

Mobile Payments -

A study of the emerging payments ecosystem and its inhabitants while building a business case.

By: Cherian Abraham
11/1/2011

Follow me on Twitter @ http://twitter.com/cherian_abraham
Connect with me @ <http://www.linkedin.com/in/cherianabraham>

If you would like to comment on the study, then you could reach me at cherian.abraham@gmail.com or 804-767-2526

EXECUTIVE SUMMARY:

The advent of the ubiquitous smart phone has along with it brought dramatic shifts in customer behavior and payment modalities. Banks are finding themselves in an unenviable position of choosing to wait until a secure and safe standard emerges for “Digital”, or take the plunge in to these murky payment waters. There is a battle waging for the customer mind-share and emerging revenue streams, between traditional and non-traditional players - who are ever more emboldened by advances in technology and disappearing barriers to entry.

The objective of this study is to build a business case for banks evaluating the opportunities and challenges present in building out mobile payment solutions, including direct and indirect revenue generation. This study paints a roadmap of current mobile payment initiatives undertaken by Financial institutions, MNO’s and technology upstarts, and to highlight the risks of building payment solutions which are not centered on the payment context. This study summarizes the challenges ahead for mobile payments, including a lack of interoperability, consumer apathy and a general lack of understanding of its merits. It is targeted at financial institutions that may be making first steps, by building out their own mobile wallet initiatives or partnering with others, and seeks clarity.

CONTENTS

Banking: A Changing Landscape	3
mobile Payment approaches.....	8
I. Embedded Solution:.....	9
II. SIM based Solution:	10
III. Secure Digital Card based Solution:	11
Bank's chosen solution:.....	12
Payment Wars & Uneasy Alliances:	13
Google Wallet:	13
ISIS:.....	15
American Express:.....	17
PayPal:.....	18
Square:	20
VISA:.....	21
ClearXChange:	21
Rest:.....	21
What about Apple:.....	22
Challenges for NFC.....	24
Payment Context: The Untold Story	29
Conclusion	32

BANKING: A CHANGING LANDSCAPE

Yahoo Finance recentlyⁱ reported Newspaper Publishing, Video Rental, Wired Telecoms among the 10 industries that are disappearing due to external competition, disruptive technological change and lack of innovation. Even in Banking, tidal shifts in customer behavior and technology adoption has seemingly ignored high barriers to entry, and has made possible- a significant influx of both *private equity* and *non-traditional financial services technology startups* looking to challenge existing notions and models. Those who question the significance of the threat posed by these technology upstarts at the entrenched incumbents may not find comfort in the seminal book “Innovator’s Dilemma” authored by Clayton Christensenⁱⁱ. He posits that well run companies are slow to react to *disruptive innovations* to its value networks; and by the time it reacts, it can at best survive to stave off further erosion of its customers and hardly ever regains its prior primacy.



Banking is essential.

Banks are Not. - Bill Gates



Technology has consistently knocked down barriers to entry in to once impenetrable bastions of retail prowess and replaced them with technology companies. Similarly, fundamental shifts underway in banking, led by rapidly

changing distribution models, and shifts in customer behavior are threatening to change the face of the retail financial services sector forever. What does not give banks comfort are studies such as the recent one by Forresterⁱⁱⁱ which found out that of the 94% of banks surveyed to have a mobile banking strategy in place, for 38%, this strategy has been in place for less than a year. It took Financial Institutions 7 years since the launch of the World Wide Web to launch Internet banking, which makes their track record far from perfect.

When the same Forrester consumer survey asked U.S. mobile banking users how mobile has changed their use of other banking channels, 43% said they had made fewer phone calls to their bank’s call center since adopting mobile banking and more than one-third (35%) said they visited branches less often than they did before adopting mobile banking. This represents changed customer expectations on how services and products should integrate with their lives. Customers are no longer willing to change behaviors; they expect products and services to adapt to their needs. Forcing a customer to visit a branch or use a channel in a manner that

seem artificial or convoluted to them, appears antiquated in an age of customer centric technologies and will in turn disenfranchise its customers. Customers expect a seamless experience that weaves together one or more of the banking channels and with the core banking system to meet their needs. A traditional siloed approach is antithetic to customer expectations of how services and products should work.

With the emergence of mobile payments, banks are at the cusp of a revolution, brought on by both technology and shifts in customer payment modalities. At a time when declining interchange revenues (*to the tune of \$9.4Bn per year^{iv}*) brought on by regulatory changes compel banks to look for new revenue streams, mobile payments offer a '*blue ocean*' opportunity. At the same time, it also brings new stakeholders to the table vying for a share of the revenues, even when revenue models are still being finalized. Some of these revenue models are discussed below:

- a. ***Create new revenue streams via P2P mobile payments*** – Mobile P2P payment services can unlock new revenue streams for banks, even if merchant adoption or other challenges end up delaying proximity payment rollouts. Paypal predicts up to \$3B in mobile payments that it will process in 2011 alone, the bulk of which are P2P in nature. Whether banks create new peer to peer payment frameworks or partner with existing initiatives such as ClearXChange, by going this route, banks can replenish some of the lost revenues from lowered interchange fees for debit cards via the Durbin amendment. Paypal's P2P payment service managed to be unaffected by the restrictions imposed by the same amendment and goes to show that banks can follow this example.
- b. ***Access to mobile payment solutions as a premium model***– As declining revenues force banks to cut back on free services offered to customers, banks could opt to provide mobile payment solutions on a "*freemium*" model where P2P services are mostly for free, with transaction fees kicking in at higher amounts. However as mobile banking and payment access becomes commoditized, banks may be compelled to keep access free. Moreover, any "Premium" costs for mobile payment solutions will only go towards depressing adoption and merchant acceptance.
- c. ***Reach the underbanked*** – As mobile payments become ubiquitous, banks have an opportunity to reach the 43 million adults in US who are '*underbanked*' and cater to their credit and lending needs more effectively. '*Underbanked*' does not translate to lowered credit worthiness however; as 50% of them has a college degree and 25% has prime credit ratings. Currently relegated to the fringes of the financial services industry due to both a lack of sufficient asset requirements and unwillingness on the part of the

Underbanked to engage with financial institutions, it's not certain that the bankers extended olive branch will be met with reciprocal affection.

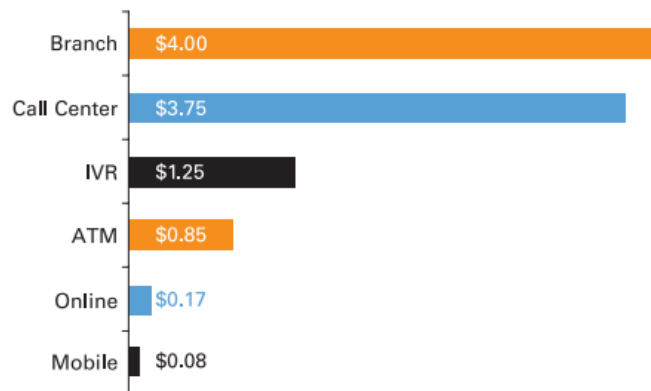
- d. **Stored-value cards & Prepaid Debit Cards** – As the payment form factor shifts from plastic to mobile, the ease of use by which stored-value cards and prepaid debit cards can be issued, activated, used, and replenished will increase its appeal and help drive the \$200 billion sector (*for 2011 alone*) and revenues for the issuing banks. Prepaid or value stores residing on a mobile phone can prove to be far more secure and flexible, by releasing funds when the customer is at a specific location, store, or retail category, if so specified at the time of issuance. (*e.g. parents issuing prepaid debit cards for children that can only be used at specific stores, or only for certain retail categories*)
- e. **Fueling Payments for Digital or Virtual Goods** – Mobile payments for virtual goods and services sold via online gaming and social-networking sites are expected to grow exponentially in 2011. Apple has set the precedent of higher profits in digital purchases by establishing a 30% cut of iTunes in-app subscriptions. As MNO's like T-mobile enable carrier billing for digital purchases, banks must position themselves to take advantage of this opportunity.
- f. **Daily deal platforms** – None of the current daily deal platforms can compete with the granularity and relevance with which banks could target a deal to a specific subscriber, having access to their extensive spending history and preferences. A feedback loop extending from the Bank to the merchants enabling the creation of a curated list of customers who consistently spend in specific retail categories can help merchants in delivering targeted offers to attract new customers. AmEx has partnered with Facebook, Foursquare and AOL for its daily deal platform. Ultimately the frequency and density of such deals offered will decide whether these initiatives are perceived as a success or failure. Location based deals is another aspect where banks will leverage their access to the customer's purchase history to suggest new retail experiences.
- g. **Mobile Couponing & Offers**– Banks can help tailor merchant coupons to match customer's personal interests and preferences based on their past purchase history, either at the point of sale, or when the customer is nearby. By partnering with entrenched location based services such as *Foursquare*, *Gowalla* and *Facebook Places*, banks can help deliver compelling offers from retailers while charging an advertising fee or sharing a cut of the revenue.
- h. **Loyalty Cards and Rewards** – As retailers utilize location based services and social networks to reward loyal customers, banks can reduce friction at the point of sale, by incorporating the loyalty programs in to its mobile payment suite. This ensures that the customer rewards accrue or redeem automatically while abstracting out all the complexity inherent in that

process from the merchant and the customer. Some of these scenarios are covered as part of the *Payment Context* section in this study.

- i. **Engage disenfranchised younger consumers** – To remain viable to a segment of consumers whose banking loyalties will solidify soon and are now entering the peak of their earning years, banks must build and provide services that are mobile and customer centric in nature and does not require them to switch channels for engagement.
- j. **Reduction in Costs** - Mobile transaction costs are about 2% compared to Branch and IVR. Use of mobile services might also improve stickiness and customer retention, while lowering support costs.

Per-Transaction Costs by Banking Channel

Mobile is the lowest-cost banking channel to serve on a per-transaction basis.



Source: TowerGroup, Fiserv/M-Com Data: Mobile transaction costs based on actual data from M-Com, the international mobile banking and payments solutions provider and Fiserv partner whose technology powers Mobile Money™ from Fiserv.

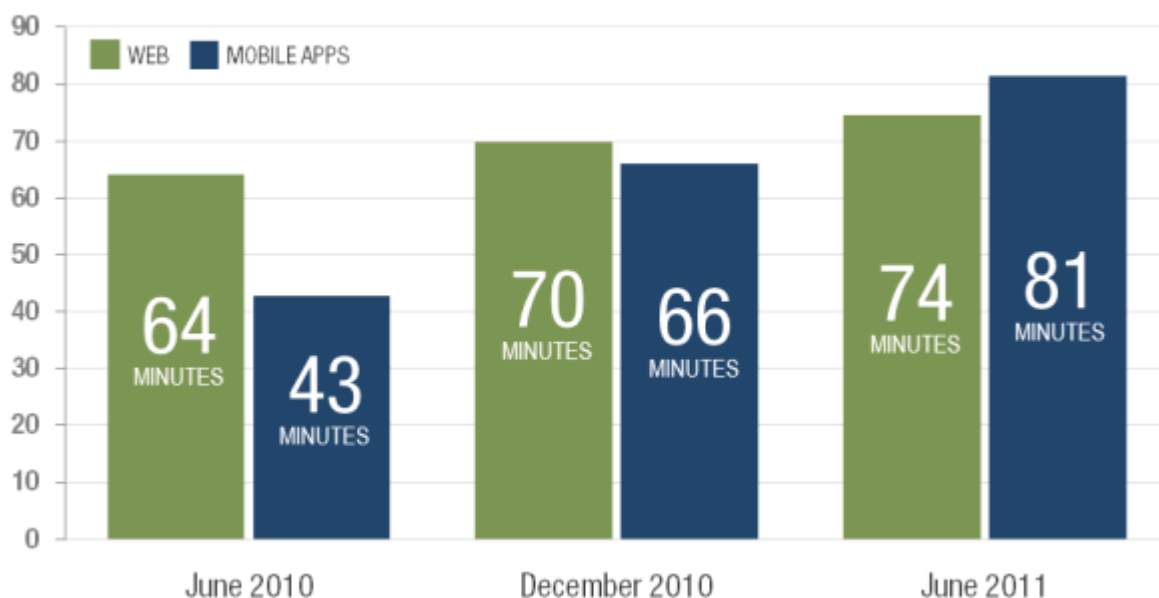
The risk of a bank ignoring the creation of a mobile payment strategy or delaying it is evident; a loss of strategic advantage among its competitors as declining revenues and regulatory pressures push banks to cut costs and innovate. Reduced profitability from interchange revenues can only be offset if it decides to capitalize on the opportunities that ride on the new payment form factor.

Banks can further decide on how to position themselves in the payment technology adoption lifecycle model, by choosing to be either *innovators* or the *conservative late majority*, waiting for a standard to evolve before wading in. The **advantages** of jumping in early range from an increased market share from being first to market, a more significant role in setting standards, and ability to capture new revenue streams while the **risks** include higher costs due to unproven platforms, risk of

creating isolated networks, and slower consumer/merchant adoption. Banks must carefully evaluate both advantages and risks involved before making a decision.

MOBILE PAYMENT APPROACHES

U.S. Mobile Apps vs. Web Consumption, Minutes per Day



Sources: comScore, Alexa, Flurry Analytics

Mobile is on track to rightfully take its place as the mainstream banking channel. Mobile banking is expected to overtake online banking soon, considering in June a user spent an average of 81 minutes per day on mobile apps vs. 74 minutes per day on the web. Mobile payments for digital and physical goods, money transfers and NFC (Near Field Communication) transactions are expected to reach \$670 Billion by 2015^v. PayPal expects to process \$3 Billion^{vi} in mobile payments this year alone that shows the popularity of mobile phones as a payment enabler, as well as positioning PayPal as one of the leaders in this space. Mobile payments have enjoyed widespread adoption overseas, especially in developing nations where the lack of infrastructure has accelerated this shift in customer payment modalities (e.g. M-Pesa in Kenya). Gartner's latest research report^{vii} says mobile payment users worldwide will surpass 141.1 million this year, a 38.2% rise from last year, when users reached 102.1 million. Globally, the value of mobile payments is forecast to total \$86.1 Billion, up 75.9% from last year's figure of \$48.9 Billion.

Mobile payments are currently synonymous with contactless technologies such as NFC despite the fact that NFC is not required as an enabler. Paying for physical or virtual goods as well as P2P money transfers are all possible today utilizing today's

hardware and existing payment solutions. Two broad categories exist in the realm of mobile payments, namely *remote payments* and *proximity payments*. Remote mobile payments may be implemented using the existing financial payments infrastructure or using a closed loop mobile payments system. The much hyped NFC based payments support the latter, and mostly software solutions exist for the former, for e.g. PayPal. The most obvious differences between the two are speed, ease of use, and the fact that NFC payments use the existing financial payments processing infrastructure. Proximity payments may not require setting up payment processes or accounts with a trusted third party, and the payment data is linked directly to a payment card issued to the consumer by a trusted financial institution.

Following, we present the three different approaches to NFC based proximity payment solutions that differ primarily on the placement of the NFC secure element (one's encrypted payment card credentials) in the NFC enabled handset, whether its embedded in the phone hardware, on the SIM card or on a separate microSD card. Each approach has its own advantages and short falls, as listed below.

I. EMBEDDED SOLUTION:

In this approach, the NFC secure element is baked in to the phone hardware, such as in the case of the Google Nexus S, which comes with an NFC chip from NXP. RIM, Google and possibly Microsoft and Apple would prefer that the secure element be embedded on the phone so that they have access to invaluable customer spending preferences while positioning the handset makers to provide easier upgrade paths to newer handset models for customers. This option is further expanded upon under the Google Wallet section below.

A combination of the PN544 NFC controller along with an embedded SmartMX secure element was chosen for the Google Nexus S. It can also support SWP, which allows a mobile operator put a secure element in the SIM.

Advantages include:

- Provides a common architecture for content providers independent of the mobile phone technology – GSM or CDMA
- Data encrypted while stored and remains encrypted for processing along the entire data path.

Disadvantages include:

- Difficult to transfer applications to a new handset.
- In the event of repair, even though encrypted, the secure element will be in someone else's hands for an extended period.
- Not many phones exist currently that support an onboard NFC Chip^{viii}.
- With each new device, applications will have to be re-tested, leading to delayed deployment.

II. SIM BASED SOLUTION:

Traditionally the SIM Card, which already plays a key role on handsets by identifying the subscriber and related account, was the ideal Secure Element of choice for supporting mobile payments. Its formidable security and OTA provisioning capabilities made it an ideal choice, but ultimately the evolving ecosystem blanched at giving too much control to a single stakeholder – the mobile operator. Control has slowly begun to shift from the mobile operator in to the ecosystem via external SE approaches and Trusted Service Managers (TSM). ISIS, an operator led initiative is a key example of a SIM based SE solution that started its life as an independent payments processor and morphed later in to a TSM^{ix}.

Advantages include:

- Preferred by MNO's and controlled by the issuing party.
- Meets security standards imposed by Financial Institutions
- Faster deployment as this method is independent of handsets, current and future
- OTA(Over-the-Air) Provisioning possible so that new applications can be downloaded remotely
- In the case of a lost device, all applications on the SIM can be blocked (or unblocked)
- Provides mobility for the consumer financial credentials
- Can be segmented in to a number of security compartments to support multiple cards

Disadvantages Include:

- Requires cooperation from the operator network

- When multiple payment applications are present in one SIM card, questions arise as to who maintains control and visibility of credit cards from separate banks.
- Ambiguity around the role operator networks will play in the ensuing transaction and whether they will opt for revenue sharing or a flat fee.

III. SECURE DIGITAL CARD BASED SOLUTION:

This approach commonly comprises of a self-contained SD Card/NFC antenna combo that allows the handset to communicate with contactless readers. An approach that stores the Secure Element on SD cards has the added advantage of being totally agnostic of operator networks and handset manufacturers.

DeviceFidelity which provides a microSD card based Secure Element has partnered with VISA on its In2Pay microSD solution to offer NFC payment capabilities across VISA's payWave platform. DeviceFidelity allows its microSD cards to be issued and personalized like traditional smart cards. It has partnered with Vivotech to add OTA provisioning capabilities to its In2Pay microSD product^x.

Advantages include:

- Rapid application deployment
- Works with existing hardware
- Agnostic of operator networks or phone hardware and therefore, preferred by Financial Institutions
- Allows the Card Issuing Bank to own the secure element
- Secure Element can stay in the microSD card while relying on the handset for NFC capabilities.

Disadvantages include:

- No standard currently exists on secure communication between SD Card and Keypad/Screen
- May mean multiple cards for multiple banks
- Requires an available SD Card slot
- Higher Cost and ambiguity over who will pay for the microSD card - customer or the issuing bank.

BANK'S CHOSEN SOLUTION:

With three competing approaches and advantages and shortfalls unique to each, a content provider may be forgiven if it were to be confused as to which solution is optimal. While evaluating the various service models and processes involved in provisioning and lifecycle management of a mobile contactless payment application, banks must be cognizant of these critical success factors:

- Does the initiative have existing quality partnerships or will it be able to attract the right partners?
- Is the payment platform able to support the full breadth of payment flows required?
- Does it support rapid application development and deployment?
- Does it support Over the Air provisioning?
- Does it support open standards/commerce?
- Are there enough mobile devices to support it on day one?
- Is it secure along the entire payment path?
- Which payment service model will be the first to arrive in market?

Next, we address some of the major mobile payment initiatives and partnerships currently underway. Hastily made alliances are shoving operators, financial institutions and technology companies in to a coterie of shared goals as evident from the initiatives referenced below.

PAYMENT WARS & UNEASY ALLIANCES:

Various partnerships are advancing globally between financial institutions, MNO's, technology upstarts and other stakeholders in the payments industry to take advantage of a burgeoning demand. Following, we look at a handful of these initiatives which has made some significant strides and a couple of others whose initial trials have not translated in to meaningful outcomes. Beneath the choppy waters, financial giants and technology upstarts are entering in to uneasy alliances, each new partnership augmenting capabilities to differentiate itself from competitors, as the battle for winning the customer mindshare on the mobile payment front, begins.

GOOGLE WALLET:

Launched at least an year ahead of a competing MNO led initiative (ISIS), Google Wallet has received extensive acclamation for its innovative concept. Google has managed to weave together a string of partnerships including MasterCard, Citi, Sprint, First Data and pushed its initiative in to field trials earlier this year with an eye for a wider rollout in subsequent weeks. Google Wallet works with its Nexus S smart phone equipped with an NFC embedded chip, and MasterCard PayPass terminals used by over 140,000 merchants. To address the paucity of retailers who have access to contactless terminals (fewer than 3% of card-accepting merchants in US take contactless payments today^{xi}), Google plans to subsidize NFC equipped POS Terminals by VeriFone to select retailers during its trial. Apart from encrypting data on the NFC embedded chip and requiring that the customer use a PIN to authorize every transaction, Google also recently announced that it will use fingerprint sensors^{xii} as an added security measure. Google Wallet is eventually expected to be ported to other platforms and devices as well, such as iOS and Blackberry.

Sprint might have been more amenable to Google opting to store the secure element in the handset, as their network use CDMA and in turn their phones do not use SIM cards. This is not expected to change, even after the recently announced Sprint-Lightsquared LTE partnership

GOOGLE WALLET – STRATEGY

Google has indicated that it will not collect an interchange fee on transactions made through Google Wallet which shows that it has its eye squarely focused on a more promising aspect of a payment. Beyond functioning as a payment device, the mobile phone provides what a plastic card cannot - it can provide payment context. Google realizes that the context of payments, at the corner of online and offline, is the most lucrative advertising market to emerge (one that is predicted to be at \$1.3 Trillion in 2013 by Forrester^{xiii}). Google understands it stands to gain very little from the current revenue and expense sharing arrangements in place today for traditional payments. Google expects to employ a strategy similar to where they made Android a compelling “better than free”^{xiv} option to handset makers by offering to share a portion of search-based advertising revenues generated through the Android ecosystem. As Google agrees to leave its share on the table, the banks are expected to be more amenable to opening up their payment platforms, or outright favor it compared to ISIS.

As Google sacrifices its share of the interchange fees for a far lucrative market, cultivating a new capability that combines location based advertising with purchasing preferences to better predict consumer behavior, Banks risk finding themselves being relegated to becoming the dumb pipe, serving up infrastructure and nothing else. Banks must be cognizant of this risk.

Google’s recent acquisition of Motorola Mobility indicates its intent to produce more handsets with NFC chips as well as its wallet solution pre-loaded in to Motorola Android phones. With over 13.7 million smartphones shipped in 2010, and a 10% market share Motorola can ramp up the number of NFC enabled Google Wallet phones in the market.

Google also plans to lease space on its wallet solution to banks for free, compared to ISIS who plans to charge a rental fee. Google has not made clear as to whether it plans on controlling the secure element outside of Nexus S, on handsets that run Android, despite not being in direct ownership of the master keys.

CHALLENGES FACING GOOGLE WALLET:

Google has shrugged off the recent coup^{xv} by ISIS in signing up MasterCard, VISA and American Express to handle payments generated through ISIS, by pointing out that it remains at least a year ahead of ISIS, and that it supports an open platform. Google Wallet indeed, is designed to be interoperable, so as to attract more partners, but so far these efforts have not been met with reciprocal affection from other players in

the payment ecosystem. If ISIS MNO's (Verizon, T-Mobile & AT&T) mandate that any and all mobile wallets must work through ISIS to be function on their carrier networks, Google may be forced to modify Google Wallet so as to work with a SIM based secure element.

Google Wallet's launch outside of U.S may run counter to European mobile operator's current business model where they charge fees to banks and other service providers for putting their NFC applications on SIM cards owned by the MNO's. As Google attempts to court European banks to be part of the Google Wallet initiative, this could deter European mobile operators from adopting Android handsets if Google continues to unilaterally control the embedded secure element. Even though Google Nexus S supports SWP^{xvi} (Single Wire Protocol) that allows a mobile operator to put the secure element in the SIM, Google has opted not to enable this capability.

The high interchange fees a merchant pays for pin-less contactless payments will also run counter to Google's hopes for ramping up merchant adoption.

ISIS:

ISIS, a MNO led initiative, plans to rely on the sheer scale of their combined mobile operator subscriber base (more than 200^{xvii} million consumers and over 100 million phones per year across T-Mobile, Verizon and AT&T) to drive NFC adoption at the retail segment. Initially created as a proprietary parallel payment backbone to compete with MasterCard and VISA, it ultimately acquiesced to merchant demands and gave up its efforts to be a competitor to the payment networks and forged new partnerships with American Express, MasterCard and VISA. It plans on rolling out initially to Austin and Salt Lake City in the first half of 2012.

Verizon, despite being a traditional CDMA network, foresees SIM Card based phones on its 4G LTE network that will use the ISIS wallet. Sprint on the other hand is waiting to see if ISIS plans on having a presence beyond the SIM based secure element approach before jumping onboard.

STRATEGY:

ISIS intends to act as its own TSM (Trusted Service Manager) and will push secure information and apps between banks and others to the handset. If Verizon, AT&T and T-Mobile ends up equipping each of their phones with the ISIS wallet and ISIS

remains a closed market, ISIS could potentially force other mobile wallets to work through ISIS in order to function on the three MNO networks.

ISIS has partnered with C-SAM^{xviii} who has over twenty five reference value added services bundled with its SDK, from mobile payments, coupons, ticketing, parking, health and banking, enabling service providers to rapidly build and deploy their own secure transaction widgets. ISIS expects its partnership with C-SAM to allow them to quickly ramp up capabilities for Mobile Network Operators (MNO) and Banks to build a secure transaction system.

CHALLENGES FOR ISIS:

A SIM based NFC approach appeals most to the MNO's. In the realm of virtual products with long tail (e.g. ring tones, music and video) Mobile operators currently take a substantial cut of profits, up to 40%. The SIM based NFC approach puts them back in the driver seat and MNO's such as T-mobile has already shown a willingness^{xix} to take a cut of online sales profits by opening up their carrier billing system to online retailers. This would indicate that MNO's plan on playing a central role in online and offline mobile payments. This could further complicate the relationship between the MNO and Banks despite the advantages of a SIM based secure element approach. This is because the fee structure in place today for traditional card based payments dictates the revenue and expense sharing arrangements among merchants, acquirers, issuers, and networks. Without a significant increase in volume there is no incremental revenue, while adding new stakeholders to the mix. Existing stakeholders such as banks need a compelling reason to share these revenues.

Another revenue sharing approach ISIS may prefer would be to take a cut of the revenue made from special offers served up to mobile payments customers (similar to Groupon), and leave the interchange fees alone. ISIS is said to be planning to charge a rental fee for leasing out space on its wallet solution to banks.

It's also possible that Google could control secure elements on Android phones (*Over 100mn Android phones activated to date*) other than its own Nexus S, including others made by other handset makers, even if it does control the keys to the NFC chip, which would be under the control of the handset maker or the mobile network operator. It is unknown at this point whether Google will plan on using its Android API availability to prohibit other wallet service providers such as ISIS. It's unlikely that Google would make such a move, however.

Unknown at this point is whether the ISIS ecosystem will be based on open standards, and whether portability of customer financial credentials be an easy or a convoluted process.

AMERICAN EXPRESS:

Of all the Financial Institutions, the 162 year old American Express has emerged as having both a clear vision and a coherent strategy in extending its proprietary payment network in to online, mobile and NFC based proximity payments space. AmEx through its recently launched Serve platform, while being similar to PayPal, aspires to be something much broader that integrates mobile payments, loyalty programs and other social and connected services. It has signed up Sprint and Verizon, while its partnership with Payfone will allow millions of customers from either Mobile Network Operator (MNO) use AmEx to pay using their mobile phone number. The Serve digital wallet service is accepted by the millions of merchants who accept AmEx.

STRATEGY:

Serve allows the creation of a pre-paid account funded via bank accounts, debit or credit cards to use for P2P payments, as well as online and offline purchases. By keeping Serve accounts separate from traditional AmEx credit cards, AmEx prevents itself from diluting its own offering. Via Serve, AmEx pits itself against PayPal and ClearXChange, a Chase, BOA & Wells Fargo P2P service, while its partnerships with Facebook, FourSquare and AOL allows it to push ahead with a mobile and location based social strategy. Serve illustrates AmEx's foray in to the "*debit card*" revenue stream where it had no prior presence.

The Serve digital payment platform is also evidence of AmEx hedging its bets on NFC, by creating a P2P and mobile payment service that will work with existing AmEx merchant base and current POS terminals, while it tests the waters with its NFC partnership in ISIS.

AmEx also partnered with Facebook on a new daily deals platform^{xx}, which improves on the deal redemption experience pioneered by the likes of Groupon and LivingSocial. Groupon and other Daily Deals competitors, despite their meteoric rise cannot compete with the granularity and relevance by which American Express can target location based contextual offers at its 48 million card subscribers. Serve merchant services generate a feedback loop for its merchants to track deal redemption and curate a list of repeat customers. On the consumer end, Serve aligns naturally without forcing the consumer or the merchant to change their behavior, which results in greater adoption and reduces chargebacks.

Verizon joined Sprint recently on the Serve platform which will allow AmEx Serve to be pre-loaded on over 150 million phones combined for these MNO' networks.

Serve, will likely appear on a wide variety of Verizon and Sprint devices upon launch, compared to Google Wallet which is limited to only NFC capable devices. Serve on the other hand is powered by the MNO based authentication system provisioned by Payfone. Its partnership with Payfone can help it determine if a consumer has the funds or the credit worthiness to make a purchase. By having Payfone check with the MNO upfront, it can dramatically reduce fraud charge-backs and identity theft—which makes it feasible to reduce the fees in the system.

CHALLENGES:

Groupon employs a sales staff of over 4000 for signing up local businesses, which assists in much hand holding during deal signups, conflict resolution and merchant training. To compete with Groupon, AmEx will need to equip itself with a similar sales force, to deliver the same quality and density of deals in a specific geo-graphic area.

PAYPAL:

With a payment volume of over \$100 Billion, PayPal is the undisputed king of online e-commerce and P2P payments. Faced with a nascent retail environment, where the convergence of online and offline is taking shape through mobile and local experiences, eBay has made significant investments in to its local commerce strategy with PayPal at the core. Forrest estimates this online-to-offline market to eventually reach \$1.3 Trillion^{xxi} and account for nearly 50% of total retail sales by

2013. To capture this market, PayPal is in the process of marshaling its considerable resources, to the tune of over \$200 Million^{xxii}, so as to achieve a far bigger point-of-sale presence. PayPal's elaborate local commerce strategy weaves together recent acquisitions, such as WHERE (Location based couponing), Milo(Real-time retail product inventory), RedLaser (Comparison shopping), and Fig (Mobile payments framework), to build out its X.commerce platform. PayPal plans to offer a seamless end to end experience to a consumer who uses PayPal's platform from product lookup, comparison shopping across local retailers, couponing, payment and order fulfillment.

PAYPAL'S STRATEGY:

PayPal currently collects a fee for each online e-commerce transaction made through its online payment service. If PayPal were to begin to support NFC transactions which rely on existing POS and Card Infrastructure, PayPal's gains will be much smaller compared to its current online e-commerce revenue, owing to existing cost structures for processing payments at the point of sale. PayPal would prefer that its customers bypass the POS infrastructure completely and use their internet enabled smart phones to transact using PayPal's online payments service. As competition heats up at the traditional POS hub for NFC based mobile payments, one should see more and more technology companies like PayPal opting to circumvent the POS and Card infrastructure and create their own new service framework. A cloud based competitive backbone to the traditional payment networks could disrupt the current interchange environment. Paypal is exempted from the Durbin interchange restriction by the Federal Reserve by way of strict definition of being a *three party network*.

Though PayPal is not exactly a name associated today with mobile payments, it certainly will not offer comfort to Banks to know that a survey^{xxiii} conducted by Market Research firm GfK in 9 countries, found PayPal to be the foremost trusted brand in mobile payments, beating out both established financial brands like Visa and MasterCard, as well as mobile brands such as Nokia and Apple. PayPal found ubiquity online because traditional methods were so convoluted to be counterproductive in the digital world. What remains to be seen is whether PayPal becomes synonymous with mobile payments at the point of sale as well.

CHALLENGES FACING PAYPAL:

PayPal's NFC endeavors have not extended beyond simple Person to Person transactions using an existing PayPal account. So far, PayPal has not spoken about any plans for building a mobile wallet or becoming a TSM(Trusted Service

Manager). As the battle for mobile payments spills over from online to offline, PayPal is predicting that contactless terminal adoption among merchants will be slow and customers will increasingly prefer to pay using PayPal on their smart phones due to the lack of a comparable secure payment platform.

SQUARE:

Square allows credit cards to be transacted via a mobile phone equipped with a square reader. As a potential disruptor in the POS market, Square started off at the low end, creating its own market and moving up market to eventually dethrone traditional POS terminals vendors like Verifone. Square has shipped half a million readers so far and is currently transacting \$4 million a day^{xxiv}. Square recently launched a software update bringing its software to the POS allowing stores to track inventory, generate digital receipts and provide cash register functions.

STRATEGY:

Square has no NFC presence so far. For that reason alone, Square would be disruptive in an environment that lacks a traditional POS or Card Infrastructure (e.g. Africa, Asia etc). China, Africa all remain fertile grounds for Square to supplant itself. And if Square keeps plastic alive in those nations, then NFC will face some uphill battles for adoption outside of US, if Square is able to do what it does best: capture the low-end market and steadily move up-market to ultimately push out incumbents.

CHALLENGES FACING SQUARE:

Though Square's transaction volume is notable for a newcomer, with half a million readers sold, Square is still pulling relatively low volume across those merchants. Square has to pay interchange fees on every transaction and will lose money on transactions below \$6. Square's merchant set up costs are coming out of their bottom-line and their transaction volume has to improve significantly before they begin to break even. Square also constantly finds itself being compared to a card skimmer and insecure by design.

VISA:

Through its strategic investment in Square, and Fundamo acquisition, VISA has exhibited its belief that current Card based POS terminals are not going away any time soon, while gearing up to build a mobile payments platform. Similar to AmEx, VISA plans to have a multipronged strategy including bets on NFC (via ISIS and DeviceFidelity) while launching a P2P payment service separately earlier this year.

Visa's Acquisition of Fundamo will ensure that it will have a wallet solution, and will end up owning the plug-in to the VISA backbone; however, the critical piece of the solution which is the context of the payment is still missing.

CLEARXCHANGE:

After letting PayPal reign P2P Online Payments & E-commerce for over a decade by capturing more than 232 million accounts in over 190 markets and gross revenue over 1\$ Billion last quarter, Bank of America, Wells Fargo and Chase formed a new venture to enable P2P payments for their customers. ClearXChange allows customers to send money to each other without needing to open a separate ClearXChange account. Though it took banks 11 years to meet the challenge laid down by PayPal, the ClearXChange initiative at the very least makes an honest attempt to make P2P payments (*an estimated \$865 billion a year in 11 billion transactions*) painless for the banking customer.

ClearXChange partners including banks will decide individually if they will eventually charge their customers for using ClearXChange to make peer to peer payments, creating a new revenue stream for banks.

Though, ClearXChange is estimated to eventually offset a portion of the loss in interchange fees caused by the Durbin Amendment, this initiative has made glacial progress since its pilot announcement and is expected to be launched nationally in 2012.

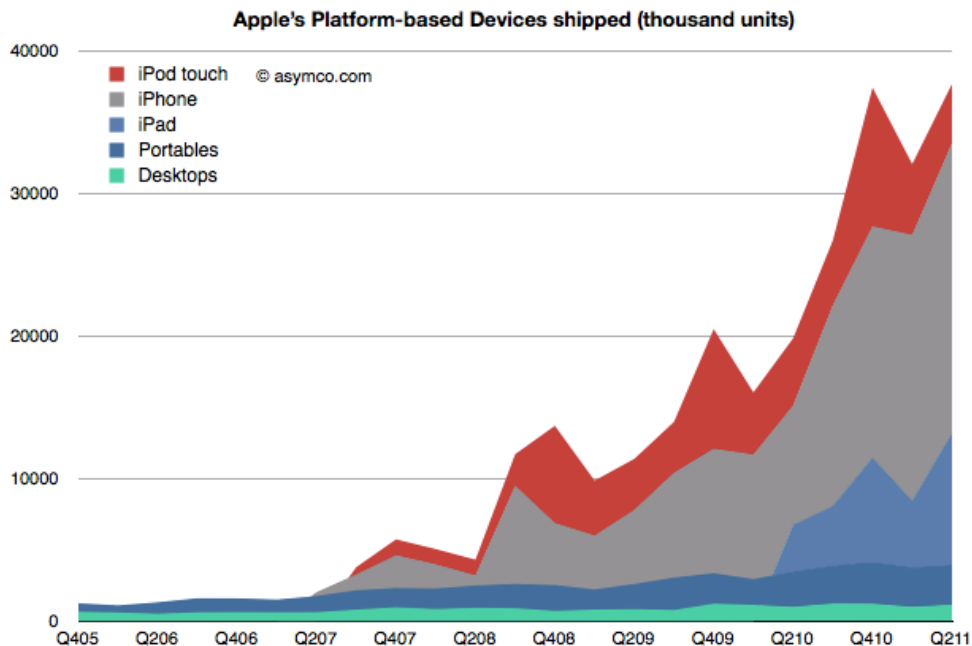
REST:

Bank of America, Wells Fargo & Chase partnered with DeviceFidelity and VISA to use its In2Pay microSD solution to run NFC payment trials across VISA's payWave

platform. These trials lend evidence to the fact that financial institutions are testing the waters with their own mobile payment applications to test market adoption while waiting it out for Google, ISIS and the broader industry to offer a standard and a clear way ahead.

WHAT ABOUT APPLE:

When Apple changed their name from Apple Computer to Apple Inc. they were signaling that they had moved on from desktop computing to mobile computing devices. Reasons for this shift are evident from the graphic below tracking devices shipped over last six years.



Apple is synonymous with innovation and customer experience, both of which resonate with customers who might find the idea of Apple as a bank appealing. According to a survey^{xxv} by Retrevo, 40% of iPhone users are waiting to use their iPhone to make mobile payments. Also telling is the fact the same survey reported that more customers trust Apple and Google to run their mobile wallets, compared to AmEx, VISA and MasterCard. If Apple enters banking by acquiring one, and becomes a credit source for its iTunes accounts, then the 200 million credit portfolio^{xxvi} it has already built up in iTunes makes it a serious competitor to banks. More threatening will be if Apple decides to circumvent the POS backbone and use

the over 100 million IP enabled devices (iPhones) to further disrupt the payment industry?

If Apple opted to merely launch a contactless payment application based on the iTunes store, the interchange they would have to charge to cover their costs would be prohibitive for merchants. Apple is used to charging 30% on digital goods purchases, which is not feasible at the point of sale.

Google recently released its AdWords Credit Card which has been designed for small-to-medium size businesses that already advertise on Google, providing them with a credit line. It will be a MasterCard and charge an annual interest rate of 8.99%.

Apple will be well advised to note ISIS' failure to create a competing payment network, and may instead choose to circumvent the traditional Card based POS infrastructure and create an online payment backbone. But then, Apple will have to augment each POS with an iPhone and conduct the transaction similar to Square.

Other than Apple, Amazon, Microsoft & Facebook could also launch a mobile payment solution and enter local commerce or partner with one of the above wallet solutions.

CHALLENGES FOR NFC

As the unbridled enthusiasm over NFC that permeates the payment and technology industry reaches a feverish pitch, there are serious questions being raised to its practicality, concerns about interoperability, and its slow pace of adoption owing to merchant and consumer apathy and perceptions about a loss of privacy or security. Some of these risks are listed below:

MULTIPLE MOBILE ECOSYSTEMS:

Currently only Android has a mobile wallet solution. It is certain that RIM, Microsoft and Apple will build in mobile wallets for their corresponding platforms. Banks will find it prohibitively expensive to develop and maintain payment solutions for each ecosystem. Due to the lack of an open platform, along with a scattered payments landscape with no clear winner, Banks will either wait and lose out on a first mover advantage, or proceed to carpet bomb across the various ecosystems and platforms and hope to hit something.

LACK OF INTEROPERABILITY

Competing mobile wallet solutions across the nascent mobile payment landscape pledge openness, yet across the broader industry, interoperability is a big concern. As banks, MNO's and technology companies create payment solutions, banks and retailers need to support customers from a slew of competing platforms to be profitable. Closed ecosystems will continue restricting choice while increasing costs for everyone involved. Similar to credit cards and ATMs, a global mobile payments system is reliant on interoperability between institutions and processing systems locally and internationally — and a standard technology and business blueprint has yet to emerge.

RELATIONSHIP BETWEEN MNO'S AND BANKS

Ambiguity surrounding the structure of the relationship between Financial Institutions and MNO's in partnerships such as ISIS will continue for the time being.

In initiatives similar to ISIS, MNO's control access to the secure element, and therefore can stipulate terms of the relationship, including a flat fee or a recurring fee based on the number of transactions. Future friction between MNO's and banks could translate to locked wallets and consumer frustration that may reflect poorly upon the banking institutions.

RELATIONSHIP BETWEEN MNO'S AND THE CONSUMER

Ambiguity surrounding the impact of the nature of relationship between the MNO and the consumer herself is another area where the consumer could find herself locked out of the mobile wallet due to a payment dispute with the MNO that has nothing to do with the mobile wallet. This goes back to the control exercised by the MNO over the customer's mobile wallet and should be a cause of concern to the banking institutions.

OWNING THE CUSTOMER:

In the bank-centric model, banks own the customer relationship and mobile payments are processed over traditional payment networks. In the nascent mobile payments landscape, MNO's, Handset makers, Banks and others are equally vying for control of the customer. Non-traditional players are more focused at owning the customer experience, wanting to leverage that capability in to providing more localized offers to the consumer. However, the whole premise of owning the customer itself may be a fantasy, as customers are averse to the idea of being owned by a brand. Instead, empowered by social media, they are increasingly being vocal about their brand interactions and loyalties, and can lasso together enough consumer awareness about a specific brand, enough to tilt its standing in public one way or the other.

RISING COSTS:

Significant operational and risk management implications exist for NFC adoption. Banks can expect an increase in costs relating to activities surrounding customer service, device tracking, application management, key management and OTA provisioning. As mobile payments find broader adoption, banks can expect to be in a maelstrom of events surrounding provisioning and customer training, as consumers learn the ropes and adapt to using their mobile phone as the new payment form factor.

LOSS OF CONTROL OF DISTRIBUTION & OPERATION:

With mobile phones and NFC, Banks are cautiously entering a new environment, where they neither own nor control the distribution or operation of the payment form factor, as they do today with magnetic stripe cards. This is a paradigm shift for banks and only those who are able to adapt to this new changed relationship will end up profiting and outmaneuvering the competition.

CHALLENGES WITH OVER THE AIR PROVISIONING:

Rising costs may not be the only undesired effect from OTA provisioning. MNO's rarely achieve an above 60% success rate with OTA provisioning. The main challenge involves failure when consumer input is required. Consumers tend not to expect upgrades as they occur, or may ignore them or cannot remember the actions they need to perform for a successful provisioning. As new handsets enter the market through channels outside of MNO's control, they pose new roadblocks to wallet upgrades. If OTA provisioning fails, then banks may need to fall back on providing support through traditional channels such as IVR for the mobile wallet to be operational. Provisioning will also come in to play when the customer switches phones and the payment credentials needs to be ported over.

CHALLENGES FROM PAYPAL, AMEX & SQUARE:

Despite making friendly overtures towards NFC, these three have hedged their bets on a bumpy road ahead for NFC adoption, and invested significant efforts towards building payment platforms that support and augment the traditional Card and POS infrastructure. They are intent on proving that the current convoluted payment process can be streamlined without introducing proximity payments in to the mix or at the very least, support both side by side. If they are successful in their efforts for mass market adoption, Consumers will decide whether to keep plastic in play or opt for NFC based mobile payments, based on the benefits each offer to the consumer.

MERCHANT ADOPTION:

Despite the unbridled enthusiasm surrounding NFC based proximity payments; merchant acceptance is far from guaranteed. Merchants cite both the costs of upgrading their current POS terminals and the lack of enough NFC enabled handsets as proof against wading in too early. Retailers are watching NFC based payment trials closely to learn of any evidence of friction at the checkout lanes as customers

maneuver around a new payment form factor. Retailers look for solutions that are effortless and simple, one that requires very little employee training, one that is intuitive to the customer, while augmenting the payment experience with loyalty programs and coupons. Merchants also seek a dialogue in creating new cost structures around processing mobile payments at the point of sale, if they were to be burdened with the acquisition of new NFC enabled payment terminals. Merchants see interchange fees as artificially high and plan on seeking new service agreements on the back of a new payment form factor. Large retail chains, including Walmart are expected to force the hand of payment processors and financial institutions in procuring favorable terms.

Retailers at this time are not committed to any one approach, and are currently working with AmEx, PayPal, Square, Google Wallet and ISIS to see which payment solution provides the most benefits to the merchants. It is also quite likely that retailers will support more than one, as well as insist on an open standard, which in turn reduces friction and costs for the merchant. In the end, merchants should be encouraged to see beyond NFC as a mere payment enabler, and look at its potential to helping build a better relationship with the customer, through loyalty programs and location based mobile marketing leading to deals and coupons through partners such as Shopkick, Foursquare, Gowalla etc.

Verifone has announced that NFC support would become standard in all its POS terminals, going forward.

CONSUMER APATHY AND FEARS ABOUT SECURITY AND PRIVACY:

In a recent survey done by Mobio^{xxvii}, over 90% of respondents said they would make a mobile payment if they knew it was secure. Despite protections baked in to the handset, including encrypted data on chip, biometric security support in the handset, a secure channel between the keypad/screen to the NFC chip, and secure transmission of data from the handset to the banking systems, NFC has attracted an array of security concerns and challenges. Dispelling rumors of a lack of security surrounding proximity payments and educating the public will be critical to assuaging consumer fears and therefore encouraging consumer adoption of NFC based mobile payments.

Fears of financial credentials being stolen do not begin and end at the Point of sale, however. If a device is lost or stolen, the secure element that stores the credentials is impervious to any attempt to tamper with it, and in some cases can even self

destruct. The Trusted Service Manager can also lock or deactivate the mobile wallet upon request. Counterfeiting or alteration of financial credentials is discouraged by security measures in place in the NFC chip.

At the same time, banks must conduct a comprehensive risk analysis of an operational model for proximity payments that can identify potential for fraud and misuse, and assign responsibility in turn providing further confidence to the consumer. Such an exercise can help assign risks and responsibilities to each stakeholder in the payment process.

CONSUMER TRAINING:

Barclaycard reported^{xxviii} on three unexpected scenarios it encountered during its preparation to set up mobile payment accounts, including ensuring they receive all the required disclosures, supporting both plastic and OTA provisioning during the NFC adoption phase, and changes in servicing impacting other channels such as IVR. Banking customers need to be assured that the security of their financial credentials and their digital privacy is a shared concern. As consumers adapt to proximity payments and using their mobile phone at the Point of sale, they will require a bank whose traditional services has evolved to accommodate the needs and capabilities of a mobile channel.

PAYMENT CONTEXT: THE UNTOLD STORY

From a ubiquitous hand held device used to make telephone calls across a wide geographical area, mobile phones have evolved in to contextually aware smart devices that have more computing power today than a 1985 Cray Super Computer. Mobile phones today can capture and securely transmit high definition audio and video, do videoconferencing, sense geo-graphic location and proximity to other surfaces, measure tilt and acceleration, and provide a touch enabled screen to capture user input. Since incorporation of the GPS, location based services have appeared that allows a user to search and make serendipitous discoveries based on one's location as well as for businesses to begin to target the user with localized offers as per her interests.

Startups like Facebook, Foursquare and Groupon has brought together location and relevance on mobile. Beyond the realm of these social networks, location and relevance can also bring context to payments, when those payments are made via mobile. Instead of trying to fit as much of the internet banking functionality on to a smaller screen, banks must attempt to leverage the capabilities of the mobile channel to further engage with their customers. This involves using context, a hitherto unused aspect of payment in its traditional sense. This is only possible when banks look beyond the customer experience as offered through the traditional Magnetic Stripe / Pin transaction.

The big advantage proffered by a contactless mobile payment is that it can contextualize the interaction before, during and after the payment. That could be as simple as updating the customer account balance in real time or it may be about triggering localized offers or loyalty programs ingrained in to the payment experience.

The following scenarios describe when payment context is valuable in delivering targeted services:

- Indicate to the customer how many rewards points she stand to gain by completing the purchase.
- Provide a transaction summary right away along with any rewards points accrued or redeemed as part of the purchase

- Allow the customer to redeem his rewards points instead of cash/credit at the POS and abstract all the complexity of that redemption from both the customer and the merchant
- Indicate to the customer if she so prefers, for a given retail category, where she stands for that current month in terms of expenses (e.g. \$300 in Gas, \$400 in eating out etc.)
- Warn the customer if she has insufficient funds to clear the transaction. Or better, if the purchase will in turn overdraw the account so that any scheduled bills or checks would not clear, then warn the customer.
- If the customer has one or more credit/debit cards with the bank, then default to the card that will provide the maximum value, in terms of rewards accrued or a favorable interest rate. Or pick a credit card that has a coupon that could be applied to this payment. Allow the customer to choose if there is more than one.
- Issuance of value stores including prepaid debit cards that automatically unlock to release funds when in proximity to a particular store, location or when used for a specific retail category.
- Use location and the purchased item as context and suggest to the customer a recommended accessory to her purchase at the same or a nearby retailer.
- Use location and time of day along with the social graph of the customer to recommend new retail experiences.
- Use past purchase history along with frequency of purchases on specific retail categories to deliver localized offers from nearby merchants.
- Provide couponing capabilities that just works – including picking the right coupon at the POS without the customer having to remember.
- If the bank deems the purchase amount to be significant, and requires that the customer credit limit to be raised, then it should do an STP (Straight through processing) and ask the customer whether to raise her limit.

Or in the previous scenario, the bank could ask whether the customer would like to opt for a small term loan and provide a decision right away. As in this case, enabling

proximity payments also means that the bank should streamline its services so as to support a quick and easy decision. But if the bank lacks STP or has a convoluted credit line upgrade process, then it will lose out on some of the more enticing business cases for NFC and its customers will eventually seek others that offer a simpler and elegant customer experience.

CONCLUSION

Despite all threats to its adoption and the challenges it face today, NFC based proximity payments are here to stay. Disruption has finally reached the payment industry, from newcomers like Square who is redefining the POS experience, established online payment giants such as PayPal entering local commerce, to GoogleWallet/ISIS who is creating souped up wallets which will power new mobile payment platforms. Beyond just being a payment enabler, these mobile wallets have the capability to transform the retail experience, by utilizing the customers location, interests and time of day to create highly targeted, contextual offers.

Regardless of how the mobile payment landscape evolves in the coming year, banks can expect to find themselves in one or more mobile wallet partnerships. Equally important will it be to prepare itself for the daunting creative and operational tasks that lie ahead, including application development, OTA provisioning, customer training and issue resolution.

Beyond payments, banks must learn to simplify customer engagement and enable relationships digitally. It must ensure an optimal overall customer experience, regardless of volume. Most importantly, it must learn to engage customers where they are encountered, and not force them to switch channels for resolution or acknowledgement.

Banks have not been able to make the transition from a controlled media and brand messaging environment in to social media, where customers control the conversation. Wells Fargo uses Twitter actively to monitor customer sentiment and improve customer support. Doing sentiment analysis on real time feeds like Twitter provides businesses with a reality check on how they are perceived as a brand. Nowadays, a customer's influence across their social network can be measured through social media analytics tools such as Klout and PeerIndex. Businesses use this influence score as an inflection point while providing support or addressing customer issues.



Half the money I spend on advertising is wasted; the trouble is I don't know which half. - John Wanamaker



Banks should be using social media, not just for conflict resolution, but for customer acquisition as well. Banks today, spend significant amounts of money on traditional media, while ignoring that digital and social acquisition are both lower cost even when they provide more engagement. It is time that it spurs a rethinking of marketing spend allocated across the bank's spectrum of channels.

Banks should ask themselves of how they should apportion their budgets and energies to digital while executing broader marketing strategies that may also include traditional channels. They must be mindful that every visitor to its website has a specific intent in mind. These intents are expressed in their previous engagements via social media or how they interact with the bank's mobile channel or the website. Only by providing a seamless customer experience, unencumbered by traditional notions of channels, can a bank enchant its visitors and transition them in to paying customers.

Banks should also be leveraging analytics to better predict consumer behavior. By utilizing personal data, transaction data and account-access behavior, banks can structure personally relevant offers and deliver improved services, while potentially lowering operating costs.

The banking industry is in the midst of a seminal shift, where banks are waking up to the realization that banking is no longer just about product, services and technology. Rather, it's about simplicity and providing an experiential journey for its customers. The primacy of customer has been reestablished. By reducing friction between the customer and the bank, and improving upon the overall customer experience, banks can enchant their customers and create lifelong fans.

ⁱ List of disappearing industries: <http://oregonbusinessreport.com/2011/06/list-of-disappearing-industries/>

ⁱⁱ Innovator's Dilemma: <http://www.claytonchristensen.com/>

-
- iii What's the ROI of Mobile Banking? <http://www.americanbanker.com/bulletins/-1037534-1.html>
- iv <http://education.cardhub.com/interchange-fee-study-2010/>
- v Mobile payment transactions to hit \$670 billion by 2015 - <http://www.bgr.com/2011/07/06/mobile-payment-transactions-to-hit-670-billion-by-2015/>
- vi PayPal Doubles Mobile Payments Predictions to \$3 billion in 2011 - <https://www.thepaypalblog.com/2011/06/paypal-doubles-mobile-payments-predictions-to-3-billion-in-2011/>
- vii <http://www.gartner.com/it/page.jsp?id=1749114>
- viii Phones that currently support NFC - http://en.wikipedia.org/wiki/Near_field_communication#NFC-enabled_handsets
- ix Isis Plans Change, but NFC Still on Track - http://www.readwriteweb.com/archives/isis_plans_change_but_nfc_still_on_track.php
- x ViVOtech teams up with DeviceFidelity - http://www.vivotech.com/newsroom/press_releases/ViVOtech_%20DeviceFidelity%20contactless_payments.asp
- xi 3% merchants accept Contactless in U.S - <http://www.nfctimes.com/news/google-announces-launch-its-mobile-wallet>
- xii Google unveils safety measure for their upcoming mobile wallet - <http://www.qrcodepress.com/google-unveils-safety-measure-for-their-upcoming-mobile-wallet/853399/>
- xiii 1.3 Trillion by 2013: Forrester Report, "US Online Sales Forecast: 2008-2013", Feb 2, 2009
- xiv Google Is Paying Carriers and Phone Makers to Adopt Android - <http://www.phonescoop.com/articles/article.php?a=5730>
- xv Isis Challenges Google Wallet With Visa, MasterCard, Amex - <http://www.eweek.com/c/a/Mobile-and-Wireless/Isis-Challenges-Google-Wallet-with-Visa-MasterCard-Amex-857133/>
- xvi Uncovered: The hidden NFC potential of the Google Nexus S and the Nokia C7 - <http://www.nearfieldcommunicationsworld.com/2011/02/13/35913/uncovered-the-hidden-nfc-potential-of-the-google-nexus-s-and-the-nokia-c7/>
- xvii 200 Million subscriber base: http://www.computerworld.com/s/article/9197228/Despite_bold_moves_on_mobile_payments_long_haul_ahead
- xviii C-SAM's Wallet Management Platform and SDK to Support Isis Mobile Commerce Platform - <http://www.c-sam.com/archives/2002>
- xix T-mobile direct carrier billing: <http://www.pcmag.com/article2/0,2817,2390308,00.asp>
- xx 160-Year-Old American Express Out-Innovates Google and Groupon - <http://techcrunch.com/2011/07/19/160-year-old-american-express-out-innovates-google-and-groupon/>
- xxi Paypal 1.3 Trillion market: 1.3 Trillion by 2013: Forrester Report, "US Online Sales Forecast: 2008-2013", Feb 2, 2009
- xxii Ebay's 200 million acquisitions: <http://www.nearfieldcommunicationsworld.com/2011/05/17/37380/ebay-and-paypal-acquisitions-point-way-ahead-for-mobile-payments/>
- xxiii PayPal is top brand for mobile payments: GfK survey - <http://www.reuters.com/article/2011/05/12/us-mobile-payments-survey-idUSTRE74A8I420110512>
- xxiv Square processing 4 million per day: <http://techcrunch.com/2011/07/31/square-now-processing-4-million-in-mobile-payments-per-day/>
- xxv Apple 40% iPhone users waiting for mobile payments: <http://www.retrevo.com/content/blog/2011/06/iphone-owners-ready-mobile-wallet-will-apple-deliver>
- xxvi Apple 200 million iTunes accounts: <http://techcrunch.com/2011/03/02/apple-200-million-itunes-accounts/>
- xxvii Mobio survey : <http://www.nearfieldcommunicationsworld.com/2011/03/17/36483/mobile-payment-security-concerns-put-brakes-on-m-commerce-market/>
- xxviii Barclaycard findings: <http://www.bankinnovation.net/profiles/blogs/3-unexpected-mobile-payment>