Foreword

NFC promises to fuse online and offline commerce into a seamless customer experience. This simple, but effective, contactless technology can digitise in-store shopping, enabling consumers to easily make payments, redeem vouchers and collect loyalty points.

Mobile NFC also enables retailers to maintain a free-flowing and fruitful dialogue with their customers in-store, as well as online. Major supermarkets and small boutiques alike can entice potential customers into their stores with timely and personalised NFC vouchers delivered via mobile networks.

Crucially, mobile NFC will also keep individuals in control, enabling them to choose when and where they want information.

Delivering on the promise of mobile NFC depends on a strong ecosystem and collaboration across the value chain. Mobile operators, retailers and their partners will need to work closely together to enable mobile NFC to bring intuitive digital interactivity to traditional bricks and mortar retailing.

This white paper is designed to play an important role in helping the wider ecosystem to appreciate both the potential benefits of mobile NFC and the key tasks that need to be accomplished to roll out successful retail services.

I hope you will find this paper a useful tool.

Anne Bouverot

Director General GSMA
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Near Field Communication, or NFC, is a contactless radio technology that can transmit data between two devices within a few centimetres of each other. Mobile phones are increasingly being equipped with NFC capabilities, enabling an array of new digital services that could greatly enhance the consumer shopping experience.

The combination of NFC, an easy-to-use and versatile technology with mobile connectivity, could realise many benefits in the retail sector.

**Potential benefits of mobile NFC for consumers include:**
- NFC-enabled tags both in-store and elsewhere can provide easy access to relevant information and services
- NFC handsets can automatically record and collate transactions to help with budgeting and claiming expenses
- Data generated by NFC services could be used to create more relevant advertising and marketing
- Mobile NFC provides a fast way to redeem vouchers and complete transactions in-store, avoiding queues

**Potential benefits of mobile NFC for retailers include:**
- Greater customer engagement as consumers use NFC to check-in to stores and receive personalised offers
- NFC enables automated loyalty programmes, increasing customer satisfaction and lowering costs
- Adverts equipped with NFC tags would enable consumers to purchase the relevant product immediately
- Mobile NFC provides a fast and accurate way to complete payments and redeem vouchers
- Mobile NFC could facilitate greater competition in the payments space

**Potential benefits for mobile operators include:**
- Greater usage of mobile services – NFC interactions could prompt more usage of the mobile network
- Greater adoption of mobile NFC and accelerated upgrades of handsets and UICCs
- Platform for mobile commerce services, such as targeted marketing, and other new revenue streams

Although some of these benefits could also be realised using alternative technologies, mobile NFC enables shoppers to interact with their immediate surroundings and online services in an intuitive and straightforward way. An NFC interaction requires a deliberate, yet simple, action on the part of the consumer. Rather than scanning codes or inputting text, a consumer simply touches their NFC handset against a terminal to complete an interaction.

However, pilot and commercial deployments of mobile NFC in the retail sector have shown that the technology needs to minimise costs and overcome a number of complexities. Retailers and mobile operators need to take into account an array of commercial, technological, user-experience and political considerations to deploy effective mobile NFC solutions.

**Commercial considerations:** Both retailers and mobile operators need to respect each other’s desire to maintain the existing relationship with their customers. Mobile NFC services should also be aligned as closely as possible with an individual retailer’s distinctive proposition. Moreover, the use of joint ventures and hubs could reduce the need for bilateral negotiations, while “off-the-shelf” loyalty solutions could help small retailers capitalise on mobile NFC.

**Technological considerations:** Mobile NFC services should be designed to work with the existing contactless infrastructure as much as possible, while achieving an acceptable throughput time at checkout and keeping sensitive data in a secure domain at all times. Moreover, an NFC phone with a flat battery should still be able to interact with an NFC terminal.

**User experience considerations:** It will be important to establish a straightforward, yet secure, enrolment process and quick and simple procedures for payments and the redemption of vouchers. Retail-related NFC services should also support a range of different payment options and offer full transparency, choice and control around
the use of customer data. Effective customer service, particularly in cases of lost or stolen handsets, will also be crucial to consumer confidence.

**Political/regulatory considerations:** The mobile NFC ecosystem should aim to harness the potential socio-economic benefits of mobile NFC. Service providers should also seek to work with regulators to establish who can do what with sensitive customer data.

In summary, a carefully-designed and well-implemented mobile NFC solution could significantly improve the efficiency and effectiveness of retail operations, while dramatically enhancing the consumer shopping experience.
2. Introduction

Near Field Communication, or NFC, is a contactless radio technology that can transmit data between two devices within a few centimetres of each other. Mobile phones are increasingly being equipped with NFC capabilities, enabling an array of new digital services, such as:

- **Ticketing** – interactive fare media on public transport systems
- **Payments** – an alternative to cash and plastic credit cards to purchase goods and services
- **Access control** – an alternative to traditional keys
- **Couponing** – an interactive alternative to paper vouchers and coupons

**Purpose of this paper**

This white paper is designed to help retailers, mobile operators and their partners deploy mobile NFC solutions to improve the consumer shopping experience – mobile NFC could enable consumers to interact with physical stores in the same way they interact with online websites. The paper aims to set out the potential benefits, the potential obstacles and the key considerations relating to the deployment of mobile NFC services in the retail sector.

Drawing on the views of the broad ecosystem, the paper is intended to be a comprehensive and wide-ranging reference document, rather than a prescriptive template. It is designed to support business discussions between mobile operators, retailers, banks and other players in the value chain. The paper is aimed at senior executives in the strategy, marketing, commercial and technology functions of mobile operators, retailers and other companies involved in the broader mobile NFC ecosystem.

Rather than reading this paper from start to finish, we expect the target audience to look up the sections most relevant to them. Please note that some of the benefits, obstacles and considerations outlined in the paper may not be applicable to each and every specific mobile NFC deployment in the retail sector.

**Scope of this paper**

This white paper considers mobile NFC solutions in the retail sector in Europe and other developed markets, such as South Korea and Japan. It is applicable to all forms of retail, including restaurants, coffee shops, bars, pubs and cafes, as well as shops selling products.

Although mobile NFC services may in practice be secured in various different ways, the paper focuses on mobile NFC services in which the universal integrated circuit card (the UICC, commonly referred to as a SIM card) inside a mobile handset is used to secure the service. It envisages that sensitive data related to the mobile NFC service will be stored in an applet in a dedicated secure domain within the secure element (in this case the UICC) where it can only be accessed by authorised applications running on the handset. However, the paper recognises that some mobile operators, retailers and other players in the ecosystem may also use alternative approaches.

The paper also envisages that a mobile wallet application running on the handset will enable an individual to view their NFC-enabled services and content, such as payment cards, vouchers and travel tickets. The mobile wallet, which could be used to complete transactions, will provide access to digital versions of payment cards, receipts, vouchers, loyalty cards, tickets and any stored value.

The paper assumes that consumers will typically access mobile NFC services by opening a dedicated retail application, a browser or a mobile wallet application on their handset, which would then interact with the relevant UICC applet.

The deployment of mobile NFC using the UICC as the secure element will provide authentication, security and portability across many different handsets. Adopting UICC-based NFC globally will also ensure economies of scale and interoperability, enabling people around the world to benefit from NFC services, regardless of their operator network or device type.

More broadly, mobile NFC services are being deployed at a time when the handset is fast becoming a valuable tool for many shoppers. Consumers with smartphones, in particular, are increasingly using their handsets to locate retail outlets offering specific products and services. Handsets with full web browsers have also made it easy for consumers to compare prices in a specific store with those available elsewhere. The advent of mobile NFC provides an opportunity to enhance and extend the functionality and features of retailers’ existing mobile applications and websites.
**Methodology**

In preparing this paper, the authors interviewed representatives of mobile operators, retailers, equipment providers, payment service providers and trade associations from across Europe. The organisations involved in the development of this paper include:

- Aima
- Barclaycard
- Boku
- Casino
- Deutsche Telekom
- DNB
- EMVCo
- Eurocommerce
- European Payments Council
- Everything Everywhere
- GS1 Germany
- Hutchison Europe
- Ikea
- Ingenico
- Leroy Merlin
- MasterCard
- McDonald’s
- Metro Systems GmbH
- Norgesgruppen
- NXP
- Oberthur Technologies
- Orange
- Telecom Italia
- Telefonica
- Telenor
- TeliaSonera
- VeriFone
- ViVOtech
- Vodafone
- WHSmith

This paper aims to reflect the views and requirements of both the retail and mobile industries. However, it should be noted that the individual organisations listed above may not agree with each and every statement listed herein.

**Glossary**

**NFC** – Near Field Communications – A short range (typically 4cm) communication technology which is compatible with ISO/IEC 14443 and FeliCa contactless technologies.

**NFC terminal** – an NFC-compatible device in a fixed location capable of two-way interaction with another NFC device. The existing contactless smartcard readers, based on the ISO/IEC 14443 type A and B standard, can function as NFC terminals.

**NFC tag** – an NFC device in a fixed location, such as a smart poster or billboard, that stores information that can be read by another NFC device.

**Mobile wallet** – a handset application designed to enable a consumer to view and use digital versions of payment cards, tickets, receipts, loyalty cards and other items typically found in a physical wallet. A mobile wallet also enables a consumer to browse through and then access mobile NFC services.

**UICC** – a Universal Integrated Circuit Card, commonly known as a SIM card, acts as the secure element for the storage of sensitive data.

**Secure domain** – a dedicated space within the secure element reserved for data related to a specific set of mobile NFC services.

**UICC applet** – an application running on the UICC that holds secure data and interacts with an NFC terminal. It typically interacts with a dedicated application running on the handset and/or the mobile wallet.
3. The Vision - how mobile NFC could transform retail

3.1 An NFC-enhanced shopping experience

This section illustrates how mobile NFC, combined with conventional mobile connectivity, could enhance an everyday shopping experience. It is a high-level, long-term vision that demonstrates how mobile networks and NFC infrastructure can work together to provide a passenger with a cohesive and compelling experience. Note, this example is not intended to be exhaustive – it is designed to give a flavour of the potential and versatility of NFC in a retail context.

Maria has been invited to a drinks party at the weekend, but she is very busy with work and has little time to shop for a new outfit. As she leaves her office to buy a sandwich, Maria receives a message from the app of her favourite clothes store. She clicks on a button to download an electronic 20% voucher - redeemable on summer dresses and valid for the day - into the mobile wallet on her handset.

On her way to the nearest branch of the clothes store, she passes her regular sandwich shop. There is a long queue, so she taps her NFC handset against an NFC tag embedded in a picture of her favourite sandwich on a billboard next to the shop. The shop’s app sends her a message asking her to confirm payment, so the sandwich can be delivered to her office within 30 minutes.

As Maria enters the clothes store, she taps her NFC handset against the welcome terminal. The store’s app on her phone opens up and tells Maria that this branch has seven different summer dresses in her size and where they are displayed. As she moves through the store, a cardigan catches Maria’s eye. She taps the NFC tag under the cardigan – the app tells her there are none left in her size, but a store near her home still has two in stock. She clicks on a button to reserve the cardigan at the store in the suburb where she lives.

The store’s app then highlights which of the summer dresses will go particularly well with the cardigan. Maria tries on the recommended dress and decides to buy. A shop assistant invites her to tap her NFC handset against a point of sale terminal, which automatically recognises and redeems the 20% voucher and adjusts the price. She taps her handset against the terminal a second time and completes the purchase by entering her mobile code. An electronic receipt for the purchase is sent back to her handset from the point of sale terminal.

When she gets back to the office, her sandwich has been delivered. As she eats, the clothes store app on her handset notifies her that she has accumulated more than 1,000 loyalty points, which will enable her to buy the cardigan for free.

3.2 The wider value proposition of mobile NFC in retail for consumers

Building on the example in 3.1, this section considers how mobile NFC could enhance the consumer shopping experience. Note, some of the potential benefits detailed below are not unique to mobile NFC - they could be realised by alternative systems that use electronic validation infrastructure and/or online interactivity. However, such systems are unlikely to be as user-friendly as mobile NFC, which enables consumers to interact with both their immediate surroundings and online services in an intuitive and straightforward way: An individual simply touches their NFC handset against a terminal to complete an interaction. For this reason, mobile NFC may be the most effective way to realise the benefits detailed below.

Easy access to relevant information and services while shopping

NFC could make it easy for a shopper to get personalised information both through NFC terminals and tags in store and NFC-enabled advertising elsewhere. For example, a consumer could tap their handset against a billboard advertising ice cream, to trigger a download of a map showing the nearest store selling the ice cream, as well as the closest stockist to their home. Crucially, NFC keeps the consumer in control (they only receive the information if they tap the relevant tag), yet it is simple and straightforward to use.

A consumer could also keep an NFC-enabled shopping list in the mobile wallet on their handset. As they move around, an authorised broker could alert the shopper to local stores that stock items on the list. Once the consumer buys the item with NFC, it is automatically crossed off the list.

Richer in-store experience

A shopper can alert a store to their arrival by tapping an NFC handset against a welcome terminal. This automated concierge service could trigger the delivery of a personalised message directing him or her to new products that might be of interest. By checking in, the shopper could...
also authorise the transfer of personal information, such as past purchases and clothes sizes, to the concierge service, which might then use this information to recommend particular products. Alternatively, the personal information could be transmitted to handsets carried by shop assistants that would enable them to give the shopper relevant advice.

For example, a supermarket could use NFC to create a kind of electronic concierge service, which would greet customers with a personal message. For example, a consumer who regularly buys fresh salmon, might receive a message asking whether they plan to purchase salmon today. If they say yes, then staff at the fish counter will prepare the salmon and have it waiting for the customer. Similarly, a consumer could input details of any allergies they have into their regular supermarket’s mobile app, which would then alert them if they select any foods that might trigger an allergic reaction. Such a service would have to be based on a trusted source of product data authorised by the product manufacturers.

**Useful data – for budgeting and claiming expenses**

When a shopper makes a purchase with an NFC handset, they could automatically receive a digital receipt. They could authorise their mobile wallet or another application on their handset to track their spending and send an alert when specific thresholds are reached. If an employee on a business trip is authorised to spend 75 euros a day, for example, the real-time digital trail created by a mobile wallet on an NFC handset would enable them to easily track how much of their daily budget remains.

**More personalised and relevant advertising and marketing**

A consumer could give a trusted broker access to some of the data captured by an NFC handset, such as details of past purchases and travel patterns. The broker could use that data to provide highly-personalised and relevant advertising and marketing. For example, if the data captured by a consumer’s NFC handset shows they regularly eat at French restaurants, they are likely to be interested in a 20% discount for a new Gallic bistro opening near their place of work.

**In-store transactions without the hassle of queuing**

NFC could make it easier for consumers to complete transactions in store without the involvement of staff. For example, NFC-enabled self-checkout terminals could redeem electronic NFC vouchers, as well as accept payments. For a consumer, such terminals would reduce the need to queue, making shopping a faster and more pleasant experience. Moreover, consumers would no longer have to remember paper vouchers, as they would be stored electronically on their handset.
4. Why use mobile NFC in retail – the value proposition for retailers

This section considers how mobile NFC could make retailers more efficient and effective. Note, some of the potential benefits detailed below are not unique to mobile NFC - they could be realised by alternative systems that use electronic validation infrastructure and/or online interactivity. However, such systems are unlikely to be as user-friendly as mobile NFC, which enables consumers to interact with both their immediate surroundings and online services in an intuitive and straightforward way: An individual simply touches their NFC handset against a terminal to complete an interaction. For this reason, mobile NFC may be the most effective way to realise the benefits detailed below.

In some cases, the potential benefits depend on mass-market usage of mobile NFC. It should also be noted that the actual benefits for an individual retailer will depend on their current infrastructure, particularly whether they already accept contactless smartcards at point of sale and make use of mobile marketing and advertising.

A closer relationship with customers

A retailer could use mobile NFC to cost-effectively create a more rewarding and interactive in-store experience (akin to the personal service provided in high-end stores) that will encourage consumers to keep coming back to that retailer and create opportunities for upselling and cross-selling. As NFC is easy-to-use and easy-to-understand, it could enable retailers to enter into a meaningful dialogue with consumers without having to employ additional staff.

Retailers could invite shoppers to check-in using their NFC handset as they enter the store. Unlike a network-based check-in system, NFC requires the customer to physically enter the store, so a retailer has much more reliable information on who is looking at their products. As the consumer checks-in, the retailer can deliver offers specifically tailored for that shopper: Research has shown that personalised offers are more effective than generic offers at generating sales. For example, a grocer might give a shopper who always buys red wine, a voucher if they buy the store’s own brand wine and cheese.

Retailers and brands can also use a mobile network or a Wi-Fi network to deliver personalised NFC vouchers to nearby consumers (who have opted-in to receive such marketing) and draw them into the store. The appropriate applet on the UICC could authenticate these vouchers and assure the consumer that they are genuine and will be honoured in-store or online.

A retailer or brand can also use NFC to track whether the voucher has been redeemed or not. If the voucher isn’t redeemed, the retailer may decide to take a different approach with that consumer next time. By closing the loop between direct marketing and actual transactions, NFC vouchers enable retailers to better understand consumer’s lifestyles and preferences. They can use that understanding to hone their direct marketing strategy and potentially increase sales.

With an individual’s permission, a retailer could use past transactions, movement patterns and other personal data to tailor their products and services precisely for that individual. For example, a grocer could offer to deliver food to a consumer’s home 30 minutes after they usually get in from work. This degree of personalisation would enable the retailer to build a much closer relationship with consumers at a time of rapid change in the retail sector.

Automated redemption of vouchers, increasing customer satisfaction and lowering costs

Knowing it will be straightforward to redeem electronic vouchers in-store via NFC, the shopper is more likely to visit the retailer and may also buy other products. Receiving a timely, personalised offer that can be redeemed easily is a good experience for the shopper, enhancing the reputation of the retailer.

Automatic processing of electronic coupons and loyalty points will also lower retailers’ administrative costs. In the case of NFC-enabled coupons, the retailer’s supply chain could be configured so that the brand automatically compensates the retailer for any coupons redeemed through NFC.

Unlike other mobile couponing systems which depend upon approximating the shopper’s position using GPS, the redemption of an NFC-based voucher proves beyond doubt that the consumer was in the store and redeemed the offer.

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Furthermore, both the consumer and the retailer will no longer need to handle physical loyalty cards, coupons and receipts, cutting material costs, reducing their impact on the environment and freeing up staff time for customer service. Consumers will no longer need to carry a purse or wallet stuffed with loyalty cards, receipts and vouchers.
Turn physical advertising into a sales channel

A retailer can add an NFC tag to an advert or billboard to enable consumers to order the advertised products or services by tapping an NFC handset against the tag. This mechanism enables a consumer to respond immediately to advertising, acting on impulse, potentially increasing the retailer’s sales. Moreover, NFC-enabled “shopping walls” can enable consumers to order products (or place them in an online shopping basket) while waiting for a bus or a train. By making shopping more convenient for consumers, retailers can potentially increase sales.

Fast and accurate throughput

For most retailers, the faster they can process transactions, the fewer staff they need manning checkout tills. Paying by tapping an NFC handset should typically be faster than a traditional cash or card payment, especially for small transactions which don’t require the customer to enter a mobile code. The use of the UICC to secure mobile NFC services enables a point of sale terminal to authenticate payment cards, vouchers and loyalty points quickly and accurately. As the data and applets on the UICC are ring-fenced from interference by applications or malware, a voucher stored on the retailer’s secure domain or a payment card in a bank’s secure domain on the UICC are very likely to be genuine, enabling a point of sale to validate them quickly and easily.

Less cash handling

The rollout of mobile NFC handsets would introduce another way to pay electronically, in addition to plastic credit, debit and stored value cards. In time, the widespread usage of mobile NFC could lead to a major reduction in the volume of cash retailers need to handle. This is particularly true for retailers, such as coffee shops and newsagents, handling large numbers of small value transactions, which are typically paid in cash today, but are well-suited to payment by simply tapping an NFC handset against a point of sale terminal. A significant reduction in the usage of cash would allow retail staff to spend less time counting money and transporting it to the bank.

Mobile NFC could facilitate greater competition in the payments space

By removing the need to issue plastic cards to authenticate payments, mobile NFC could lower the barriers to entry in the payments market, potentially leading to greater competition and more efficient alternatives to cash. Third parties could use mobile NFC to enter the payments market, perhaps by offering prepaid, stored-value schemes with low credit risk. Mobile devices could also be used to offer basic, no-frills payment services with low transaction fees.

Mobile NFC could lower the costs of running retailers’ existing payment schemes and could encourage more retailers to launch such schemes. Mobile operators with their own payment instruments (such as co-branded prepaid credit cards or closed loop payment cards/accounts) could extend these instruments to support payment via mobile NFC. Greater competition in the payments market may lead to a broader selection of services, lower retailers’ transaction costs and/or enhance payments services.
5. Why mobile operators should support mobile NFC retail

This section considers the reasons why mobile operators are supporting the deployment of mobile NFC in the retail sector.

Greater usage of mobile services

As it will further enhance the role of the mobile phone in everyday life, mobile NFC is a strategically-important technology platform for mobile operators. This short-range contactless technology is the ideal complement to their existing mobile networks – it enables people to interact quickly and easily with their immediate surroundings and then source additional information and services over the mobile network. Each interaction with an NFC terminal or reader may prompt the mobile customer to download more data, make a phone call or send a text message.

Spur adoption of NFC and accelerate handset and UICC upgrades

As shopping is part of everyday life, the widespread adoption of mobile NFC in the retail sector would raise awareness of the technology and its potential to enhance other facets of people’s lives, both among consumers and among businesses. It would encourage consumers to buy NFC handsets and upgrade to NFC-enabled UICCs. Deployment of mobile NFC in retail would also help to generate economies of scale for manufacturers of NFC components and reduce the cost of deploying the technology in other parts of the economy.

Mobile commerce

Widespread usage of mobile NFC in the retail and travel sectors could help mobile operators to create a mobile commerce platform that reduces the friction between buyers and sellers, opening up new revenue streams for the mobile operator. For example, a mobile operator could provide a service that enables an advertiser to send NFC-enabled vouchers to consumers (who have given their permission) in a specific geographic location. The number of NFC vouchers that are redeemed at point of sale would help the advertiser to determine how effective the campaign is, enabling it to modify its messaging accordingly.

The widespread usage of mobile NFC in retail would also help people to become accustomed to using mobile wallets, enabling mobile operators to deploy other value-added services that make use of a wallet.

New upstream revenues

The deployment of mobile NFC in the retail sector may open up opportunities for mobile operators to provide upstream services to retailers, restaurants and suppliers of branded goods, generating new revenues. Mobile operators could, for example, provide application lifecycle management services.
6. Mobile NFC in retail today

This section considers progress towards actual deployments of mobile NFC in the retail sector.

Trials of mobile NFC technology in the retail sector

Mobile NFC has been widely tested by retailers in Europe and elsewhere. A public-private partnership in Nice in France, for example, is piloting city-wide mobile NFC services in both the retail and transportation sectors. Several large multinational retailers, including the Metro Group and IKEA, have also tested the technology and other retailers are now following suit. For example, in Sweden, retail chain ICA is piloting a mobile NFC-enabled loyalty programme at its ICA To Go food store in Stockholm. The programme is built into the ICA To Go app for iPhone and Android - iPhone and Android users without NFC phones can pick an NFC tag from the store and put it on the back of their handset. In the U.K., department store John Lewis has installed NFC-enabled adverts in 100 bus shelters in London, which invite consumers to tap their NFC handsets against a tag to find out more, according to NFC World.

NFC handset availability

The usage of mobile NFC services clearly depends on consumers having NFC handsets. The availability of such handsets is now growing quickly. There will be 70 different NFC handsets on the market by the end of 2012 compared with 26 at the start of the year, according to research firm Gartner. Samsung Electronics, one of the world’s leading handset makers, has said that it sold 20 million units of an NFC-enabled, high-end smartphone, the Galaxy SIII, worldwide in the 100 days after it went on sale, according to the AP news agency. Some device manufacturers, such as ZTE of China, have also developed NFC handsets aimed at the mass-market.

Deloitte has predicted that 200 million NFC phones will be in use worldwide by the end of 2012. By 2015, 50% of the smartphones shipped will support NFC, according to one leading semiconductor vendor. By then, the vast majority of handsets sold in Europe will likely be smartphones.

Live commercial services

Shoppers in Japan, South Korea, Turkey, parts of France, the UK and Sweden can all use NFC handsets to make retail purchases today. Shops in many countries are being equipped with NFC-enabled point of sale terminals by MasterCard or Visa and their partners in the banking sector, initially for use with contactless plastic cards. Barclaycard, for example, has deployed 50,000 terminals in the UK. These terminals can also accept payments by virtual versions of the same cards stored in a mobile wallet on an NFC handset.

In South Korea, more than 10 million UICC-based NFC handsets have been sold by the country’s three leading mobile operators. Myeong-dong, Seoul’s busiest shopping district, offers a wide range of NFC services, including payments, loyalty programmes, couponing, smart posters and digital receipts. Two hundred merchants in the district accept payments made with NFC handsets, while some cafes and restaurants enable diners to order a drink by tapping an NFC tag. Shoppers can download coupons and advertising information from smart posters, while cinema tickets can be validated by NFC.

In Japan, millions of people already use their handsets to buy products in store and from vending machines, but using a proprietary contactless technology called Felica, which is incompatible with many of the services based on the contactless standard ISO 14443 standard being deployed in other parts of the world. Japan is now upgrading its Felica readers and terminals to support international NFC services, including ISO14443 A & B, while its mobile operators are preparing to offer handsets that are compatible with both Felica and UICC-based NFC services.

Mobile operators in Japan and South Korea are enabling international roaming between the two countries - 200 shops in Japan already have NFC terminals that will accept coupons stored on the NFC handsets of Korean visitors. The visitors download the coupons before leaving Korea.

In Turkey, Turkcell is rolling out a mobile wallet service, branded Cep-T Cüzdan, which supports credit cards, prepaid cards, loyalty cards and transportation and city cards, that can be provisioned over the air on any phone with a 64K UICC. Users with NFC handsets can simply tap their handset to pay at point of sale, users without NFC need to type in their mobile phone number, which is acknowledged by a text message, asking them to choose which bank card to pay with. They then need to key in the mobile code for the card.

As well as storing loyalty cards in the wallets on behalf of merchants and brands, Turkcell plans to send users of the wallet up to five personalised offers a day, based on the places they go. The service will also enable retailers and
brands to interact with customers in-store, right up to the point of sale. Turkcell’s portfolio of NFC handsets includes the BlackBerry Bold 9900 smartphone and two own-branded NFC handsets made by Huawei and ZTE. Turkcell launched its NFC service in May 2011 and, by February 2012, 300,000 of Turkcell’s customers had NFC handsets, according to media reports. However, not all of these handsets were equipped with an NFC-capable UICC.
This section outlines the main challenges facing companies wishing to deploy mobile NFC services in the retail sector.

**A complex value chain**

A complex and multi-faceted value chain is required to enable a full suite of retail-related NFC services, encompassing advertising, direct marketing, vouchers, payments, loyalty and after sales customer care. This value chain could potentially include the suppliers of branded goods (brands), merchants, banks, payment networks, systems integrators, point of sale terminal suppliers, mobile operators, specialist aggregators, handset makers, marketing and advertising brokers and Internet companies. It can be difficult to align the interests of so many players so that they move with sufficient speed to deploy NFC services. Clearly, each of these players will be looking to generate revenue either directly from providing NFC services or through the provision of related products and services.

**Diversity of existing point of sale and payments infrastructure across Europe**

There are significant differences within Europe between national payments markets. This diversity could make it difficult for NFC retail solutions to gain economies of scale and be fully interoperable across the continent. The EMV standard has been fully adopted in many European countries, but there are still areas that use local payment schemes that are not integrated with EMV. Moreover, some retailers have developed their own payment schemes, which a mobile NFC solution will need to support. Although the EU Single Euro Payments Area (SEPA) initiative is aiming to simplify and harmonise bank transfers within Europe, it will take time to iron out the existing differences.

**An increase in transaction fees in some countries**

In time, the EU Single Euro Payments Area (SEPA) initiative should lead to the disappearance of domestic debit card schemes. In the meantime, such schemes still exist in some European countries, such as Norway. In these markets, local banks may not enable these schemes, which generally offer low transaction fees, to be used for contactless payments, as doing so may require significant investments. The alternative for payment issuers, acquirers and service providers in these countries could be to offer NFC payment and services based on established global payment schemes, such as EMV. However, in this case, transaction fees may be higher than for the existing domestic debit card payment system, which could be a disincentive for retailers in these countries to deploy contactless services.

Still, the SEPA initiative may lead to the emergence of alternative pan-European payment systems. Moreover, payment transaction fees should be regarded as only one part of retailers’ business case and customer value proposition assessment.

**Cash can be cheaper**

Until a tipping point is reached, replacing cash with mobile NFC payments may increase some retailers’ transaction costs. The cost to a retailer of managing cash is generally fixed - they need to make a certain number of trips to a bank each week. But the costs of debit and credit card transactions (including those made via mobile NFC) are variable - the more card transactions, the more transaction fees paid by the retailer. Mobile NFC should encourage consumers to reduce their usage of cash for small transactions, but a retailer will only benefit once the number of cash transactions has fallen to a point where they no longer need to go to the bank as frequently.

**NFC services need to be cost-effective**

Neither consumers nor retailers are likely to pay more to use mobile NFC to complete a transaction than they would to use a plastic card. That means the cost of deploying NFC terminals in stores, rolling out NFC handsets and UICCs, and other start-up costs will need to be covered by alternative sources of revenues and/or justified by cost savings from the ongoing use of NFC services in a retail environment.

**Different cultural norms in different parts of Europe**

There are significant cultural differences between different European countries, particularly with respect to the acceptability of credit - in the UK, for example, credit cards are used far more than they are in Germany. These cultural differences may mean that, in some markets, consumers will want to store value within mobile wallets, while other markets may be more comfortable settling bills at the end each of the month or accumulating debt.
Cost and complexity of systems integration

Many large retailers and brands are involved in well-established loyalty programmes spanning multiple companies. For example, the Nectar card scheme in the UK includes some supermarkets, energy suppliers, travel companies and car manufacturers. As a result, Nectar points have become a kind of currency redeemable across many different products and services. To support such wide-ranging loyalty programmes, a mobile NFC solution may need to be integrated with several different IT systems. This may be a complex and costly task involving coordination across multiple companies.

Cost of NFC-enabled point of sale terminals

Many retailers, particularly smaller ones, will not want to go to the expense of upgrading their point of sale infrastructure to support NFC until their existing equipment has reached the end of its life. As the cost of NFC technology falls, most new point of sale equipment will support NFC as a standard feature, but it may still take five years or more before most European retailers have such equipment in their stores - retailers typically upgrade their point of sale equipment every four to seven years.

Lack of loyalty and voucher programmes

For many retailers, the business case for deploying mobile NFC will be based partly on the opportunity to forge a closer (and subsequently more lucrative) relationship with customers. To do this, they may need to run loyalty and voucher programmes to ensure the consumer derives value from NFC-based interactions. Many smaller retailers don’t have existing loyalty and voucher programmes, so would need to set these up from scratch in order to harness the full potential of mobile NFC.

Need for distribution of NFC handsets/new UICCs to consumers

As mobile NFC gains economies of scale, the technology will be added to more mainstream handsets, but most consumers only replace their handset every two or three years. It could, therefore, be several years before the majority of people in Europe have NFC handsets.

NFC handsets generally also need sophisticated UICCs that can store applets and data related to each retailer in a secure domain. These UICCs, which cost more than conventional UICCs, need to be distributed to consumers. Some mobile operators are now issuing NFC-enabled UICCs to all customers purchasing a new UICC. As consumers may not yet see the value of NFC services, the mobile operator may need to subsidise the roll out of these NFC-enabled UICCs.

Variety of different handset platforms

If a retailer wishes to support its mobile NFC services with a tailored handset application, it will need a different app for each of the different smartphone and feature phone software platforms in use in their market. However, the retailer’s UICC applet should be able to work across different smartphone and feature phone platforms and across different mobile operators’ UICCs and mobile wallets.

Retailers need to deal with multiple mobile operators in each market

In most European markets, there are at least four mobile network operators and several mobile virtual network operators (which resell network capacity). That means that a retailer will have to deal with multiple mobile operators to offer all of its customers and potential customers the opportunity to use its NFC services. Different mobile operators may have different timescales for the roll out of NFC handsets and services, creating further complexity for the retailer.

Need for standard interfaces

If a retailer wishes to add their vouchers and loyalty programmes to a mobile operator’s mobile wallet and UICC, these value added services will need to use a standard interface to ensure they are compatible with wallets and UICCs from multiple mobile operators. There is also a need for a standard interface between the mobile wallet and an NFC-enabled point of sale terminal to enable the terminal to process coupons, vouchers and loyalty points.

Need to minimise disruption

When installing mobile NFC solutions, a retailer needs to ensure that these services do not negatively impact their existing processes at point of sale, both from a technical standpoint and a process flow standpoint. The redemption of vouchers and the collection of loyalty points using NFC will need to be a swift, straightforward process that doesn’t extend the time a shopper spends at check out. To minimise disruption, a retailer will need to train staff in how to support consumers unfamiliar with the NFC services and related applications.
8. How to move mobile NFC in retail forward – defining roles and responsibilities

To help enable retailers and their partners to overcome the costs and complexities detailed in the previous section and deploy a mobile NFC solution, this section aims to identify the tasks that need to be accomplished. It considers the required roles related to system design and development, consumer uptake and to the platform services that will be required to maintain the solution once it has been deployed.

8.1 System design and development

This section considers what needs to be done to enable the deployment of mobile NFC solutions in the retail sector.

Development of retail applications for different mobile handset platforms

In addition to supplying a UICC applet, retailers may also wish to develop own-branded applications that people can download on to their handsets and then use to browse through products and services, request vouchers, review special offers, check-in to stores, complete transactions both online and at point of sale and redeem loyalty points. In most cases, the retailer’s app will need to be adapted for each handset operating system used by potential customers. Many retailers may have existing apps they can upgrade to support NFC functionality.

Provision of “off-the-shelf” app development and delivery solutions across all handset platforms

To make it easier for small retailers to deploy apps that support NFC functionality, mobile operators and other companies may provide templates and other tools that streamline the development of apps for different handset platforms. They could also provide dedicated solutions that would enable the retailer to easily deliver their app and a related UICC applet to a customer’s handset. Small retailers may also need off-the-shelf solutions that will enable them to easily set up an NFC-enabled loyalty programme.

Integrate NFC-based services, such as in-store information and offers, into retail apps

To harness the full potential of NFC, a retailer may wish to deploy the technology in information points and kiosks within the store. Such NFC tags will need to be integrated with the retailer’s mobile app so the two elements work together to provide the customer with a personalised experience. In practice, these tags could trigger the app to download relevant information - for example, if a customer looking at accessories in an electronics shop, taps the NFC tag on the shelf, the retailer’s app could show him which of the accessories is compatible with the television he bought from the same store earlier that year.

Integration of mobile NFC point of sale terminals into existing infrastructure

Retailers will need to integrate mobile NFC point of sale terminals into their existing infrastructure. How they do this will depend on the configuration of their existing in-store systems. In some cases, the retailer’s point of sale units (which manage the transaction itself) may be integrated into the electronic cash register. Alternatively, the point of sale units may be integrated into a PIN-entry device, which is connected to the cash register via a wireless network or a USB cable. As a result, some retailers may simply be able to replace their PIN entry devices, while others may need to also replace their cash registers. However, if the retailer is trying to combine equipment from multiple vendors, they will probably face significant integration costs.

Integration of NFC-enabled marketing services into advertising posters, kiosks, on-shelf-signage

Posters, adverts and kiosks both in-store and on external advertising hoardings could be equipped with NFC tags that provide customers with more information, vouchers or web links. When these tags have been touched by an NFC handset, they could transfer a link to a remote server designed to deliver up-to-date and location-specific information to the handset over a mobile or WiFi network. For example, a retailer might add an NFC tag to a poster advertising a new store. Touching the tag with an NFC handset could prompt the remote server to send the device a link to the opening hours of the new store, a map showing its location and a 20% discount voucher.
8.2 Consumer uptake

This section considers the steps that are required to drive usage of retail-related mobile NFC services.

Addition of NFC chips to a wide selection of handsets

Ideally, NFC needs to become a standard feature on mobile phones across a wide range of price points to enable mass-market retailers to make NFC their primary platform for loyalty, vouchers and payments. Wider deployment of NFC services should create demand among consumers for NFC handsets, leading to a broader selection of NFC phones at a wider range of price points.

Procurement and distribution of NFC-enabled handsets

European mobile operators, which typically distribute most of the handsets sold in their markets, could request that device makers add NFC capabilities to more models. They could also promote NFC handsets to consumers in stores, on their websites and through other marketing and distribution channels.

Reduce fragmentation of handset platforms

Retailers and mobile operators need to ensure consumers have an intuitive and consistent experience across handsets and operating systems. Two key market forces are gradually reducing fragmentation in the handset market, thereby, simplifying the process of developing consistent retail apps and retail-related NFC services. Firstly, smartphone sales are growing rapidly, reducing the number of feature phones, which tend to use proprietary or semi-open software, sold each year. Secondly, both consumers and app developers are gravitating towards the most popular smartphone platforms, creating a virtuous circle that is further strengthening these platforms at the expense of less popular platforms.

Promotion of mobile NFC handsets and services

Most Europeans are not aware of NFC technology and the services it can provide. The ecosystem will, therefore, need to educate consumers about mobile NFC both to encourage them to purchase NFC handsets and then use NFC services. Promotions, discounts and offers may also be needed to encourage consumers to buy NFC handsets, download NFC apps and use NFC services.

Promotion of use of mobile NFC in retail

There will be a need to highlight to consumers that they can use NFC handsets to check-in to stores, redeem vouchers, make payments and collect loyalty points. NFC services could be advertised on posters and on tills. They could also be demonstrated by retail staff. In some cases, a retailer may decide to drive uptake by offering a discount for goods bought.

Distribution and promotion of mobile wallets

In most cases, consumers are likely to discover, access and manage their NFC services through a mobile wallet. Mobile operators are likely to preload these wallets on the NFC handsets they distribute. But wallets may need to be downloaded over-the-air to handsets sold through other channels. In the latter case, mobile operators will need to make it easy for consumers to discover these wallets either by promoting them in app stores or through NFC tags that link to a download site. No matter how mobile wallets are distributed, most consumers will still need to be educated on how to use them. Once they have a wallet on their handset, a consumer will need to be able to download any payment card applications (and associated UICC applets) they wish to use to make payments via NFC. This task may be carried out by a trusted intermediary.

Distribution and promotion of retail apps to handsets

Depending on the handset’s operating system, retail applications could be downloaded from the mobile wallet, an applications store or an appropriate website. In any case, these apps will need to be promoted to consumers and will need to be easy to discover and install.

8.3 Platform services

This section considers the ongoing services needed to support the use of mobile NFC solutions in the retail sector

Provision and management of sensitive data

To use an NFC service (as with many existing services), some identifying (and potentially sensitive) data will need to be loaded on to the secure domain on the UICC. If necessary, the individual should be able to have the data deleted or amended securely and transferred to another UICC or to another device. The intermediary that performs
these provisioning and management services clearly needs to be trusted by the individual concerned, the mobile operator and the relevant retailer.

Retailers should consider whether they should authorise a single intermediary to provision and manage data on their secure domain within the UICC, to gain economies of scale, or whether they would prefer to use several competing providers.

Management of the secure domain

The secure domain within the UICC needs to be supplied and provisioned, so that it can receive new applets and data over-the-air. UICCs are supplied by mobile operators and can be provisioned through a trusted intermediary. If a handset is stolen or lost, a mobile operator can disable the UICC remotely, or the trusted intermediary can disable the services, ensuring that the sensitive data can’t be accessed.

Enable a consumer to move bank cards, loyalty points, vouchers and coupons from one UICC to another

If a consumer wishes to change their mobile operator, they will want to move any bank cards, loyalty points, coupons, vouchers and stored value they have purchased from their existing UICC to a new UICC. This transfer will need to be carried out by a company that is trusted by the consumer, the mobile operators and the retailer to access the secure domain of the UICC. This process, which would typically be carried out over a wireless network, will clearly require mobile operators to take a common approach to storing applets and data in the secure domain of the UICC.

Management of the lifecycle of the retail application on the handset

Once a retail app, supporting NFC services, has been developed and deployed on consumers’ handsets, it will need to be updated regularly with relevant information and, if necessary, new functionality. Such updates could be delivered via a mobile wallet or via an applications store or a website, depending on the handset’s operating system

Provision of ongoing connectivity

A secure wireless connection will be required to enable consumers with an NFC handset to interact with retailers over-the-air and receive vouchers, coupons and information – customers will need to be able to make both proactive enquiries and receive alerts. Some retailers may want to use a wireless network to send direct marketing messages to consumers (who have given their permission) in the vicinity of their stores. The location of a consumer’s handset can be determined using data provided by GPS, mobile and/or Wi-Fi networks.

In some cases, mobile connectivity will also be required to access the information advertised by an NFC poster or advert. As the amount of data that can be transferred during a single NFC tap is relatively small, an NFC service provider may choose to transmit the advertised data via an over-the-air download from a remote server over a mobile network.

Provision of different payment options

When purchasing goods, a consumer will want a choice of different payment options. Some consumers will want to use a debit card, others a credit card, while people without bank accounts may need to be able to pay using value stored on a prepaid card or via a mobile operator’s bill. Rather than going through the cumbersome process of keying their card details into a website, many consumers are likely to prefer to use the mobile wallet stored on their handset.

If a consumer’s bank and the associated payment network support virtual cards, the mobile wallet could support digital versions of the consumer’s debit and credit cards and any prepaid cards. To complete a transaction, the wallet would source much of the necessary data from the UICC applet. The bank and the payment network will typically stipulate that transactions above a defined amount (usually more than 20 to 25 euros) will require the consumer to enter a mobile code, while smaller transactions can be completed simply by tapping the handset against an NFC point of sale terminal. Mobile operators may also enable consumers to use their mobile wallets to make charges to their postpaid phone bill or their prepaid stored value. Regardless of the payment mechanism, the process clearly needs to be simple to use and low cost, yet secure. Moreover, all payment procedures in the EU should, of course, comply with the Payment Services Directive, the E-Money Directive and the Data Protection Directive.

Note, that the security of any payment system is of paramount importance for it to gain the trust of consumers and also of merchants. Ideally, standards for security of mobile payment applications, and their integration into the system of granting certificates to verify compliance with these rules, should be harmonised across Europe.
Provision of customer service

As many consumers will be unfamiliar with the concept of using a mobile handset to check-in to a store or make payments at point of sale, mobile NFC services will need to be supported by a comprehensive customer service offering ranging from extensive and clear FAQs on relevant websites and mobile apps through to helplines and face-to-face support in retail stores. These customer service operations need to encompass every aspect of the NFC services from registration through to service termination. They should also be capable of disabling NFC handsets that have been lost, stolen or misused. Retailers and mobile operators will need to agree procedures covering which party is responsible for which aspects of customer service.

Delivery of loyalty programmes via the mobile platform

Retailers may wish to reward regular customers with loyalty points that they can use to obtain a discount on other goods and services. The retailer will need to install IT systems that can add loyalty points to a customer’s retail app or mobile wallet each time they purchase goods and services. At the same time, the check-out systems at point of sale and online will need to be modified to enable consumers to redeem the loyalty points either via NFC or over a wireless network. The retailer may also choose to make their loyalty scheme part of a broader programme enabling consumers to redeem their points against products and services offered by third parties, such as other retailers or transport operators. In this case, some systems integration will be required with the third parties’ IT infrastructure.

Aggregation services that enable multiple retailers, banks and mobile operators to easily integrate their services and apps

Given the large number of retailers, banks and mobile operators in any given market, there may be demand for aggregation services or hubs that enable multiple players to easily integrate their different NFC services. For example, rather than dealing with each retailer bilaterally, a mobile operator may prefer to work with an aggregator that ensures retailers’ apps and UICC applets comply with the relevant standards and are compatible with all the key handset operating systems. Similarly, a retailer or bank may prefer to deal with an aggregator that integrates their app and UICC applets with the mobile wallets and UICCs of multiple mobile operators.

Provision of advertising/marketing inventory

A retailer or a supplier of branded goods will often want to place digital advertising and NFC-enabled direct marketing collateral, such as vouchers and coupons, in front of customers and potential customers. In many cases, they will want to use multiple channels, in addition to their own websites and mobile apps, to deliver such adverts and collateral. There will, therefore, be demand for advertising and marketing brokerage services that enable retailers and brands to easily send advertising and NFC-enabled vouchers and coupons to selected consumers who have opted-in to receive such messages.

As well as collating and analysing the data necessary to identify the consumers that meet a retailer or brand’s criteria, these brokerage services will need to be able to deliver NFC-enabled vouchers and other marketing collateral over the air to mobile handsets either via SMS and MMS or via adverts within third-party mobile apps or websites. If they are of sufficient value, the retailer or brand may want vouchers to be stored in the secure domain on the UICC. These vouchers will clearly need to be both fraud-proof and user friendly – so a consumer can use the mobile wallet or the retail app to easily see what discounts they are entitled to and in what circumstances.

Management and maintenance of NFC tags and terminals

NFC tags and terminals both in store and in external locations will need to be managed and maintained. This NFC infrastructure will need to be checked regularly to ensure that it works as expected. Any damage will need to be repaired very quickly to ensure that consumers view NFC as a reliable means of interacting with retailers.
9. How to move mobile NFC in retail forward – what to consider

This section outlines the key factors that need to be considered when designing and deploying a mobile NFC solution in a retail environment.

9.1 Commercial considerations for all parties

Build on existing point of sale infrastructure

In the past few years, many European retailers have deployed contactless point of sale terminals in store to enable shoppers to pay with contactless cards. To keep capital costs down, this existing contactless infrastructure could also be used for mobile NFC solutions, even if it can’t yet support all the value added services, such as automated vouchers and loyalty programmes, made possible by mobile NFC. Such functionality may be introduced once consumers and retail staff have become familiar with using NFC handsets for payments. If capital is in short supply, the deployment of some value-added services may have to wait for the existing point of sale equipment to reach end of life and the next upgrade cycle.

Develop a sustainable short-term and longer-term business model for all parties in the value chain

The success of a mobile NFC retail solution will depend on multiple actors being able to build a sustainable business model. Mobile operators, retailers, suppliers of branded products and their partners need to consider both the short-term and the long-term business case for mobile NFC solutions for all parties in the value chain. It may be that different actors in the value chain have different time horizons for making a return on their investment in mobile NFC and these differences clearly need to be catered for. Business models should also consider whether there will be a tipping point in the uptake of a mobile NFC solution in which economies of scale and network effects kick-in lowering the cost of rollout and creating a virtuous circle that makes mobile NFC increasingly attractive for all parties involved.

Mobile operators will expect to generate revenues to offset the costs they incur and the risks associated with the provision of value-added services in the retail sector. Given the considerable uncertainty around the business case for NFC services, it may be appropriate to deploy business models that share the risks and rewards across multiple parties.

Maintaining the customer relationship

For most mobile operators and retailers, it is strategically important to maintain a close relationship with consumers and ensure that their brand is highly prominent on any consumer-facing service they deliver. In this context, as they design mobile NFC services, both mobile operators and retailers need to respect each other’s desire to maintain the existing relationship with their customers. In practice, this may mean that retail mobile NFC services are delivered by a branded retailer’s app and a mobile operators’ branded mobile wallet working in concert. Given that the consumer’s handset and operating system may also carry separate brands, the value chain needs to ensure that the branding of a mobile NFC service accurately reflects the different entities’ roles and the responsibilities. It is important to ensure that a profusion of brands doesn’t lead to a confusing consumer experience, particularly in cases where the individual is being asked to share sensitive personal information.

A lean value chain

The value chain involved in delivering mobile NFC services in a retail environment is potentially complex. The likely actors will include banks, payment networks, suppliers of branded goods, point of sale terminal suppliers, systems integrators, advertising and marketing brokers, retailers, mobile operators, device manufacturers and Internet companies. Wherever possible, the value chain needs to be simplified, so as to avoid adding unnecessary layers of cost and to enable it to move swiftly and decisively to deliver mobile NFC services in a timely fashion. A lean value chain will also improve the mobile NFC business case for each party.

Align mobile NFC services as closely as possible with an individual retailer’s distinctive proposition.

To differentiate themselves in a highly-competitive market, most retailers attempt to create a distinctive proposition. Mobile NFC services need to be aligned with this positioning. For example, a retailer, such as a fast food outlet, that aims to ensure that busy customers can get in and out of the shop quickly should be wary of implementing a multi-faceted mobile NFC service that invites customers to interact with different signs and kiosks. Conversely, a department store aimed at older shoppers may want to avoid implementing a mobile NFC solution that is designed to speed them through the checkout process as fast as possible.
Consider new use cases for NFC in-store and at point of sale

Mobile NFC is a highly versatile technology that can be exploited by retailers in many different ways. Retailers should be open to new ideas about how to use mobile NFC in-store and at point of sale. Even simple solutions, such as enabling people to reserve a place in a queue at a fresh food counter using their NFC handset (they could receive an alert when the person before them in the virtual queue is being served), could enhance the shopping experience.

Educate consumers on how to use mobile NFC

As many retailers can’t afford delays at point of sale, they need to ensure that the deployment of a mobile NFC solution doesn’t disrupt their existing processes and create confusion among shoppers. Some shoppers struggled to use the first self check-out solutions in some supermarkets, potentially damaging the retailers’ brands. The value chain will, therefore, need to put some resources into educating consumers in how to use a mobile NFC solution, particularly if multiple taps are required at check-out to redeem vouchers, make a payment and then collect loyalty points. Retail staff may need to be on hand to demonstrate the service or simple explanatory videos may need to be available in store.

Develop a robust and secure framework for the management of customer data

The use of mobile NFC in the retail sector will capture a lot of potentially sensitive data about individuals, ranging from bank card details to information about where they live, where they work and where they were and when. Individuals aren’t going to use their handsets to check in and out of stores if they think that the resulting data is insecure and could find its way to unauthorised third-parties. It is, therefore, critical to communicate clearly with consumers about how their personal data is protected and the rules governing its use. Ultimately, mobile NFC solutions will only be used by consumers if they trust the companies providing those services to safeguard their personal data.

As a general rule, personally-identifiable data should only be shared with third parties if the individual concerned has given their express permission. Consumers should have control over what information is used and by whom, and what marketing they receive and from whom. This may require the industry to establish appropriate standards and agreements and to ensure privacy is designed in from the outset, and to provide customers with a consistent and convenient way to manage their marketing permissions. The entire value chain should, of course, also ensure that their mobile NFC services are compliant with data protection laws.

Where feasible, use joint ventures, hubs or associations to reduce the need for bilateral negotiations

Given the large number of retailers and multiple mobile operators in each European country, negotiating bilateral agreements between each of these parties would be a lengthy and resource-intensive process. Mobile operators in each market may consider establishing joint ventures that would enable retailers and other service providers to deploy NFC services that are available to all mobile users, regardless of their operator. Alternatively, there may be scope for third parties to create hubs that retailers and mobile operators could use to ease the roll-out of NFC services across multiple entities. Such hubs should aim to ensure that retailers and consumers have a consistent experience across mobile operators.

Make the mobile wallet as open as possible

Mobile wallets need to be as open as possible - mobile operators should enable banks, retailers, transport operators and other service providers to use their wallets and their UICCs to offer mobile NFC services in a fair and non-discriminatory way. Open mobile wallets will encourage competition and innovation, resulting in a broad selection of compelling mobile NFC services for consumers, driving uptake and benefiting the broader economy.

Identify what needs to reside in the secure domain and what doesn’t

Retailers may not need secure storage for all the data and collateral related to their mobile NFC services. For example, a voucher entitling the consumer to a one euro discount on a coffee may not need to be stored in the secure domain on the UICC - it could simply reside within the retailer’s app on the handset. If this app is hacked, the loss of a small-denomination voucher is not a major issue. However, more valuable vouchers and data that show where the individual lives and where they shop may need to be stored securely.
Standardisation is important to ensure interoperability and economies of scale

Actors in the mobile NFC ecosystem should support the work of standards bodies to facilitate interoperability and economies of scale. Both mobile operators and retailers should seek to roll out standard mobile NFC solutions (or, at least, solutions that can easily be adapted to work with standards) wherever possible. A retail app, for example, should be able to work across the mobile wallets and UICCs of multiple mobile operators without modifications. Any new payment, voucher or loyalty systems should be designed to be compatible with standard mobile NFC solutions.

Aim to lower the cost of point of sale terminals through standardisation and economies of scale

Like any manufactured goods, mobile NFC point of sale equipment is subject to economies of scale. Standardisation will help lower the cost of point of sale terminals for retailers and accelerate their widespread deployment.

Many small retailers will want an “off-the-shelf” loyalty solution that is straightforward to implement

Some retailers may want to use off-the-shelf app templates and development tools provided by mobile operators or third parties. These templates and tools should aim to support functionality that enables even a small retailer to exploit the potential of mobile NFC to build a closer relationship with customers. In most cases, that will mean implementing a loyalty programme that would enable the retailer to identify and interact with customers, rewarding them for returning to the store. Off-the-shelf templates and tools should be designed to enable retailers to quickly and easily deploy apps compatible with many different models of handsets.

Consider whether loyalty programmes/vouchers need to be transferable across international borders

Multinational retailers may want to use mobile NFC to enable customers to accumulate loyalty points or redeem vouchers in multiple countries. This would require mobile operators to enable mobile NFC roaming to ensure that mobile wallets and applets on UICCs will continue to function as normal outside the home country. Such roaming services will clearly need to handle exchange rates and currency fluctuations in a way that is transparent to the consumer.

9.2 Technological considerations for all parties

Where appropriate, integrate mobile NFC-based services, such as checking-in and payment, into existing retail apps

Many large retailers will have existing mobile apps. Ideally, support for NFC-enabled services should be integrated into these existing apps, so the consumer doesn’t need to download a new app and can carry on using the same interface - ideally, the introduction of mobile NFC should create as little disruption as possible for consumers. To support NFC, existing retail apps and the related back-end software will need to be adapted to work with mobile operators’ wallets and UICCs.

Mobile NFC services need to work with existing contactless infrastructure as much as possible

To be able to interact with standard NFC handsets, NFC point of sale infrastructure will need to be compatible with the NFC standard ISO 14443 at the level of the radio interface. In most cases, a retailer’s existing contactless infrastructure will already be compatible with this standard or could be adapted through a software upgrade. However, the application layer on the point of sale terminals may also need to be modified and extended to support the desired range of payment options, voucher redemption and the transfer of loyalty points.

Sensitive data should stay in the retailer’s secure domain. The retailer’s app and UICC applet should be designed in such a way as to ensure that the data relating to the consumer’s identity, bank details, shopping patterns and other sensitive information remains within the secure domain reserved for the retailer on the UICC, where it can’t be accessed by other applications. At the same time, NFC terminals need to be configured in such a way as to ensure that the data they exchange with the device can’t be intercepted by any other devices in the vicinity.

Ensure throughput time for high turnover retailers is acceptable with any operator and any handset

For most retailers, the time it takes to process a transaction will determine how many staff are needed to man checkout tills. The faster the throughput on each till, the more staff that can be freed up for customer service and other value-added activities. For this reason, a retailer may wish to minimise the steps a shopper will need to take to redeem a voucher, make a payment and collect loyalty points, while still keeping this process transparent to the consumer. To
maximise speed and efficiency, the check-out experience needs to be consistent across any NFC handset and any mobile operator - it isn’t feasible to train retail staff to support different interfaces and different processes across different devices.

Complete standardisation work

While most of the standards pertaining to mobile NFC in the retail sector have now been completed, work continues in the following areas:

■ In June 2011, the U.S. National Retail Federation’s Association for Retail Technology Standards released version 2 of its Digital Receipts standard.

■ The South Korean telecoms research institute ETRI recently agreed a standard format for NFC receipts.

■ Open protocols for the redemption of single or multiple coupons and vouchers via NFC at point of sale are also under development.

■ Open protocols for supporting other value added services via NFC at point of sale, such as recognising the presence of a loyalty card and the receipt of follow-on offers from the point of sale terminal, are also under development.

■ GlobalPlatform, a cross industry, not-for-profit association, is developing specifications to facilitate the secure and interoperable deployment and management of multiple embedded applications on secure chip technology, such as smartcards, application processors, SD cards, USB tokens and secure elements – for protecting assets (data, keys and applications) from physical or software attacks. GlobalPlatform, the GSMA and EMVco are jointly defining requirements to certify mobile handsets for transactions. Development guidelines for UICC applet requirements are defined by the GSMA, while access control (from handset apps) is defined by GlobalPlatform.

■ The Cards Standardisation Group is writing standards for all SEPA cards/terminals which will similarly apply to applications in UICCs.

The GSMA continues to work on improving interoperability across the NFC services provided by different mobile operators, building on its existing technical documents that address NFC services interoperability between mobile operators. These include:

■ GSMA NFC UICC Requirements Specification Release 2.0 and 3.0

■ GSMA NFC Handset & API Requirements Release 2.0 and 3.0

■ GSMA Mobile NFC Infrastructure v1.0

■ GSMA NFC MNO-SP Interface Business Process Implementation v1.0

■ GSMA NFC SP Applet Development Guideline v1.0

Ensure an NFC phone with a flat battery can still interact with an NFC terminal

Given the growing use of mobile multimedia services, there are increasing demands on handset batteries. However, even if an NFC handset has a flat battery, the NFC point of sale terminal should still be able to deduct a payment. Although an NFC handset should be capable of operating in these circumstances, a device with a flat battery won’t be able to run applications and will, therefore, only support limited functionality. Note, in some cases, the service provider or the consumer may configure an NFC service so that it can’t be used on a handset with a flat battery.

9.3 User experience considerations for all parties

Automate wherever possible

In general, the more actions required of a consumer, the less likely they are to complete an interaction. For that reason, mobile NFC solutions should be as automated as much as possible without compromising security and transparency. In particular, interactions between NFC handsets and terminals need to be quick and easy, while ensuring that there is sufficient transparency to enable the consumer to easily understand what they are doing or authorising.
Ensure that payment/coupon redemption is quick and simple

Retailers need to consider whether they will require customers to open their retail app to make a purchase or whether they will allow the mobile wallet alone to handle payments, redeem vouchers and accumulate loyalty points. They also need to consider whether they will enable the consumer to redeem a voucher, make a payment and accumulate loyalty points in a single tap or whether multiple taps will be required. Note that some point of sale equipment may require a voucher to be redeemed and the price adjusted before the payment is made, necessitating a multi-tap process. In any case, a multi-tap process may be more transparent to the consumer, while giving them the option of deciding whether they actually wish to redeem a voucher or loyalty points. A retailer should be able to use a back-office system to change the rules around voucher redemption as required.

Support a range of different payment options

Ideally, retail apps will accept a wide range of payment options, such as debit and credit cards, stored-value accounts, carrier billing (the purchase is charged to the consumer’s postpaid mobile bill or available prepaid credit). Mobile NFC may also enable new entrants to offer alternative payment mechanisms, such as bank-to-bank transfers (triggered by NFC). Note that, payments could be initiated by the mobile wallet application on the customer’s handset or by the relevant retail app.

Preinstall apps wherever practicable

Large retailers should consider partnering with mobile operators to pre-install their retail apps on NFC handsets. Pre-installing apps in this way removes the need for the consumer to go to the trouble of identifying and downloading the correct retail app, while potentially giving the retailer an edge over its competitors.

Ensure that enrolment is straightforward, yet secure

When a consumer opens a retailer’s app or website, it needs to be immediately apparent how they register to use the service and what the benefits are. The enrolment process needs to be designed to be straightforward to complete on a mobile handset (key inputs should be kept to a minimum), but it also needs to be transparent, secure and fraud-proof.

Retail applications have to be simple and intuitive to use

Great care needs to be taken in ensuring that retail applications are simple and intuitive to use on a mobile handset with a relatively small screen and no physical keyboard. Where possible, mobile applications should use icons, rather than text, and should avoid asking the consumer to key in lots of information. Ideally, they should “learn” which products the user is interested in and provide appropriate shortcuts that will speed up navigation through the app.

Ensure full transparency around use of customer data

NFC services should adopt a privacy by design approach – in other words they should be developed from the outset to support a high level of privacy and data security. It is crucial that mobile operators, retailers and their partners should be very clear with individuals about how they will use information about a person’s use of NFC services. It is also important that individuals are given choice and control over how their information is used for secondary commercial purposes such as targeted advertising. This will require giving users simple, concise, and context appropriate messages and choice mechanisms, as opposed to lengthy and legalistic terms and conditions. Before sharing personal data with third parties, mobile operators, retailers and other actors in the value chain should explicitly ask the individual’s permission, stating clearly how the data will be used and for what purposes.

A seamless experience between interacting online and interacting in-store

A retailer’s loyalty points and vouchers should, of course, be equally valid online and at point of sale in a store. Moreover, if a consumer begins shopping online and adds specific items to their basket or “wish list”, but doesn’t complete the transaction, that information could be used to enhance their next visit to the retailer’s store. For example, when the consumer checks in to a store using their NFC handset, a message could direct them to the items stored in their online shopping basket or wish list.
Ensure that the service is relevant to the user

To be effective, mobile commerce services need to be highly-targeted. Retailers, therefore, need to be careful to ensure that their direct marketing is relevant. Ideally, they should have a clear understanding of their customers’ shopping patterns and preferences before attempting to send out NFC-enabled vouchers, for example. Offering a bald man discounts on shampoo, for example, or a vegetarian a voucher for steak would be a mistake that could alienate the customer.

Consistent and clear branding and promotion of mobile NFC services

NFC services should be branded in a consistent way so that consumers quickly recognise when and where they can use their NFC handset. They should also be promoted in a consistent and clear way that carefully articulates how consumers can use NFC and what the benefits are. Consistent and clear communications both to consumers and the media will minimise confusion and increase usage.

Accessible and effective customer service, particularly in cases of lost or stolen handsets

Consumers with questions or concerns should be offered a broad range of customer care options, including clear and comprehensive FAQs in the retail app and the mobile wallet, supported by the opportunity to speak to knowledgeable staff. Individuals who lose an NFC handset will naturally be concerned that someone else could use it to make payments and purchases. The process by which they can disable a handset needs to be clear and simple to use.

9.4 Political/regulatory considerations for all parties

Win political support at EU and national levels by highlighting the socio-economic benefits of mobile NFC

In order to win political and regulatory support, the retail and mobile industries should aim to harness and highlight the potential socio-economic benefits of deploying mobile NFC solutions. In particular, they should clearly explain how mobile NFC solutions could make it easier to match buyers and sellers, reduce costs and enrich the shopping experience. Mobile NFC could increase the productivity of retailers and help fuel economic growth by reducing the time and resources wasted on unnecessary shopping. Moreover, it should also yield environmental benefits by increasing efficiency and reducing the need to produce and distribute plastic cards and paper receipts and coupons.

Work with regulators to establish who can do what with sensitive customer data

Ideally, companies providing mobile NFC services should work with regulators to establish how individuals and businesses can use NFC-derived data to support public policy objectives and help drive economic opportunities. For example, they should clarify under what circumstances, retailers and mobile operators can use the data generated by mobile NFC solutions to provide personalised services and make targeted offers.

Ensure UICCs and mobile wallets meet anti-trust and regulatory requirements

Mobile operators and their partners should meet their anti-trust obligations by seeking to ensure that any legitimate retailer, bank or payment services provider can use the mobile wallet and the UICC to provide consumers with mobile NFC services. To reassure regulators and maximise competition and innovation, mobile NFC handsets need to be an open platform that facilitate competition between competing retailers, banks and payment services providers. In a similar vein, mobile operators and their partners should seek to use open standards as much as possible to fuel competition.