

# **Near-field communications**

## Emerging issues in media and communications

### Occasional paper 2

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# Executive summary

Near-field communications (NFC) is a technology development that allows communications devices like smartphones to transfer data from one device to another, securely and at short range. Smartphone take-up in Australia and the rise of apps are facilitating growth in the use of NFC. Early commercial uses of NFC support mobile financial transactions and this area of activity expected to grow rapidly in the next five to 10 years. Other expanding uses of NFC include loyalty cards stored on mobile phones, electronic locks, accessing advertising and marketing information and sharing social information by holding or 'bumping' two phones together.

NFC developments are of interest to the Australian Communications and Media Authority (the ACMA) because of the insights they offer into the conditions that encourage the widespread adoption of new technologies. Future growth rates for NFC in Australia will be subject to a range of conditions being met. These include the availability of NFC-enabled smartphones and devices, apps to drive take-up and use, consumer confidence in the protections that apply, particularly to personal and financial transactions, and continued investment in NFC payments systems.

NFC is also an example of a converged communications activity that combines smartphone device functionality, access to spectrum and the downloading of software applications (apps) to deliver a service. Traditionally, devices, spectrum and communications services were regulated separately. NFC challenges this regulatory model. While electronic payments one of the early applications of NFC, it is also driving a convergence of communications and the financial services sector. It is therefore a communications development of interest to the ACMA because of the role that NFC can play in Australia's networked society and information economy.

Within this changing environment, there are ongoing points of public interest that remain relevant to NFC developments. This includes the ACMA's traditional regulatory roles in encouraging competitive and efficient markets by allocating public resources such as spectrum, determining technical standards and telecommunications consumer protection. Privacy and personal data protections remain another important area of regulatory focus in an environment where increasing amounts of personal and financial information can be exchanged using NFC-enabled phones,

Existing regulatory arrangements only partially address the various aspects of NFC-enabled activities. The main consequence of the current arrangements is complexity for industry participants and consumers. Both are required to navigate a fragmented regulatory environment spread across industry-specific regulation and economy-wide measures. This has associated compliance costs and uncertainty arising from this complex landscape. As NFC-enabled data exchanges become a more mainstream method for social activity and financial transactions, there are potential benefits where NFC communications issues are addressed within a single, coherent regulatory framework.

In developing coherent responses to ongoing areas of public interest, it is likely that a mix of strategies will be needed to provide flexible responses that address different issues in a complex supply chain and across a range of industry sectors. Direct regulation may continue to be needed for some matters. However, it is increasingly likely that co- and self-regulatory arrangements and communication programs will offer more flexible responses to addressing issues of concern in a dynamic and developing market.

# Introduction

NFC is an example of a communications activity that combines device functionality, supporting wireless spectrum infrastructure, and apps to deliver a particular service. NFC relies on a set of standards to allow low-power wireless links to transfer small amounts of data from one device to another, securely and at very short range. All radiocommunications that operate within one wavelength are considered 'near field'.

Smartphone take-up in Australia and the rise of apps are facilitating growth in NFC. Mobile payments are one of the early applications of NFC in Australia, but there is a diverse range of other applications being developed that use NFC for commercial transactions and social interactions. As a converged communication activity, NFC provides the ACMA with insights into the potential inhibitors as well as enabling strategies to facilitate the development of innovative digital communications services. The ACMA is examining how these developments affect current regulatory settings, including those aspects of regulation that remain relevant for NFC-enabled communications. The agency is also considering how regulatory and non-regulatory strategies can be adapted to address identified areas of business and consumer concern arising from the use of NFC-enabled communications.

This paper is the second in a series of occasional papers, which examines emerging issues in contemporary media and communications. The first paper looked at the apps market.

This paper covers:

- > the evolving NFC environment
- > the expanding commercial and social uses of NFC in Australia
- > areas for regulatory attention with the mainstreaming of NFC in the digital economy
- > strategies and tools to enable a wider adoption of NFC-enabled services in Australia.

The ACMA would welcome further discussion from interested parties on the following questions:

1. Are there other aspects of the NFC market and the use of NFC not covered in the discussion that the ACMA should consider?
2. Are there current barriers to further innovation occurring in NFC that the ACMA needs to be think about?
3. In a globalised communications market, what are the most effective methods of supporting consumers' confident and productive engagement with NFC and NFC-enabled smartphones?
4. Are some regulatory or non-regulatory strategies better suited to facilitating further innovation and adoption of NFC technology, while supporting consumer engagement with the NFC market?

Feedback on this paper can be directed to: [regframe@acma.gov.au](mailto:regframe@acma.gov.au)

Recently published papers in this series include:

- > [mobile apps](#)

Other papers in the series to be published soon cover:

- > cloud computing
- > privacy and digital data protections.

# The evolving NFC environment

## What is NFC?

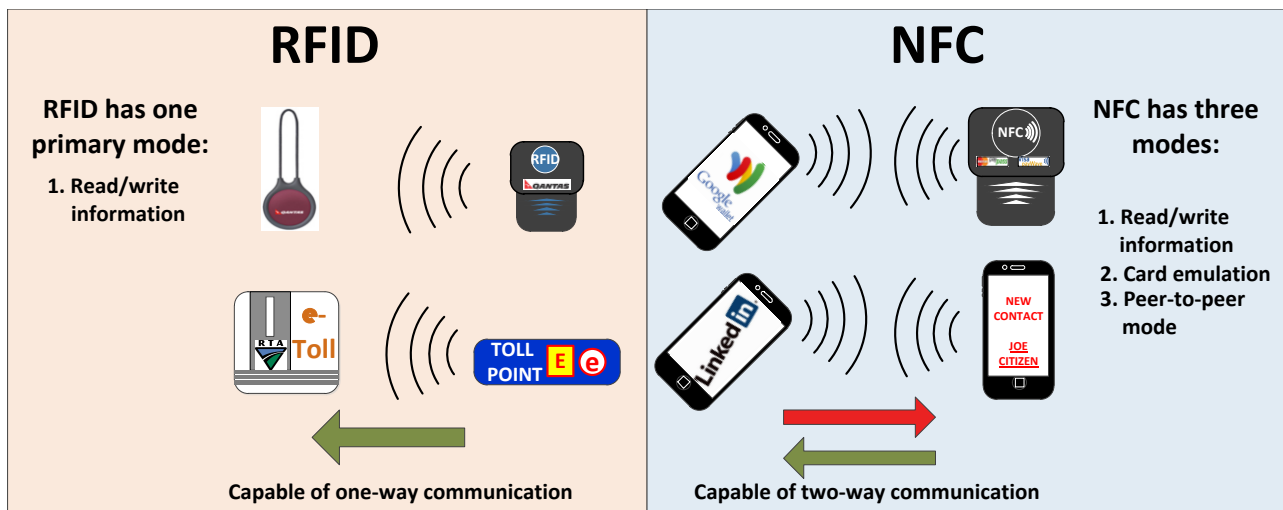
NFC is a set of standards allowing low-power wireless links to transfer small amounts of data from one device to another, securely and at very short range.

NFC is derived from an existing communications technology standard, Radiofrequency Identification (RFID), first patented in the early 1970s. RFID technology as applied today is a one-way communication system that allows information to be put on a tag which can be read by an RFID reader. RFID is currently used in a variety of swipe cards (public transport ticketing systems such as Myki, 'tap and go' credit and debit cards, electronic toll-road readers and building access passes), in advertising (RFID tags on posters), and as a potential replacement to universal product bar codes in the retail and manufacturing industries.

Building on RFID technology, NFC allows for secure two-way communication to transfer data between endpoints, such as a mobile phone and an electronic pay station in a car park. Current NFC chips used in devices operate in the 13.56 MHz industrial, scientific and medical spectrum band and transmit at data rates of up to 424 kbits/s.

NFC can read smart tags in read/write operation mode in the same way as RFID technology. However, NFC has two additional modes, card emulation and peer-to-peer, which are used in smartphones and other newer NFC-capable devices. Card emulation transforms smartphones into mobile wallets by storing a financial value. Peer-to-peer mode allows the easy sharing of information between phones and devices, such as exchanging business card contacts. Peer-to-peer also supports device pairing so that two phones can be synchronised, for example, to allow multi-player online gaming. Both modes of operation give the consumer a range of existing and potential commercial applications.

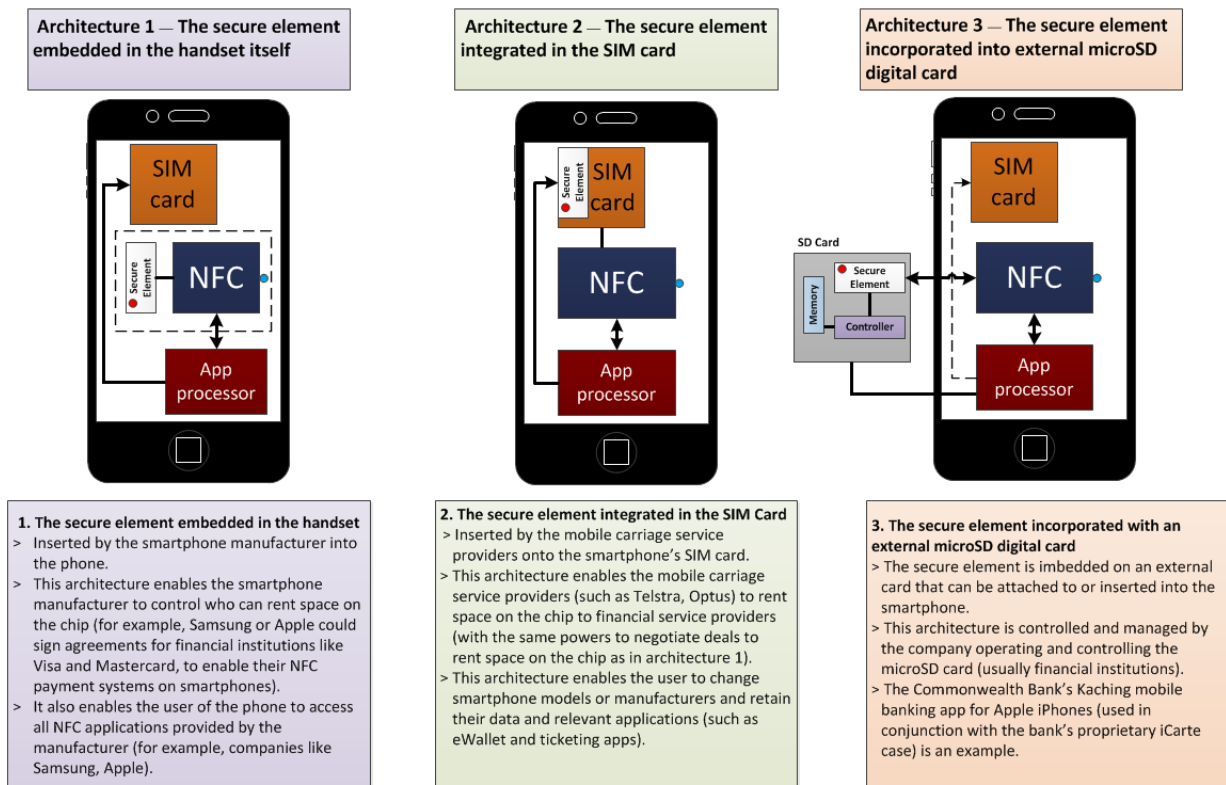
Figure 1 Different capabilities of RFID and NFC technology



## NFC-capable smartphones

NFC technology can be enabled in smartphones in a number of ways. These are largely differentiated by the way they embed the 'secure element'. The secure element is an encrypted, tamper-proof, smart card chip that enables secure mobile NFC transactions. The three primary methods of embedding the NFC-secure element into smartphones are outlined in Figure 2.

Figure 2 The three primary NFC 'secure element' architectures



While NFC technology standards are well-established, there has been considerable debate worldwide on how best to enable NFC in smartphones. Mobile carriage service providers, smartphone manufacturers and financial institutions have been negotiating for several years, with preferences largely motivated by which architecture is most advantageous commercially for one industry over another. To date, there have been some notable agreements and systems released to consumers, mainly supporting electronic payment services.<sup>1</sup>

<sup>1</sup> These include arrangements between Visa and Samsung (discussed later in the paper), Google's agreement with Sprint Mobile in the US for their Google Wallet banking app, the NFC payments system developed in the US by the ISIS consortium (AT&T, Verizon and T-Mobile) and the simplified FeliCa contactless payment system in Japan.



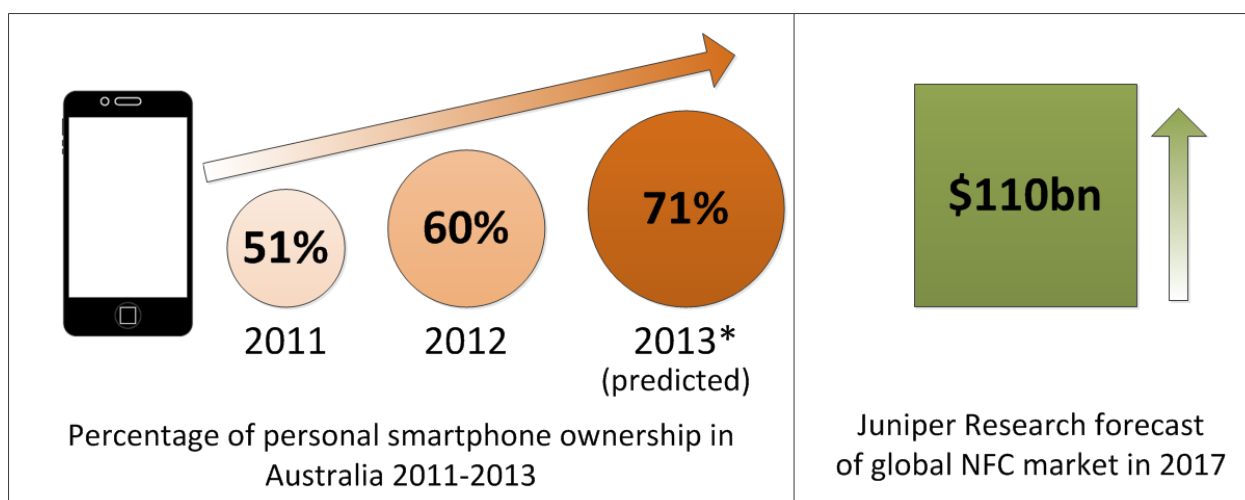
# NFC's expanding commercial and social use

## Smartphones and apps driving NFC growth

In Australia, the rapid take-up of smartphones and smart devices, combined with growth in the applications market, has contributed to expanding NFC use in recent years.

Australia is an early adopter of smartphones, with over 49 per cent of adult Australians using a smartphone at May 2012, up from 25 per cent at June 2011.<sup>2</sup> The number of NFC-enabled smartphones available in the market is also growing, with a majority of phone makers enabling NFC in their new smartphone models (Apple being the primary exception).<sup>3</sup>

Figure 3 The expansion of NFC— growth in smartphones, total mobile services and the NFC market<sup>4</sup>



Since the first major trial of NFC in Australia in 2008, financial institutions, credit and debit card companies and merchants have responded to growth in the availability of NFC-enabled devices by offering an increasing number of products that take advantage of the commercial applications. Currently, electronic mobile payments are the most common application of NFC in Australia.

NFC-enabled payments involve NFC-equipped smartphones configured to pay for goods and services. These smartphones or phones with cases that have an NFC chip, are not automatically configured to purchase items; the user must install appropriate software to use these features—primarily payment applications (apps) such as Google Wallet, Mastercard Mobile Wallet and Visa Pay Wave.

In December 2011, the Commonwealth Bank launched its 'Commbank Kaching' mobile banking app for Apple iPhones. Unlike the more common process of delivering the secure

<sup>2</sup> ACMA, *Communications report 2011–2012*, p. 27, [www.acma.gov.au/WEB/STANDARD/pc=PC\\_600070](http://www.acma.gov.au/WEB/STANDARD/pc=PC_600070).

<sup>3</sup> Mawston, N., [Global NFC Handset Sales Forecast by Region: 2004 to 2017 \(Summary\)](http://www.strategyanalytics.com/default.aspx?mod=reportabstractviewer&a0=8428) [www.strategyanalytics.com/default.aspx?mod=reportabstractviewer&a0=8428](http://www.strategyanalytics.com/default.aspx?mod=reportabstractviewer&a0=8428) and [www.nfcworld.com/2013/03/27/323280/2014-will-see-500m-nfc-devices-in-use-says-abi/](http://www.nfcworld.com/2013/03/27/323280/2014-will-see-500m-nfc-devices-in-use-says-abi/).

<sup>4</sup> Nielsen, *Australian Connected Consumers: Evolving Patterns of Media Consumption in the Digital Age*, February 2013, p. 20 and Clark, M. *Juniper Scales Back NFC Forecast* [www.nfcworld.com/2012/12/05/321429/juniper-scales-back-nfc-forecast/](http://www.nfcworld.com/2012/12/05/321429/juniper-scales-back-nfc-forecast/).

element for NFC via the SIM card, Kaching delivers the secure element through a microSD card attached to the Commonwealth Bank's iCarte case that is connected to the iPhone. As yet, none of the other three major banks have released a commercially available NFC mobile banking app, though several trials continue.<sup>5</sup>

MasterCard and Visa are investing heavily in their PayPass/MasterPass (Mastercard) and Pay Wave (Visa) contactless payment systems. In Australia, MasterCard has launched the MasterPass online payment digital wallet service for online purchases. MasterCard is developing a dedicated smartphone app using NFC to pay in-store. The company is also undertaking a trial with Vodafone and Coles, assessing the user-friendliness of a Coles-Mastercard mobile wallet that enables customers to make payments, earn Coles loyalty rewards points and pay for goods via an NFC phone.<sup>6</sup>

In February 2013, Samsung and Visa announced that all future Samsung smartphones would be built with Visa's NFC payment system, Pay Wave, already installed. The agreement enabled apps and mobile wallets to be developed for banks and different payment processes other than Visa. Samsung has one of the most popular smartphones on the market. The partnership between Samsung and Visa is expected to greatly boost the reach and functionality of NFC as a payment option by taking advantage of the pre-existing Visa commercial/merchant infrastructure.

In contrast to other proprietary models, electronic payments group, eftpos, recently announced a trial with selected Australian retailers, part of a five-year agreement with mobile transactions company C-SAM. The agreement provides an eftpos mobile wallet and NFC 'widget' developed as white label products, which are able to be used by a number of Australian retailers and financial institutions.<sup>7</sup> Because the NFC capability in this development is generic or 'white label', it supports interoperability across a range of transactions and card types. As a result, this partnership has the potential for NFC-enabled mobile wallet capabilities to be deployed more rapidly in the Australian market.

Although no individual NFC architecture or related NFC payment system has gained market dominance, the NFC payments market is still growing (albeit from a low starting point). Reports assessing the growth of the market estimate that NFC-enabled retail payments could exceed \$110 billion globally by 2017, a seven-fold increase from 2012, though down on previous predictions.<sup>8</sup>

Beyond electronic payments, other applications/devices that currently utilise NFC technology include:

- > NFC-enabled loyalty cards, which allow users to download a loyalty app so when the user swipes their phone at the checkout it accesses their loyalty membership and awards points or grants free products
- > electronic locks that use NFC to lock or unlock doors
- > social media, where NFC chips can be embedded in posters, promotional material or notices. People wanting to use information on that poster can put their phone up to embedded chip to access more details
- > marketing campaigns where NFC-enabled devices can be used to 'like' various products in a store, sending product information to the consumer's account—and the store's records—at the same time.<sup>9</sup>

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<sup>5</sup> [www.gizmodo.com.au/2012/10/anz-bank-has-a-contactless-payment-app-for-android-but-youre-not-getting-it/](http://www.gizmodo.com.au/2012/10/anz-bank-has-a-contactless-payment-app-for-android-but-youre-not-getting-it/)

and [www.nfcworld.com/2013/02/18/322374/australian-supermarket-coles-tests-nfc-payments-and-rewards/](http://www.nfcworld.com/2013/02/18/322374/australian-supermarket-coles-tests-nfc-payments-and-rewards/)

<sup>6</sup> [www.nfcworld.com/2013/02/18/322374/australian-supermarket-coles-tests-nfc-payments-and-rewards/](http://www.nfcworld.com/2013/02/18/322374/australian-supermarket-coles-tests-nfc-payments-and-rewards/)

<sup>7</sup> [www.itwire.com/your-it-news/mobility/59803-efpos-gives-aussie-users-a-mobile-wallet](http://www.itwire.com/your-it-news/mobility/59803-efpos-gives-aussie-users-a-mobile-wallet)

<sup>8</sup> [www.nfcworld.com/2012/12/05/321429/juniper-scales-back-nfc-forecast/](http://www.nfcworld.com/2012/12/05/321429/juniper-scales-back-nfc-forecast/) and

[www.juniperresearch.com/reports/nfc\\_mobile\\_payments\\_market\\_update](http://www.juniperresearch.com/reports/nfc_mobile_payments_market_update)

<sup>9</sup> [adage.com/article/global-news/field-communication-shifting-marketing-japan/235260/](http://adage.com/article/global-news/field-communication-shifting-marketing-japan/235260/)

Figure 4 The increasing number of commercial applications for NFC technology



Social interaction enabled by NFC-equipped smartphones is another development where NFC, in conjunction with apps, allows sharing of social information. For example, two people with NFC-enabled phones, with an enabling record management app installed, can pass information quickly from one phone to another (calendar invites or contact details) by holding ('bumping') the two phones together.

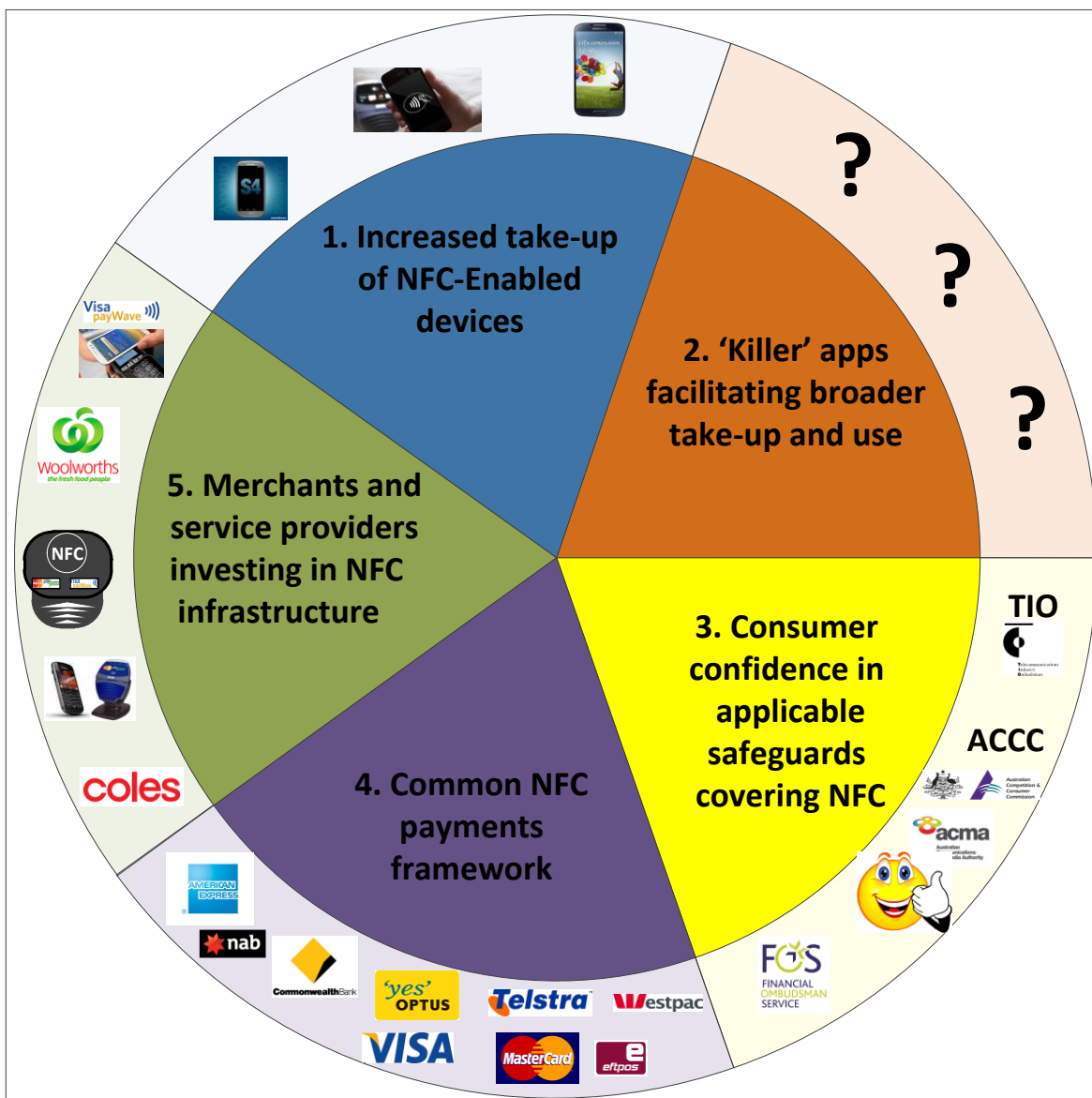
Future uses for NFC and RFID technology that are still in the development stage include:

- > airlines deploying NFC to allow consumers to seamlessly check-in and board flights. This form of ticketing may be applied to various industries requiring seamless identification or authentication processes.
- > NFC devices that can read RFID tags, extracting the information contained in them. This can be applied in the retail and advertising industries. Consumers using an NFC-enabled smartphone could purchase items with RFID tags embedded in them. For example, this development would allow a consumer to load a supermarket trolley with groceries, connect their phone to the trolley by secure link, which reads the tags on the items. The consumer is then billed to their phone for their purchases.

## Conditions facilitating wider NFC adoption

The NFC market has the potential to grow rapidly worldwide in the next five to 10 years, according to some industry projections. For example, Juniper Research has forecast the global NFC market will reach US\$110 billion by 2017 (down from a previous prediction of \$180 billion).<sup>10</sup> Market research firm, ABI Research, has similarly predicted that NFC mobile payments will jump from US\$4 billion in 2012 to \$191 billion in 2017.<sup>11</sup> Foundations for future growth of NFC in Australia have been laid, but there are important interrelated conditions that must be met before NFC, or an alternative payment and communications technology, gains a mass-market foothold in Australia.

Figure 5 Conditions facilitating wider NFC adoption



<sup>10</sup> [www.nfcworld.com/2012/12/05/321429/juniper-scales-back-nfc-forecast/](http://www.nfcworld.com/2012/12/05/321429/juniper-scales-back-nfc-forecast/)

<sup>11</sup> <http://bgr.com/2012/10/19/nfc-mobile-payments-growth-abi/>

## 1. Increased take-up of NFC-enabled smartphones and devices

The percentage of operational, NFC-enabled smartphones in the Australian market is a key driver of further investment in NFC retail and commercial infrastructure. Around 50 per cent of phones in the Australian market are smartphones—with this figure growing—though not all of them are NFC-enabled devices.<sup>12</sup> Furthermore, Apple, who is yet to adopt NFC in its iPhones, commands an estimated 22 per cent share of the global smartphone market, and a 43 per cent share of the Australian smartphone market.<sup>13</sup> Apple's decision to not include NFC in its products has arguably influenced consumers and merchants, due largely to the company's influence and contribution to the exponential growth and popularity of smartphones and tablets.

Additionally, a percentage of consumers, with smartphones and mobile phones that are not NFC-enabled, are likely to wait until their existing contracts expire before purchasing a new, NFC-enabled phone. (At June 2012, there were 18.56 million post-paid services in Australia.)<sup>14</sup> Any slowing of the rate of NFC-enabled smartphone adoption—and subsequent use of NFC functions—would have a dampening effect on the rollout of NFC merchant infrastructure in retail outlets.

High churn rates for mobile phone contracts<sup>15</sup>, combined with the rapid take-up of smartphones by children<sup>16</sup> indicate that smartphone usage as a percentage of the overall Australian mobile phone market will continue to grow, even if overall mobile sales remain stable.<sup>17</sup>

## 2. 'Killer apps' facilitating broader take-up and use<sup>18</sup>

NFC functionality appears on an increasing number of smartphones, though it is software installed—largely in the form of an app—that provides functionality and enables the smartphones to facilitate the purchase items, accrue loyalty and awards points, or generate scannable tickets.

Development of popular apps will be a critical component in the wider use of NFC technology. Apps development will also drive retailer and merchant infrastructure investment to support NFC-enabled alternative payment, ticketing and loyalty card options. Consumers will become more familiar with the technology in the process.

At present, there is a growing number of Android NFC apps, though none have gained a large market share or led to a dramatic increase in NFC use in smartphones at this stage.<sup>19</sup> The primary categories of NFC apps available include:

- > Google Wallet and other eWallet apps that hold credit and debit cards, offers, and rewards cards<sup>20</sup>

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<sup>12</sup> ACMA, *Communications report 2011–2012*, p. 27.

<sup>13</sup> <http://macdailynews.com/2013/02/08/apples-worldwide-market-share-surged-from-15-to-22-on-iphone-5-strength-in-q412/> and [www.telsyte.com.au/?p=1995](http://www.telsyte.com.au/?p=1995).

<sup>14</sup> ACMA, *Communications report 2011–2012*, p. 21.

<sup>15</sup> ACMA, *Communications report 2011–2012*, p. 33.

<sup>16</sup> ACMA, *Like, post, share—Young Australians' experience of social media: qualitative findings – 2011, quantitative findings – 2012*, to be published June 2013 and [news.com.au/lifestyle/parenting/rise-in-number-of-australian-kids-with-smartphones/story-fnet085v-1226630247931](http://news.com.au/lifestyle/parenting/rise-in-number-of-australian-kids-with-smartphones/story-fnet085v-1226630247931).

<sup>17</sup> [www.gartner.com/newsroom/id/2335616](http://www.gartner.com/newsroom/id/2335616), <http://venturebeat.com/2013/02/06/800-million-android-smartphones-300-million-iphones-in-active-use-by-december-2013-study-says/> and <http://www.examiner.com/article/mobile-phone-sales-drop-nothing-to-worry-about>.

<sup>18</sup> A killer app is defined by the Merriam–Webster Dictionary as being '... a computer application of such great value or popularity that it assures the success of the technology with which it is associated; broadly: a feature or component that in itself makes something worth having or using.' [www.merriam-webster.com/dictionary/killer%20app](http://www.merriam-webster.com/dictionary/killer%20app).

<sup>19</sup> [www.nearfieldcommunication.org/android-apps.html](http://www.nearfieldcommunication.org/android-apps.html)

<sup>20</sup> <https://play.google.com/store/apps/details?id=com.google.android.apps.walletfcrl&hl=en>

- > 'bump' apps that allow two smartphones to share photos, contacts, apps and files<sup>21</sup>
- > SmartTag reader apps that allow users to personalise various smart tags that trigger functions on a smartphone.<sup>22</sup> For example, smart tags can activate the NFC-enabled phone to switch on power and appliances in an automated home.

The absence of an Apple NFC offering on its iPhones may be having an impact on the development of future NFC apps. Given the growth trajectory of the apps market over the last five years, further development of dominant NFC-based payment, ticketing and loyalty rewards card apps is expected in the near future.

### 3. Consumer confidence in applicable safeguards covering NFC

Increased consumer confidence in NFC technology, especially as an alternative to traditional forms of transactions, is a crucial prerequisite for the broader adoption of NFC functions in smartphones. Surveys indicate that consumers are yet to warm to contactless payment systems over traditional forms of payment, such as cash and credit cards.<sup>23</sup>

A process that highlights existing consumer safeguards and protections relevant to NFC-enabled payments would increase awareness among consumers of ways they can protect personal information during NFC transactions.

### 4. A common NFC payments framework in Australia

Currently, there is no preferred approach to the implementation of NFC in smartphones across both the telecommunications and financial services industry in Australia. There are three primary models to enable secure mobile payments in smartphones (See Figure 2).

Secure mobile payment systems in NFC-enabled smartphones have been trialled by individual mobile carriage service providers partnering with financial institutions and retailers. While NFC-enabled payments are the most prominent use of NFC capabilities, to date there is no readily accessible, secure smartphone NFC payment system released in Australia on a mass scale.<sup>24</sup>

The absence of a common financial and retail approach to NFC could potentially slow growth in the NFC payments market. This is because the lack of a common approach reduces the level of interoperability between NFC payment systems in various retail outlets, ticketing and loyalty card systems, as well as the number of regions these systems could operate.

### 5. NFC infrastructure investment

Provided the requirement to develop an accepted NFC payment framework in Australia is realised, merchants, financial institutions and service providers must also increase their investment in NFC-related infrastructure. This investment primarily involves the installation of more contactless payment 'point-of-sale' (POS) terminals for several different uses, for example, payments, ticketing, loyalty cards, marketing, and advertising. Investment is also required in back-end IT infrastructure to support effective, efficient and secure uses of NFC-enabled devices. Also needed is investment in marketing, customer education, support and training for staff facilitating NFC payments, including payments across interoperable systems such as:

<sup>21</sup> [https://play.google.com/store/apps/details?id=com.bumptech.bumpga&feature=search\\_result#?t=W10](https://play.google.com/store/apps/details?id=com.bumptech.bumpga&feature=search_result#?t=W10).

<sup>22</sup> [https://play.google.com/store/apps/details?id=com.sonyericsson.extras.smarttags&feature=search\\_result#?t=W10](https://play.google.com/store/apps/details?id=com.sonyericsson.extras.smarttags&feature=search_result#?t=W10)

<sup>23</sup> [www.finextra.com/News/FullStory.aspx?newsitemid=24759](http://www.finextra.com/News/FullStory.aspx?newsitemid=24759)

<sup>24</sup> ANZ, NAB and Westpac have been trialling apps with the secure element of NFC imbedded in the SIM card, but have not released any NFC apps to the mass market as of May 2013. The Commonwealth Bank released its Kaching app in 2012 that enabled NFC payments for Apple iPhones (4 and 4S models via a case containing a MicroSD card), but not for Android smartphones or the new iPhone 5.

- > loyalty card schemes to allow customers to use their NFC-enabled smartphone as a loyalty card—with all of the back-end changes to databases, IT and record-keeping that this would require
- > ticketing for airline flights by airlines operating in Australia and domestic and international airports.

## **NFC and the constantly connected citizen**

The enabling of NFC in smartphones is an example of how an evolving technology standard, combined with rapidly shifting and innovative market structures, affect consumers' experience of contemporary communications.

In the networked economy, a smartphone is commonly equipped for voice, data, and video/radio services and can facilitate contactless payment services through NFC and mobile wallet apps. With the advent of long term evolution (LTE)/4G, smartphones will increasingly function with full-time access to broadband internet.

There are indications that consumers are taking advantage of mobile broadband access. Smartphone owners are spending an increasing percentage of their time using or in possession of their smartphones, from when they wake up to when they go to bed.<sup>25</sup> This rise in mobile broadband use is expected to also increase demand for available spectrum.

For the NFC market, the increasing reliance on smartphones for day-to-day social interaction, information gathering and planning presents an obvious commercial opportunity. As ownership and use of NFC-enabled smartphones continues to grow, there are opportunities for a further move away from the cash economy toward contactless payments, especially if there is adequate investment in NFC infrastructure.

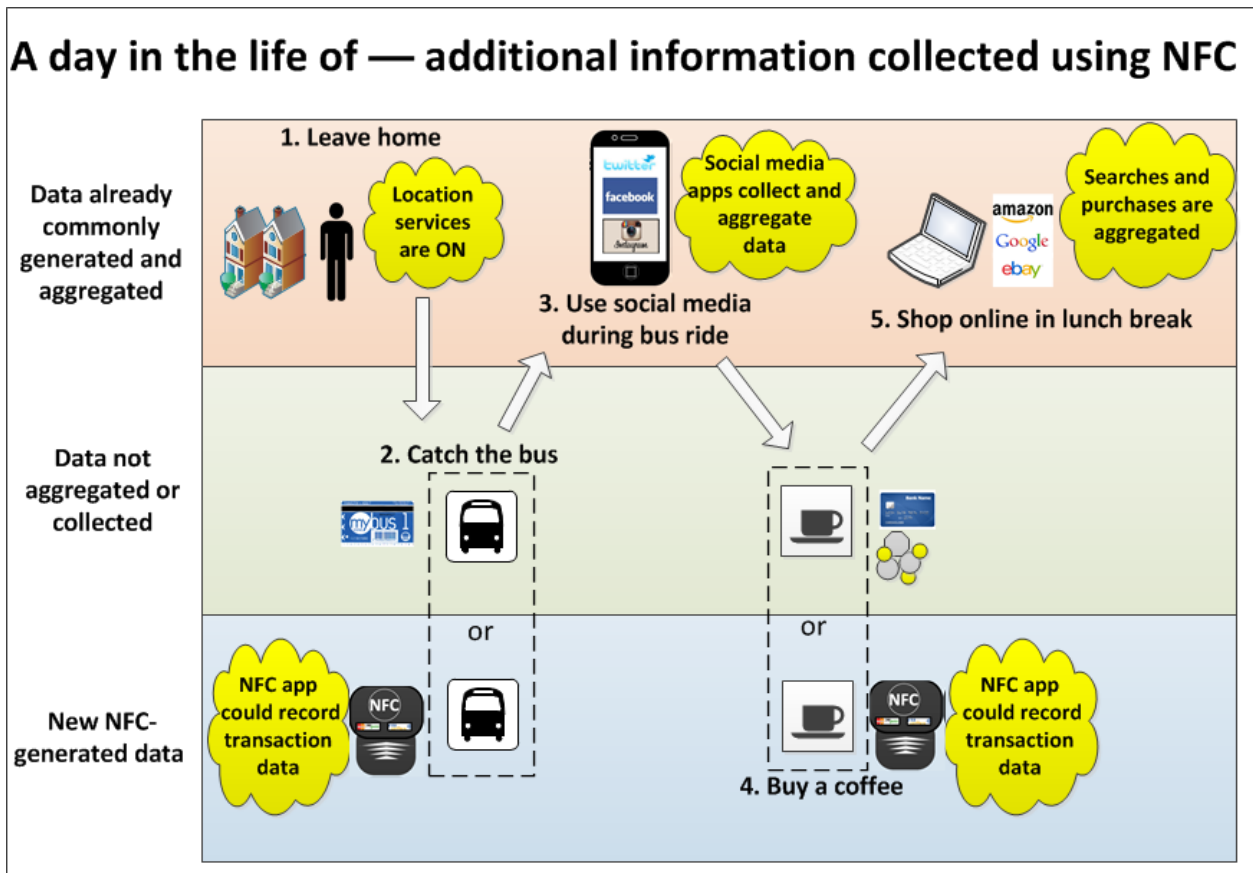
Use of contactless payments as an alternative to traditional payment forms raises particular issues that consumers may need to consider in NFC-enabled transactions (see Figure 6):

- > assumptions by consumers on how NFC technology works in a user's smartphone, and how the integration of the NFC-secure element can define different levels of access to personal data, including data collected and aggregated during a transaction
- > awareness of whether a skimming or eavesdropping risk exists in the general use of an NFC-enabled smartphone, such as the recording of location details of the phone
- > an understanding of the remedies available to a consumer where a transaction was charged incorrectly, including how these remedies may differ from traditional forms of payment (if at all).

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<sup>25</sup> <https://fb-public.box.com/s/3iq5x6uwnqtq7ki4q8wk>

Figure 6 Additional 'data' that could be captured when using a smartphone for NFC purchases





# Mainstreaming NFC and regulatory consequences

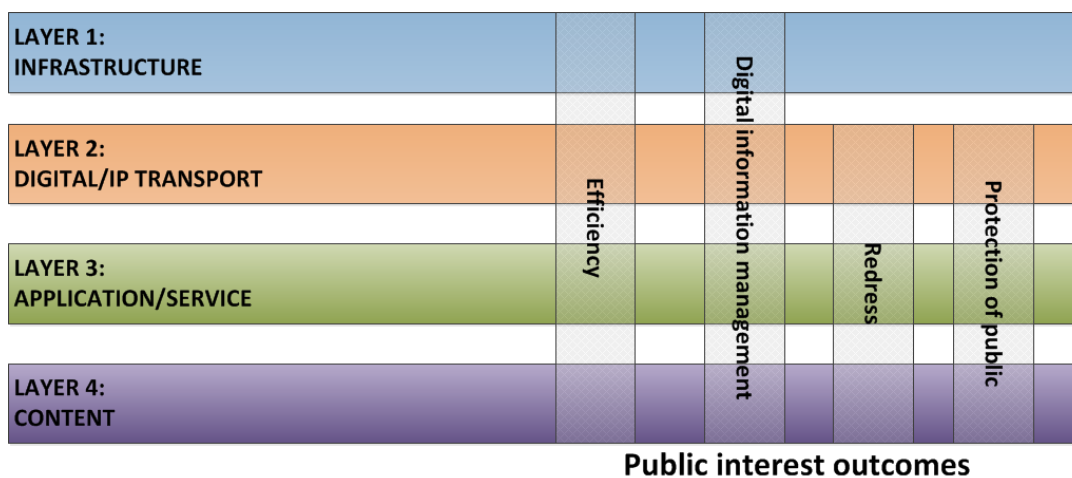
As a converged digital communications experience, NFC offers important insights into some of the regulatory and individual challenges of accommodating technology and service developments. The delivery of NFC-enabled services involves each layer of digital IP-technology architecture because NFC:

- > operates in device and infrastructure layers
- > it relies on apps in the apps/service layer of the delivery chain
- > it may involve the exchange of digital content in NFC-enabled transactions.

Existing regulation may only partially address specific aspects of the NFC service delivery model. As with other emerging technologies and services, there are ongoing matters of public interest that continue to be important. With NFC-enabled services, key matters are:

- > facilitating competitive and efficient markets
- > important consumer and personal data protections, where increasing amounts of personal and financial digital data can be exchanged using NFC-enabled phones (see Figure 7).

Figure 7 Public interest outcomes in the NFC environment



## Fluid market structures and institutional complexity

As another emerging service market, NFC shares some common characteristics with the apps market. Both developments pose challenges for regulatory approaches built on regulation of discrete service sectors, such as communications and financial payments. This can create uncertainty for both business and for consumers about:

- > which entity in the supply chain may have particular regulatory obligations
- > the coverage of safeguards, such as those dealing with personal transactional information.

One consequence of new technologies is the potential for institutional and regulatory ambiguity. For NFC-enabled activities, there are several government agencies, consumer and industry groups with direct interest in different aspects of NFC delivery. These include:

- > The ACMA, which requires industry to develop codes and standards to ensure consumer protections are maintained in the telecommunications industry. Part 6 of the *Telecommunications Act 1997* sets out the requirement for bodies and associations representing sections of the telecommunications industry to develop industry codes relating to the telecommunications activities of participants in those sections of the industry.<sup>26</sup> These codes ensure that there are consumer protections in a range of different areas including privacy, maintenance of service standards, and appropriate redress measures.
- > The ACMA in its role as spectrum regulator is responsible for planning and managing radiofrequency spectrum as a public resource. Growth in the take-up and use of NFC-enabled services would need to be accommodated in future spectrum demand planning and the management of spectrum interference.
- > The ACMA, which also provides consumer protections by requiring active devices, such as readers at a cash register or a mobile phone with an NFC chip, to meet the relevant electromagnetic compatibility (EMC) and electromagnetic emissions (EME) standards.<sup>27</sup>
- > The Australian Securities and Investments Commission (ASIC), which administer the e-Payments Code and related measures under the *Corporations Act 2001*. These regulate electronic payments, including internet/online payments and mobile banking. The e-Payments Code includes remedies for transactions that are initiated using electronic equipment, including transactions using mobile devices. Furthermore, clause 43 of the code provides the scope to list any other transaction specified by ASIC as a transaction to which the code applies (enabling future technologies or payment systems to be covered).
- > The Australian Competition and Consumer Commission (ACCC) and state and territory fair-trading agencies, which administer Australian Consumer Law, provide consumer guarantees for faulty NFC transactions, where a customer may have been incorrectly charged by a merchant or the contactless payment terminal was not operating properly.
- > The Attorney-General's Department which, supported by the Office of the Australian Information Commissioner (OAIC), administers the *Privacy Act 1988*. The Privacy Act outlines National Privacy Principles (NPPs) which organisations facilitating NFC transactions need to comply with for the information they hold.<sup>28</sup> In NFC, relevant financial services, retail and commercial organisations must all comply with the privacy provisions outlined in the Privacy Act.

With the ongoing development of separate responses to emerging technology developments, there is the risk of an overall loss of regulatory coherence, with consequences for industry participants in terms of increased compliance costs. For consumers, increased complexity can make it more difficult to manage their communications experience. A single regulatory framework for addressing the changing dimensions of NFC-enabled activities potentially offers a more coherent arrangement for business and consumers.

## Emerging personal risks and protections

The mainstreaming of NFC-enabled transactions highlights other dimensions for individuals in managing digital information exchanged during a transaction, with a particular focus on emerging areas of:

- > financial risk
- > privacy risk.

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<sup>26</sup> *Telecommunications Act 1997*, s112.

<sup>27</sup> There are several EMC standards, which can be found at

[www.acma.gov.au/WEB/STANDARD/pc=PC\\_310707](http://www.acma.gov.au/WEB/STANDARD/pc=PC_310707). The primary EME standard is the Radiocommunications (Electromagnetic Radiation-Human Exposure) Standard 2003, [www.comlaw.gov.au/Details/F2011C00165](http://www.comlaw.gov.au/Details/F2011C00165)

<sup>28</sup> As of March 2014, NPPs will be harmonised with the Information Privacy Principles to become Australian Privacy Principles (APPs).



**Digital data and privacy risk**

The growth in the use of NFC-enabled smartphones, combined with the constant connectivity of consumers, has the potential to increase the amount of digital data made available for analysis. As NFC technology is increasingly used in mobile applications—for example, mobile wallet, loyalty programs, and ticketing—the digital data from these apps could be theoretically collected if security systems were not adequate, or an individual did not take action to activate security settings on a device.

In the absence of market-dominant NFC apps, the amount of new consumer data that will be generated by use of NFC-enabled smartphones is unclear, as is the adequacy of future privacy settings. There is a balance between educating consumers about managing personal information disclosed and shared in NFC-enabled transactions and ensuring that access to the benefits of using NFC-based technologies are available to them.

# Enabling strategies for NFC

NFC-enabled services combine a number of different elements of digital IP-based communications—including spectrum infrastructure, devices and software apps—to enable citizens to communicate and connect to a range of financial, retail and transactional activities. In developing coherent responses to ongoing areas of public interest, it is likely that a mix of strategies will be needed to provide flexible responses that address different issues in a complex supply chain and across a range of industry sectors.

## Direct regulation

The ACMA has a direct regulatory role in facilitating the availability and use of NFC-enabled services through its spectrum management responsibilities and standards-setting role for radiocommunication devices. Planning for changes in spectrum use as a result of NFC-enabled smartphone take-up and ongoing developments in device capabilities, points to ongoing regulatory involvement in the NFC market.

## Industry co- and self-regulation

The current regulatory model for communications works effectively where regulation aligns with the activities of recognisable entities operating within a jurisdiction and the regulator's [the ACMA's] role is clearly specified as monitoring or enforcing rights or obligations specified in legislation. One immediate challenge arising from NFC-enabled payments is identifying relevant industry participants, particularly for addressing consumer complaints and redress arrangements, and developing best practice guidance to promote confidence in the use of NFC-enabled services.

Facilitation of strategies, such as industry self-regulation, are particularly useful in circumstances where the intended outcomes are improvements in service standards, knowledge about obligations, or incentives for behavioural change by industry participants or individual citizens. The ACMA's framework for effective co- and self-regulatory arrangements identifies that a number of environmental conditions for effective self-regulatory measures are present in the NFC market. This includes factors such as:

- > a small number of market players with side industry coverage
- > homogeneity of products
- > a common industry interest to address a problem or enhance standards
- > a rapidly changing environment.<sup>29</sup>

With NFC, there are identified areas of interest. These include:

- > enhancing standards or developing best-practice guidance to deal with matters such as encryption of NFC signals
- > protection from data corruption/interception attacks
- > the facilitation of robust password protection on smartphones

These enhancements and protections could improve consumer's confidence in using NFC as a contactless payments mechanism.

With NFC-enabled transactions, this will involve working with industry participants across a range of sectors, including communications service providers, finance and retail. Inevitably, this has also required the ACMA, as an industry regulator, to work flexibly with other sector-specific agencies in addressing emerging areas of risk or consumer detriment.

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<sup>29</sup> ACMA, *Optimal conditions for effective self and co-regulatory arrangements*, Occasional paper, September 2011.

## **Other non-regulatory strategies**

Other non-regulatory solutions, such as communication strategies, are particularly useful where improvements in knowledge or industry/citizen behaviour is the intended regulatory outcome. Currently, from a consumer's point of view, the boundaries between the various technology layers may not always be clear when an issue with an NFC-enabled service arises. With the blurring of industry sectoral boundaries comes a lack of clarity and ambiguity over which entity in the supply chain is subject to any specific regulatory obligations and, for the consumer, a potential lack of clarity about how to take remedial action. Initiatives to improve consumer awareness of existing protections and safeguards, as well as developments in NFC technology, its capabilities and the way NFC-enabled devices operate, could bolster more confident use and take-up of NFC-enabled services.

The ACMA has experience with other forms of electronic payment mechanisms, such as those used in the mobile premium services market. This may provide insights into the effectiveness of industry self-regulatory approaches and public communication strategies to address consumer information needs and issues of concern with complaints-handling measures and mobile direct account billing practices.

Communication strategies also offer a flexible response to addressing emerging issues in digital communications and content—such as mitigating personal privacy and financial risks through more active management of an individual's digital identity and reputation. These were not areas of concern at the time existing communications legislative arrangements were developed. However, they are becoming more central to a digital citizen's ability to participate effectively in the economy, taking advantage of services such as NFC-enabled contactless payments.

# Conclusion

The contactless payments and services market in Australia, driven by NFC and RFID technology, is predicted by many to grow exponentially in coming years.

Wider adoption of NFC will depend on a range of factors being addressed—primarily industry developing more appealing, market-defining applications of NFC technology for consumers, while supporting this technology with ubiquitous and interoperable infrastructure.

NFC illustrates a digital communications development where communications are merging into the wider economy as transactions increasingly become digitalised. In this changing environment, there is ongoing interest in making resources available to:

- > support innovative services
- > equip consumers and citizens with the information and skills they need to better manage the growing amount of digital data involved in their personal transactions.

NFC developments also raise direct challenges for regulatory arrangements based on particular industry sectors and technology and service models. As NFC-enabled data exchanges become a more mainstream method for social activity and financial transactions, there are potential benefits where NFC communications issues are addressed within a single coherent regulatory framework to reduce uncertainty arising from complex regulatory arrangements and also improve business and consumer confidence in taking up new services.

In developing coherent industry and regulatory responses to ongoing areas of public interest, it is likely that a mix of strategies will be needed to address issues in NFC's complex supply chain. Direct regulation may continue to be needed for some matters, but it is increasingly likely that co- and self-regulatory arrangements and communication programs will offer more flexible responses to addressing issues of concern in a dynamic and developing market.

The ACMA would welcome further discussion from interested parties on the following questions:

1. Are there other aspects of the NFC market and the use of NFC not covered in the discussion that the ACMA should consider?
2. Are there current barriers to further innovation occurring in NFC that the ACMA needs to be think about?
3. In a globalised communications market, what are the most effective methods of supporting consumers' confident and productive engagement with NFC and NFC-enabled smartphones?
4. Are some regulatory or non-regulatory strategies better suited to facilitating further innovation and adoption of NFC technology, while supporting consumer engagement with the NFC market?

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