. CDMA.

Payment systems also differ by market. For example, the SMS system, a text-message payment, has taken off in countries like India. This probably won't happen in North America. Canada also has a unique market system. The debit networks tend to be very closed from security and market point of view.

NFC will probably be the next big thing

Since mid 2000, there has been significant growth in mobile technologies. The acceptance of mobile payment systems is likely to be higher since information is already available online. However, there is a lack of technological development in the U.S. For example, Google Wallet was installed in few stores in America, and even many sales people don't know about it. Vivo Tech is at the forefront of mobile payment technology. It started with stickers and moved into mobile phones, and already partners with Visa and MasterCard.

POS three areas

Smartphone: SMS-related payment like OPO Pay in India (no other alternative). B2B has huge penetration of the mobile phone users, but not as much for banking.

Interac: Canada's Interac system is addressing questions in the same way: what to do with technology. There is competition with Visa and MasterCard. Each is figuring out their strategy: open network or closed network.

NFC: Mobile payment penetration can be compared to internet payment. Internet payment was available to be used since the '90s, but not until 2005 did it really take off. There is a lack of penetration in America. ViVOtech is at the forefront of this innovation.

Issue of the "unbanked"

Currently in the U.S., 15 to 16 million people are not using cell phones.

And then there are those who do not have a bank account, or the "unbanked". These people might be a take-off in adopting mobile payment since they already have some relationship with corporations through prepaid cell phones such as BOKU and PayOne.

Who's going to reach the customers? Bank and mobile operators will both fight to win those customers. It will be a competition between bank-centric and operator-centric payment systems.

Experience vs. security

1. Customer experience: How easy to use; how interesting is it (interface)? iPhone is a good example of an easy-to-use interface.

2. Security: Mobile is obviously more secure than credit card, although customers don't realize that. (Credit card info could be easily stolen on the card, but not on the mobile phone.)