Cards 2.0: A Look at the Near Field Communication Payments Landscape

How to adapt to the evolving Near Field Communication payments landscape

Table of Contents

1. Introduction

Over the last couple of decades, cards have been the quintessential mode of payment. However, with the evolution and proliferation of smartphones, there is a growing demand from customers for payments mechanisms to replace plastic cards. This is where the mobile proximity payments using Near Field Communication (NFC) can fill the gap. While mobile payment schemes such as M-Pesa[1] have become popular, there have been very few mobile payment initiatives based on NFC.

This paper explores the role of NFC payments in the overall payments landscape. It also looks at various business models, challenges, and stakeholder responses to this evolving payment mechanism.

1 M-Pesa is a mobile money transfer scheme launched by mobile network operator Safaricom in 2007

2. Global Non-Cash Payments

With the increase in non-cash transactions across the globe, there is an increasing need for financial services firms to develop products/services which have a better value proposition and offer more competitive advantage.

2.1. Growth of Non-Cash Payments Market

Between 2011 and 2012, global non-cash transactions are expected to grow by 7.9% from 307 to 331 billion transactions.[2] The growth in non-cash transactions is being driven by the developing markets of Latin America; Continental Europe, Middle East and Africa (CEMEA); and Rest of Asia which are due to grow by 20.6% in 2012 compared to 2011. At a country level, the growth in non-cash transactions is driven by China, Ukraine, Poland, and Russia. The increase in regional expansion by banks, innovation of payment systems, and increasing product sophistication are likely to drive non-cash payments in these markets in the near future.

Exhibit 1: Number of Worldwide Non-Cash Transactions by Region (Billions), 2008–2012E
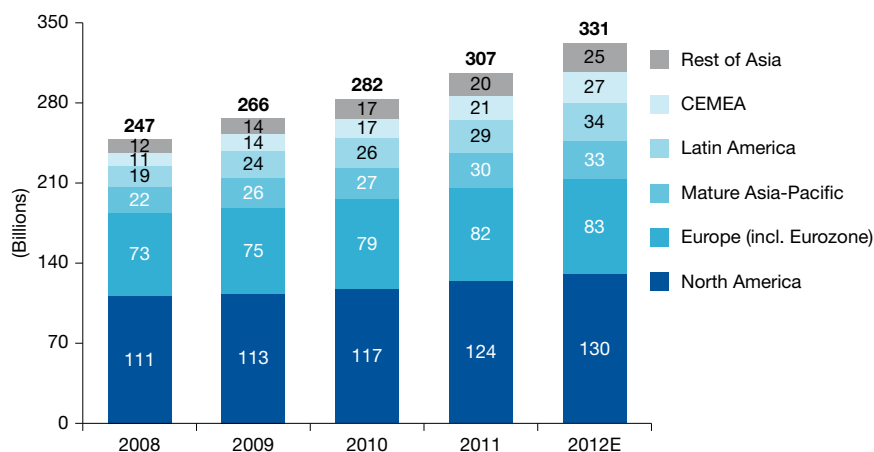

Note: Continental Europe, Middle East and Africa (CEMEA) includes Russia and Poland; Mature Asia-Pacific includes Japan, Australia, South Korea, and Singapore; Latin America includes Brazil as well as Mexico and Other Latin America; Emerging Asia includes India and China as well as Hong Kong and Other Asian countries. Chart numbers and quoted percentages may not add up due to rounding. Some numbers may differ from data published in WPR 2012 due to previous year data updated at source. Source: Capgemini Analysis, 2013; ECB Statistical Data Warehouse, 2011 figures released September 2012; Bank for International Settlements Red Book, 2011 figures released January 2013; Country's Central Bank Annual Reports, 2011

For mature markets such as North America and Europe, non-cash transactions are expected to grow at a modest rate of 4.1% from 2011 to 2012. Growth in the European region is expected to slow down due to the sovereign debt crisis, especially in countries such as Italy, Ireland, and Sweden. Growth in usage of several non-cash instruments such as checks, direct debits, and credit transfers is expected to decrease during 2012 and growth in the North American region is expected to be modest from 2011 to 2012. Even though the growth of other non-cash instruments except cards is expected to decline during 2012, they still hold a significant share of the payment instrument mix across regions. For Europe and Latin America, non-card payment instruments contributed to more than 50% of the transactions in 2011.

In spite of steps being taken by central banks and governments to reduce their usage, checks are still enjoying a sizable market share, especially in regions such as North America and Emerging Asia. As checks are perceived to be one of the safest forms of payment instrument, it is unlikely that checks will become extinct in the near future but their usage is expected to decline further going forward.

Exhibit 2: Payments Instrument Mix, by Region (%), 2011
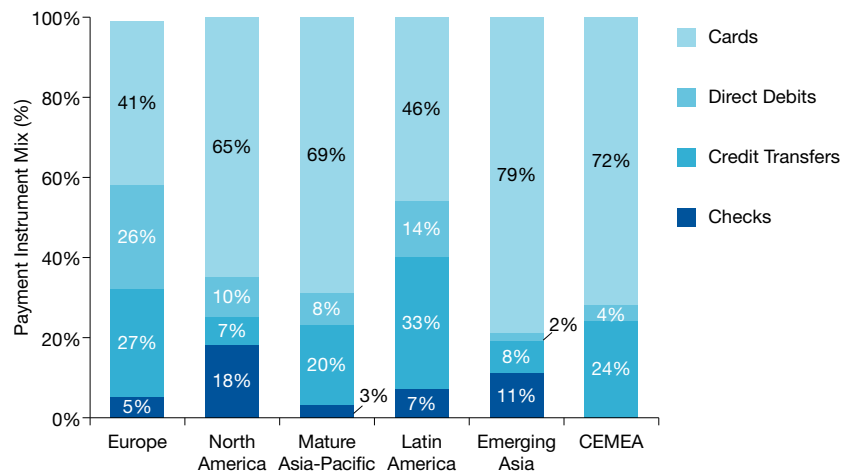
Note: Singapore credit card transaction volume data and Japan data for direct debits not available for all years; Ukraine and South Africa credit card data not available for all years; Ukraine, Turkey, and Hong Kong direct debit data not available for all years; Ukraine and Hong Kong credit transfer and checks data not available for all these years; South Africa direct debit and credit transfer data available only for 2009, 2010, and 2011; Chart numbers and quoted percentages may not add up due to rounding; Some numbers may differ from data published in WPR 2012 due to previous year data updated at source
Source: Capgemini Analysis, 2013; ECB Statistical Data Warehouse, 2011 figures released September 2012; Bank for International Settlements Red Book, 2011 figures released January 2013; Country's Central Bank Annual Reports, 2011

Customers are expected to shift in their behavior from cash and check payments to card payments. The growth of global e-commerce and m-payments transactions will result in a high share of cards in the payment instrument mix going forward.

Exhibit 3: Global E-Commerce and M-Payments Transactions (Billion), 2010–2014F
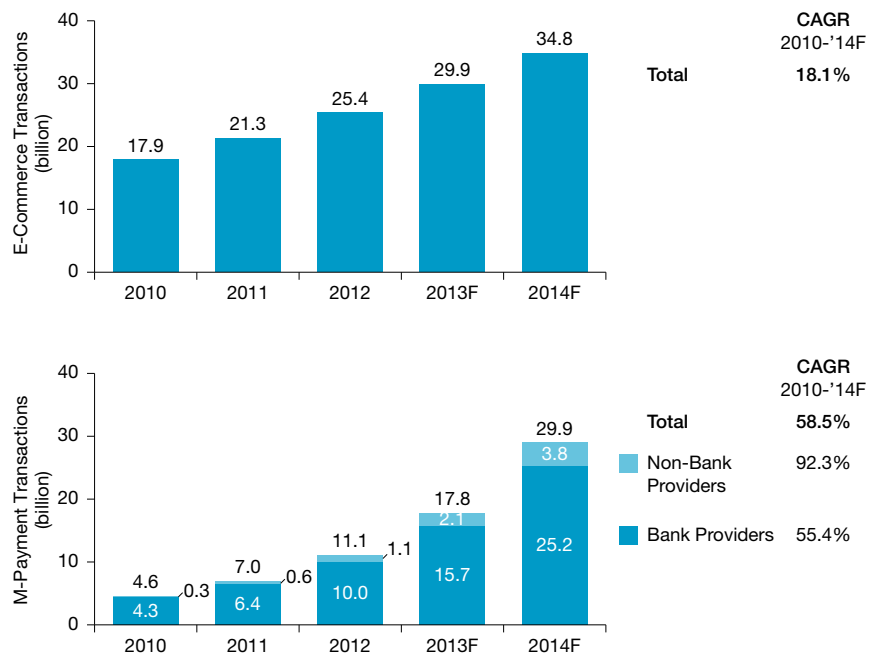
Source: World Payments Report 2013, Capgemini, 2013

From 2010-2014, global e-commerce transactions are predicted to grow from 17.9 to 34.8 billion with a compounded annual growth rate of 18.1%. This growth can be attributed to the increasing preference of customers for online stores that offer more convenience, competitive pricing, and a larger product portfolio to choose from. Also, personalized services and loyalty programs launched by e-commerce firms are expected to have a positive impact on the number of global e-commerce transactions.

In comparison to global e-commerce transactions, m-payments are expected to have a higher growth trajectory during 2010-14. M-payments are expected to witness a growth rate of 58% reaching 28.9 billion transactions in 2014 from 4.6 billion transactions in 2010.

While bank providers' are expected to capture more than 75% of the m-payments market in 2014 with a growth rate of 55.4% during 2010-14, non-bank providers are expected to outpace the bank provides in terms of growth (92.3%) during the same period.

The growth in m-payments transactions is being driven by peer-to-peer payments in developing markets, and consumer-to-business payments in developed markets. Also, the increasing penetration of smartphones and mobile point-of-sale (PoS) devices are leading to an increase in initiation and acceptance of m-payment transactions.

2.2. Mobile Payments Landscape

With the increase in the global m-payments transactions, there has been an increase in the number of technologies that are being leveraged for mobile payments. The mobile payments market can be categorized based on the technology being used.

Short Message Service Payments

As the name suggests, short message service technology is leveraged for making payments. This method of payments is mobile network operator agnostic and is easily scalable and cost effective. Also, SMS is present in all the mobile phones and it is widely used across the globe, making SMS-based payments relatively easy to use with a flat learning curve. However, this method has a limited functionality and does not provide a high degree of security. Also, the transactions are not real-time which may have a detrimental effect on the overall customer experience.

Unstructured Supplementary Service Data Payments

USSD payments have evolved to address some of the drawbacks of SMS-based payments. USSD offers menu-based services which help in improving the customer experience along with the ability to establish a semi-permanent connection for the interactive exchange of information between the user and service provider. Also, USSD-based payments provide real-time communication and a higher degree of security compared to SMS-based payments.

Mobile Web/Wireless Application Protocol Payments

This method of payments uses the wireless application protocol and requires a mobile web browser or a mobile application for initiation of payments. While its graphic user interface provides a better customer experience, it is dependent on software data encryption, which poses some security complexity.

The mobile payments market is categorized based on the technology being used:

- Short Message Service (SMS)
- Unstructured Supplementary Service Data (USSD)
- Mobile Web / Wireless Application Protocol (WAP)
- Near Field Communication (NFC)

Exhibit 4: Comparison of Different Mobile Payment Technologies

	Mobile Payment Technologies			
	SMS	USSD	Mobile Web / WAP	NFC
Features	Low	Medium	High	High
Security	Low	Medium	Medium	High
Reliability	Low	Low	Low	High
Speed	Low	Medium	High	High
Ease of Use	Medium	High	High	High

Low ▪ Medium ▪ High ▪

Source: Capgemini Analysis, 2013

Near Field Communication Payments

This method uses standards-based wireless communication technology for an exchange of information between a mobile phone and a point-of-sale terminal. Similar to WAP payments, mobile applications are used for initiation of payments, leading to a better customer experience. The card details are stored on the mobile phone in a secure element which can take the form of a Subscriber Identity Module, secure chips, or a secure digital card. Hardware encryption is leveraged and it can only be used in close proximity to the point-of-sale terminal, making it one of the most secure payment mechanisms.

Of the four different mobile payments methods, SMS-based payments are expected to have the highest market share (51%) by 2015. While SMS-based payments have multiple drawbacks, they enjoy high market share in developing markets due to the universal availability of the SMS feature, the relative ease-of-use, and attractiveness for the unbanked population. SMS-based payments volume is expected to increase from $31 billion in 2010 to $217 billion in 2015.[3]

After SMS-based payments, WAP-based payments are expected to have the highest market share. The growth of WAP-based payments is expected to be driven by the proliferation of smartphones and mobile application, and is expected to have 38% of the market share by 2015 with a CAGR of 77% during 2010-15.

In comparison, NFC-based payments are expected to have a market share of only 8% in 2015 due to the non-availability of NFC-enabled mobile phones and the adoption challenges they face. However, NFC-based payments offer significant benefits to stakeholders (banks, mobile network operators, merchants, and customers) and market share can increase significantly if the adoption challenges are addressed.
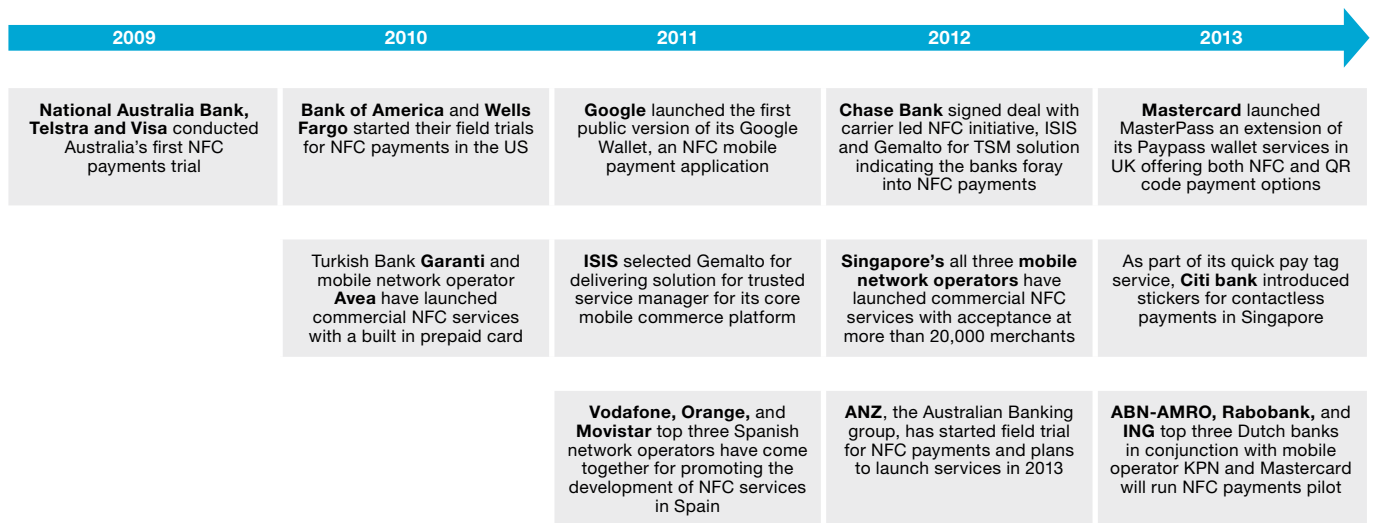
3. The NFC Payment Landscape

With the increase in card usage across the globe, many alternate payment service providers have made a foray into the market. Also, since more and more customers are using smartphones, there is an increase in customer expectations to use their mobile phones for payments. To meet these changing dynamics, banks and mobile operators can leverage NFC technology to provide payment services.

Exhibit 5: Examples of NFC Initiatives during 2009–2013

2009	2010	2011	2012	2013
National Australia Bank, Telstra and Visa conducted Australia's first NFC payments trial	**Bank of America** and **Wells Fargo** started their field trials for NFC payments in the US	**Google** launched the first public version of its Google Wallet, an NFC mobile payment application	**Chase Bank** signed deal with carrier led NFC initiative, ISIS and Gemalto for TSM solution indicating the banks foray into NFC payments	**Mastercard** launched MasterPass an extension of its Paypass wallet services in UK offering both NFC and QR code payment options
	Turkish Bank **Garanti** and mobile network operator **Avea** have launched commercial NFC services with a built in prepaid card	**ISIS** selected Gemalto for delivering solution for trusted service manager for its core mobile commerce platform	**Singapore's** all three **mobile network operators** have launched commercial NFC services with acceptance at more than 20,000 merchants	As part of its quick pay tag service, **Citi bank** introduced stickers for contactless payments in Singapore
		Vodafone, Orange, and **Movistar** top three Spanish network operators have come together for promoting the development of NFC services in Spain	**ANZ**, the Australian Banking group, has started field trial for NFC payments and plans to launch services in 2013	**ABN-AMRO, Rabobank,** and **ING** top three Dutch banks in conjunction with mobile operator KPN and Mastercard will run NFC payments pilot

Source: Capgemini Analysis, 2013; NFC Trials, pilots, tests and live service around the world, SJB Research Ltd., http://www.nfcworld.com/list-of-nfc-trials-pilots-tests-and-commercial-services-around-the-world/

3.1. Drivers for Adoption

While an increasing number of players are beginning to offer NFC-based payments, the drivers for adoption of an NFC payment system vary considerably for by stakeholder.

Drivers for **banks** to use NFC-based payments are:
• Increased customer satisfaction
• Increased revenue from small ticket payments
• Increased revenue from processing fees

For **merchants**, drivers are:
• Faster checkout leading to higher cashier efficiency
• Reduced costs of handling cash
• Access to targeted marketing and loyalty programs

Mobile network operators want to increase customer loyalty, while **customers** are looking for:
• Increased convenience and faster payments
• Better customer experience
• Access to deals and offers

Even though drivers for the adoption of NFC payments exist, major stakeholders need to clearly understand the value proposition for successfully creating a viable long term NFC payments environment. NFC payments offer both opportunities and challenges which need to be addressed.

3.2. Opportunities

While the NFC payment system offers significant opportunities to stakeholders, there are also challenges to be addressed. The opportunities offered by the NFC payment system include:[4]

- **Increased merchant efficiency**. The NFC payment system offers faster checkout times, leading to improved merchant efficiency

- **Increased customer convenience**. Multiple cards can be stored on a mobile phone and payments can be initiated through an application. This method helps increase customer convenience

- **Higher security**. Data encryption is done using hardware, which offers better security than other methods

- **Value-added services**. the NFC payment system enables stakeholders to provide value-added services such as mobile advertising

- **Targeted marketing and loyalty programs**. A customer's location can be leveraged to deliver marketing content which is relevant and is in the vicinity of the customer

3.3. Business Models

Four business models have evolved to address the requirements for rolling out an NFC payment system.[5] The NFC payment system involves a considerably higher number of stakeholders compared to traditional card payments, and requires significant investments to roll it out. Developing business partnerships and revenue sharing agreements is of paramount importance.

Bank-Centric Model

This model is an extension of existing payments systems where the bank plays the pivotal role. Here, the bank develops the applications required for initiation of payments and deploys the point of sale terminals as required by the merchants. Since the roles and responsibilities of the stakeholders are already known due to similarities with existing payments systems, this model allows a smooth transition for rolling out the NFC payment system. In this model, mobile network operators are not involved in any of the payment activities and are restricted to being just a network provider.

Operator-Centric Model

The mobile network operator plays a critical role in the value chain. Mobile applications are independently deployed by the operator and the charges are prepaid by the customer or are incorporated as part of the existing mobile billing system. The role of the financial institution is marginalized. This model helps mobile network operators to increase their revenues and customer loyalty.

Four business models have evolved to address the requirements for rolling out an NFC payment system: bank-centric, operator-centric, peer-to-peer and collaborative.

4 Marianne Crowe, *Evolving Mobile Landscape Challenges and Opportunities* [PowerPoint], Federal Reserve Bank of Boston, https://www.bostonfed.org/bankinfo/payment-strategies/presentations/2012/crowe6-7-2012.pdf, June 2012

5 Proximity Mobile Payments Business Scenarios: Research Report on Stakeholder Perspectives, Smart Card Alliance, July 2008

Peer-to-Peer Model

This model creates a new payments landscape, catering to new payment schemes such as PayPal. Intermediaries such as banks and mobile network operators can potentially be removed from the value chain. Their possible revenues streams then would be payment processing and network usage respectively. However, due to the lower user base and significant investment required from the P2P service provider, scalability of this model could be a problem.

Collaborative Model

This model involves collaboration among all the stakeholders, with specific roles and responsibilities assigned based on their core competencies. In this model, the deployment of the mobile application would be managed by a third-party called a trusted service manager. Since this model involves multiple stakeholders, the process of reaching agreement on revenue sharing and liability management can slow the roll out and adoption process.

Stakeholders can adopt any of the above mentioned business models, but they first need to analyze the risks and benefits associated with each.

Exhibit 6: Risk-Benefit Comparison for Different Business Models of NFC Payments

Model / Stakeholder	Operator-Centric	Bank-Centric	Peer-to-Peer	Collaborative
Bank	High Risk, Low Benefit	Medium Risk, High Benefit	High Risk, Low Benefit	Medium Risk, Medium Benefit
Mobile Operator	Low Risk, High Benefit	High Risk, Low Benefit	High Risk, Low Benefit	Medium Risk, Medium Benefit
Merchant	Medium Risk, Medium Benefit	Medium Risk, Medium Benefit	Medium Risk, Medium Benefit	High Risk, High Benefit
Customer	Medium Risk, Medium Benefit	Medium Risk, Medium Benefit	Medium Risk, Medium Benefit	High Risk, High Benefit
P2P Service Provider			Low Risk, High Benefit	
Trusted Service Manager				Medium Risk, Medium Benefit

Risk: Low (red), Medium (yellow), High (green). Benefit: Low (red), Medium (yellow), High (green).

Source: Capgemini Analysis, 2013; Proximity Mobile Payments Business Scenarios, Smart Card Alliance, July 2008; Mobile Money – The future of the payments market, BearingPoint, 2012

Of the four business models, the collaborative model strives to strike an optimal balance between risks and benefits for the stakeholders. Since this model is best suited from the customer's and merchant's perspective, the number of NFC initiatives based on it may be higher in comparison to other business models.

3.4. Key Challenges

The challenges for large scale adoption of the NFC payment system include:[6]

- Complexity of revenue-sharing and payments due to the high number of stakeholders
- Lack of availability of NFC-enabled mobile phones
- Resolution of ownership of data and customers
- Non-availability of NFC-enabled mobile phones and lack of large scale merchant acceptance
- Lack of clarity in terms of regulations
- Weak business case for merchant adoption due to a low user base and the cost of upgrading terminals

Challenges from customers and merchants must also be addressed.

Business Model

Even though the stakeholders agree on the right business model based on the environment they operate in, they will have to:

- Decide on the revenue sharing agreement between the stakeholders
- Develop liability management policies for the chosen business model
- Develop clarity on the ownership of customers and their data
- Develop rules and policies governing the use of customer data

These issues will be critical for developing a sustainable and long-term NFC initiative for the stakeholders.

Merchant Acceptance

Since an NFC payment system involves upgrading payment terminals (PoS) at the merchants end, the associated costs need to be addressed. Also, due to the lack of NFC-enabled mobile phones in the market and higher cost of NFC-enabled PoS terminals, the value proposition of NFC payments needs to be clearly communicated to the merchants.

Consumer Adoption

This is the most critical issue with the adoption of an NFC payment system. While an NFC payment system promises significant benefits to customers, universal acceptance and customer awareness about the payment method need to be addressed. Also, the value proposition needs to be clearly communicated to customers in order to increase their likelihood to switch to contactless payments. Another aspect would to address security-related issues by increasing customer awareness and increasing the availability of mobile applications.

Security Issues

As with any payment method, security of the process plays a critical role for large scale adoption. Stakeholders should work towards enhancing the security features of mobile wallets and addressing issues of possible data breaches. Stakeholders should also work towards improving customer perception by highlighting the security features of the NFC payment system.

6 Marianne Crowe, *Evolving Mobile Landscape Challenges and Opportunities* [PowerPoint], Federal Reserve Bank of Boston, https://www.bostonfed.org/bankinfo/payment-strategies/presentations/2012/crowe6-7-2012.pdf, June 2012

3.5. Changing the Target Operating Model

Once the right business model is chosen and the challenges addressed, the stakeholders—especially banks and mobile network operators—will need to make changes to their operating models. The changes in the operating model can include processes, people, and technology.

Processes

An NFC payment system involves processes which are different from existing payment mechanisms. Stakeholders would be required to develop new processes or make changes to existing processes to accommodate the new payment mechanism. The new payment mechanism may also require stakeholders to develop, change or modify processes across the value chain, requiring considerable planning and execution.

For example, when a customer loses a mobile phone, there needs to be a clear process in place to address the lost from a payments perspective. Since different stakeholders are involved, the customer needs to know who to contact. Existing internal processes need to be re-written to address such a scenario.

People

With the involvement of a higher number of stakeholders compared to traditional payment mechanisms, customer service will play a vital role in increasing the adoption of a NFC payment system and enabling a smooth transition for customers. In view of this, the training of the people involved in customer service becomes important. The key stakeholders—banks and mobile network operators—need to create a comprehensive training plan for their customer service teams to ensure a smooth transition to the NFC payment system.

Technology

Due to the presence of legacy systems, there may be a need for stakeholders, especially banks and mobile network operators, to change or upgrade their infrastructure to facilitate the NFC payment system. This can have a significant impact, especially in an operator-centric model where mobile network operators will be operating the payment space. This will also have a significant impact when stakeholders decide to co-operate with a trusted service manager.

Apart from banks and the mobile network operators, merchants would also be required to make changes to their operating models. For example, merchants may need to develop ways to process new information such as the number of mobile payments being processed, install a new point of sale terminal, and train staff to handle the new payment mechanism smoothly.

Overall, there is a need for stakeholders to follow a holistic approach by assessing the different elements of the NFC payment system including business models, adoption challenges, changes to operating models and charting out a clear course of action for successful implementation.

4. Path Forward

Implementation of an NFC payment system requires co-ordination between several stakeholders. Each stakeholder needs to focus on the key success factors for NFC adoption.

4.1. Key Success Factors

Market Features

To develop a sustainable business, stakeholders need to focus on achieving critical mass and generating market visibility quickly. In this regard, partnering with organizations such as large supermarkets, public transport operators, and fast food chains can help in achieving critical mass and market visibility quickly.

Customer Service Features

The value proposition of the offering needs to be clearly communicated to customers. Features such as simplicity, cost-effectiveness, flexibility, and value-added services need to be highlighted to increase traction. Also, stakeholders need to develop a merchant network to increase the scale of acceptance of the offering through partnerships. Collaborating with banks will help in enhancing the value proposition and increasing the speed of payment processing. And in terms of security, stakeholders need to take steps to improve customer perception by providing additional security features such as two-factor authentication and secure data storage mechanisms

Technical Features

Stakeholders need to develop mobile applications that are operating system agnostic and which work on different mobile phones. Also, standardization exercises need to be taken up between banks, mobile network operators, merchants, technology providers, and trusted service managers to ensure interoperability. From the security stand point, technical frameworks need to be developed to ensure enhanced security, and application developers need to be licensed to ensure compliance with security standards. At a firm level, payment processors, hardware manufacturers, and application developers need to collaborate to develop cryptographic algorithms and malware protection systems to enhance security.

Business Model Features

The market strategy of all stakeholders should be gaining market share, building a brand, and increasing customer loyalty. Customers need to be incentivized to increase adoption of NFC payments and measures should be taken not to burden them with any additional costs. Also, merchants need to be incentivized through discounts or differential pricing to build a large acceptance network. With the increase in competition from alternative payment providers, the focus of entrants should be to offer the service over larger geographies to get critical mass quickly.

4.2. Valued Added Services

While stakeholders address key success factors, they should also focus on developing value-added services in order to maintain the attractiveness of the offering over a longer time horizon.

Stakeholders can explore the following value added services:

• Advertisements: Smart poster, one-to-one marketing

• Loyalty & Rewards: Points, voucher, and coupons

• Peer-to-Peer transfers, ticketing, and access control

Exhibit 7: Value Added Services for NFC Payments

• Increased convenience for the customers in getting product/ service information
• Increased brand awareness for the merchants
• Ability to deliver one-to-one marketing based on user profiles
• Increased ad revenues for the stakeholders
• Emergence of new service models for all stakeholders
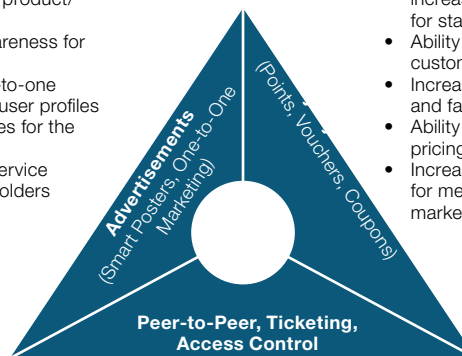
• Increased customer loyalty and increased cross-selling potential for stakeholders
• Ability to generate real-time customer insights
• Increased sales for merchants and faster check outs
• Ability to deliver value added pricing for the customers
• Increased return on investment for merchants through targeted marketing

Advertisements (Smart Posters, One-to-One Marketing)

(Points, Vouchers, Coupons)

Peer-to-Peer, Ticketing, Access Control

• Increased convenience for the customers
• Enhanced security through implementing access control
• New modes of payment for customer leading to increased loyalty and convenience
• Reduction in cost of transport operators and increased precision

Source: Capgemini Analysis, 2013

4.3. Host Card Emulation

As NFC payments offer significant benefits albeit a complex ecosystem, there has been an emergence of Host Card Emulation (HCE) architecture to perform NFC payments. This new technology allows for creating virtual card on the device with the credentials being stored in the cloud, by-passing the traditional secure element controlled mostly by MNOs which could lead to structural changes to the NFC landscape. As there is no dependence on the secure element while using HCE in contactless payments, this can make the process of launching NFC payment services much easier for banks. However, while HCE increases convenience for several stakeholders involved, through evaluation of security risks needs to be undertaken to ensure the robustness of this method.

Considering the above and the significant impact this emerging technology can have on the NFC landscape, it will be prudent for all the stakeholders to closely follow this development to increase the adoption and penetration of NFC payments.

4.4. Roadmap

Along with developing value-added services for an NFC payment system, stakeholders need to take a systematic approach for rolling out the service to streamline the operations and ensure smooth transition. We propose the following roadmap:

Exhibit 8: Roadmap for Successful Implementation and Adoption of NFC Payments
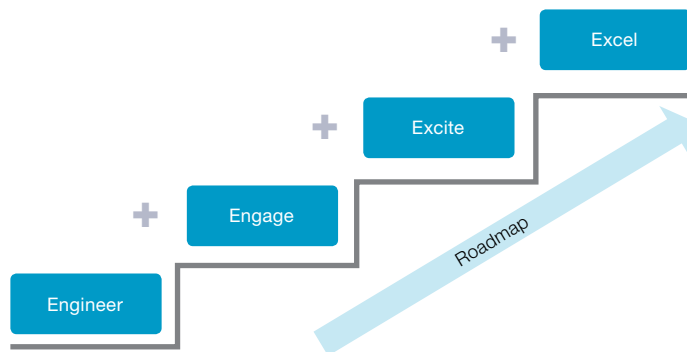
Source: Capgemini Analysis, 2013

Step 1: Engineer

- Adopt a business model which balances the risks and benefits associated with the system along with a clear differentiation of roles and responsibilities
- Develop and deploy supporting infrastructure
- Develop applications which instill trust and confidence in customers and merchants by addressing security concerns

Step 2: Engage

- Increase awareness of the new payments model with both customers and merchants
- Communicate the value proposition clearly to engage both customers and merchants and increase their acceptance of the new model
- Incentivize both customers and merchants to develop a critical mass

Step 3: Excite

- Roll out value-added services to improve the value proposition for both customers and merchants
- Develop new service models to include other stakeholders such as advertisers
- Focus on incorporating other services such as ticketing and peer-to-peer payments to address all the payment activities of the customer

Step 4: Excel

- Include stat analytics to improve the impact of value-added services

By following this roadmap, stakeholders can streamline their activities and ensure a smooth transition towards an NFC payment system. However, the strategies which the stakeholders wish to adopt should be aligned with their business objectives to build a strong business case for an NFC payment system and enhance collaboration among stakeholders.

5. Conclusion

We can say the NFC payment system offers significant benefits to stakeholders involved in the payments process. NFC initiatives are expected to pick in the near future as more and more NFC-enabled smartphones reach consumers.

However, as NFC-based payments face considerable adoption challenges, it will be in the best interest of stakeholders to address these issues at an early stage to create a viable and sustainable payments ecosystem. Also, stakeholders need to focus on the key success factors, decide on an appropriate business model, agree on revenue sharing schemes, create business cases for merchants and customers, and develop appropriate roadmaps for increasing adoption of the NFC payment system.

Since NFC technology can be leveraged for activities such as advertising, loyalty and rewards, ticketing, and access control, stakeholders need to partner with players in other industries to create value-added services.

Finally, considering the complex nature of the NFC payments landscape with multiple stakeholders, there is a need for increased collaboration among the stakeholders to create a sustainable payments value chain.

References

1. Analysis & Evolution of Mobile Payment Initiatives, Capgemini Consulting, March 2012

2. Enabling a new paradigm in NFC/mobile marketing and advertising, Kovio, http://members.nfc-forum.org/resources/presentations/Kovio_MIT_Event_December_2010.pdf (December 2010)

3. Evolving Mobile Landscape Challenges and Opportunities, Federal Reserve Bank of Boston, http://www.bostonfed.org/bankinfo/payment-strategies/presentations/2012/crowe6-7-2012.pdf (June 2012)

4. Google Wallet ends support for physical secure elements, March 17 2014, NFC World, http://www.nfcworld.com/2014/03/17/328326/google-wallet-ends-support-physical-secure-elements/

5. Host-card emulation enables NFC without a secure element, SecureIDNews, 24 March 2014, http://secureidnews.com/news-item/host-card-emulation-enables-nfc-without-a-secure-element/#sthash.yVXbxEhy.dpuf

6. Host Card Emulation positions of Networks, Banks, Carriers, Experts and NFC Forum, HCE roundup, letstalkpayments, March 21 2014, http://letstalkpayments.com/host-card-emulation-positions-networks-banks-carriers-experts-nfc-forum-hce-roundup/

7. How Couponing and Rewards Stimulate Retail & Customer Engagement, Molo Rewards and GSMA, http://www.gsma.com/mobilecommerce/wp-content/uploads/2012/11/MoLo-Rewards-How-Couponing-and-Rewards-Stimulate-Retail-Customer-Engagement.pdf (November 2012)

8. Jeroen de Bel, Monica Gâza, *Mobile Payment 2012 – My Mobile, my wallet?*, Innopay, http://www.innopay.com/publications/mobile-payments-2012-my-mobile-my-wallet (September 2011)

9. Mobile Money – The Future of the Payments Market, BearingPoint, 2012

10. Mobile NFC in Transport, GSMA and International Association of Public Transport (UITP), http://www.uitp.org/public-transport/technology/Mobile-NFC-in-Transport.pdf (September 2012)

11. NFC and Marketing – Bridging the gap, Newad and Gaugemobile, http://www.newad.com/DATA/DOCUMENT/185-en.pdf (2012)

12. NFC Forum issues statement on host card emulation, NFC World, 20 March 2014, http://www.nfcworld.com/2014/03/20/328384/nfc-forum-issues-statement-host-card-emulation/

13. NFC Trials, pilots, tests and live service around the world, SJB Research Ltd., http://www.nfcworld.com/list-of-nfc-trials-pilots-tests-and-commercial-services-around-the-world/

14. Proximity Mobile Payments Business Scenarios, Smart Card Alliance, http://www.smartcardalliance.org/pages/publications-proximity-mobile-payments-business-scenarios-research-report-on-stakeholder-perspectives, (July 2008)

15. Proximity Mobile Payments: Leveraging NFC and the Contactless Financial Payments Infrastructure, Smart Card Alliance, http://www.smartcardalliance.org/pages/publications-proximity-mobile-payments (September 2007)

16. Security Concerns with NFC Technology, NearFieldCommunication.org, http://www.nearfieldcommunication.org/nfc-security.html

17. Security in Near Field Communication (NFC) – Strengths and Weaknesses, Ernst Haselsteiner and Klemens Breitfuss, Philips Semiconductors, http://ece.wpi.edu/~dchasaki/papers/Security%20in%20NFC.pdf

18. Smart Posters-How to use NFC Tags and Readers to Create Interactive Experiences that Benefit both Consumers and Businesses, NFC Forum, April 2011

19. The Fight to Control the Mobile wallet, Deutsche Bank, March 2012

20. The Future of Retail Customer Loyalty, Cisco, http://www.cisco.com/web/about/ac79/docs/innov/RFID_Loyalty_IBSG_0614.pdf (June 2011)

21. The Mobile Payments and NFC Landscape: A U.S. Perspective, Smart Card Alliance, http://www.smartcardalliance.org/pages/publications-the-mobile-payments-and-nfc-landscape-a-us-perspective (September 2011)

22. Visa and MasterCard to cut ties binding banks and telcos via Host Card Emulation, Finextra, 19 Feb 2014, http://www.finextra.com/news/fullstory.aspx?newsitemid=25743

23. Which Economic Model for Mobile Payments, Econstor, http://www.econstor.eu/handle/10419/60380 (July 2012)

24. *World Payments Report 2013*, Capgemini and RBS, 2013

People matter, results count.

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