

2007

UK Chip and PIN Report



TABLE OF CONTENTS

1	KEY POINTS	3
2	INTRODUCTION	4
3	EXECUTIVE SUMMARY	5
3.1	Chip & PIN Implementation	5
3.2	Fraud (Lost & Stolen, Counterfeit & CNP)	5
3.3	Stakeholder Research	7
3.4	Post Chip & Pin Events	9
4	BACKGROUND / HISTORY	10
4.1	Northampton Trial (May 2003)	10
4.2	UK Rollout (October 2003)	12
4.3	Chip & PIN Changeover Day - "I ♥ PIN" (February 2006)	12
5	BUSINESS CASE - HIGH LEVEL COST / BENEFITS ANALYSIS (2000 – 2010)	13
5.1	Forecast Fraud (2000 – 2010)	13
5.2	Forecast Non-Fraud Related Costs / Benefits	14
5.3	Fraud Effectiveness	15
5.4	Assumptions	17
5.4.1	General Assumptions	17
5.4.2	Bank Assumptions	18
5.4.3	Retailer Assumptions	20
5.5	Business Case – Key Sensitivities	21
6	CHIP & PIN IMPLEMENTATION PROGRESS 2006	22
7	CHIP & PIN BUSINESS CASE FRAUD ANALYSIS (UK ISSUED CARDS) 2000 - 2010	23
7.1	Business Case Analysis 2000 - 2010 (Lost & Stolen, Counterfeit & CNP Fraud)	24
7.2	Lost & Stolen (Overall)	25
7.2.1	Lost & Stolen (UK Cards Used In The UK)	26
7.2.2	Lost & Stolen (UK Cards Used Abroad)	27
7.3	Counterfeit (Overall)	28
7.3.1	Counterfeit (UK Cards Used in the UK)	29
7.3.2	Counterfeit (UK Cards Used Abroad)	30
7.4	CNP (Overall)	31
7.4.1	CNP (UK Cards Used in the UK)	33
7.4.2	CNP (UK Cards Used Abroad)	34
7.5	Foreign Issued Cards Used In The UK	35
7.6	Face To Face Analysis	36
7.7	Fraud – UK vs. Abroad (2000 – 2010)	37
7.7.1	Lost & Stolen (2000 – 2010)	38
7.7.2	Counterfeit (2000 – 2010)	39
7.7.3	CNP (2000 – 2010)	40
7.8	Fraud On Foreign Issued Cards Used In The UK (2000 – 2006)	41
7.9	ATM Fraud	42
7.9.1	ATM Fraud – Domestic Vs. International (2005 – 2006)	42
7.9.2	ATM Fraud Abroad - Overall	43

7.10	Fraud Comparison - Three Types	44
7.11	Fraud Projections To 2015 (Lost & Stolen, Counterfeit & CNP Fraud)	46
7.12	UK Fraud : Sales Turnover Ratio	47
8	CHIP & PIN PROGRAMME – POST IMPLEMENTATION REVIEW (2005)	48
8.1	High Level Implementation Successes	48
8.2	Governance	48
8.3	Management	49
8.4	Decision Making and Trial Date	49
8.5	Common Cause and Central Communications	50
8.6	Power Balance	50
8.7	Mid – Tier Retailers	50
8.8	Certification + Vendors	51
8.9	Other	51
9	POST IMPLEMENTATION STAKEHOLDER ANALYSIS (2006–2007)	52
9.1	Business Case Feedback	52
9.1.1	Dispute Handling – Retailers	52
9.1.2	Issuing - Issuers	52
9.1.3	Transaction Processing	53
9.1.4	Market Development	53
9.1.5	Central Systems - Issuers	54
9.1.6	Other Comments	55
9.2	Key Learnings	56
9.2.1	Key Lessons	56
9.2.2	Successes	57
9.2.3	Least Successful	59
9.2.4	Selection of Additional Comments	60
10	EXTERNAL COMMUNICATIONS	61
10.1	Phase I – Northampton Trial & National Rollout (2003 – 2005)	61
10.2	Phase II - I ♥ PIN	64
10.3	Media Impact	65
11	SPECIAL INTEREST GROUPS	69
11.1	Disability Engagement	69
11.2	Government	70
12	POST PIN EVENTS (2005 – 2007)	71
13	LEGAL DEVELOPMENTS	73
14	NEXT STEPS - UK CHIP & PIN: EXPLOITING THE NEW INFRASTRUCTURE	74
14.1	Two Factor Authentication	74
14.2	Contactless	75
14.3	Migration from SDA to DDA Cards	76
15	CHIP & PIN – WHAT NEXT?	78

1 KEY POINTS

- Chip & PIN was introduced into the UK in three phases commencing with a trial in Northampton in 2003, before a phased national rollout from October 2003 that culminated in Chip & PIN Changeover day on 14 February 2006. The UK is now a mature Chip & PIN marketplace.
- The overall Business Case predicted fraud¹ of £8,437m during the period 2000-2010 if Chip & PIN was not introduced. With the implementation of Chip & PIN, fraud was predicted to reduce to £5,075m (a £3,362m fraud saving), industry implementation costs to amount to £1,037m and, with an additional £664m in non-fraud related benefits, the net benefit to be £2,989m. Taking actual fraud experienced (2000 – 2006) and the 2006 fraud forecast to 2010, there is now forecast to be an additional fraud saving of £170m over the Business Case.
- Today's forecast savings for Lost & Stolen and Counterfeit fraud, two fraud types which Chip & PIN can directly influence, are £820m more than the Business Case predicted - £490m of which has already been realised from actual fraud savings (2000 – 2006).
- In 2000, when the Business Case was created, the level of future Card Not Present fraud was underestimated. It was not fully appreciated how UK consumers' purchasing patterns would change through the use of remote channels and, in particular, the acceleration of purchases made over the Internet.
- Chip & PIN has been extremely successful in reducing face-to-face fraud in the UK. For purchases made in retail outlets, fraud has reduced by 67% or £146.7m comparing 2006 with 2004. However, there has been a large increase in fraud on UK issued card used in ATMs abroad. Comparing the rolling 12-month totals for the period December 2006 vs. December 2005 there has been an increase of more than 800% from £4.0m to £32.9m.
- Stakeholder research showed that the key lessons learnt from implementing Chip & PIN in the UK are that all stakeholders have to be involved, that such a programme cannot be positioned simply as a bank or retailer-focused project, and that one should avoid attempting more than one major industry change at the same time (e.g. in the UK, the implementation of Chip & PIN coincided with the migration of debit cards from Switch to Maestro).
- Chip & PIN has been judged a success amongst consumers. Evidence from research showed that they embraced the technology quickly, found it easier to use PIN at Point of Sale and that it is quicker than the old signature based system.
- The campaign to communicate the implications of Chip & PIN to cardholders was extremely successful because of the clear coordination of central messages and the involvement of all relevant parties – card schemes, issuers, acquirers and retailers – in delivering those messages with one voice. The Chip & PIN campaign was also assisted by positive media coverage.

¹ Three types of fraud were considered: Lost & Stolen, Counterfeit and Card Not Present

2 INTRODUCTION

This report has been produced by APACS, the UK trade association for payments and for those institutions that deliver payment services to customers. The report is for the key stakeholders who participated in the introduction of Chip & PIN in the UK including APACS and its sub committees, the British Retail Consortium and members of the Chip & PIN Programme. The report aims to assess whether the forecasts and assumptions contained in the original high-level Business Case have been met and to provide explanation, where applicable, for any divergence. The report will also quantify, where robust data is available, the figures used to justify the Business Case.

This report represents the final chapter in the UK's successful implementation of Chip & PIN and demonstrates that the UK is a market leader in this technology. It will present the high level business case used to justify the movement towards Chip & PIN in the UK and compare the forecast reductions in fraud against actuals (2000 - 2006) and more recent forecast figures until 2010 to assess the effectiveness of Chip & PIN on fraud compared with the anticipated levels had it not been implemented.

Included in the report is qualitative analysis from UK stakeholders on key learnings from their involvement in Chip & PIN's design and implementation together with independent analysis of the role played by the Programme Management Office (PMO).

Although this is the final report covering the introduction to the UK of Chip & PIN, it does not represent the end of the story. Globally, there are moves to introduce similar Chip & PIN initiatives and the UK will itself not stand still. Having introduced the Chip & PIN infrastructure, which provides a platform for future innovation, there are a number of planned developments that will build on its robustness to tackle other areas of card fraud. Without the Chip & PIN infrastructure in place, the introduction of additional authentication to address fraud in remote channels and the launch of contactless card technology would be more difficult.

Looking at global Chip & PIN developments, Europe is committed to becoming EMV-compliant by 2010 under its Single Euro Payments Area (SEPA) initiative. Central Europe, Middle East and Africa (CEMEA) already has a liability shift for Point of Sale (POS) transactions in place and ATM transactions are expected to follow suit. Canada has its own PMO in place and is expected to implement a liability shift for Lost & Stolen and Counterfeit cards by 2010 and Asia Pacific is believed to be considering a liability shift for chip and signature cards.

3 EXECUTIVE SUMMARY

3.1 Chip & PIN Implementation

In 2000, plastic card fraud on UK issued cards was projected to reach in excess of £800m per annum by 2005. Chip & PIN was devised as a strategic response to tackle counterfeit and lost & stolen card fraud in the face-to-face environment. Up until this point, UK consumers signed for their goods and services and only used their PIN for ATM withdrawals.

A trial took place in Northampton in 2003 to test consumer and merchant acceptance of Chip & PIN; iron out any operational glitches; see how customers learnt about the new technology; and test a co-ordinated advertising and public relations campaigns ahead of a national Chip & PIN rollout. Stakeholder research highlighted the following key lessons: consumers took to Chip & PIN extremely well and felt at ease with the new system; customers and staff both adapted quickly and enthusiastically to the new way of paying; and cardholders' ability to change their PINs at any ATM was a critical element.

The UK rollout commenced in October 2003 and involved upgrading 860,000 shop terminals and 40,000 ATMs to accept the new Chip & PIN cards; issuing 140 million credit, debit and charge cards to 42 million customers; and training 3 million retail staff. Due to its scale and complexity, the rollout happened steadily across the country rather than via a 'big bang' approach.

The rollout programme was judged to be complete on 14 February 2006, from which date cardholders were required to use their PIN when paying with a Chip & PIN card instead of a signature. This was the Chip & PIN Changeover Day, and being positioned on 'Valentine's Day', a widely celebrated event in the UK, allowed communications activity with a highly visible creative hook of "I ♥ PIN".

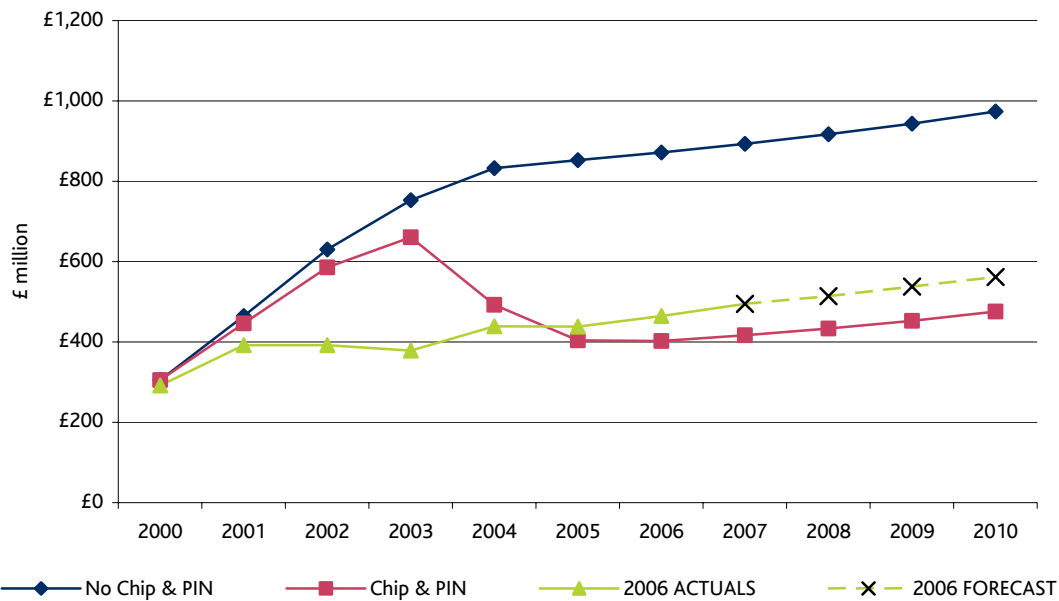
APACS 2006 statistics for Chip & PIN implementation progress show the UK is a mature Chip & PIN environment with 97% of UK issued payment cards having Chip & PIN capability. In December 2006, 91% of face-to-face transactions on UK issued cards taking place in the UK were PIN verified.

Consumer research showed that 77% of consumers liked using Chip & PIN; 93% found using Chip & PIN was easier than signing and 85% found that using Chip & PIN was faster than signature. Source: "Attitudes to Card Fraud", APACS 2006.

3.2 Fraud (Lost & Stolen, Counterfeit & CNP)

The Chip & PIN Business Case (2000 – 2010) predicted future fraud² of £8,437m reducing to £5,075m, as illustrated in the graph below, industry implementation costs of £1,037m and an additional £664m of non-fraud benefits resulting in a net benefit of £2,989m.

² UK issued cards used in the UK and abroad and Foreign issued cards used in the UK.

Chart: Overall Fraud Analysis (exc. Mail-Non-Receipt and Application Fraud)

Source: 2006 APACS Statistics

When taking Actuals³ and the 2006 Forecast⁴ into account there are additional fraud savings of £170m over and above those forecast in the Business Case. This consists of £500m actual fraud savings (2000 – 2006) together with additional forecast fraud losses of £330m (2007 – 2010).

For the period 2001 – 2004, Actuals were £584m below the Chip & PIN forecast. This is due to a better performance than was expected for Lost & Stolen (L&S) cards used abroad, Counterfeit cards used both in the UK and abroad together with foreign cards used in the UK. These positive fraud influences were offset by UK L&S fraud losses of £46m more than predicted.

However, from 2005, Actual / 2006 Forecast fraud is above the Chip & PIN Business Case forecast largely due to predicted CNP fraud losses of £1,417m (£843m on UK issued cards used in the UK and £574m for those used abroad).

Within the overall picture presented in the graph, the following points should be noted:

- There was an increase in Counterfeit fraud (2003 – 2004) due to increased criminal activity before full-scale introduction of Chip & PIN.
- There was an increase in Counterfeit fraud abroad (2005 – 2006) as it was more difficult for fraudsters to use counterfeit cards in the UK.
- The degree of CNP fraud was underestimated in the Business Case and losses exceeded expectations from 2003 onwards. In addition, there was an assumption of a greater introduction and effectiveness of the Address Verification Service (AVS) and Card Security Code (CSC) from 2003 than actually occurred. This mainly explains the divergence of Actuals / Forecasts from the Business Case.

³ Actual fraud for the period 2000 – 2006 (Source: APACS)

⁴ 2006 fraud forecast for the period 2007 – 2010 (Source: APACS)

- The primary focus on fraud saved by Chip & PIN was on UK issued cards for face-to-face (F2F) transactions in the UK. Comparing F2F fraud pre-Chip & PIN (2004) and post-Chip & PIN (2006) there was a 67% or £146.7m fraud reduction in F2F fraud at Retail Outlets (merchants with Point of Sale terminals).
- There has been a significant increase in fraud conducted using UK issued cards in certain countries where the Chip & PIN infrastructure does not exist or rollout is less advanced than in the UK.

3.3 Stakeholder Research

A questionnaire was prepared by APACS and sent to each of the stakeholder groups (October 2006 – February 2007) to gather feedback on aspects of the cross-industry Business Case that related to their businesses and on the key learnings they had gained from the Chip & PIN implementation. Key points from the perspectives of these stakeholders were:

Business Case Feedback

Retailers

- Some retailers have experienced a 50% decrease in write-offs and up to £100k in savings and are predicting further savings to come.
- Some retailers achieved a return on their Chip & PIN investment within one year.

Issuers

- A majority reported relatively no change in their level of re-issuance due to wear and tear.
- Chip & PIN has allowed changes to the way cards and PINs are delivered to cardholders. Expensive secure delivery has been removed for a majority of mailings except new issues to high-risk areas - some have seen a 98% reduction in cards intercepted and used fraudulently.
- New opportunities identified from Chip & PIN may include improved credit control, low value payments, operational benefits from changing and unlocking PINs at ATMs and increased lifecycles on credit and debit cards.

Acquirers

- With the greater security provided by PIN, some acquirers are considering how best to use Cardholder Activated Terminals (CAT).
- Extending Unattended Payment Terminals mechanisms into petrol, ticketing and car parking.
- With liability shift, Chip & PIN would help in migrating paper merchants to electronic payments.

Schemes

- Differing approaches are being taken globally to Chip & PIN's rollout; most markets are using a less co-ordinated approach than was used in the UK.

Key Learnings

Stakeholders were also asked what they considered were the key lessons, successes and what were the least successful aspects of the introduction of Chip & PIN into the UK.

Key Lessons

- All major stakeholders have to be involved from day one; if Chip & PIN had been viewed as a bank or retailer-only project then it would not have been possible to deliver the end-to-end migration from cardholder to merchant to acquirer to issuer to card scheme.
- The final and definitive specifications, technical standards and approvals process from all stakeholders / the schemes should be decided early on in the project to help in discussions with retailers, vendors etc.
- Early merchant engagement in the programme is essential.
- Chip & PIN cannot be treated as just a technical change to reduce fraud. Rather, the customer proposition must be developed as part of the programme and must include suitable products for the special needs community.
- A project of this scale would have been easier without other major projects taking place at the same time (e.g. the Switch to Maestro migration which some issuers went through during the same period).

Successes

- The smooth and largely trouble-free change in cardholder behaviour. PIN bypass removal day proved to be no problem at all.
- Co-ordinated cross-industry co-operation under APACS' leadership.
- Broad acceptance, understanding and adoption of the technology by consumers and merchants and improved customer confidence in cards.
- Full stakeholder participation, including the sharing of ideas and best practices, and the value of detailed planning and open discussions with regular meetings to discuss issues / progress.
- Improved risk management now that there is the ability to target non-chip transactions.

Least Successful

- Offline benefits of chip are still not being realised by the UK market. For example, setting zero floor limit at many merchants due to historical arrangements or using low risk management parameters on EMV cards as the issuer's back-office fraud and risk system are still heavily reliant on online authorisations.
- The benefit from reducing on-line authorisations has failed to materialise with some issuers controlling bad debts as well as fraud using the card settings. Merchants have complained that the chip has taken away their control of authorisations.
- The reluctance of mid-tier retailers to accept Chip & PIN, notwithstanding the introduction of the liability shift. Some did not upgrade their estates. Despite the introduction of liability shift, there was a delay by some mid-tier retailers in upgrading their systems to accept Chip & PIN on the basis that their respective business cases were not positive.
- Not yet a global requirement with some countries implementing over much longer timescales.
- Requirement to still have magnetic stripe on cards for non-EMV UK retailers, overseas merchants and overseas ATMs that has led to quicker than expected fraud migration overseas due to the lack of global chip migration.

3.4 Post Chip & Pin Events

Terminals

Although Chip & PIN has not been compromised there have been examples of fraudsters attacking the terminal to gain magnetic stripe data and watching PIN numbers as they are entered:

- In March 2006 there was a compromise of the PIN pad in some petrol stations. Criminals opened the PIN pad, defeated the tamper responsive switches inside the casing of the terminal and fitted a skimming device to copy a card's magnetic stripe data.
- Cambridge University Computer lab took control of a POS device and re-configured it to play 'Tetris' to show how cardholders could be duped into putting cards into a compromised device without becoming suspicious. They also demonstrated a potential, if somewhat unlikely, relay type of attack to intercept a 'real' transaction.

Legal Developments

A grey area existed in UK law whereby when using a PIN to verify a transaction, a fraudster may not be committing an offence. Representations were successfully made to the Government to amend the law to cover PIN verification so that fraud carried out against a Chip & PIN transaction or any other automated or machine based banking transaction was illegal.

Future Developments

The UK's Chip & PIN infrastructure platform allows new services / products to be created taking advantage of Chip & PIN's security:

- Some banks are considering the use of a form of Two Factor Authentication across their banking services and for remote shopping channels that places an additional application onto the chip and provides the functionality to generate a one-time unique and dynamic passcode.
- Contactless card payments designed for transactions of £10 or less will be introduced in late 2007.
- With the cost of Dynamic Data Authentication (DDA) computer chips falling, it is predicted that UK issuers will move towards this stronger card authentication method in the future.

4 BACKGROUND / HISTORY

In 2000, plastic card fraud was projected to reach in excess of £800m per annum by 2005 if only tactical initiatives were deployed. The UK card payments and retail industries recognised that this would jeopardise public confidence in card payments to the detriment of both industries and presented an ever-increasing cost of doing business in the UK that would, ultimately, become unsustainable.

Chip & PIN was devised as a strategic response to specifically tackle the escalating problems of Counterfeit cards in the face-to-face environment (where card details are skimmed - electronically copied from a card's magnetic stripe without the cardholder's knowledge and used to make an illegal copy of the genuine card) and fraud on Lost & Stolen cards. By introducing chips on cards, this made it more difficult for fraudsters to clone a card as they could not replicate the data on the chip. At the same time, PINs replaced signature as the means by which cardholders authenticate themselves at the Point of Sale (POS) by using a cardholder verification method (CVM) which was known only by the cardholder.

With such an enormous change in the way that card payments are accepted, a trial was put in place in Northampton in 2003. This was to check that cardholders were able to use the new way of making payments; to test the cardholder Chip & PIN communications process; to prove that retailers could design Chip & PIN into their shopper payment process; to ensure that the banks and payment industry could successfully process the payments and agree rules and operating instructions going forward; and guarantee that terminal manufacturers could provide the hardware to take the payments. Following a successful trial, the project moved to a phased national rollout: details are provided below.

4.1 Northampton Trial (May 2003)

The UK was one of the first countries to introduce chips on cards meeting new global EMV (Europay / MasterCard / Visa) specifications. A three month trial, the biggest of its type in the world, started in May 2003 with 120,000 people given card(s) with Chip & PIN card capability – 200,000 cards were issued – with 1,000 shops / outlets taking part in the trial. The trial was to test consumer and merchant acceptance of Chip & PIN (not the underlying technology or Chip & PIN infrastructure as this had already been proven), the coordinated communication campaigns and to resolve any operational issues that might arise. During and following the trial, research was carried out amongst stakeholders to identify the key lessons to be learnt which would then be used for the national rollout. The following lessons were identified:

Cardholders

- Consumers took to Chip & PIN extremely well and felt at ease with the new system.
- Awareness and favourability in Northampton towards Chip & PIN was very high during the trial.
- Consumers found it harder to adapt to using PINs with their credit cards as they were less familiar with it.
- Privacy was the most widespread concern and would be a critical issue to address during rollout.
- Disabled customers generally viewed Chip & PIN positively, but experience varied depending on the type of disability.

Retailers

- Customers and staff both adapted quickly and enthusiastically.
- Preparation time was critical for retailers implementing Chip & PIN; the time required for testing and approval was often underestimated.
- Retailers needed to consider the requirements of people with disabilities in their planning phases.
- Privacy was a key concern for customers. Retailers needed to ensure they took this into account.
- Although some major retailers experienced teething problems, these were considered to be of the same magnitude for any technology project of this kind.
- Staff training was critical but did not take long for each employee.
- Transaction times were good and reductions were achieved in the trial. Research showed that customers said it took them no longer to pay using Chip & PIN than when signing.

Financial Institutions

- It was essential to carry out extensive closed trials before the trial went public.
- Credit cards were a slightly bigger challenge than debit cards as fewer people knew their credit card PIN.
- Cardholders who did not use ATMs found it harder to adapt to using a PIN as they had only ever signed when using their card.
- The ability for cardholders to change their PIN at any ATM was a critical element.
- Coordinated cardholder communications was a key element in the successful implementation of the Chip & PIN trial.

Technology Suppliers

- Certification was a concern and could be confusing and time consuming.
- Suppliers needed to encourage retailers to move to Chip & PIN without delay to avoid supply bottlenecks.
- Suppliers needed to register with the Chip & PIN programme in order to be kept up to date.

The trial was a success with the banking and retail industries working together and collaborating in an unprecedented way. In Northampton, the industry was able to iron out any operational glitches, see how customers learnt about the new technology and test a co-ordinated advertising and public relations campaigns ahead of a national Chip & PIN rollout.

Further information can be found in "Checking out Chip & PIN - The Northampton trial report 2003" (September 2003) supplemented by "Rolling out chip & PIN – A retailer guide to lessons from the Northampton trial" (2003). Both reports were issued by APACS. These publications can be obtained from APACS by sending an e-mail to corpcomms@apacs.org.uk.

4.2 UK Rollout (October 2003)

The UK national rollout of cards by UK issuers and terminals by retailers / acquiring banks commenced in October 2003 and was scheduled to have critical mass by end 2004. Due to its scale and complexity, the rollout happened steadily across the country rather than via a “big bang” approach. By the end of 2004, all the rollout targets for upgrading cardholders and businesses to Chip & PIN had been achieved. The following points illustrate the size of the task:

- The project involved upgrading 860,000 shop terminals and 40,000 ATMs to accept the new Chip & PIN cards. Issuing 140 million credit, debit and charge cards to 42 million customers and training 3 million retail staff.
- By the end of 2004, more than 75% of UK cardholders had been issued with at least one Chip & PIN card and 600,000 (70%) of the UK’s shop terminals had been upgraded to accept Chip & PIN cards. Of these 420,000 (84%) were bank owned terminals from the 500,000 bank owned estate.

So far, this report has mentioned general stakeholders (cardholders, merchants / retailers, banks and technology suppliers). But there were specific stakeholders with clearly identified needs. In this respect, work was undertaken with the disabled community to conduct detailed research and consultation. This was to ensure that existing cardholders could continue using their cards after the introduction of the new technology, and to be as inclusive as possible for those who historically had not used cards. The programme held regular disability forums for retailers, banks and disability groups - for many, Chip & PIN cards provided a more convenient means of paying than by signature. For further details on disability groups, see section 11.1 Disability Engagement.

Further information can be found in “Chip & PIN – The UK rollout 2003 – 2005” (March 2005) issued by APACS. These publications can be obtained from APACS by sending an e-mail to corpcomms@apacs.org.uk.

For the latest report on rollout progress see section 6: Chip & PIN Implementation Progress 2006.

4.3 Chip & PIN Changeover Day - “I ♥ PIN” (February 2006)

This was the culmination of the largest change in UK consumer behaviour since decimalisation in 1971 and Valentine’s Day, 14 February 2006 was when cardholders were required to use their PIN, at virtually all times, when paying with a Chip & PIN card. This date was chosen because it was a memorable event, widely celebrated in the UK, and allowed long term communications activity with a highly visible creative hook of “I ♥ PIN”.

It was recognised that there would still be pockets of cardholders who could not complete a Chip & PIN transaction and they were allowed to continue signing where their cards had not yet been upgraded. In addition, operating guidelines covered disabled customers who had requested chip and signature cards as an alternative on the basis that they had difficulty in using PIN. Guidance was given to UK retailers on accepting cards issued which did not have a chip but used the magnetic stripe. This, of course, included cards used by many non-UK cardholders.

5 BUSINESS CASE - HIGH LEVEL COST / BENEFITS ANALYSIS (2000 – 2010)

This section presents the case for the introduction of Chip & PIN in the UK, looking at the forecasted fraud savings, projected implementation costs and non-fraud benefits together with the underlying assumptions used to derive the figures. At a high level, the Business Case (2000 – 2010) predicted fraud of £8,437m that reduces to £5,075m (a £3,362m fraud saving) with the implementation of Chip & PIN, industry implementation costs of £1,037m and an additional £664m in benefits to give a net Business Case benefit of £2,989m. Note: all values are absolute and have not been adjusted for inflation.

An anticipated reduction of fraud in the future was the single largest factor impacting the Chip & PIN Business Case ensuring that a positive return on investment was achieved. Fraud benefits comprised both Fraud Saved and Fraud Avoided which are described as follows:

- **Fraud Saved:** Represents the extent to which the level of fraud losses occurring at the time the business case was compiled in 2000 would have been reduced by the introduction Chip and PIN.
- **Fraud Avoided:** Represents the additional levels of fraud above that currently seen in 2000 that would not be incurred as a result of the Chip & PIN implementation.

5.1 Forecast Fraud (2000 – 2010)

Taking into account all planned tactical fraud prevention initiatives from 2000 onwards and assuming Chip & PIN was not introduced into the UK, UK fraud for the categories of Lost & Stolen, Counterfeit and Card Not Present were forecast to grow as follows in the years stated:

£m	2000	2003	2005	2007	2010	INCREASE (2010 vs. 2000)
Fraud on UK issued cards used in the UK	154	347	358	365	389	152%
Fraud on Foreign Issued Cards used in the UK	58	152	202	221	265	356%
Fraud on UK issued cards used outside the UK	94	254	293	306	319	239%

Fraud Saved / Avoided by the UK banks, following introduction of Chip & PIN, was estimated at £470m per annum from 2005 onwards.

5.2 Forecast Non-Fraud Related Costs / Benefits

To implement Chip & PIN in the UK, it was estimated that it would cost UK stakeholders £1,037m from 2000 to 2010. This figure was split £727m for the banks and £310m for the retailers. By introducing Chip & PIN, it was forecast that these stakeholders could also realise an estimated £664m of non-fraud related benefits over the period 2000 – 2010. This benefit figure can be broken down into £328m for banks in direct administrative and operational benefits, and £336m for the retailers – this assumed that fallback was not available and a copy of the payment signature receipt was not required to be stored.

These two elements of costs and benefits (expressed as absolute costs and not Net Present Value) are further broken down in the tables below and are split between the banks and retailers:

FORECAST COSTS (2000 - 2010)		
Card Issuance	Banks	£109m
Terminal Upgrades (three types)		
POS	Banks	£69m
Branch Counters	Banks	£17m
ATMs	Banks	£58m
Terminal Upgrades (three types)		
Integrated POS	Retailers	£157m
Stand Alone POS	Retailers	£13m
UPTs	Retailers	£9m
Terminals – Support / Maintenance	Banks	£12m
	Retailers	£96m
Host Systems - Changes	Banks	£102m
	Retailers	£9m
Host Systems – Support / Maintenance	Banks	£96m
	Retailers	£6m
Customer changes in tender type used / Attrition	Banks	£137m
	Retailers	Reduced costs of £38m
Staff Training	Banks	£1m
	Retailers	£40m
Customer education	Banks	£51m
	Retailers	£1m
Marketing	Banks	£25m
	Retailers	£5m
Project and Central Management	Banks	£50m
	Retailers	£12m
	TOTAL	£1,037m

FORECAST BENEFITS (2000 - 2010)		
Chargeback Processing	Banks	£79m
	Retailers	£31m
RFI Processing	Banks	£73m
	Retailers	£57m
Reduction in non-Fraud Write Offs	Banks	£4m
	Retailers	£91m
Referral Processing	Banks	£72m
	Retailers	£17m
Receipt Handling	Retailers	£139m
Fraud Management & Investigation	Banks	£43m
Secure Delivery	Banks	£44m
Reward on Cards	Banks	£13m
Terminal Fallback Processes	Retailers	£1m
	TOTAL	£664m

5.3 Fraud Effectiveness

In formulating the Business Case, assumptions were made in five areas on the effectiveness of proposed developments to tackle fraud that influenced the overall forecasts.

1) Business Case

- In the absence of chip, counterfeit losses were not considered sustainable at 2000 growth rates and the cards industry would need to find alternative non-technology based solutions. It was assumed that losses for this fraud type, without Chip & PIN, would be capped at 2005 levels through to 2010.
- Lost & Stolen (L&S) fraud would be controlled through enhancements to knowledge-based systems (neural networks) and Hot Card files. Without chip, it was assumed that the UK would attract L&S fraud from surrounding countries (particularly those that were chipped).
- It was assumed that the Address Verification Service and Card Security Code (AVS / CSC) checking would be fully operational in Mail Order and Telephone Order for all card schemes by 2003 but that fraudsters would find ways to circumvent AVS / CSC by 2007. In reality, implementation and take up of the system was slower than anticipated and this partly explains the un-forecasted increase in CNP fraud. Little impact was predicted on UK cards used overseas as it was assumed that other countries would not adopt the system.

2) Chip Introduced onto the Card

- UK domestic implementation effectiveness would be 100% in 2004. However, for International transactions, this figure peaks at 40% in 2005.
- Against L&S fraud, chip would be 10% effective domestically and 5% internationally.
- Against Counterfeit fraud, chip would be 90% effective with the remainder accounted for by transactions conducted in fallback mode or at remaining paper-based merchants.
- There would be a migration of domestic counterfeit fraud; 3% going to CNP and 10% to International.

3) PIN

Where a chip had been introduced onto a card and a PIN was used to validate the cardholder against information held on the chip, the following assumptions were made:

- An increase in baseline fraud abroad of 10% for credit and 6% for debit cards.
- Migration of 15% of domestic L&S fraud at POS purchases to ATMs as a fraudster would want to obtain cash rather than goods as the ATW was higher at an ATM for cash withdrawals.
- Against L&S at POS and Branch Counters, PIN effectiveness was assumed to be 75%. Of the 25% remaining, 15% would migrate to ATMs and 10% would remain at POS.

4) Foreign Issued Cards

For Foreign issued cards used in the UK (purchases and cash withdrawals), it was assumed that:

- UK acquired foreign issued fraud would grow at similar rates to that of domestic fraud.
- The fraud effectiveness assumptions used for domestic fraud were applied to foreign issued fraud forecasts. However, it was also assumed that only 50% of foreign issued fraud would be affected as 50% was assumed to remain on cards issued in countries continuing to use magnetic stripe only.
- The benefit of fraud avoided would only materialise when liability shifts were introduced by the card schemes from 2005.

5) Liability Shift

It was assumed that fraud liability would shift (from 2005 onwards) to the point in the card transaction process that could not process a full Chip & PIN transaction. For example, in the table below, where a card of technology level 1 (Magnetic Stripe) was used in a terminal that could process up to technology level 3 (Chip & PIN), the issuer would be liable.

This would occur for cross-border transactions conducted using cards issued within one EU country and used in a second EU country. It would give protection to the party that had moved the furthest, in technological terms, towards full Chip & PIN implementation. For EU / EU transactions (excluding domestic transactions), the liable party (issuer or acquirer), after liability shift, would be as follows:

Card Type (presented to the terminal)		Terminal Type (Which card type it can process)		
		MAGNETIC STRIPE	CHIP ALONE	CHIP & PIN
Technology Level		1	2	3
1	MAGNETIC STRIPE	Issuer	Issuer	Issuer
2	CHIP ALONE	Acquirer	Issuer	Issuer
3	CHIP & PIN	Acquirer	Acquirer	Issuer

Note: Acquirer liability is shown here as the acquirer controls the transaction information that is passed onto the issuer for authorisation and would be ultimately liable for a bank-owned terminal where it could not accept a card with a higher level of technology. However, where a terminal is owned by a merchant, and it could not accept a higher level of technology, the merchant would be liable. In the event, these fraud liability assumptions proved to be accurate.

5.4 Assumptions

In constructing the Business Case, a number of general commercial assumptions were made together with specific ones for the banks and retailers: these are listed below in three sections. Validation has been via stakeholder questionnaire response (October 2006 – February 2007) and APACS-held data together with anecdotal feedback. However, given the amount of time elapsed since finishing the implementation and that a majority of the Chip & PIN teams have long since been disbanded, empirical proof was hard to come by. To provide a more robust picture of how well the Business Case has been met, see section 7 Business Case Fraud Analysis (UK Issued Cards) for the fraud figures that have been supplied by APACS.

5.4.1 General Assumptions

ASSUMPTION	OUTCOME
Authorisations levels would not change.	Authorisation levels have increased. Schemes have introduced retailer benefits to authorise transactions independent of Chip & PIN.
Fallback from PIN to signature as a cardholder verification method would not be permitted where a fully functioning PIN-enabled card was used.	Fallback removed as of 14/02/06; although, some issuers allowed fallback after this date.
The level of card failure at the POS would be no more than 0.25%.	Outturn of 0.33% as of early 2007. This higher than assumed figure has been influenced by the level of technical fallback.
Requests for Information (RFI) on Chip & PIN transactions would be eliminated, as an issuer could gain no additional information from the retailer.	Anecdotal evidence suggests that this was the case.
Card schemes would not require retailers to retain Chip & PIN transaction payment receipt copies as these would add no value to an investigation – retention would be required for transactions processed using non-Chip & PIN technology e.g. foreign issued cards.	Not all issuers have withdrawn this requirement and there has been no instruction from acquirers to remove this requirement either.
Rewards for captured cards would reduce by 10%.	These are unable to be quantified, as central data was not collated after 2003.
There would be a continuing need for an Industry Hot Card file.	Yes. The Industry Hot Card file has been maintained although its usage has evolved. For example, consideration is being given to using this as a conduit to disseminate any SDA compromised card details. It is also being used for CNP and overseas transactions.
An 80% reduction in referrals for UK cards used in the UK.	It is believed that referral rates have fallen, although it has not been possible to quantify this accurately.

ASSUMPTION	OUTCOME
Card schemes would approve the use of CSC/AVS by 2003 to help combat CNP and MOTO fraud.	The schemes mandated AVS / CSC in 2002. However, its implementation was at merchant discretion unless their fraud was outside the schemes' mandated limits.
Foreign fraud liability shift from 2005 for cross border transactions conducted using chip cards issued within one EU country and used in a second EU country. The liability shift is intended to give protection to the party that has moved the furthest in technological terms to accept a Chip & PIN transaction. To provide retailers with an incentive, where both they and the issuers can accept a Chip & PIN transaction, the issuer would be liable for the transaction.	Liability shift agreed by the card schemes.

5.4.2 Bank Assumptions

COST ASSUMPTIONS	OUTCOME
The implementation plan assumed 70% of cards, 100% of bank owned terminals and 70% of retailer owned terminals would be PIN capable by end March 2004 with the remaining to be compliant by end 2004.	End 2004 figures were 57% of all payment cards (45% credit and 70% debit), with 79% of bank owned terminals converted – no figures were available for retailer owned terminals and for end 2006 it was 97% of cards and 98% of shop tills.
It was estimated that 99 million debit, credit and charge cards require upgrading inline with their normal re-issue cycle and that there would be an additional cost of 5p per card to put PIN on a chip card (£5m).	In the event, there was more forced re-issue than in the Business Case.
50% of the estimated 391,000 bank owned terminals would need to be upgraded outside of their normal replacement cycle at a cost of £350 for a Chip & PIN terminal. (391k x 50% x 350 = £68.4m)	It is estimated that, given the volumes required and the 2007 cost, the figure for the period 2004 – 2006 would be £200. This represents a 43% or £29.3m saving over the business case.
Upgrade of the bank-owned ATM estate to support Chip & PIN:	
<ul style="list-style-type: none"> £12m capital investment to provide a PIN change and unblock facility 	No data available.
<ul style="list-style-type: none"> Half of all cardholders would consolidate their PINs across their card holdings and half of all new cards would have their PIN changed at a cost of 7p per change (current cardholders = £3.5m). 	Data for the period May 2004 – May 2006, shows that there were 22m PIN changes equating to a cost of £1.55m assuming the per unit cost has remained the same (insufficient data to assess this).
<ul style="list-style-type: none"> There would be 2m PIN unblock transactions performed per annum at a cost of £1 each time. £10m (2005 – 2010) 	For the period May 2004 – May 2006, there was an average of 1.65m p.a. PINs unblocked. This results in a projected reduction in this cost to £8.25m.

COST ASSUMPTIONS	OUTCOME
Terminals at bank branch counters (12,000 branches x 4 terminals) would require upgrading at a cost of £350 per terminal (48000 x 350 = £16.8m) + a 10% ongoing maintenance cost of the original investment (£16.8m x 10% x 5 years = £8m)	As with bank owned terminals above, the price was £200. This represents a £7.2m saving over the business case estimate.
Banks' host system upgrades for both issuers and acquirers were assumed to range from £0.25m to £1m depending on size and complexity with an ongoing maintenance cost of 10% of the original cost per annum.	No data to quantify this figure.
Staff training of £1m (48,000 staff x 1.5hrs x £11.41 per hour)	No data to quantify this figure
Merchants would be provided with a training pack for each bank owned terminal at £5 per pack (391,000 x 5 = £1.95m)	No data to quantify this figure
Marketing costs covered three specific areas:	
<ul style="list-style-type: none"> • Sending information leaflets to cardholders at an assumed cost of 30p per card exc. Development and design costs (30p x 99m = £29.7m). 	Stakeholder research estimates that costs were 40% – 50% below estimate saving £14.7m (Source: Nicholls Report, April 2005).
<ul style="list-style-type: none"> • PIN re-notification for 100% of credit card and 30% of debit cardholders at 30p per mailing (47m + 50 x 30% = 62m x 30p = £18.6m). 	Stakeholder research estimates that costs were 40% – 50% below estimate saving £9.3m (Source: Nicholls Report, April 2005).
<ul style="list-style-type: none"> • Advertising campaign of £25m. 	Central advertising costs were c.£12m
Project management costs of £33m (APACS = £4.3m, schemes = £4m and banks = £25m) + a central management team for three years of £6m.	The Programme Management Organisation cost £13.6m over a three-year period and there is insufficient data to quantify other project management costs.
POS hardware support and maintenance was assumed to be 10% of the incremental cost per annum and relates to the PIN pads (391,000 terminals x £350 x 10% x 5 years [2005 – 2010] = £68m). Terminal figures as at end 1999.	The estimate of 10% was correct. However, when the reduced cost of terminals is factored in the cost falls by £29.1m to £38.9m.
HOST system hardware + software support and maintenance was assumed to be 10% of the incremental cost per annum.	No data to quantify this figure.
90% of RFIs for successful Chip & PIN card present transactions removed going from 2.3 to 0.23 per 10,000 transactions with a per item cost of £7.57p for issuers and £7.15p for acquirers.	Insufficient robust data to assess the outcome.
51% of chargebacks would be eliminated from 2.4 per 10,000 transactions to 1.2 with a per item cost of £10.94p for issuers and £10.38p for acquirers.	Insufficient robust data to assess the outcome.

COST ASSUMPTIONS	OUTCOME
20% of all cards were delivered using secure delivery methods and it was assumed that 75% of these would be replaced by cheaper options.	A movement to cheaper options has happened.
By avoiding future fraud, it was assumed that the banks would not have to increase the size of their fraud investigations team resulting in £6m of staff costs savings per annum from 2005 onwards = £30m by 2010.	In the event, there has been no change in the size of fraud teams. Chip & PIN has allowed these to be re-focused into other areas. It could be argued that the forecast savings have been achieved since staff have been re-deployed.
Rewards for captured cards would reduce by 10% at £70 per card (£2m p.a. = £10m [2005 – 2010]).	38% reduction achieved to give additional savings of £3.86m (2005 – 2010).
Referrals would fall by 80% for UK cards used in the UK. Year 2000 referral rates were 6m per annum, increasing in line with transaction growth and at a marginal cost of £2.40p (6m x 80% x £2.40p = £11.5m in year one).	No data to quantify this figure.
Fallback from PIN to signature would not be permitted in a mature Chip & PIN environment.	Removed as of 14/02/06, but allowances made for chip and signature only cards e.g. disability groups.

5.4.3 Retailer Assumptions

COSTS ASSUMPTIONS	OUTCOME
Communications / Network upgrades due to increased message length required at 20% of merchants at 5% of host development cost.	No data to quantify this figure.
294,000 integrated terminals would need upgrading at a cost of £400 for the terminal and £74 for the software. (294k x [400 + 74] = £139.4m)	The estimate for software is correct. However, the terminal cost was £250 resulting in a fall of £52.3m to £87.1m.
50% of the estimated 73,500 retailer owned terminals would need to be upgraded out side of their normal replacement cycle at a cost of £350 for a Chip & PIN terminal. (73.5k x 50% x 350 = £12.9m).	It is estimated that the terminal cost was £250 resulting in a £3.7m fall in costs to £9.2m.
10k unattended payment terminals (UPT) – 50% for petrol @ £1,200 and 50% for other markets @ £600 (5k x £1,200 + 5k x £600 = £9m).	It is estimated that the UPT cost was £1,350 for petrol and £800 for other markets resulting in a cost increase of £1.75m to £10.75m.
Staff training for Integrated POS of 4 hour, 5 staff per terminal + retailer owned POS of 1.5 hours and six staff per terminal all at £6.09p per hours (294k x 5 x 4 x 6.09 + 73.5k x 6 x 1.5 x 6.09 = £35.8m + £4m = £39.8m).	No data to quantify this figure.
Project Management – Top 50 retailers + Other retailers and Central Management contribution = £11.9m.	No data to quantify this figure.

COSTS ASSUMPTIONS	OUTCOME
Chargebacks reduced by 33% from 2.4 to 1.6 per 10,000 with a per item cost of £11.13p (40% of current chargebacks were due to fraud of which 85% were on UK issued cards).	Insufficient robust data to assess the outcome.
RFIs reduced by 90% from 2.3 to 0.345 per 10,000 with a per item cost of £10.23p (15% come from foreign issued cards).	Insufficient robust data to assess the outcome.
A reduction by 0.8 per 10,000 of write-offs with an ATV of £40.	No data to quantify this figure.
No referrals – 0.5% of transactions were referred affecting 21% of the market. 10 minutes per referral to process at £6.09p per hour.	No data to quantify this figure.

5.5 Business Case – Key Sensitivities

The following areas of sensitivity were of sufficient size or uncertainty to, potentially, materially affect the business case:

FRAUD: The potential to avoid fraud in the future was the key determinant in the business case. If fraud, where Chip & PIN is implemented, were to be 60% below the forecasts, this would result in the Business Case just reaching breakeven on a net present value (NPV) basis. Alternatively, if the chip were only 35% effective against domestic counterfeit fraud (rather than the 90% assumed) the Business Case would only have a break-even NPV.

ATTRITION: This described consumers' change in payment behaviour where, due to concern about the use of Chip & PIN, there might be a migration away from card use. It was assumed that there would be a low level of attrition. However, migration would reduce potential fraud avoided savings as purchases moved towards cash or cheques.

CARD SCHEME RULE CHANGES: With receipt handling, storage, retrieval etc. the removal of paper was assumed to achieve savings of 1p per transaction and that this would deliver at least £139m of benefits to retailers but this was dependent on the necessary card scheme rule changes.

TRANSACTION TIMINGS: With the introduction of Chip & PIN, it was assumed that there would be no cost or benefit from changed transaction times. Although, if transaction times for the UK retail marketplace were to change by one second this would result in a change in costs of £8m.

These sensitivities are shown in the table below:

Sensitivity Factor	Cost / Benefit Impact (combined Business Case to 2008)
Fraud: +/- 10% on forecast	+ / - £210m
Attrition: Migration + / - 1%	+ / - £25m
Receipt Handling: + / - 0.1p per voucher	+ / - £18m
Transaction Times: + / - One second	+ / - £8m

6 CHIP & PIN IMPLEMENTATION PROGRESS 2006

Throughout the programme, APACS tracked the implementation of UK-issued Chip & PIN cards as well as the UK Top 300 retailers for Chip & PIN terminal implementation. The statistics for Dec 2006 show that:

Cards Converted to Chip & PIN

Of the 142m UK issued payment cards

- 94% of UK issued credit cards were Chip & PIN
- 99.5% of UK issued debit cards were Chip & PIN
- Overall, 97% of UK issued payment cards were Chip & PIN

In December 2006, 91% of transactions using UK issued cards in the UK POS environment were PIN verified. The UK is, therefore, considered a mature Chip & PIN environment with the residual 9% of transactions comprising transactions involving:

- Cards which are not yet Chip & PIN enabled;
- A genuine fallback to magnetic stripe;
- Disabled chip and signature cards;
- Terminals which have not yet been upgraded; and
- Merchants who were still using paper vouchers.

Retailer Terminal Implementation

85% of the Top 300 retailers that remain in business from the original introduction date (22 having closed in the interim) have completed their Chip & PIN rollout. Of the 40 remaining, the majority were forecast to complete by early 2007 (there remains one retailer where the status is unknown).

Consumer Attitudes

Recent research amongst consumers showed that 94% agreed with the statement "I would prefer to shop in a store which accepts Chip & PIN rather than signature" and 89% agreed "Chip & PIN is more secure than signature". In addition, 80% of consumers say that they "always" or "sometimes" protect their PIN number at ATMs and in shops and 82% of consumers would expect a card transaction to be refused if they did not know their PIN.

When using Chip & PIN: 77% of consumers liked using Chip & PIN; 93% found using Chip & PIN was easier than signing and 85% found that using Chip & PIN was faster than signing (Source: "Attitudes to Card Fraud", APACS 2006).

7 CHIP & PIN BUSINESS CASE FRAUD ANALYSIS (UK ISSUED CARDS) 2000 - 2010

The following sections cover the detailed fraud forecasts made in the Business Case and compares these to actual figures as at end 2006 and forecast figures 2007 to 2010, providing explanations, where possible, for any differences in the outturn.

In the Business Case, the figures used were based on UK issued cards used in the UK and abroad and foreign cards used in the UK and these figures focus on three key fraud elements; Lost & Stolen cards, Card Not Present (CNP) transactions and Counterfeit card transactions.

Note: Mail-Non-Receipt was excluded from the analysis on the grounds that other measures could more easily be adopted to tackle this category of fraud. In addition, Application Fraud was also excluded as it was assumed that it would not be affected by the implementation of Chip & PIN

In the graphs, the following legend and notes apply:

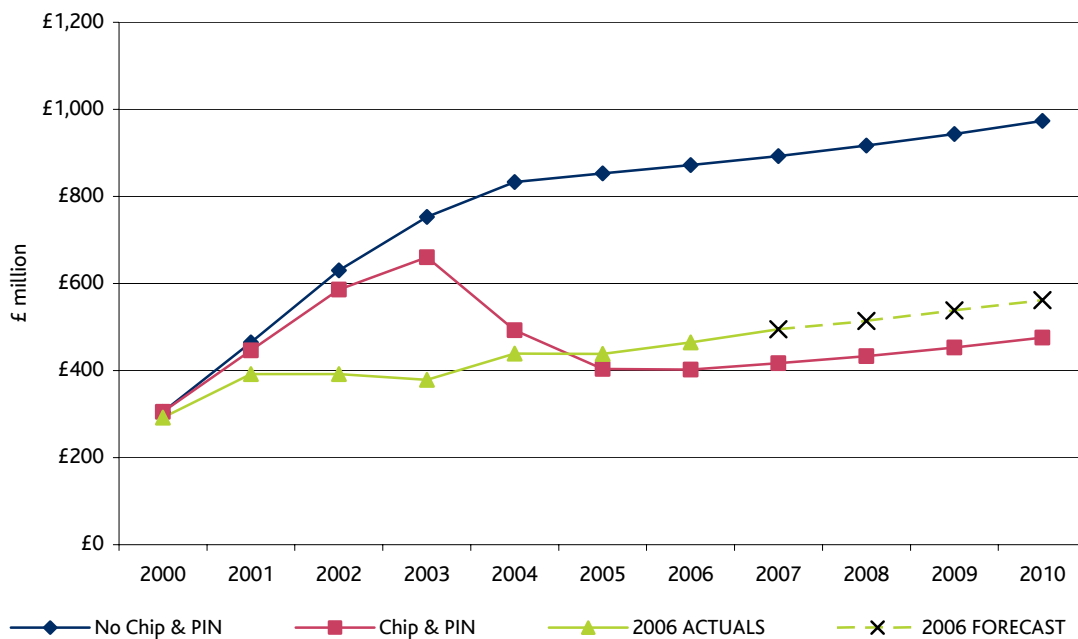
LEGEND

No Chip & PIN:	Fraud forecast if Chip & PIN is not introduced in the UK.
Chip & PIN:	Fraud forecast if Chip & PIN is introduced in the UK and effective from 01/01/2005.
2006 Actuals:	Actual Fraud figures (2000 – 2006)
2006 Forecast:	Forecast figures 2007 – 2010

Note: Figures used in this section have been rounded and may lead to minor discrepancies of +/- £1m.

7.1 Business Case Analysis 2000 - 2010 (Lost & Stolen, Counterfeit & CNP Fraud)

Chart: Overall Fraud Analysis (exc. Mail-Non-Receipt and Application Fraud)



Source: 2006 APACS Statistics

The total cumulative UK card fraud figure (2000 - 2010) where there was no implementation of Chip & PIN was forecast as £8,437m and this was predicted to fall to £5,075m following the introduction of Chip & PIN with forecasted fraud savings of £3,362m for the period.

Actuals (2000 – 2006) and 2006 Forecast (2007 – 2010) shows additional fraud savings of **£170m** over and above those forecast in the Business Case. This is made up of £500m actual fraud savings (2000 – 2006) less an increase in the forecast fraud losses of £330m (2007 – 2010).

The forecast for Chip & PIN 2003 – 2004 and through to 2005 showed a substantial fall in fraud as the new Chip & PIN cards were rolled out into the marketplace from October 2003.

Chip & PIN forecast for 2005 – 2006 was flat as it was assumed the UK would be a mature chip marketplace for Chip & PIN by February 2006.

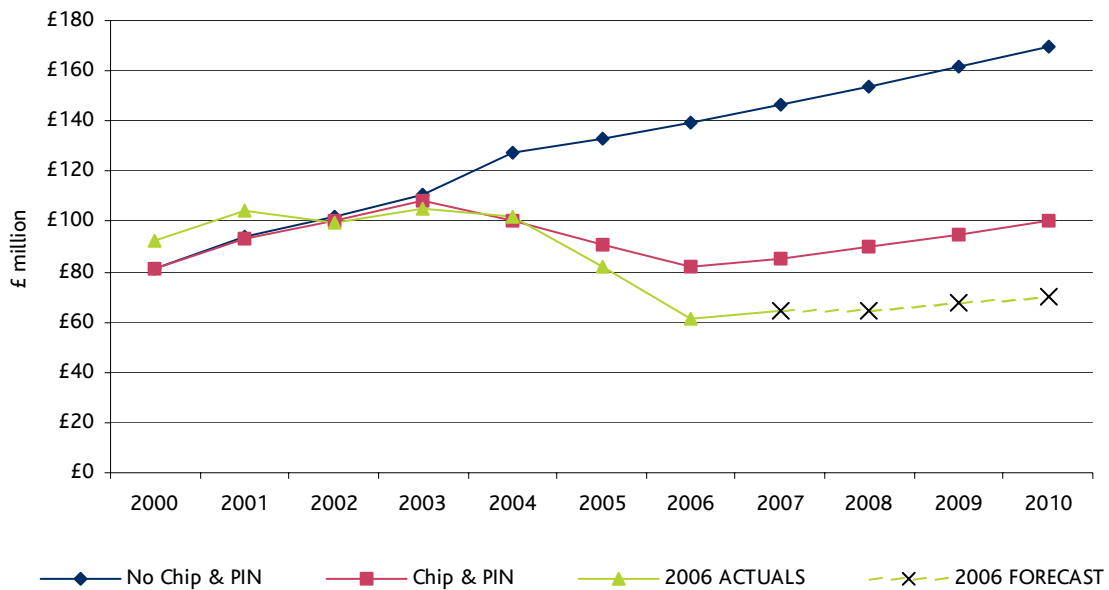
The major fraud influence 2001 – 2004 whereby Actuals were significantly below the Chip & PIN forecast by £584m is explained by a better performance than expected for L&S cards used abroad, Counterfeit cards used both in the UK and abroad together with Foreign cards used in the UK. These positive influences on fraud were tempered by L&S fraud losses in the UK of £46m.

However, from 2005, the Actual / Forecast fraud is above that forecast for the Chip & PIN Business Case. This is primarily explained by the large fraud losses occurring in the CNP marketplace of £1,019m - £568m for UK issued cards used in the UK and £451m for those used abroad.

The following sections explore, in greater detail, fraud occurring for L&S, Counterfeit and CNP both in the UK and abroad together with foreign issued card fraud occurring in the UK.

7.2 Lost & Stolen (Overall)

Chart: Fraud Analysis – Lost and Stolen (Overall)



Source: 2006 APACS Statistics

The total cumulative UK card fraud figure (2000 - 2010) where there was no implementation of Chip & PIN was forecast as £1,419m and this was predicted to fall to £1,026m following the introduction of Chip & PIN giving forecasted fraud savings of £393m for the period.

Actuals (2000 – 2006) and 2006 Forecast (2007 – 2010) shows additional fraud savings of **£112m** over and above those forecast in the Business Case. This is made up of £8m actual fraud savings (2000 – 2006) and further forecast fraud savings of £104m (2007 – 2010).

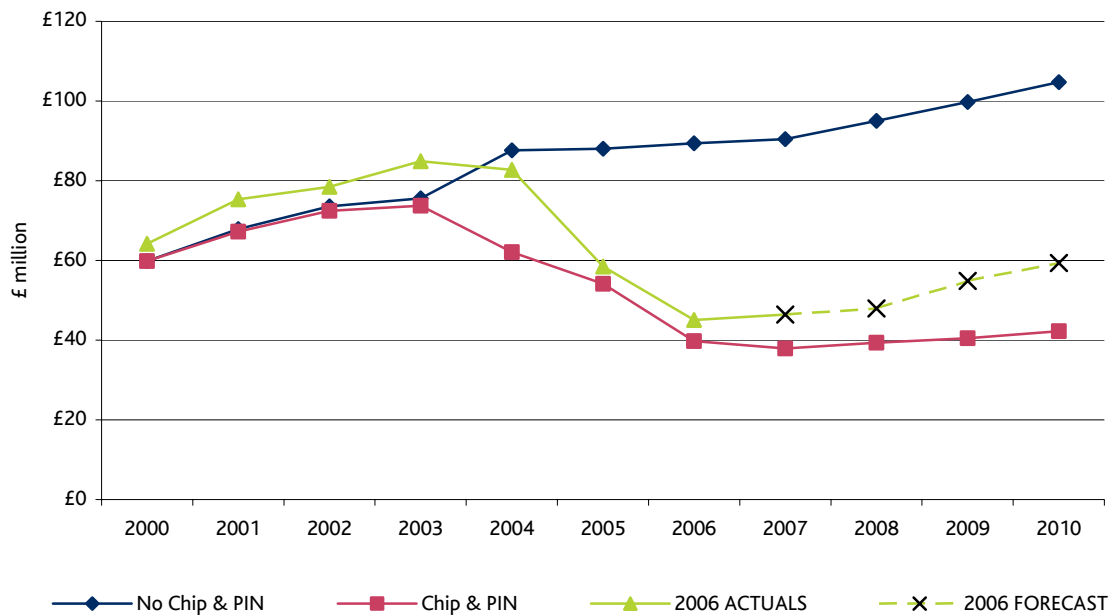
The direction of the forecast Business Case figures for L&S have been broadly in line with Actuals and the small divergence in Actual figures for the years 2000 + 2001 are within the APACS' standard forecasting margins for error of +/- 5%. Overall, L&S performance is better than forecast in the Business Case and is expected to continue improving 2007 onwards. This was due to the 2006 Actual figure being considerably lower than that in the Business Case and it is on this figure that the forecast for 2007 – 2010 has been derived.

The 2007 forecast onwards remains fairly flat as this was based on forecasts of a relatively flat rate of growth of future cards in issue.

The Actual figures achieved show a huge improvement over what would have happened without the introduction of Chip & PIN and this is forecast to continue. The next two sections look at the difference between L&S fraud on UK issued cards when used in the UK and when used abroad.

7.2.1 Lost & Stolen (UK Cards Used In The UK)

Chart: Fraud Analysis – Lost & Stolen (UK)



Source: 2006 APACS Statistics

The total cumulative UK card fraud figure (2000 - 2010) where there was no implementation of Chip & PIN was forecast as £932m and this was predicted to fall to £589m following the introduction of Chip & PIN with forecasted fraud savings of £343m for the period.

Actuals (2000 – 2006) and 2006 Forecast (2007 – 2010) shows that there would be additional fraud losses of **£109m** over and above that forecast in the Business Case. This is made up of £60m additional fraud losses (2000 – 2006) and further forecast additional fraud losses of £49m (2007 – 2010).

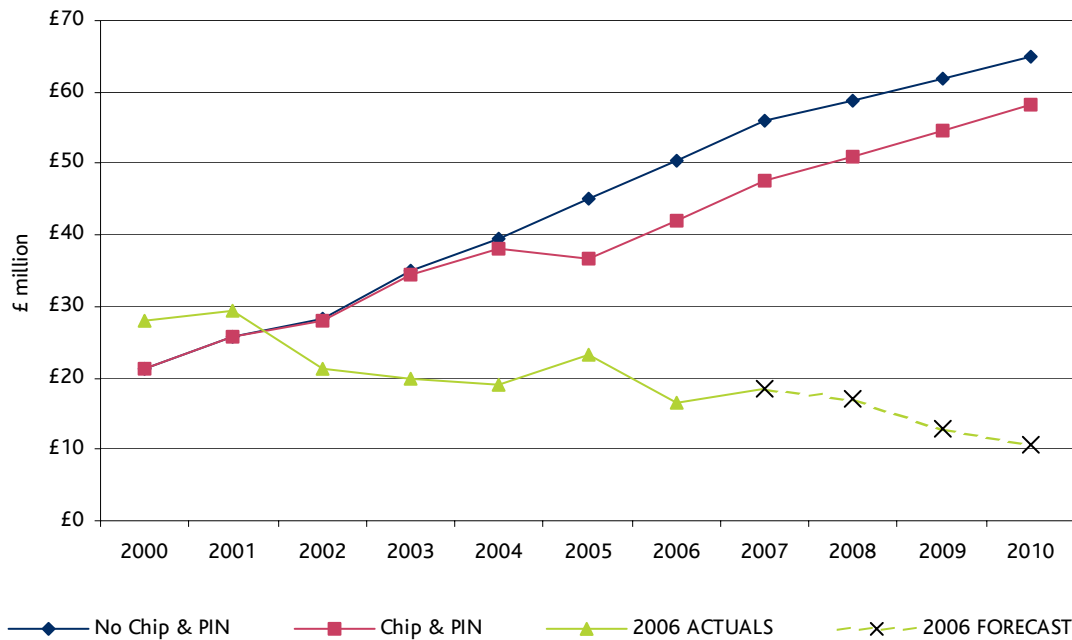
The Actual figures are showing a rise over those forecasted in the Business Case as the UK does not quite have 100% coverage of Chip & PIN POS devices in 2007 - It is estimated that 9% of merchants and 4 million cards have yet to upgrade to Chip & PIN.

There was a significant 29% fall in Actuals between 2004 and 2005 believed to be due to fraudsters' uncertainty of how Chip & PIN would affect their fraudulent operations. There was also a migration of fraud to UK ATMs where the fraudster had intercepted the card and PIN in the post, stolen a card that had the PIN number written down on it or observed the cardholder using their PIN and then stolen the card.

There was a Business Case expectation that fraud would start falling from 2003 as Chip & PIN started to rollout, and this has been seen. However, this was not as significant as expected since the initial rollout was slower than predicted before gathering pace from 2004 - 2006.

7.2.2 Lost & Stolen (UK Cards Used Abroad)

Chart: Fraud Analysis - Lost & Stolen (Abroad)



Source: 2006 APACS Statistics

The total cumulative UK card fraud figure (2000 - 2010) where there was no implementation of Chip & PIN was forecast at £487m and this was predicted to fall to £437m following the introduction of Chip & PIN giving forecasted fraud savings of £50m for the period.

Actuals (2000 – 2006) and 2006 Forecast (2007 – 2010) shows additional fraud savings of **£221m** over and above those forecast in the Business Case. This is made up of £68m actual fraud savings (2000 – 2006) and further forecast fraud savings of £152m (2007 – 2010).

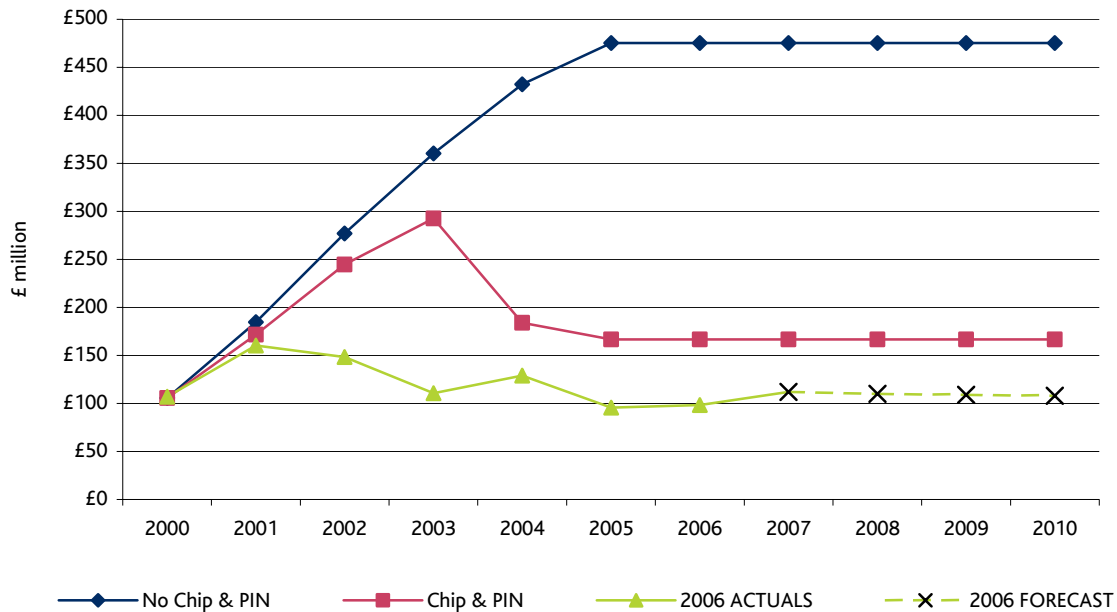
In the Business Case, a conservative assumption was made on the speed at which the rest of the world would introduce EMV technology. It was assumed that there would be no change in fraud levels 2000 – 2004 depending on whether Chip & PIN was introduced or not. It was predicted that fraud would fall in the period 2004 – 2005 by 3% and that from this 2005 figure, fraud was predicted to increase at the same rate as if Chip & PIN had not been introduced for 2005 - 2010.

There has been a faster rollout of Chip & PIN across Europe than expected; especially, in countries that UK consumers are visiting. In addition, the influence of the Single Euro Payments Area (effect of accelerating EMV rollout) was not anticipated in the original Business Case. This has led to an ongoing forecast reduction in fraud for 2007 – 2010.

The Actuals show an upward blip in 2005 and this was due to fraudsters making the most of a small window of opportunity as UK cards moved to Chip & PIN.

7.3 Counterfeit (Overall)

Chart: Fraud Analysis – Counterfeit (Overall)



Source: 2006 APACS Statistics

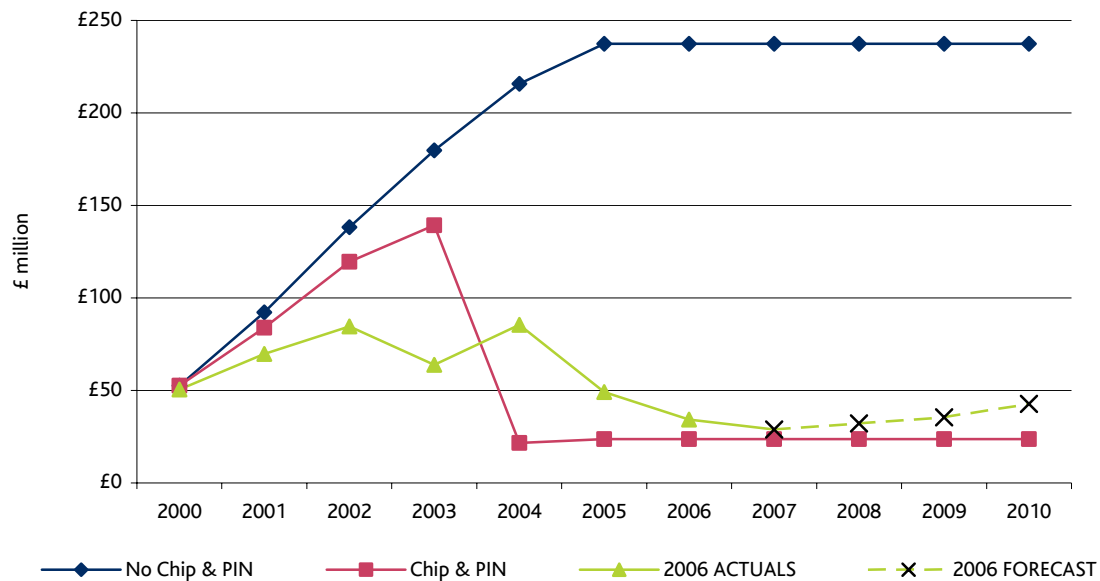
The total cumulative UK card fraud figure (2000 - 2010) where there was no implementation of Chip & PIN was forecast as £4,212m and this was predicted to fall to £1,998m following the introduction of Chip & PIN, giving forecasted fraud savings of £2,214m for the period.

Actuals (2000 – 2006) and 2006 Forecast (2007 – 2010) shows additional fraud savings of **£710m** over and above those forecast in the Business Case. This is made up of £482m actual fraud savings (2000 – 2006) and further forecast fraud savings of £228m (2007 – 2010).

Overall, Actuals / Forecast are below the Chip & PIN Business Case. However, this picture masks distinctive differences in the respective outcomes for the cards used in the UK and cards used abroad as seen in the following two sections.

7.3.1 Counterfeit (UK Cards Used in the UK)

Chart: Fraud Analysis – Counterfeit (UK)



Source: 2006 APACS Statistics

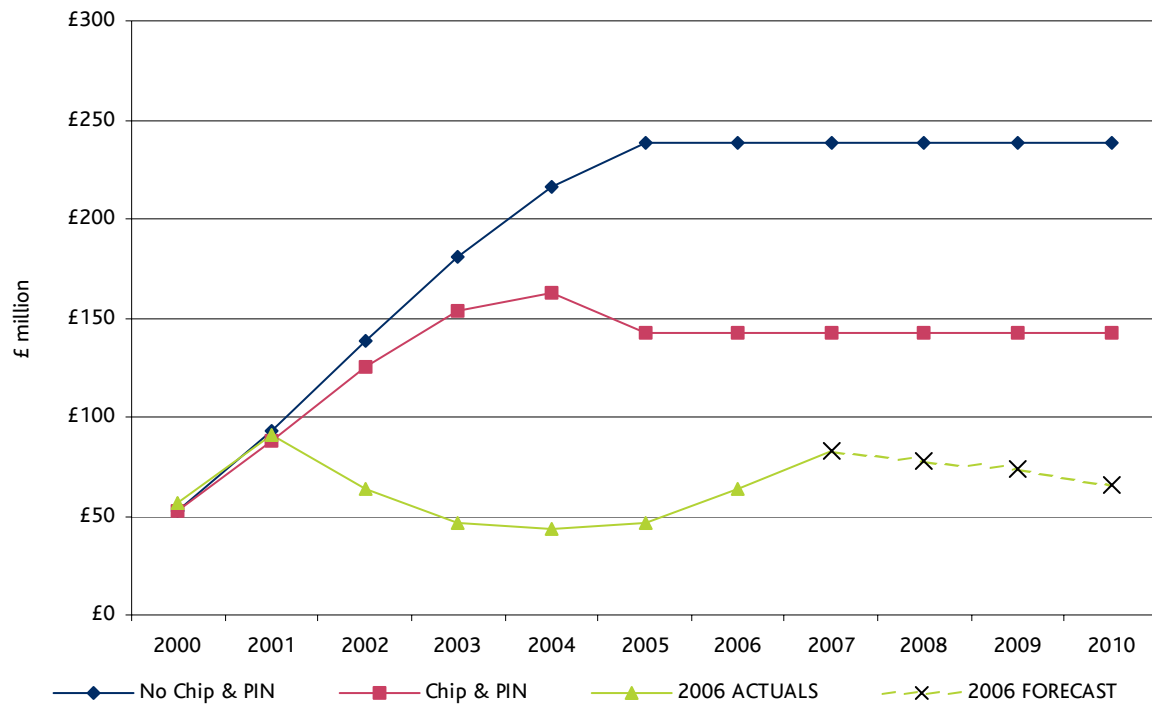
The total cumulative UK card fraud figure (2000 - 2010) where there was no implementation of Chip & PIN was forecast as £2,102m and this was predicted to fall to £559m following the introduction of Chip & PIN giving forecasted fraud savings of £1,543m for the period.

Actuals (2000 – 2006) and 2006 Forecast (2007 – 2010) shows that there would be additional fraud losses of **£18m** over and above that forecast in the Business Case. This is made up of £27m actual fraud savings (2000 – 2006) and further forecast additional fraud losses of £44m (2007 – 2010).

The Business Case predicted a sharp fall in fraud 2003 – 2004 due to magnetic stripe fallback being removed but this did not happen until February 2006 resulting in an increase in Actual fraud for this period following a fall in 2002 – 2003. This increase in Actual fraud for the period was due to heightened fraud activity before this type of fraud would be eradicated following full scale introduction of Chip & PIN. However, Chip & PIN’s introduction has led to a decrease in counterfeit fraud at POS.

7.3.2 Counterfeit (UK Cards Used Abroad)

Chart: Fraud Analysis – Counterfeit (Abroad)



Source: 2006 APACS Statistics

The total cumulative UK card fraud figure (2000 - 2010) where there was no implementation of Chip & PIN was forecast as £2,110m and this was predicted to fall to £1,439m following the introduction of Chip & PIN giving forecasted fraud savings of £671m for the period.

Actuals (2000 – 2006) and 2006 Forecast (2007 – 2010) shows additional fraud savings of **£728m** over and above those forecast in the Business Case. This is made up of £456m actual fraud savings (2000 – 2006) and further forecast fraud savings of £272m (2007 – 2010).

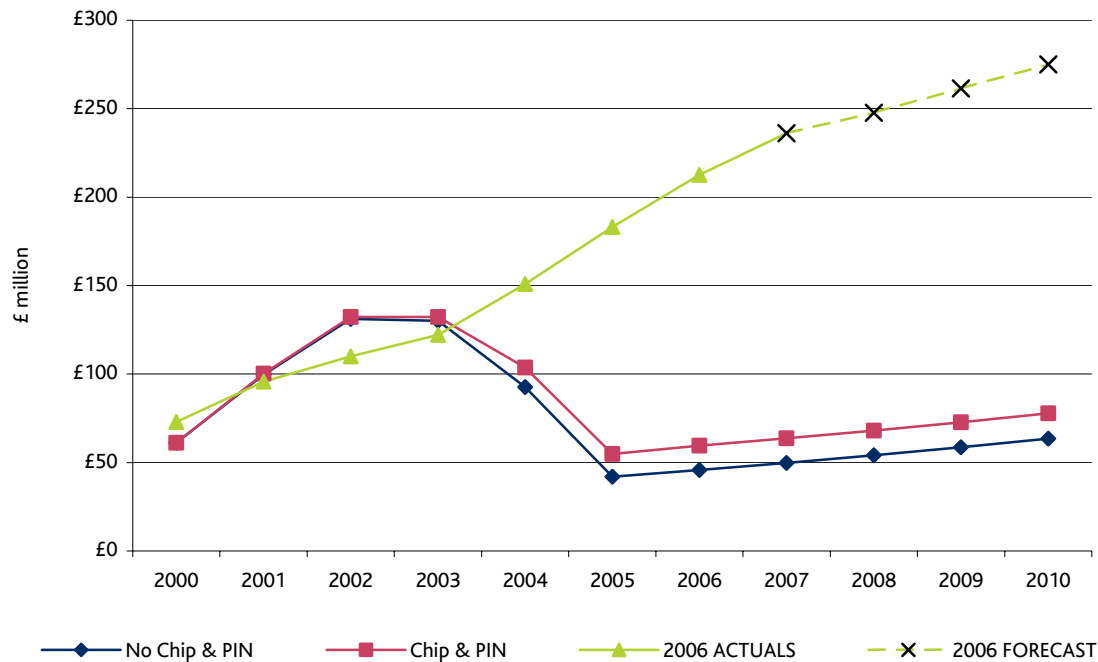
The Business Case predicted that there would be a small fall in counterfeit abroad from 2004 – 2005 when Chip & PIN was introduced, and that this level would then continue to 2010. However, the predicted migration of Counterfeit to overseas did not materialise and this fell steadily from 2001 – 2004 and marginally increased in 2005.

There was a sharp increase of 39% in 2005 - 2006 Actuals as fraudsters used UK cards overseas when it became more difficult to counterfeit cards in the UK. There has been a reduction in Counterfeit experienced at International POS but this has been offset by a marked increase in fraud at cross border ATMs – see section 7.9 ATM Fraud for further details.

Counterfeit is forecast to fall again in 2008 – 2010 as UK issuers apply better control of fallback and the international rollout of EMV gains pace.

7.4 CNP (Overall)

Chart: Fraud Analysis – CNP (Overall)



Source: 2006 APACS Statistics

The total cumulative UK card fraud figure (2000 - 2010) where there was no implementation of Chip & PIN was forecast at £829m, and this was predicted to increase to £926m following the introduction of Chip & PIN resulting in forecast additional fraud of £97m for the period.

Actuals (2000 – 2006) and 2006 Forecast (2007 – 2010) shows that there would be additional fraud losses of **£1,042m** over and above those forecast in the Business Case. This is made up of £304m additional fraud (2000 – 2006) and further forecast additional fraud losses of £738m (2007 – 2010).

In 2000, the scale of change in the UK, as consumers moved away from goods and services purchased in traditional bricks and mortar locations to the internet or remote buying via Mail Order or Telephone Order, was significantly under-estimated. It was assumed that the influence of the Internet would be less significant on the UK.

There has been phenomenal growth, for example, in the value of goods purchased over the Internet using cards from £3.5bn in 2000 to £30.2bn in 2006 to give a cumulative spend of £101bn (Source: APACS Consumer Payments Surveys 2000 - 2006). This partly explains the corresponding £304m increase in CNP fraud (2000 – 2006) over that forecast in the Business Case.

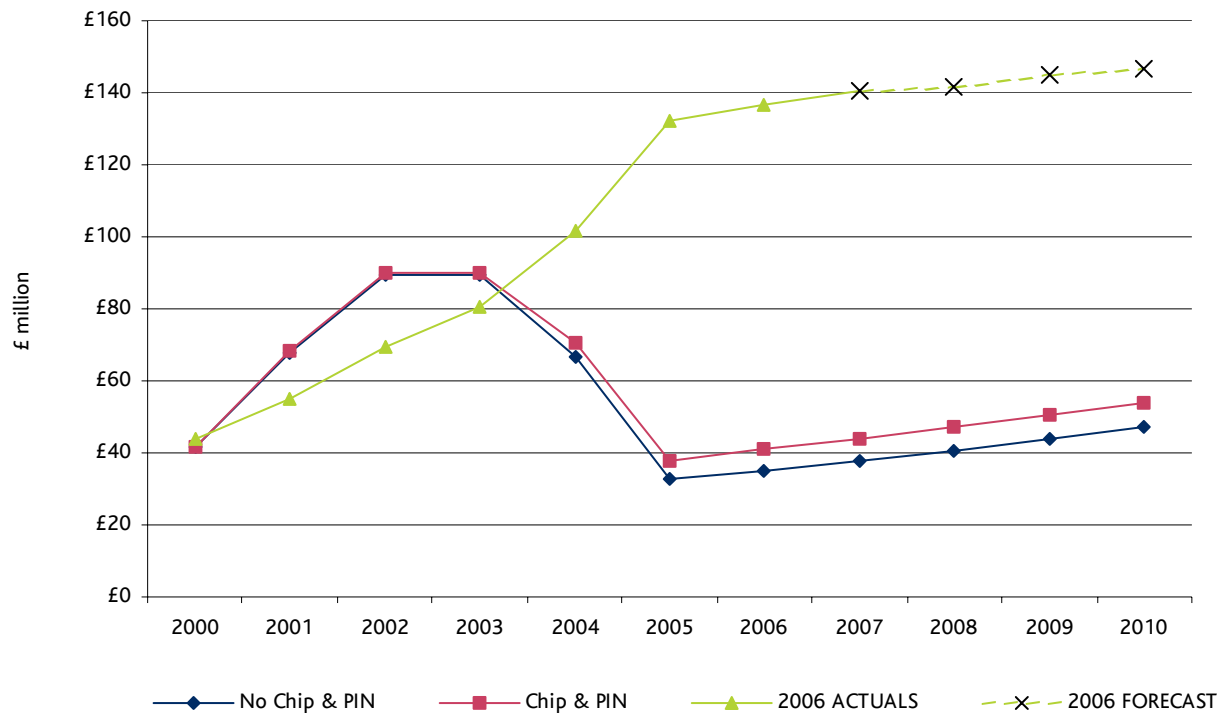
Although there has been a significant increase in sales through the CNP channel, the fraudsters' speed of migration and success in exploiting this channel, over the same period, has exceeded expectations. For fraudsters, it is now easier to commit fraud using CNP channels than in the face-to-face environment, as they risk being exposed at a retail outlet when asked to enter a PIN at the POS.

The forecasts for introduction of Chip & PIN vs. no Chip & PIN were always higher due to an assumption of an increasing Average Transaction Value (ATV) on spending over the Internet.

Overall, CNP market growth hugely exceeded expectations from 2003 onwards. In addition, there was an assumption of greater introduction of AVS / CSC from 2003 and on its effectiveness in preventing fraud than has actually occurred which explains why the Actuals / Forecasts have diverged from the Business Case to the extent that they have.

7.4.1 CNP (UK Cards Used in the UK)

Chart: Fraud Analysis – CNP (UK)



Source: 2006 APACS Statistics

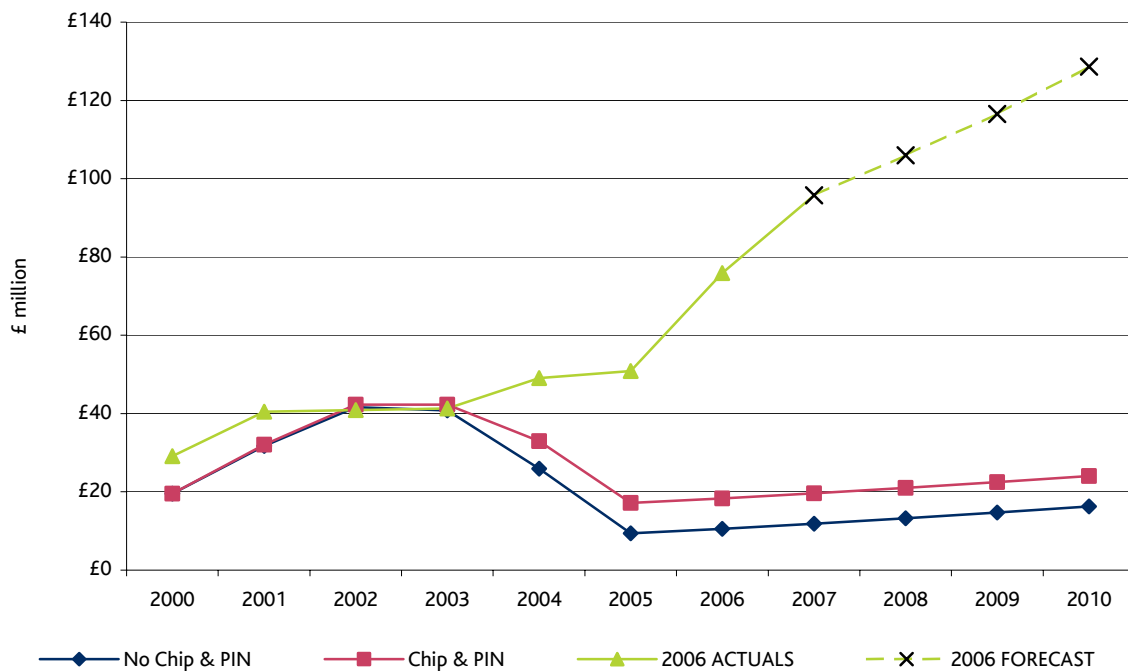
The total cumulative UK card fraud figure (2000 - 2010) where there was no implementation of Chip & PIN was forecast as £593m and this was predicted to increase to £634m following the introduction of Chip & PIN, resulting in forecast additional fraud of £41m for the period.

Actuals (2000 – 2006) and 2006 Forecast (2007 – 2010) show that there would be additional fraud losses of **£559m** over and above that forecast in the Business Case. This is made up of £180m additional fraud losses (2000 – 2006) and further forecast additional fraud losses of £378m (2007 – 2010).

As with the overall position for CNP, the limited introduction to the UK of AVS / CSC positively impacted fraud during the period 2000 – 2006. However, with the slower than anticipated rollout of 3D Secure (only c.5% of cards have been registered and a relatively small number of online merchants have adopted this service) and the anticipated introduction of Two Factor Authentication from 2008 onwards the increase in fraud levels off.

7.4.2 CNP (UK Cards Used Abroad)

Chart: Fraud Analysis – CNP (Abroad)



Source: 2006 APACS Statistics

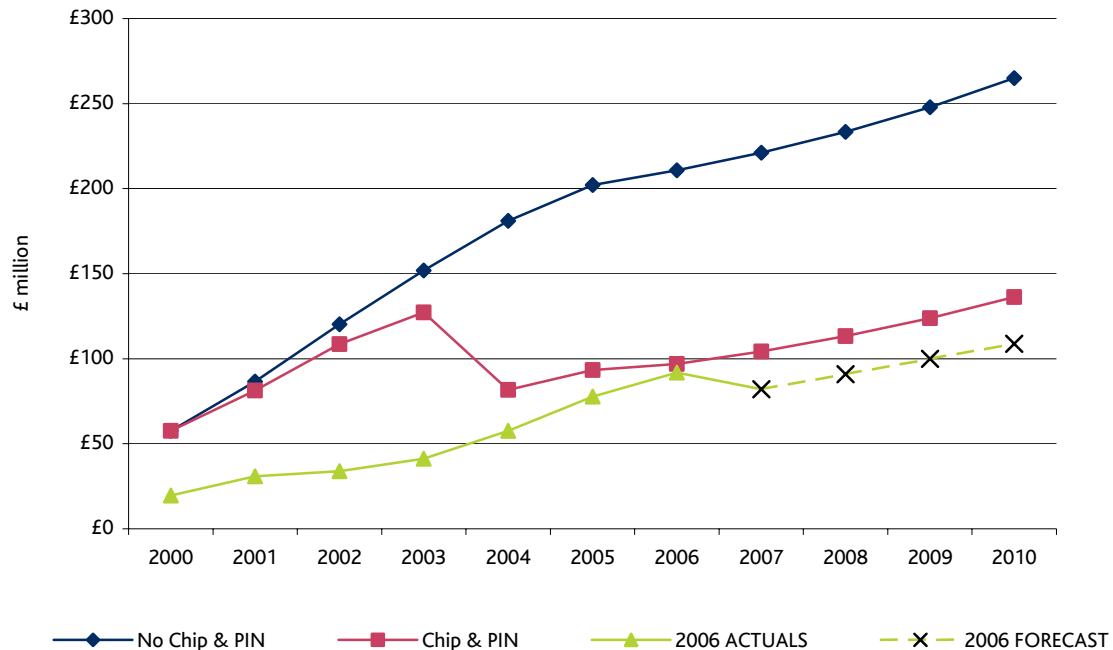
The total cumulative UK card fraud figure (2000 - 2010) where there was no implementation of Chip & PIN was forecast as £236m and this was predicted to increase to £292m following the introduction of Chip & PIN resulting in forecast additional fraud of £56m for the period.

Actuals (2000 – 2006) and 2006 Forecast (2007 – 2010) show that there would be additional fraud losses of **£483m** over and above those in the Business Case. This is made up of £123m additional fraud (2000 – 2006) and further forecast additional fraud of £360m (2007 – 2010).

The marked increase in fraud for cards used overseas is a similar explanation to that of CNP overall as the growth in this market was under estimated. There has been a strong increase in CNP sales taking place overseas as UK consumers have benefited from lower prices abroad, particularly from the USA when combined with a significant benefit in the £ Sterling : US Dollar exchange rate. In addition, a number of other factors have come into play with little use of AVS in the US (they would not be able to use a UK CSC check since the US uses a ZIP code which is not compatible with a UK postcode) and a limited take up of fraud prevention solutions in overseas markets.

7.5 Foreign Issued Cards Used In The UK

Chart: Fraud Analysis - Foreign



Source: 2006 APACS Statistics

The total cumulative UK card fraud figure (2000 - 2010) where there was no implementation of Chip & PIN was forecast as £1,978m, and this was predicted to decrease to £1,124m following the introduction of Chip & PIN giving forecasted fraud savings of £854m for the period.

Actuals (2000 – 2006) and 2006 Forecast (2007 – 2010) show that there would be additional fraud saving of **£390m** over and above those forecast in the Business Case. This is made up of £294m additional fraud (2000 – 2006) and further forecast additional fraud of £101m (2007 – 2010).

Although the Chip & PIN forecast showed a fall from 2003 – 2004, there was a rise in Actuals due to the increased influence of CNP in the figures.

There was a large disparity in the Actuals and forecast figures for 2000 as the Business Case forecast figure for 2000 was based on an over estimate of the Actuals and this effect can be seen as figures are projected forward based on an incorrect basis. This represents a shortcoming in the forecasting rather than any market dynamic.

Note: APACS does not forecast fraud on foreign issued cards used in the UK. The forecast figures used in this graph were derived using a straight line fit with respect to the Actuals recorded for 2000 – 2006.

7.6 Face To Face Analysis

The previous components of this section focused on the UK Chip & PIN Business Case considering three elements from a UK Domestic and International perspective:

- Lost & Stolen
- Counterfeit
- CNP

However, the primary focus on fraud saved by Chip & PIN was in face-to-face (F2F) transactions in the UK for UK issued cards. Comparing F2F elements of fraud pre-Chip & PIN for 2004 and post Chip & PIN for 2006 and depending on which acceptance outlet the card had been used, the following picture emerges for these three outlet types:

£m	2004	2006	% Reduction
ACCEPTANCE OUTLET			
Retail Outlets	218.8	72.1	67
ATMs	74.6	61.9	17
Branch Counters	19.3	11.6	40
TOTAL	312.7	145.6	53

Source: APACS Fraud Statistics Update (Jan 2007)

(Retail Outlets is for merchant POS, ATMs are ATMs and Branch Counters is where a card terminal is used)

The 67% reduction in F2F fraud at Retail Outlets does not represent what would be the true fall in a complete Chip & PIN environment. The £72.1m figure will also include fraud carried out against merchants who have yet to complete their Chip & PIN upgrade programme as well as fraud conducted using the small percentage of magnetic stripe cards still in circulation.

During the course of 2006, fallback to magnetic stripe at domestic ATMs has been widely removed and it is forecast that this will save £2m of fraud per month in 2007. If this forecast is met, the corresponding fraud reduction from £74.6m in 2004 to £37.9m in 2007 will be c.49% rather than 17%.

7.7 Fraud – UK vs. Abroad (2000 – 2010)

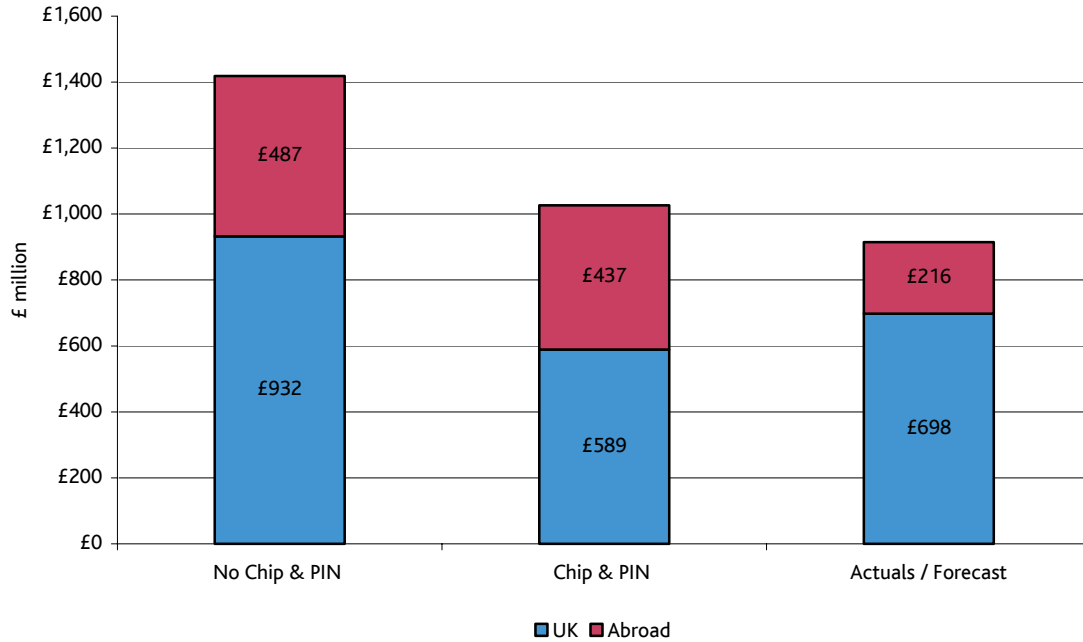
In the preceding sections 7.1 to 7.5, analysis was conducted on the Business Case fraud forecasts and Actuals / Forecast fraud within each fraud type (L&S, Counterfeit and CNP) and then by whether it was conducted in the UK or abroad. The following section analyses the three fraud types and compares the experience of UK issued cards used in the UK and where these cards have been used abroad. In the graphs, Actuals / Forecast relates to Actual fraud figures to 2006 and 2006 forecast fraud for the period 2007 – 2010.

FRAUD (£m.)		Business Case: Estimated Fraud without Chip & PIN	Business Case: Estimated Fraud with Chip & PIN	Business Case: Estimated Savings from Chip & PIN	Actuals to 2006 plus Forecast 2007-2010	Additional Fraud Savings above those in Business Case	Total Fraud Savings
		A	B	C=A-B	D	E=B-D	F=C+E
Overall		£8,437	£5,075	£3,362	£4,905	£170	£3,532
Lost & Stolen	Overall	£1,419	£1,026	£392	£914	£112	£505
	UK	£932	£589	£343	£698	-£109	£234
	Abroad	£487	£437	£50	£216	£221	£270
Counterfeit	Overall	£4,212	£1,998	£2,214	£1,288	£710	£2,924
	UK	£2,102	£559	£1,543	£577	-£18	£1,525
	Abroad	£2,110	£1,439	£671	£711	£728	£1,399
CNP	Overall	£829	£926	-£98	£1,968	-£1,042	-£1,139
	UK	£593	£634	-£41	£1,193	-£559	-£600
	Abroad	£236	£292	-£56	£774	-£483	-£539
Foreign cards used in UK		£1,978	£1,124	£854	£735	£390	£1,243

7.7.1 Lost & Stolen (2000 – 2010)

This section looks at L&S UK issued cards and their use in the UK and Abroad.

Chart: Lost & Stolen (2000 – 2010) – UK vs. Abroad



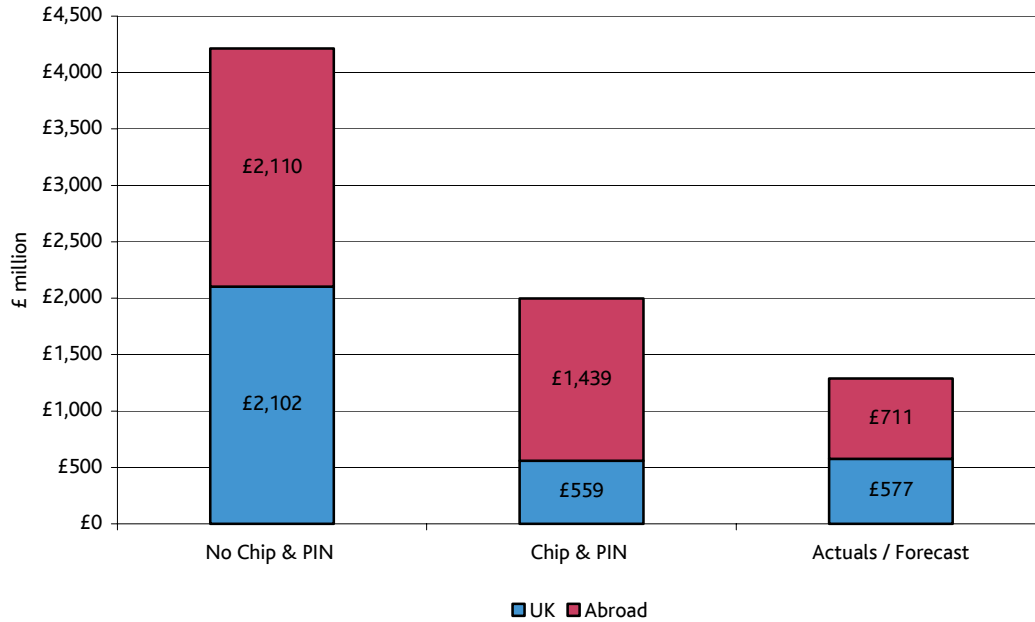
Source: 2006 APACS Statistics

The fraud saved figures for Lost & Stolen have exceeded those projected in the Business Case by £112m. However, this masks an increase in the actual / forecast level of fraud conducted in the UK over that projected in the Business Case of £109m which was more than compensated for by the reduction in Lost & Stolen UK cards used abroad of £221m.

7.7.2 Counterfeit (2000 – 2010)

This section looks at Counterfeit UK issued cards and their use in the UK and Abroad.

Chart: Counterfeit (2000 – 2010) – UK vs. Abroad



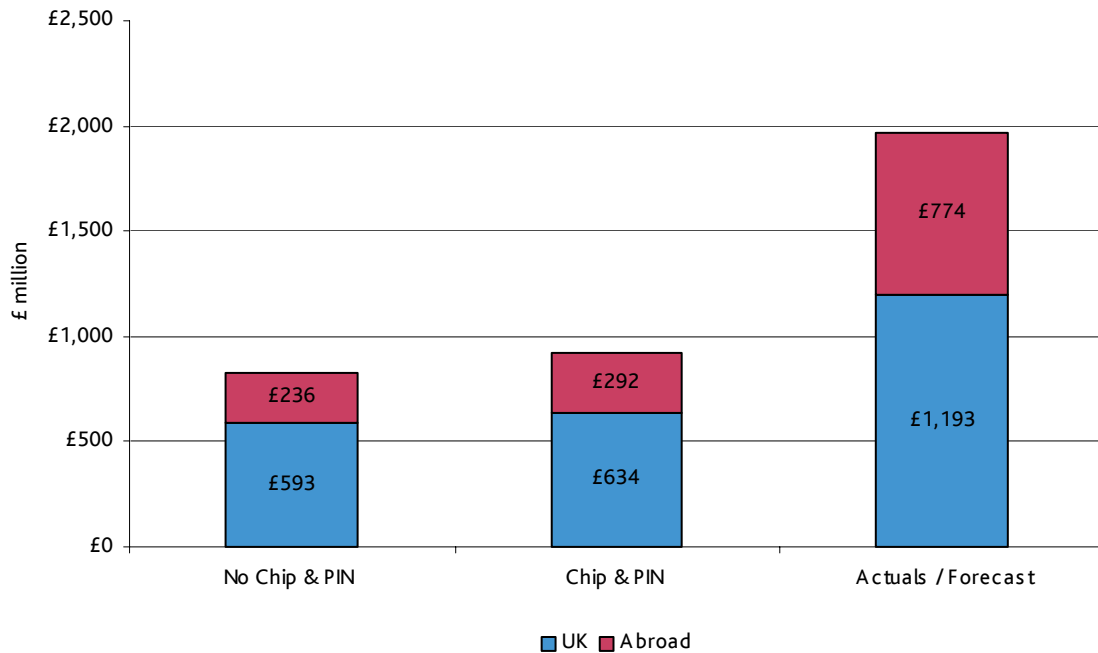
Source: 2006 APACS Statistics

The fraud saved figures for Counterfeit have exceeded those projected in the Business Case by £710m. Figures for Counterfeit UK cards used in the UK are broadly inline with the Business Case. However, there has been a 51% reduction in the Actual / Forecast level of fraud conducted Abroad over that projected in the Business Case of £728m.

7.7.3 CNP (2000 – 2010)

This section looks at CNP on UK issued cards and their use in the UK and Abroad.

Chart: CNP (2000 – 2010) – UK vs. Abroad



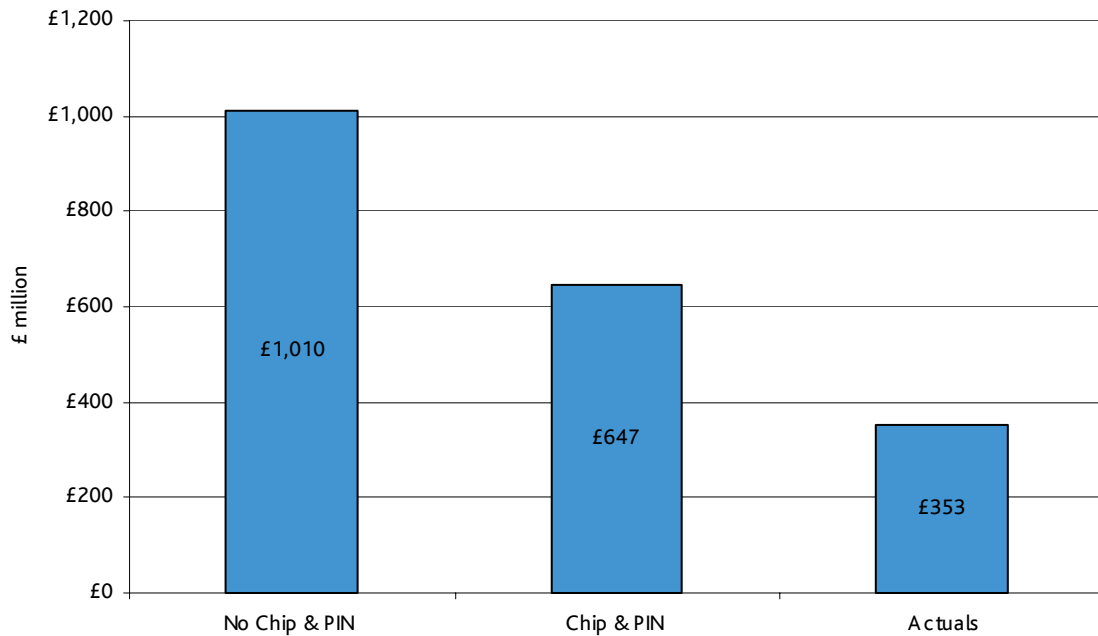
Source: 2006 APACS Statistics

These figures show there has been a £482m increase in the amount of CNP fraud conducted abroad, compared to an increase of £559m against the Business Case prediction for the UK due to the significant under estimation of growth in CNP transactions. However, fraud abroad has increased by 165% compared to the Business Case for Chip & PIN as opposed to 88% for the UK.

7.8 Fraud On Foreign Issued Cards Used In The UK (2000 – 2006)

This graph shows the levels of fraud in the UK from foreign issued cards.

Chart: Foreign Issued Cards (2000 – 2006)



Source: 2006 APACS Statistics

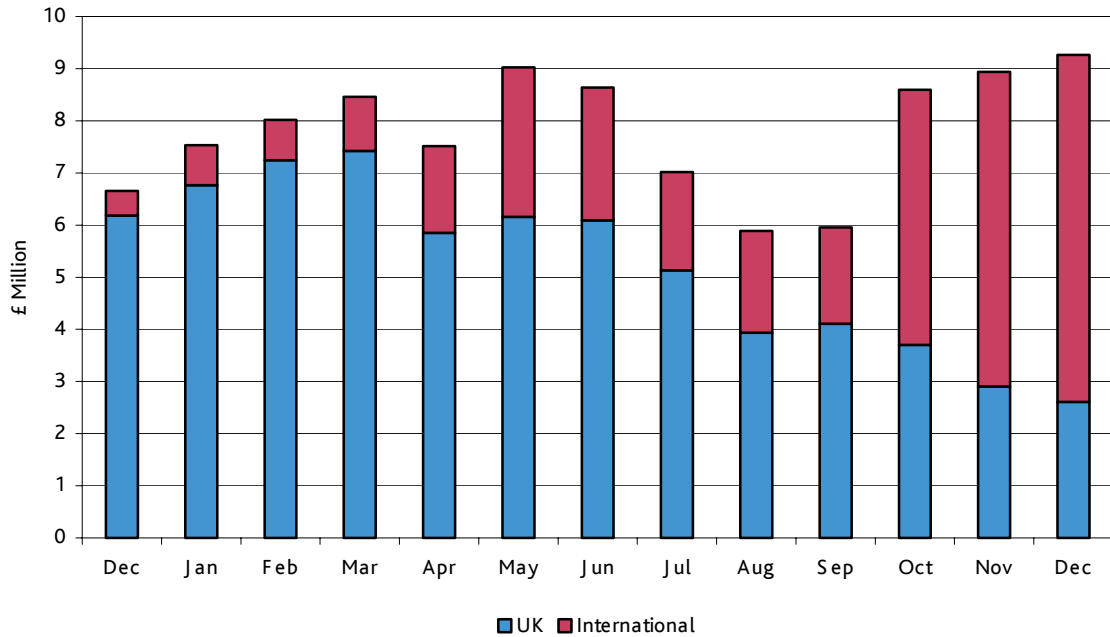
The Business Case figure of £647m of fraud in the UK on foreign issued cards has been exceeded by 45%, falling to £353m. In the Business Case it was assumed that when the UK moves to Chip & PIN, merchants would benefit from being able to chargeback to those other EU countries that had still to migrate to Chip & PIN.

7.9 ATM Fraud

With the UK nearing a 100% Chip & PIN environment, there has been a significant increase in the level of ATM fraud taking place in foreign markets where the Chip & PIN infrastructure does not exist or rollout is less advanced than in the UK.

7.9.1 ATM Fraud – Domestic Vs. International (2005 – 2006)

Chart: Fraud on UK Issued Cards at all ATMs (2005 – 2006)

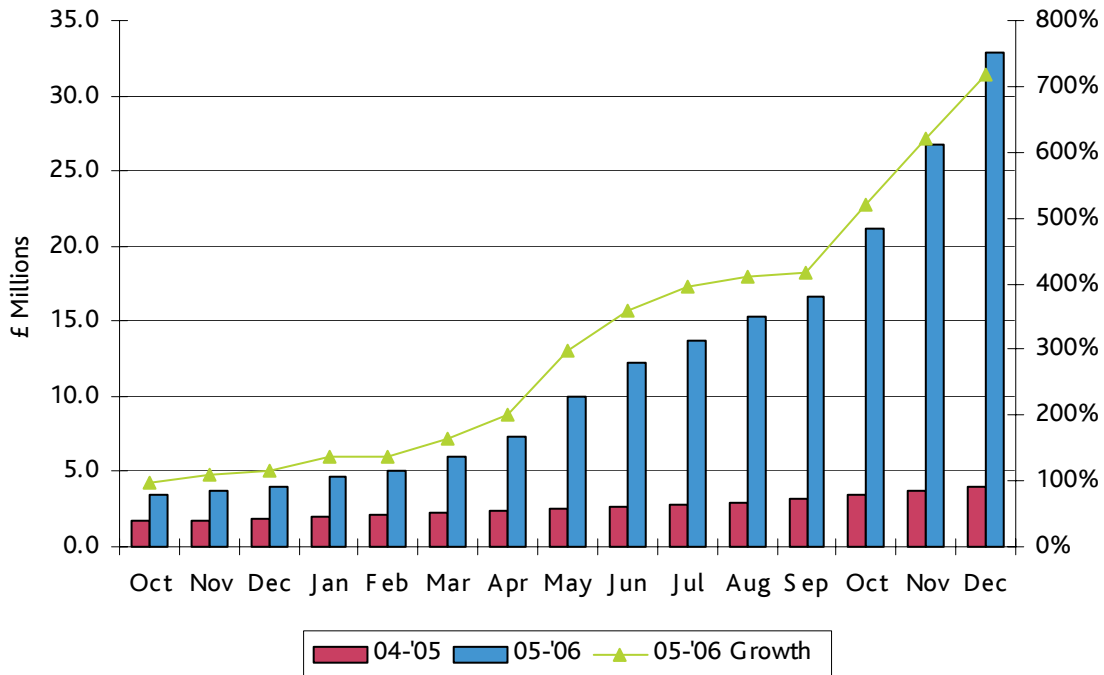


Source: 2006 APACS Statistics

Given that the majority of UK issued cards are now Chip & PIN capable and fall back to magnetic stripe at ATMs has been withdrawn (MasterCard mandate of Jan 2007) UK ATM fraud has become more difficult to commit. Fraudsters have adjusted their behaviour and switched their attention to foreign ATMs that accept magnetic stripe cards.

7.9.2 ATM Fraud Abroad – Overall

Chart: Fraud on UK Issued Cards at Overseas ATMs



Source: 2006 APACS Statistics

This graph shows the rolling twelve months' trend in ATM fraud. There is a direct link between the level of counterfeit fraud acquired at foreign ATMs and POS and the level of EMV introduction in these countries. Comparing the rolling 12-month totals for ATM fraud for the period December 2006 vs. December 2005, there has been an increase of more than 800% from £4.0m to £32.9m. This link is demonstrated by the level of conversion to EMV Chip & PIN in the table below which is broken down by key European countries:

	% ATMs converted	% POS converted
Germany	6.0	2.0
Greece	26.5	31.0
Italy	1.9	32.2
Spain	66.0	47.8
Netherlands	70.0	0.1
UK	100.0	94.0
France	99.9	94.0
Sweden	100.0	6.4
Denmark	100.0	14.25
Belgium	100.0	89.0

Source: EMV Implementation in the EU: 12th Snapshot (As of end Q4 2006) version 0.2, European Payments Council (Jan 2007). Note: UK figures provided by APACS

7.10 Fraud Comparison - Three Types

This analysis summarises the relative mix of Lost & Stolen, Counterfeit and CNP fraud on UK issued cards (used in both the UK and abroad) forecast in the Business Case against the Actuals / Forecast figures to date and highlights the difference between expected fraud forecast in the Business Case and what actually happened. For example, Total Fraud of **£6,460m** with No Chip & PIN was split 22% L&S, 65% Counterfeit and 13% CNP whereas Total Fraud (Actuals for 2000 - 2006) of **£2,443m** was split 21% L&S, 62% Counterfeit and 16% CNP.

Actuals / Forecast (2000 – 2010)

	TOTAL FRAUD	LOST & STOLEN		COUNTERFEIT		CNP	
	(£m.)	Value (£m.)	%	Value (£m.)	%	Value (£m.)	%
No Chip & PIN	£6,460	£1,419	22%	£4,212	65%	£829	13%
Chip & PIN	£3,950	£1,026	26%	£1,998	51%	£926	23%
Actuals / Forecast	£4,170	£914	22%	£1,288	31%	£1,968	47%

Actuals (2000 – 2006)

	TOTAL FRAUD	LOST & STOLEN		COUNTERFEIT		CNP	
	(£m.)	Value (£m.)	%	Value (£m.)	%	Value (£m.)	%
No Chip & PIN	£3,700	£787	21%	£2,311	62%	£602	16%
Chip & PIN	£2,631	£655	25%	£1,332	51%	£644	24%
Actuals	£2,443	£647	26%	£849	35%	£947	39%

Source: 2006 APACS Statistics

LOST & STOLEN

It was forecast that L&S fraud would increase from 22% to 26% of the total when Chip & PIN was introduced; this figure is 4% points lower at 22% when Actuals / Forecasts are taken into consideration. However, these figures differ when considering the respective Actual fraud figures for the period 2000 – 2006. These show that L&S fraud was predicted to increase from 21% to 25%; this figure is 1% points higher at 26% when Actuals are taken into consideration.

COUNTERFEIT

Counterfeit fraud was forecast to fall from 65% to 51% of the total when Chip & PIN was introduced; this figure is 20% points lower at 31% when Actuals / Forecasts are taken into consideration. However, these figures differ when considering the respective Actual fraud figures for the period 2000 – 2006. These show that Counterfeit fraud was predicted to decrease from 62% to 51% and the Actual outturn was 35% or 16% points lower.

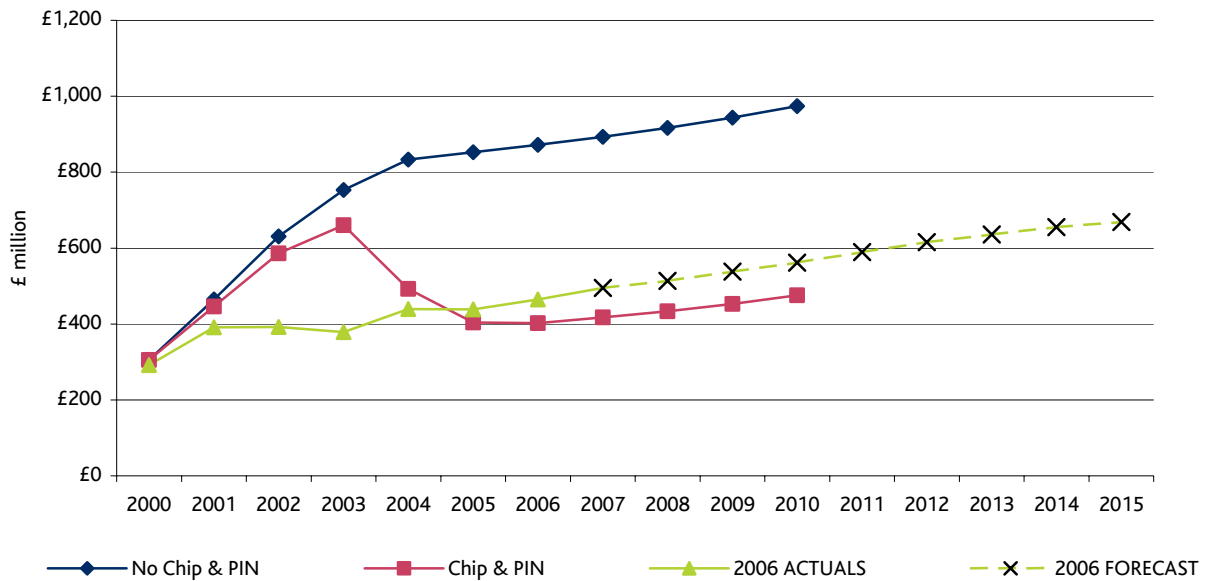
CNP

It was forecast that CNP fraud would increase from 13% to 23% of the total when Chip & PIN was introduced; this figure is 24% points higher at 47% when Actuals / Forecasts are taken into consideration. However, these figures differ when considering the respective Actual fraud figures for the period 2000 – 2006. These show that CNP fraud was predicted to increase from 16% to 24% and the Actual outturn was 39% or 15% points higher.

Overall, this analysis shows that for L&S and Counterfeit, the Business Case predictions have been broadly correct only diverging by 4% but the same could not be said for CNP. This highlights how a developing channel of which there was limited knowledge can, as opposed to one that is well understood, skew the predicted outcome.

7.11 Fraud Projections To 2015 (Lost & Stolen, Counterfeit & CNP Fraud)

Chart: Fraud Projections to 2015



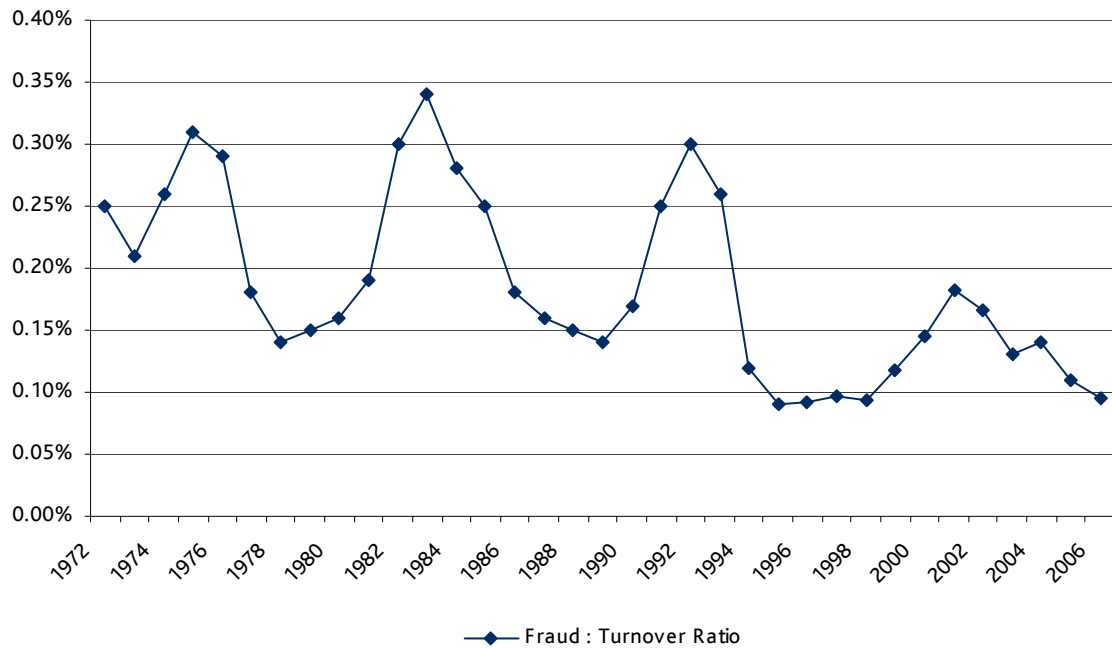
Source: 2006 APACS Statistics

The Business Case covers the period 2000 – 2010 and the current fraud forecast for 2011 – 2015 has been continued as shown in the graph above. This shows that fraud is forecast to continue rising 2010 – 2015 at an overall rate of c 3.8% per annum. However, within these figures there is forecast to be a c.2.6% per annum fall in Counterfeit fraud and c.1.0% per annum rise in Lost & Stolen fraud. For CNP fraud, there is a forecast c.4.9% increase in CNP fraud reflecting the increasing importance of these remote sales channels.

In addition, this graph demonstrates the overall accuracy of the original Business Case forecast from 2005 onwards as it broadly tracks Actuals to 2006 and the forecast trends to 2015.

7.12 UK Fraud: Sales Turnover Ratio (1972 – 2006)

Chart: Long Term Fraud Cycle



Source: 2006 APACS Statistics

The above graph illustrates the long-term picture of card fraud in the UK (covering all card fraud types). One of the key aims of the Chip & PIN implementation is to break out of the cycle of peaks and troughs. Historically, the industry has responded to crises in card fraud by making significant investment in new preventative measures (for example, terminalisation in the early 80s and, later, a major increase in levels of authorisation during the mid 90s).

One means of judging the long-term value of Chip & PIN technology will be whether it successfully provides an evolutionary way of gradually escalating the security of the card payments process in response to new risks and types of attack from the criminal fraternity. One would hope to see a smoothing out of the 10-year cycle of peaks and troughs illustrated above.

8 CHIP & PIN PROGRAMME – POST IMPLEMENTATION REVIEW (2005)

The Programme Management Organisation (PMO) was an independent team appointed to manage and support the Chip & PIN programme through to May 2005 after which time APACS resumed the role. A Programme Steering Committee (PSC), made up equally of banks and retailers, had responsibility for driving the programme forward and overseeing strategy.

External consultants were appointed in 2005 to research and review the Programme with a brief to:

- Learn what went well, why it did so and capture the lessons;
- Consider what did not go well and analyse why not; and
- Concentrate on the governance and management structure that was put in place to oversee and manage implementation.

Initial research was conducted by reviewing key documentation to gain an understanding of the programme, its history, and inception and governance arrangements. This was followed by in-depth interviews amongst key stakeholders. The overall findings were then distilled into recommendations with rationale for these and guidance on lessons learnt. The following are extracts from the report, showing the areas reviewed with headline statements on the subsection topics and supporting comment on the lessons learnt and recommendations.

8.1 High Level Implementation Successes

This shows the five key successes of the programme that the study identified:

- Banks and retailers working together through the PSC, assisted by other informal groupings.
- Consensus decision-making, facilitated by the use of an independent PSC chairman.
- Programme drive and stakeholder support, provided by the independent PMO.
- The Northampton Trial.
- Agreement, in principle, to move towards programme completion by setting a target date for ending PIN bypass.

8.2 Governance

Structure Headline Statement: "A multi-stakeholder programme to implement a shared system with no single owner requires consensus decision-making"

- The ability of a PSC to make consensus decisions was likely to be enhanced by informal discussions between key players and requires an independent chairman.
- Consultative decision-making requires strong leadership within the decision-making body – opinion formers were required to set direction and influence others.
- A governance structure was less critical than active participation of opinion-formers – key decisions were likely to be formed outside the defined structure.

Funding Headline Statement: "It was never realistic to expect retailers to fund the PMO"

Funding the PMO would have been better with a committee of funders (Finance Committee) to delegate and oversee the programme's expenditure with the offer of funds binding on those that have committed them.

Representation Headline Statement: "Representation requires consultation which in turn requires PMO expertise and support"

- It was critical to have the correct representation on PSC - only stakeholders responsible for deliverables should be represented. Representation to be drawn from banks, card schemes, retailers and vendors (not represented at the PSC). However, Government, consumer and disability groups etc. should not be included as they were stakeholders without specific deliverables.
- PSC representatives should be selected against defined competencies and characteristics.

APACS and BRC Representation Headline Statement: "Formalise role of APACS representative; and create equivalent retail sector role"

- The existence of a programme champion/conscience would enhance programme success, but note that this role could not be formalized.

8.3 Management

PMO Headline Statement: "An independent PMO is necessary to support the programme"

- A programme of this nature needs an independent PMO with solid processes and formal project management skills.
- Continuity of PMO senior management was a major contributor to the programme's success.

KPIs and Integrated Programme Headline Statement: "Excessive focus on KPIs"

- Key Performance Indicators should be fully representative of the programme's goals and care taken to avoid excessive focus on them to the exclusion of other key issues and creation of bureaucracy.
- Creation of an integrated programme should be used to build consensus around an optimized roll-out.

8.4 Decision Making and Trial Date

Headline Statement: "Success of the trial was critical to the programme but the trial date could only be decided by key players with specific interests"

- Final date for any major programme activity must be decided by all the key players with a specific interest in the outcome and if a date could not be met, only announce a change when there was a real certainty about the new date.
- An early successful trial creates visibility and gives confidence to the markets.
- A programme of this nature and size needs systems integration – integration effort was always underestimated when introducing new systems into existing business processes.

8.5 Common Cause and Central Communications

Common Cause Headline Statement: "Commitment and delivery are required to build consensus and maintain trust"

- Ensure that key players have an interest in the common goal, or consensus would not be achievable.
- Programme targets to take into account that individual stakeholders need to travel at a similar pace to encourage consensus decision-making.
- A programme of this nature should not be used for competitive advantage but it may create a platform for competitive business opportunities in the future.

Centrally Deployed Communications Headline Statement: "Accept centrally deployed communications as the baseline for a future programme"

- Where a decision had been made on centrally deployed communications, this should be used as the baseline against which other propositions are judged.
- Believe your experts, especially when they have been selected for that very purpose – banks were initially uncomfortable on the communications approach; however, their own marketing teams confirmed that the approach was sound.

8.6 Power Balance

Headline Statement: "The PMO could not have authority over an individual parties' business decisions"

- Participants would make decisions based on their own business needs; the PMO could not have authority over such decisions e.g. individual rollout plans.
- Naming and shaming of sectors is always appropriate. Naming and shaming of individual organizations requires trust and sensitivity and should not be used lightly.

8.7 Mid – Tier Retailers

Headline Statement: "Mid-Tier retailers would be late to implement"

- Where a business case is unattractive to some market sectors or tiers they may be reluctant to implement change where this shows avoiding a negative (reduction in fraud) rather than generating a positive return. This may also lead to a late implementation - mid-tier implementation tail would be long.
- Communicate a very specific message where the Business Case is unattractive to a business i.e. the impact on their business if they fail to implement.
- Have short-term planning horizons as IT was already a mid-tier's biggest spend after staff - any cost increases would be unwelcome.
- Since banks and larger retailers want the mid-tier to be included, treat them as a special interest group.
- Establish and agree a definition for this market segment. Estimates ranged from 3,000 – 28,000 retailers.

- Engage directly with opinion-formers as part of a wide-ranging approach to communications – this segment is diverse and difficult to treat as a single body and could be reached through small trade associations, local chambers of commerce etc.

8.8 Certification + Vendors

Certification Headline Statement: "Stability and interpretation of rules and specifications was critical to success"

- Freeze the specifications, and implement rigid change control with a single set of test rules and establish common interpretation.
- Ensure that tests are not too easy to pass, as this would cause problems later on.
- Build a common test facility that is cost effective and helps to overcome certification issues and bottlenecks.
- To solve problems it was best that the acquirers, hardware and software supplier stakeholders act together.

Vendors Headline Statement: "To engage vendors early, they must be incentivised with firm orders or a clear business case for product development"

- A change to specifications deters vendors from developing new products.
- Proactively encourage development of technical solutions / new products.

8.9 Other

- Include a value engineering work stream in the PMO scope as this would help to reduce costs through developing common solutions for hardware and software.
- Manage the end of the programme – it is as important as managing the beginning – to ensure the benefits are realized.

This is an extract of key points from the "Chip & PIN Programme – Post Implementation Review (Final Report) produced by The Nichols Group 11 April 2005.

Note: Analysis was also carried out by the PMO that captured the experiences from managing the Chip & PIN Programme and the knowledge gained between January 2002 and December 2004. See "Learning and Experience from the Chip and PIN Programme Management Organisation" February 2005.

9 POST IMPLEMENTATION STAKEHOLDER ANALYSIS (2006 – 2007)

This section covers qualitative research conducted amongst the key stakeholders (acquirers, issuers, retailers and the schemes) to gather feedback on aspects of the cross-industry Business Case that related to their businesses, and what they considered were the key learnings from the Chip & PIN implementation.

A bespoke questionnaire was prepared by APACS and sent to each of the stakeholder groups with replies received from October 2006 – February 2007. Eighteen responses were received from: one card scheme, four acquirers, ten issuers and three retailers. Stakeholder responses have been kept separate, where appropriate, to show their differing perspectives on the topics.

9.1 Business Case Feedback

9.1.1 Dispute Handling – Retailers

Retailers were asked to comment on the changes they experienced in their operations for dispute handling (Chargebacks, Requests for Information and Write Offs) when Chip & PIN was introduced.

- Some retailers have experienced a 50% decrease in write offs and up to £100k in savings and are predicting further savings to come.
- Decreases in Requests for Information (RFI) / chargebacks have been offset by other Chip & PIN issues such as PIN pad failures, increased support charges due to support call complexity and time taken to resolve non-payment queries where a card had been removed before the PIN pad was ready.
- An improved dispute handling process is in place with fewer physical storage requirements and a simpler RFI defence. In addition, there is now a better focus on fraud with more proactive management of fraud risk.
- Retailers have seen business efficiency improvements of around 7% and some have seen a 50% or more reduction in banks' requests for copy vouchers.

9.1.2 Issuing - Issuers

Issuers were asked to comment on how the introduction of Chip & PIN has changed their card issuing operations. For example, had there been a change in their delivery of cards to cardholders?

- Most issuers (six) reported no change in the level of requests for replacement cards, while some issuers (three) have seen an increase. However, this masks a wide divergence with card replacement pre-Chip & PIN ranging from 0.8% to 23% and for post Chip & PIN from 0.78% to 27% of their card base.
- Seven issuers reported relatively no change in their level of re-issue due to wear and tear against one who saw an increase.
- Introduction of Chip & PIN cards saw relatively little change in the issuance cycle pre and post Chip & PIN – where there were changes there was an increase of 12 months.

- Overall, the cost of issuing cards was reported as being in line with expectations (six issuers reported this); with three issuers finding this higher than expected, and one lower than expected.
- The move to Chip & PIN has allowed changes to the way cards and PINs are delivered to cardholders. Expensive secure delivery has been removed for a majority of mailings except new issues to high-risk areas. Some issuers have seen a 98% reduction in cards intercepted and used fraudulently. At a card's next re-issue, there would be no requirement to send out PIN details.
- There has been a 39% - 60% decrease in the number of rewards given for return of suspect cards and the value has fallen by 70% from £3.87m to £1.46m (three issuers). Three issuers reported no change in the level of rewards given.

9.1.3 Transaction Processing

Retailers

Retailers were asked to comment on any changes in their retail outlets for processing card transactions such as the impact on processing times at the POS and changes in the mix of payment methods – cash, cheques and cards.

- For one retailer, implementation costs were as expected but PIN pad support and maintenance costs have been 20% higher than expected.
- One retailer reported transaction times increasing by 20% or 4.68 seconds; although, this has had no material affect on the business but may create problems during peak trading periods. Another retailer reported that they had seen transaction times fall by 17% or 5 seconds.
- There has been a small increase in the use of cash / debit payments. However, this may be due to the removal of cheque acceptance after PIN bypass ceased.

Acquirers

- A decrease in voice authorisation and merchant transaction referrals.

9.1.4 Market Development

Acquirers

Acquirers were asked what developments they were considering now that a Chip & PIN infrastructure was available and the effect on their merchant operations.

- With the greater security provided by PIN, some acquirers are considering how best to use Cardholder Activated Terminals (CAT).
- Reviewing the opportunities created for contactless payments.
- The Chip & PIN infrastructure could allow greater use of two-factor authentication outside the card payments market e.g. online banking removing the use of static passwords.
- Extending Unattended Payment Terminals (UPT) mechanisms into petrol, ticketing and car parking.
- Greater use of Mobile and Portable terminals in areas where a PIN transaction protects the merchant instead of using a paper voucher.

- With liability shift, Chip & PIN would help in migrating paper merchants to electronic payments.

Retailers

Retailers were asked how Chip & PIN has allowed them to develop their businesses – new opportunities, operational benefits and new payment mechanisms.

- Similarly to acquirer feedback, retailers recognise that they could develop UPTs to reduce staff card acceptance costs.
- Since cardholders do not have to sign vouchers for a Chip & PIN transaction, retailers do not have to store transaction vouchers.
- With Chip & PIN there were fewer RFIs and this has led to significantly reduced administrative overheads.

Schemes

The schemes were asked to comment on the opportunities Chip & PIN provided to develop new products and markets.

- UK EMV infrastructure provides an opportunity to launch new technology pilots e.g. contactless payments.
- Differing approaches are being taken globally to Chip & PIN's rollout; most markets are using a less co-ordinated approach than was used in the UK.
- Some markets are adopting a mixture of the benefits Chip & PIN provides. One market is adopting chip and signature while another is opting for PIN verification.
- Asia Pacific is the second biggest EMV region with rollout of both cards and terminals taking place in parallel.
- In South America and Latin America / Caribbean, terminal rollout is more advanced than card rollout.

9.1.5 Central Systems - Issuers

Issuers were asked to comment on what opportunities and benefits the move to a system that supported Chip & PIN provided and the cost implications for that move.

- Host upgrade costs were in line with expectations (three), more than expected (three, ranging from plus 15% to 30%), and less than expected (two, ranging from minus 10% to 38%).

NEW OPPORTUNITIES

- Improved credit control
- Low value payments potential
- Increased cardholder base as the card controls the risk

OPERATIONAL BENEFITS

- Reduced fraud
- Higher card usage
- A4 PIN mailers are more secure than the impact stationery used before

NEW OPPORTUNITIES

- UPT card acceptance
- Improved credit / risk settings by using the chip
- Change PINs at ATMs rather than using a paper based self-select process
- Obtaining PIN by IVR
- Online banking
- Two Factor Authentication
- Contactless - chip allows this to be launched
- Chip on Cash cards

OPERATIONAL BENEFITS

- Introduction of PIN change and unlock for Credit and Debit cards at ATM
- Increased lifecycles on Credit and Debit cards
- Improved Management Information Systems on chip cards
- Different areas of the bank benefited from the introduction of Chip & PIN – Fraud, Authorisations and Customer Service

9.1.6 Other Comments

Set out below is a selection of comments from various stakeholders.

- Risk management improved with a softer approach applied where there are confirmed Chip & PIN transactions than for fallback, and through using settings within the chip e.g. velocity parameters.
- Ability to segregate the value and velocity parameters by transaction type has allowed higher spending for "good PIN" or "safe" transactions – improved approval rates, increased customer satisfaction and reduced volume of referrals.
- Improved profiling to identify counterfeit cards being used at POS.
- Improved risk management by using the parameters in the chip e.g. Upper Consecutive Offline Limit (UCOL) and more opportunities to send block scripts as more terminals have been placed.
- Using scheme regulations to chargeback chip transactions to a merchant who has not signed up to the Chip & PIN programme.
- Effect of domestic liability shift is small due to the advanced state and fast pace of Chip & PIN roll out on the merchant / acquirer side.
- Intra-European liability shift shows UK issuers shifting liability for counterfeit and fraudulent transactions to European markets who have yet to migrate their acquiring infrastructure.

9.2 Key Learnings

This section covers qualitative research conducted amongst the key UK players involved in the introduction of Chip & PIN into the UK. They were asked for their opinions on what were the key lessons, successes and what was least successful during the project. The stakeholders' responses have been listed in separate subsections to show the relative importance that each attached to the aspects of the Chip & PIN programme that affected their businesses.

9.2.1 Key Lessons

Respondents were asked, "What were the three most important lessons to be learned from the Chip & PIN programme?"

Card Schemes

- All major stakeholders have to be involved from day one. If Chip & PIN were viewed as a bank or retailer-only project then it would not have been possible to deliver the end-to-end migration from cardholder to merchant to acquirer to issuer to card scheme.
- Delivering the benefits of migrating to Chip & PIN requires more than simply migrating cards and terminals. Changes to fraud and chargeback systems in particular were vital to deliver an impact to the bottom line.
- It was vital that the project is owned at a high level within the business. To judge this as just a technical change would have jeopardised the whole project.

Acquirers

- Adopt a standardised approach and ensure a consistency in the prompts and processes at the Point of Sale.
- Do not underestimate the amount of merchant staff training required.
- Ensure that merchants were engaged early on in the process.
- Identify the potential 'threats' from Chip & PIN's implementation and develop actions to rectify these. For example, the industry should have pushed AVS / CSC checking more aggressively and identified more robust CNP / eComm fraud prevention measures as this was where face-to-face fraud was expected to migrate.
- It is important that the final and definitive specifications, technical standards and approvals process – from all stakeholders (including the card schemes) is decided early on in the project to help in discussions with retailers, vendors etc.
- The central Programme Management Organisation should also include forums for vendors and disability groups.
- A central communications strategy is required to provide co-ordinated and common messages addressing the needs of all stakeholders.
- Clearly define the management information requirements at the beginning of the project.

Retailers

- Card issuers should tighten their security where there is fraud liability shift away from merchants where on-line PIN bypass is authorised.
- Ensure there is good dialogue with equipment suppliers.
- The bank accreditation process was too complex and could have been communicated and executed better if the needs of the end retailers had been better taken into account.

- Early Merchant engagement and good project management supported by excellent communication.
- Ensuring there were common goals and objectives and any concerns raised were properly addressed.

Issuers

- Early adoption of programme governance and structure for a programme of this complexity and size.
- Unified cross Industry working and collaboration with open dialogue amongst stakeholders to give a single view of the customer that issuers, acquirers and retailers aimed for.
- More structure and control required in the roll out of renewal cards over a short timescale with prevention strategies in place to counter Mail-Non-Receipt fraud due to the volumes being intercepted in the mail system.
- An “industry” level change does not need everyone to move at the same pace – it only needs to be inclusive and the benefits case for individual participants is more important than the overall industry case.
- Generally positive public & media perceptions helped with behavioural change. But this required time and planning and a flow of good news stories to counteract any bad press.
- Do not treat Chip & PIN as just a technical change, develop the customer proposition as part of the programme and consider the special needs communities.
- Provide Customers and Merchants with the right level of consistent communication, education and procedures. For example, a customer’s inability to identify when a PIN had been locked made it more difficult to resolve problems during the customer enquiry process and customers were asked for a PIN at one merchant and then for a signature at the next resulting in customers believing that there was a problem with their card.
- Initially Chip & PIN was perceived as a technical project to reduce fraud. During the implementation process all business areas recognised the challenges and opportunities of the programme; especially, areas like Authorisations and Marketing.
- It was found that cardholders adapted to change quicker than anticipated.
- The speed and sophistication of fraudsters who adapted to capture the PIN and the migration of counterfeit fraud to overseas.
- Thorough testing of all systems to ensure maximum interoperability in the live environment (this was helped by the APACS testing room).
- A project of this scale would have been easier without other major projects taking place at the same time e.g. Switch to Maestro.
- Smaller Issuers were advised not to underestimate the complexities of a project of this stature, particularly key management and PIN change.
- Setting a target for PIN bypass removal earlier in the programme.

9.2.2 Successes

Respondents were asked, “In your view, what were the three key successes of Chip & PIN?”

Card Schemes

- Reduction in counterfeit, lost / stolen fraud and a reduction in the costs associated with exception processing.
- The smooth and largely trouble-free change in cardholder behaviour when they were not used to PIN verification at the Point of Sale.

Acquirers

- Creating innovation in what was a stable card payments market.
- Open discussion amongst all stakeholders in joint forums worked well as all were working towards a common goal.
- The setting of clear objectives with supporting prioritisation and teamwork led too a successful delivery of the overall project.
- Cross-industry co-operation under APACS' leadership, which provided a co-ordinated approach.

Retailers

- Broad acceptance, understanding and adoption of the technology by consumers and merchants (PIN bypass removal day proved to be no problem at all) and improved customer confidence in cards.
- The ability to deliver an unattended card payment mechanism to key sectors such as Petrol.
- Reduction in fraud and RFIs and time spent in dispute enquiry handling / administration.
- Some retailers achieved a return on their Chip & PIN investment within one year.

Issuers

- Introduction of a centralised Industry body with the participation of issuers, acquirers, merchants and card schemes through a Programme Management Organisation (PMO).
- Full participation by all stakeholders, sharing ideas and best practices and the value of detailed planning and open discussions at meetings with regular meetings to discuss issues / progress.
- Consistent message from central communications and PR - linking PIN Day to a celebration date worked well.
- Banks delivered what was required collectively and individually.
- The APACS test room allowed cards to be tested in bank owned and merchant owned terminals.
- Early engagement of all business areas impacted within the organisation.
- Good collaborative approach initially between the banks, retailers and schemes led to a smooth transition through sharing of information and lessons learned.
- Reduction in fraud overall; although, the industry should have been better prepared for the migration of fraud to CNP.
- Chip & PIN has set the foundations for future changes. For example, Two Factor Authentication and a possible move to biometrics sometime in the future.
- Improved risk management now that there is the ability to target non-chip transactions.

9.2.3 *Least Successful*

Respondents were asked: "In your view, what were the three key elements of Chip & PIN that were least successful?"

Card Schemes

- Offline benefits of chip are still not being realised by the UK market. For example, setting zero floor limit at many merchants due to historical arrangements or using low risk management parameters on EMV cards as the issuer's back-office fraud and risk system are still heavily reliant on online authorisations.
- No plan from the start to minimise then eliminate performance issues; for example, fallback and transaction speed.
- No overall plan developed for the cardholder experience e.g. the variety of ways cards were inserted in terminals.

Acquirers

- Chip & PIN may have lulled retailers and cardholders into a false sense of security. For example, in 2006 some UK petrol stations saw an increase in magnetic stripe compromise in the UK that was then used in overseas ATMs.
- Bureaucracy and multiple security testing, particularly PIN Entry Device (PED) certification has led to increased costs.
- The benefit from reducing on-line authorisations has failed to materialise with some issuers controlling bad debts as well as fraud using the card settings. Merchants have seen that the chip has taken away their control of authorisations.
- Despite the authorisation strategy being a key benefit of the Business Case – which estimated that 1 in 5 transactions or 20% would be forced online – authorisation levels are currently running at 90%.
- The engagement of mid-tier retailers to accept Chip & PIN, notwithstanding the introduction of the liability shift, where the business case to convert to Chip & PIN was not proved. Some did not upgrade their estate to Chip & PIN.
- Lack of stability in the technical standards and testing / approvals led to retailers / vendors not moving or moving earlier due to conflicting messages being received.
- Changing management information requirements after an acquirer's development team had finalised their development requirements.

Retailers

- Continuing industry confusion over where liability rests for fully authenticated transactions occurring during merchant chargeback windows.
- Poor liaison between Bank / equipment suppliers' leading to late delivery.
- Executive not engaged at the highest levels on the project, it was not judged as high priority and insufficient resources were applied.
- Some card issuers were slow to start issuing Chip & PIN enabled cards resulting in cardholder confusion that created additional problems at POS since not every card could be handled in the same way.
- Not yet a global requirement with some countries implementing over much longer timescales.

Issuers

- Requirement to still have magnetic stripe on cards for non-EMV UK retailers and overseas merchants and overseas ATMs - quicker than expected fraud migration overseas due to the lack of global chip migration.
- Delays to the "go / no go" decision subsequent to the pilot.
- Retailers slow to come on board with more focus required by acquirers on mid-tier merchants who own their own kit.
- Some merchants' internal staff education and customer communication programmes led to a lack of understanding amongst their staff about the programme with different customer experiences leading to confusion and scepticism.
- Roll out took longer than expected and led to interoperability issues in the early stages of implementation.
- Not being able to disable fallback and PIN by-pass transactions sooner.
- Not being able to fully utilise the functionality of the Chip e.g. the ability to using Script Processing to make decisions on transactions benefiting Fraud and Credit Risk.
- Cardholders not being able to unlock their cards while overseas due to lack of EMV penetration globally.
- The benefits of using offline PIN and enabling more transactions offline have not been fully realised.
- Suppliers not fully understanding the technical requirements which may be due to insufficient interaction on the part of schemes / banks.
- More timely regulatory decisions from the schemes.
- Schemes to have provided consistent and clear management information (MI) definitions to support their own MI requirements.
- Use of magnetic stripe card acceptance for non-UK cards has led to some retailers challenging cardholders who could find themselves refused.
- Some Bureau de Change outlets insisting on secondary identification even if the customer is using PIN.

9.2.4 Selection of Additional Comments

- As an industry we are only as strong as our weakest point. Pressure needs to be placed for Chip & PIN to be rolled out globally as Fraudsters would continue to search out the weakest link in the card payment chain.
- Work must continue to ensure the integrity & safety of the chip is kept from more elaborate counterfeit scams.

10 EXTERNAL COMMUNICATIONS

Introducing a new national payment system required a co-ordinated multi-media programme to communicate various messages to a wide audience. APACS co-ordinated this programme with support from advertising and PR agencies who had to meet the challenges of selling Chip & PIN to the public and educating them on its use and ensuring retailers understood and wished to move to the new system. The switch to Chip & PIN had to reach more than 40 million cardholders and three million retail staff.

The programme had two phases: to support the 2003 Northampton trial and national rollout and promotion of the Chip & PIN Changeover Day on 14 February 2006.

10.1 Phase I – Northampton Trial & National Rollout (2003 – 2005)

Key Campaign Objectives

- Create general awareness of Chip & PIN.
- Create a positive image for Chip & PIN, combating confusion and suspicion.
- Use original and creative campaign strategies to grab public attention.
- Communicate relevant information to specific sectors, such as retailers or disabled cardholders.
- Teach people how to use the new Chip & PIN system effectively and safely.

Strategy

Phase I of the campaign was a co-ordinated joint PR and advertising campaign to ensure that the campaign reached as many consumers as possible with clear, concise information that informed consumers of the:

- Introduction of the new technology;
- Timescale for its introduction; and
- Benefits of paying by PIN while ensuring that consumers were not confused and intimidated by the new technology.

The media relations campaign used a series of high-profile research and news-led projects targeting national press and broadcast media, backed up with regional press, TV and radio to provide ongoing coverage between high profile announcements. The programme was led by editorial but also used advertorials and promotions to reach the consumer locally. In addition, the Programme took the campaign out on the road to meet and reach consumers face-to-face and used other channels such as third parties including MPs and disability groups.

Phase I – Trial and Rollout

The Programme commenced in 2003 and ran until May 2005. Activity was wide-ranging and continuous in order to reach every target audience with the correct messaging. The key activity platforms included:

- *The trial in Northampton.* From May 2003, the media relations programme transformed Northampton into a 'Chip & PIN' town that led to significant national/regional and trade news coverage throughout the trial.
- *Use research to reach the consumer.* To make the trial more relevant to the country as a whole, a story was created using national research that showed cardholders' appetite for the new system and, as a news hook, reported how easy everyone thought it was to forge a signature.
- *Announcing the trial results.* These were quickly communicated to both consumers and retailers showing the success of the new technology and how it had been embraced by both cardholders and those accepting card payments.
- *Announce the rollout.* A rollout announcement event was staged to launch Chip & PIN to UK consumers nationwide in October 2003. National print and broadcast press were invited to a London supermarket where a press briefing was held which achieved national coverage.
- *Launching the March 2004 advertising campaign.* A nationwide advertising campaign on TV, radio and in print gained significant media coverage and the key messages achieved an extremely high penetration amongst its target audience.
- *Take to the road.* As the new cards started rolling out, and shops slowly switched onto the new system the Programme took Chip & PIN out to the grass roots. Between January and June 2004, the Chip & PIN roadshow visited 16 cities from Aberdeen to Exeter. A helpdesk was situated in a local shopping centre where customers could pick up leaflets, try out different PIN pads and ask questions of Chip & PIN advisers. A press event was held in each city inviting local journalists to visit a local shop that had been successfully using Chip & PIN and to interview a Chip & PIN spokesperson. This resulted in on-the-ground rolling coverage around the country every single week.
- *The press office – managing the programme day to day.* The press office for Chip & PIN was located at the PR agency and was the first port of call for all consumer, business, broadcast and trade media. APACS managed the PR agency on a day-to-day basis and its own press office played a central role in the success of the communications. Numerous calls were taken from journalists and at the height of the campaign it received more than 100 calls a day.
- *Regular updates.* To maintain momentum, regular media updates were provided in a specially designed 'barometer' format - a device that showed the progress of issuing new Chip & PIN cards and retailers switching over to the new system.
- *Helping bank staff prepare for Chip & PIN.* The Programme helped banks by: getting directly involved in various methods of staff training; advising on the format of staff training videos; preparing detailed guides for staff, giving presentations on Chip & PIN and printing advertorials aimed directly at staff.
- *Preparing MPs' postbags.* The supporting public affairs programme involved a regular Opinion Former e-newsletter issued to political stakeholders, meetings with MPs and officials including Home Office Minister, Hazel Blears, an event at the Labour Party Conference and held a Chip & PIN exhibition in the Houses of Parliament's Upper Waiting Hall.

- *Communicating with disabled people and disability and consumer groups.* Disability groups were a key group to engage with, and the options available were explained to them through e-newsletters, one-on-one meetings, forums and five waves of research with disabled people.
- *Crisis and issues management.* A full crisis management programme with more than 100 pre-prepared scenarios was put in place, spokespeople trained and three full crisis simulations were run for the programme.

Key Challenges

There were a number of challenges that threatened to undermine the rollout of the programme and the public's confidence in the technology:

- *Initial public suspicion of a new payment system.* The media campaign needed to convince the public of the security benefits of Chip & PIN cards in a society sceptical of new technology and make the Chip & PIN system as intelligible as possible. Research carried out by the programme showed that favourability towards Chip & PIN rose dramatically once Chip & PIN spokespeople demystified the system.
- *Communicating with different groups.* The range of people the Programme needed to address in the campaign meant that it was effectively running several different multi-media programmes simultaneously. The Programme had to become experts in many areas, so that it could educate and negotiate between retailers, banks, consumers and disability groups.
- *Addressing the concerns of disability groups.* A great deal of sensitivity was required in understanding how Chip & PIN affected disability groups. It was important to maintain positive communication between disability groups and banks and retailers, so that potential conflict could be dealt with effectively early on in the process.

The Results - Change in Consumer behaviour

The real proof of the success of the campaign was in the behaviour change achieved among 42 million cardholders in the UK. Throughout the rollout, consumer research was carried out to gauge the reaction of the public towards the new technology—the results, in each wave of research, were consistently positive and found that in response to the communications campaign UK cardholders had overwhelmingly embraced Chip & PIN.

Research figures showed that cardholders were becoming confident and happy when using Chip & PIN. Awareness of Chip & PIN was just 41% in 2002; by 2005, it was 97%. 82% of cardholders were confident they knew their PIN and 94% agreed with the statement, "When I next use one of my Chip & PIN cards to pay for something face-to-face, I expect to enter my PIN"; only a fifth agreed with this statement in September 2004. Finally, more than two-thirds (67%) of Chip & PIN cardholders agreed with the statement "I really like using Chip & PIN to pay", reflecting the advertising programme's success. (Source: Continental Research 2002 - 2005).

10.2 Phase II - I ♥ PIN

While people had been getting used to using PINs, a 'fallback' system had been operational, allowing cardholders to sign for goods if they couldn't remember their PIN at the till - 2 million cardholders were still signing instead of using a PIN by late-2005. Shops and card companies, therefore, agreed to implement a cut-off point, after which Chip & PIN cardholders would have to use their PIN or risk not being able to pay for their goods.

Although TV, radio and press advertising had been used to support the original launch, this new campaign was to be communicated through PR alone. The campaign needed to speak simultaneously to the two million 'PIN-bypassers' (both cardholders and shop staff); disabled cardholders unable to use PIN (and who needed to use an alternative card); the small group of UK consumers who still had old style cards (less than one per cent); overseas cardholders without Chip & PIN cards; and the majority who were already using PINs and whom it was critical not to disturb through the campaign.

Objectives

The objectives for Phase II were different to Phase I which was a broad multi-layered set of objectives:

- Get Chip & PIN cardholders still using a signature ready to use PIN by 14 February;
- Not cause panic with those already using PIN;
- Deliver clear messages about what PIN day actually is; and
- Reassure those who still have a problem with PIN.

Strategy

A strategy was developed involving a one-day changeover so consumers would have clear messaging and call to action. 14 February was recommended as the date that should become 'PIN day' – a memorable date with positive connotations, and one that coincided with a traditionally quiet time for most retailers, allowing maximum staff training and adjustment. The technology switch off would be on 15 February so as not to inconvenience the restaurant and florist industry at what would be a busy time of the year for them. To give the campaign a clear visual impact, the I ♥ PIN logo was developed – which was adopted by retailers across the country as well as in many card company mailings.

Activity

A four-month consumer campaign commenced in October 2005 reminding cardholders to start using their PIN and communicated the cut-off date and reminded people of the reason behind the change – to cut fraud and make us all safer. I ♥ PIN was then structured around a series of creative news and research-led stories targeting national, regional and trade media to drive customers to find out, remember and use their PIN. The editorial campaign was backed up with advertorials carefully targeted at the disability and retail trade press to communicate specific messages. This was coupled with ongoing direct communications with grass-roots consumer and disability organisations. Throughout the campaign, MPs and government departments were kept informed and remained supportive.

Method deployed – I ♥ PIN creative platforms

- *Launch of I ♥ PIN campaign:* Media briefing and photocall supported by half-year card fraud figures showing a fall in fraud since the introduction of Chip & PIN - the first in more than a decade.
- *Retailer advice;* Downloadable digital guides for retailers on how to accept cards after 14 Feb, advice on customer care and top tips for training staff and point-of-sale materials for everything from petrol pumps to posters.
- *Exploiting consumer spending habits:* '12 Days to Christmas' a guide to remembering your PIN over the festive season.
- *I ♥ PIN Card:* A Valentine's card mailed to all media contacts urging them to remind their audiences about the changeover – the poem inside read 'Roses are Red, Violets are Blue, by using Chip & PIN, only you can be you!'
- *The final countdown:* Weekly, then daily, countdown releases reminding cardholders of the changeover and how to prepare.
- *Ask the experts:* Radio tours and phone-ins let cardholders talk directly to Chip & PIN spokespeople.
- *Today's the day:* 14 February 2006 press briefing and radio tour answering any last minute questions.
- *Consultation sessions:* Research with disability groups and disabled cardholders to promote a special alternative.

The Results

The aim of the PR only campaign in Phase II was to target the estimated 2m Chip & PIN cardholders still opting to sign. Between October 2005 and February 2006 fallback rates dropped from 9% to just 0.6% - which meant that some 2 million people had changed their behaviour. The campaign inspired more than 1.5 million people to change their PIN at an ATM to something they could remember.

10.3 Media Impact

The media coverage generated over the three year campaign for phases I and II reached virtually every area of the country and achieved the following results:

- 3,000 pieces of coverage
- c.1000 radio interviews,
- c. 100 TV appearances/ news pieces

Coverage Highlights

Chip 'n pin will defeat crime



CRIME will be beaten back by the new technology, says a leading security expert. He says that the new technology will defeat crime. The expert says that the new technology will defeat crime. The expert says that the new technology will defeat crime.

Daily Mail **FREE**

FREE TODAY BARBARA CARTLAND DVD

CHIP AND PIN DAY!

But now banks add to the confusion by warning: You'd better carry cards AND cash



Sienna's staying single

CHIP & PIN

75% of cardholders go to grips with Chip & PIN

By Natalie Stevenson
Three quarters of UK cardholders have at least one Chip and PIN debit or credit card, and more than 520,000 tills have been converted to the technology, figures released this week reveal.

The Chip and PIN Programme, a consortium of banks and retail industry representatives, estimates that by January the majority of transactions in the UK will be made using Chip and PIN.

A total of 65 million Chip and PIN cards have been issued by UK banks and building societies. The latest big names to roll out systems include HMV, Selfridges, Sainsbury and Debenhams.

The consortium found that 87 per cent of people with Chip and PIN debit cards knew their PIN, and the majority were confident they could use it to pay for goods at the checkout.

The research also



Number crunch: tills converted

two thirds of people are aware they can change their PIN to something easier to remember.

"There are 20 Chip and PIN transactions every second and we are expecting this figure to double by the end of December."

There is concern that many consumers still do not consider Chip and PIN safe enough to use. However, Gary Hocking, director of Chip and PIN implementation at UK payments specialist Apacs, argued that fear of so called shoulder-surfing fraud was false.

He said: "After a few purchases using Chip and PIN, people get used to it. With signatures, all someone has to do is steal your card, but with Chip and PIN they need both the card and the PIN."

The consortium said that Chip and PIN would greatly reduce fraud. It also believes crime is more likely to go abroad rather than shifting to card-not-present theft, providing retailers are

Labrador has got the technology licked



Mr. Parker, 57, of Chislehurst, Kent, said yesterday: "Lots of people are frightened of the new technology, but I see that if a dog needs it, it can use it."

He said that his dog, a Labrador, had learned to use the technology. He said that his dog, a Labrador, had learned to use the technology.

Do YOU know your PIN?



CHIP AND WIN

Our tips to beat credit card chaos

Spent forces

Save of his life



COURTESY PINES: Shoppers will soon be able to cut crime by keying in their number

Chips down to pin card fraud

SHoppers this month began the battle to stop the drive to revolutionise the way everyone uses debit and credit cards. A massive advertising campaign is intended to raise awareness of "chip and pin" cards, aimed at cutting fraud, which has been the main reason why card users are being urged to use them.

Card users will pay for goods or services by keying a four-digit identification number into a machine, rather than signing a receipt. Similar technology introduced in France 10 years ago slashed card crime by 60 per cent, while research here suggests eight in 10 believe the new system will be safer.

Over 1.6 million cards already have chip and pin-enabled cards and 200,000 more are being issued. The new machines will take 10 million cards and nearly 60,000 cash machines are being upgraded.

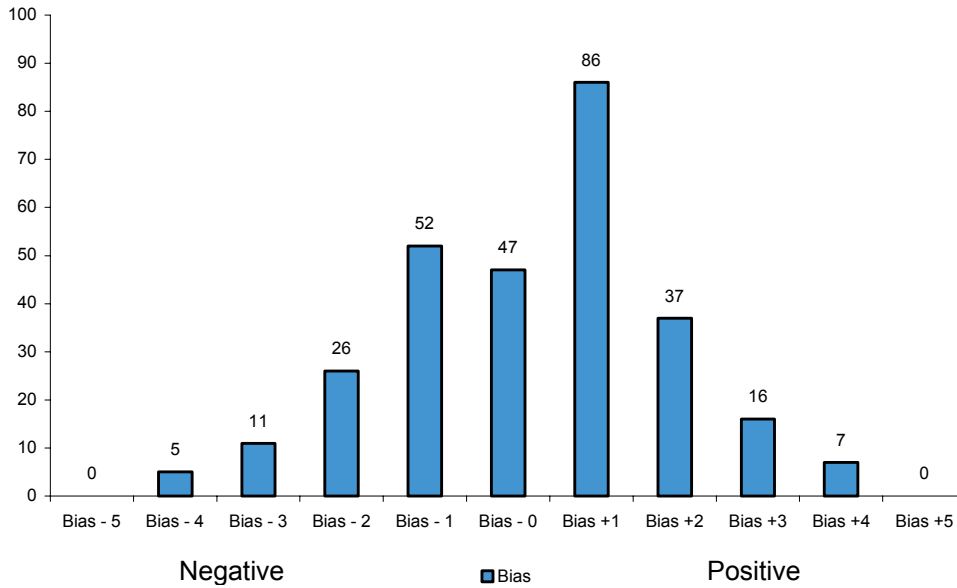
The Association of Payment and Clearing Services representatives "The ad campaign will help reassure our members about how the system works and what their card is."

ASPCA BOWEN

Media Evaluation

Media coverage achieved was consistently positive throughout the campaign. Overall 85% of coverage was either neutral or positive in its bias* towards Chip & PIN which assisted the programme in generating support amongst both cardholders and retailers. For example, over one of the busiest periods of media activity surrounding Chip & PIN, during the period when the liability shift took place (Dec 04 – Jan 05), the coverage achieved was on the whole positive towards the new technology:

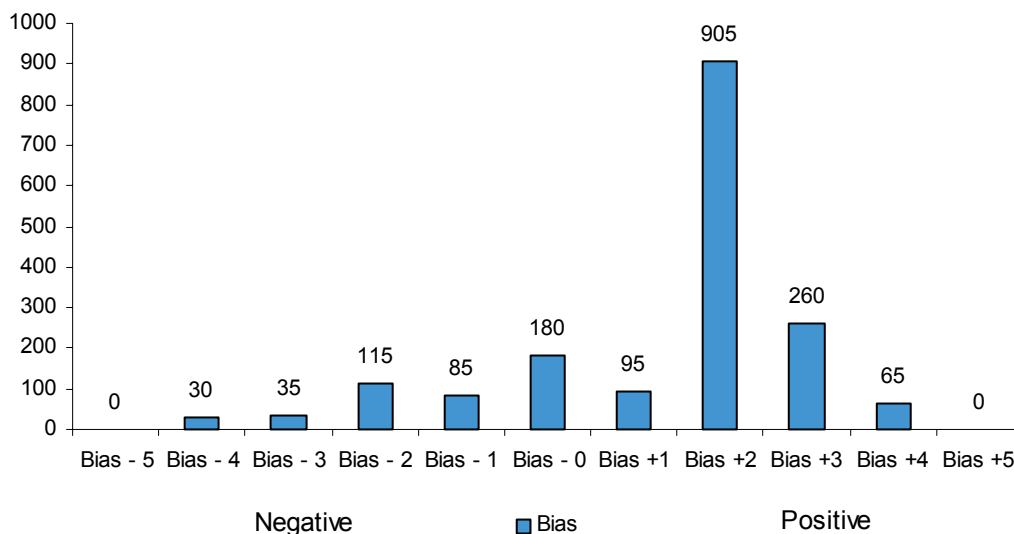
Chart: All Cuttings Bias



Source: 2007 Four Communications

As the overall campaign moved into Phase II, the media coverage became more favourable on the back of large public adoption of the technology. Over the four month I ♥ PIN campaign the overwhelming majority of coverage was very positive.

Chart: Bias – I ♥ PIN



Source: 2007 Four Communications

* Bias measures whether the coverage is positive, negative or neutral. Evaluated on a scale from negative five to positive five, the bias is based on the overall tone and bias of the article towards the payments industry. An article may contain several positive points but the overall bias could still be negative. Therefore, should the article score greater than or equal to one, the article is deemed to have positive bias.

11 SPECIAL INTEREST GROUPS

11.1 Disability Engagement

All card companies wanted to ensure that disabled customers who were not able to use a Chip & PIN card were provided with an alternative such as a chip and signature card so that they could continue to use their cards without the need to enter a PIN.

- It was recognised at an early stage that engagement with this particular sector would require time to ensure viable alternatives to PIN were developed for the launch. In developing Chip & PIN, research was carried out with both retailers and cardholders to ensure that disabled customers could continue using their cards and this continued during the Northampton rollout. Of concern to disabled customers on access was how the PIN pads would be located and positioned in the store.
- When dealing with disability groups it became apparent to the Programme that they had very high expectations as to the level of service they expected from a programme of this nature. In the wider context, disability related issues should not be considered as insignificant particularly given that this stakeholder group has a significant influence with the media, requiring issues to be managed thoroughly and professionally and the impact on resourcing should not be underestimated.
- The Programme held regular disability forums for retailers, banks and disability groups and also consulted extensively with the Disability Rights Commission and over thirty disability groups that had a particular interest in disability issues. These consultations helped to produce implementation guidelines for retailers and to ensure these were developed with the requirements set out in the Disability Discrimination Act 2004 in mind.
- The Act focuses on three key requirements:
 - Service providers have to take reasonable steps to change any policies, procedures or practices that make it impossible or unreasonably difficult for disabled people to make use of a service.
 - Where physical barriers make it impossible or unreasonably difficult for disabled people to use a service, service providers would have to take reasonable steps to provide the service by an alternative method.
 - Service providers have to take reasonable steps to provide auxiliary aids or services that would enable a disabled people to make use of a service.
- For Chip & PIN to meet the requirements of the Act required accessible PIN pads in terms of good design (large keys etc.) and well positioned PIN Entry Devices in store and offering chip and signature cards for those unable to use the PIN.
- A wide range of disabilities was considered in the programme such as: visual impairment, mental illness, wheelchair users and those people who were deaf or hard of hearing. In addition, a panel of 60 older people, who were over the age of sixty, was set up and consulted.
- It is important to note that following Chip & PIN implementation, many disability groups continue to remain engaged on how Chip & PIN works. It is clear that there remain concerns that Chip & PIN is not as accessible to disabled drivers at petrol stations as those customers feel is appropriate, and there remain PIN pads located in an inaccessible manner.
- One clear follow-up is the recommendation to amend The Banking Code to ensure card issuers make their customers aware that there is an alternative to Chip & PIN for those customers unable to use PIN.

- Notwithstanding these outstanding issues, disability consultants have been quick to praise the programme for the proactive stance they took in engaging these important customer groups.

11.2 Government

The Government's position in the development of Chip & PIN was to allow the industry to get on with its implementation and maintain a 'hands off' approach. APACS, on behalf of the Programme, maintained a consistent presence to keep Government contacts up-to-date and informed on progress with regular briefings every six months, attendance at high profile events (such as party conferences, House of Commons Committees and placing a Chip & PIN information stand in the house of Commons) and a regular e-newsletter for MPs.

12 POST PIN EVENTS (2005 – 2007)

Following the successful launch of Chip & PIN into the UK from 1 January 2005 onwards, there have been some issues with its use and these are listed below:

Terminal

- A compromise of the PIN pad took place in some petrol stations in and around the M25 in London of a leading UK petrol retailer in March 2006. Criminals had opened the PIN pad and defeated the tamper responsive switches inside the casing of the terminal. The devices were then fitted with an old-style skimming device to copy a card's magnetic stripe data at the same time. One had an internal device to record the PIN without the customer knowing and in others the PIN was compromised separately. The retailer removed PIN pads from their outlets and all Chip & PIN transactions fell back to magnetic stripe until replacement PIN pads could be installed.
- The Cambridge University Computer lab took control of a POS device and re-configured it play 'Tetris' to show how easy it would be for a criminal to take full control of the device. The point behind this exercise was to show how cardholders could be duped into putting cards into a compromised device without becoming suspicious. POS manufacturers must produce devices that are tamper responsive and it should be relatively easy to tell that a device had been compromised.
- Cambridge University have also provided details of a potential, if somewhat difficult and unlikely attack, whereby a genuine card is used to perform a fraudulent transaction in a completely bogus terminal – a phantom transaction. In this attack the 'real' transaction takes place at a different location with data being passed to and from the real card (in the bogus terminal) via a wireless link to a genuine terminal where a bogus chip card is used to emulate the EMV exchange. This relay attack would require considerable effort to synchronise actions at both locations in all but a controlled test.

Disability

- Research was carried out by Leonard Cheshire, a disability charity, into Chip & PIN and responses were received from 1,000 people. This showed that more than half of those surveyed had problems using Chip & PIN machines. A third of disabled people would prefer to return to their old signature cards (and while this is possible, it highlighted that a large number of customers were not aware of the alternatives). In addition, problems were reported when using Chip & PIN such as poor keypad accessibility and disabled users expressed a feeling of vulnerability when entering their PIN due to a concern about shoulder-surfing.

Payment Trends

- APACS statistics have shown a consistent movement over the years by UK consumers away from using cheques to other payment methods; a comparison of cheque volumes from 2004 – 2005 shows the fastest-ever rate of decline of 7.5% and for the period 2000 – 2005, there was a 28% fall. Cheques accounted for 12% of non-cash transactions in 2005 compared to 22% five years previously. It is expected that this trend would increase and the introduction of Chip & PIN has had a part to play in this shift with evidence that some major high street retailers are withdrawing the facility to pay by cheque. Since October 2005, a number of major retailers (Boots, Shell, WH Smith and Next) have announced that they will no longer accept cheques while others are restricting their acceptance – ASDA and Tesco's.
- For a growing number of adults, debit cards are the preferred payment method for their day-to-day purchases in retailers and elsewhere with debit cards seeing an 11% increase in transaction volumes 2004 – 2005, and part of this accelerated growth could be attributed to the success of Chip & PIN. Debit cards have become the most popular non-cash payment method for personal customers displacing personal cheque use in retailers and other merchants. This is in contrast to a small fall of 1.9% in personal credit card payment volumes. The increased convenience of use that Chip & PIN gives would encourage debit card use at the expense of cash and this migration could be further boosted with the potential introduction of contactless technology.
- Market developments may require new credit card business models with these being positioned as part of an overall package of borrowing or money transmission services rather than as a stand-alone product. Chip & PIN would be an enabler of new product developments to support some of these models.

Source: APACS – UK Payment Markets 2006

13 LEGAL DEVELOPMENTS

- As part of the Chip & PIN development, it was recognised that there was a potential grey area in UK law. When using a PIN to verify a transaction, a fraudster may not have been committing an offence since this is the use of a method to deceive a machine as opposed to a “human mind” as proscribed in Law at the time.
- Representations were made to the Government to consider amendments to the law to encompass PIN verification such that fraud carried out against a Chip & PIN transaction or any other automated or machine based banking transaction was covered. Statutes at the time covered an offence of falsifying a signature to deceive a human who would have been checking this against the signature held on a card.
- New offences were introduced under the Fraud Act 2006 and the most relevant for Chip & PIN is contained in Section 2 (5) which deals with “Fraud by false representation”:

“For the purposes of this section a representation may be regarded as made if it (or anything implying it) is submitted in any form to any system or device designed to receive, convey or respond to communications (with or without human intervention)”.

- This new law has much wider benefits for the UK banking / payments industry than when just making a Chip & PIN transaction. It will also allow the police to deal with all modern forms of fraud perpetrated via electronic transactions that will cover ATMs, and Internet based systems. In addition, Sections 6 and 7 of the Fraud Act 2006 make it an offence to possess, make, adapt or offer to supply any article that will help or facilitate a fraud.

14 NEXT STEPS - UK CHIP & PIN: EXPLOITING THE NEW INFRASTRUCTURE

While Chip & PIN has been successfully introduced into the UK, the programme does not stop here. The UK now has a fully robust Chip & PIN infrastructure platform onto which new services / products could be created which take advantage of the security given by Chip & PIN. The following table shows possible activities in the UK.

Activities	Objective	Timeline
Some banks introducing Two Factor Authentication for e-banking	To address fraud in e-banking	2007
Possible Two Factor Authentication trial for CNP payments	To address fraud in the Internet and telephone order channels	Possible 2008
Contactless Rollout started in London	To convert low value cash transactions into a card payment	Begins Q3 2007
Migration from SDA to DDA cards	To provide stronger authentication	To be confirmed

14.1 Two Factor Authentication

- Two Factor Authentication extends the benefits of Chip & PIN to cover remote channels and uses a form of two-factor authentication, relying upon "something you have" namely the physical bank card and a reader and "something you know" the associated PIN that goes with it.
- Research amongst cardholders shows that they are increasingly concerned about falling victim to card fraud and have changed their buying behaviour as demonstrated by the success of online and telephone ordering. Consumers appreciate the convenience that is provided by these channels and Two Factor Authentication is intended to further boost confidence and penetration of remote channels by offering a more secure solution.
- It is forecast that without the introduction of effective counter-measures, fraud would continue to migrate to CNP channels. Industry models indicate a cumulative position of over £1bn direct losses over the next decade and fraud to double by 2015 if no action is taken.
- For the following stakeholders, authentication is becoming an increasingly important part of their operations:
 - Banks are looking to enhance the verification of their customers' identities over the phone and enhance the security of their online banking websites. Currently, banks use static data details such as date of birth and mother's maiden name that may risk compromise when talking to customers over the phone.
 - Retailers could apply Two Factor Authentication to where they accept cards for payment either online or by Mail or telephone Order providing them with additional fraud prevention.
 - Government stakeholders are increasingly looking at ways in which customer authentication could take place.

- With Two Factor Authentication, enhanced security is provided for Internet shopping and Mail Order and Telephone Order businesses where secure forms of identification and cardholder verification is required.
- To use Two Factor Authentication, the cardholder inserts their Chip & PIN card into a hand-held card reader and enters their PIN (the same one used at a Point of Sale or an ATM). If a valid PIN is entered, the reader will generate a dynamic one-time passcode. The cardholder passes this to the merchant, and the card issuer validates it before the transaction is authorised – a similar approach is being introduced for banking online.
- Two Factor Authentication builds upon the Chip & PIN infrastructure by placing an additional application onto the chip that provides the functionality to generate a one-time unique and dynamic passcode. Two Factor Authentication uses the 3D Secure infrastructure for CNP transactions as a mechanism for the authentication itself.
- It is anticipated that the types of fraud that would be reduced by Two Factor Authentication are losses from online and telephone sales channels as well as Internet banking fraud.
- Two Factor Authentication trials for CNP payments are planned for 2008.

14.2 Contactless

- Contactless capability will be introduced onto payment cards in London towards the end of 2007 in the first phase of a national rollout. It is designed for transactions of £10 or less, and payment is made by a customer holding their contactless card up to a secure reader to pay for their purchases.
- The contactless card is secured by the same advanced EMV technology that underpins Chip & PIN. Though using a contactless card does not usually require a PIN to be entered from time to time the terminal will request PIN verification. This is designed to deter and limit fraudulent use should the card be lost or stolen.
- A contactless payment would make purchases quicker and more convenient for both retailers and consumers; the main benefits are:

Retailers	Cardholders
Reduced transaction times.	Reduced queuing times.
Increased ticket size of approximately 20-30% compared to cash.	Suitable across a wide range of users.
Increased frequency of purchases.	Easier than carrying cash.
Reduced cash handling and operating costs for some types of retailers.	Integrates with an existing card.
Improved terminal reliability – particularly for fast food, gas stations, movie theatres, parking garages, and vending machines.	

- Contactless payments do not have to be made using a card. In other parts of the world mobile phones or key fobs have been used. However, the focus of the initial UK rollout is on contactless cards rather than any other form given the public's familiarity with making payments by card.

14.3 Migration from SDA to DDA Cards

The UK card payments industry decided to issue Static Data Authentication (SDA) configured cards in the late 1990's. At that time, SDA provided the most appropriate card authentication method (CAM) fitting UK's risk profile by providing a strong method of confirming that the card has not been altered or tampered with prior to the transaction proceeding. It was also chosen against a backdrop of high levels of on-line authorisation where issuers would have a further opportunity to verify card data before sanctioning the transaction.

Other factors influencing the decision were:

- SDA cards cost being relatively inexpensive compared with the more complex alternative of issuing Dynamic Data Authentication (DDA) cards carrying a cryptographic co-processor
- That physical attacks on Chip cards were largely theoretical and technically very difficult
- The potential impact on terminal performance and therefore transaction timing was considered significant in the case of the DDA CAM.

Since that time, the landscape has changed significantly and the UK is considering the potential drivers that would prompt a planned migration to the stronger CAM.

The Case For Migration

The most significant factor to change has been the relative security of SDA as a 'safe' method of card authentication. In the last 4 years, theoretical SDA attacks have been converted into live demonstrations of SDA card cloning and subsequent successful use in an off-line transaction – to date, there has not been an attack in the real world. With this technological capability available to fraudsters, the industry can expect attacks on SDA chip cards in a relatively short timeframe; although this has not been seen in a live environment yet.

DDA card costs have fallen dramatically, to the point where an issuer can reasonably expect to pay the same today for a DDA card as they were for an SDA card at the beginning of the Chip & PIN rollout in 2003/4. As silicon chips develop rapidly, largely for the mobile phone industry, it is very likely that the cost of DDA cards will fall further.

As part of the justification for the Chip & PIN rollout, the card payment industry asserted that over time the level of authorisation could drop, allowing the card and terminal to make some risk based decisions. To support this move, the industry would need to strengthen card authentication and therefore naturally migrate to DDA cards. Today, any move to lower authorisation levels - and, therefore, open up the opportunity for fraudsters to exploit cloned SDA cards - must be mitigated with a migration to DDA.

It is now possible to predict the impact DDA cards would have on terminal processing. The availability of DDA cards from European markets has allowed testing of cards in UK terminals to a point where we are confident that a customer would see no appreciable difference in transaction timing.

Way Forward

In the past two years, card threat assessments have suggested no immediate fraud risk in the UK from SDA cards; although, DDA development timescales are such that issuers could begin their planning to avoid a reactive move. Issuers can take the decision to migrate in their own time and there is no need for a co-ordinated industry migration.

The current situation is such that most UK card issuers are now seriously considering when to migrate to the stronger Cardholder Authentication Method (CAM) and it is very likely that one or more will issue such cards before the end of 2007. Any move by a significant player is probably going to be matched by their peers and it is anticipated that most UK issuers will be in a position to migrate before the end of this decade.

15 CHIP & PIN – WHAT NEXT?

- In considering where next for Chip & PIN, it is worth reflecting on what this technology provides now. Currently, the Chip on a Chip & PIN card provides a tamperproof mechanism to securely hold the PIN, cryptographic keys and counters. Chip & PIN provides a strong two factor Cardholder Authentication Method (CAM) combined with a robust and simple Cardholder Verification Method (CVM) and a method to manage risk.
- Although there would be threats to the Chip these are constantly being reviewed and effective countermeasures deployed. For example, threats to the cryptography and key life management may come from mathematical computation and fast factorisation. Having examined likely threats, APACS has concluded that these do not represent sufficient danger nor are there any alternative technologies available to using chip in Chip & PIN.
- However, consideration is being given to an additional CVM to PIN to provide a three factor authentication solution – something you have, something you know (two factor) and something you are (three factor) – and it has been suggested that the next CVM would be based on biometrics.
- The problem with replacing PIN or adding to the Chip CVM is in identifying the correct biometric to use which also provides a high degree of security from being compromised. Consideration has been given to using fingerprints, but this method has an inherent weakness in that the cardholder is likely to have handled their card and hence left a fingerprint that could be copied – this assumes that a card will be present. Equally, this same problem occurs when cardholders authenticates themselves as they may leave behind an image of their fingerprint on the authentication device.
- To make biometrics work, current technology would have to be significantly enhanced. For example, experiments on voiceprints indicate a high degree of rejected transactions from valid customers. The challenge is to both identify a robust and user friendly biometric and also how to register / enrol that biometric; particularly for those card issuers that do not have a high street presence. For example, would a cardholder perform an enrolment at an ATM by leaving their fingerprint or voice biometric?
- APACS estimates that biometrics is unlikely to be a viable option before 2016. However, there may be pressure to decrease this timescale in the UK due to international pressures e.g. if the US leapfrogs PIN and goes straight to biometrics, retailers / consumers demand for this type of authentication or there is political / media pressure to develop this technology faster.
- It can be envisaged that, in the future, new verification methods could evolve together with multi-applications residing on a card's chip requiring an element of data file sharing within the chip's structures. This could allow, for example, a range of CVMs being available on a card and different applications choosing from this list that would be used for a "transaction". For example, authenticating a card payment transaction would use a PIN CVM whereas an application for a new credit card would require a biometric CVM.
- APACS will be closely monitoring developments and enhancements to Chip & PIN as well as competing authentication technologies to ensure the UK maintains its pre-eminent position on cardholder and other types of authentication.

Should you require any further information about Chip & PIN or APACS please visit these web sites:

www.chipandpin.co.uk

www.apacs.org.uk

www.cardwatch.org.uk

Any queries you may have about this report can be sent to card.payments.unit@apacs.org.uk

Copyright on this document lies with APACS (Administration) Limited

It must not be copied in whole or in part without the express permission of APACS (Administration) Limited.

While every effort is made to ensure the accuracy of any information or other material contained in the document, it is provided on the basis that APACS (Administration) Limited (and APACS and its members either individually or collectively) accept no responsibility for any loss, damage, costs or expenses of whatsoever kind arising directly or indirectly from or in connection with the use by any person of any information or other material contained herein. Any use of the information or other material contained in this document by you shall signify agreement by you to this provision. If you do not accept these provisions then you should inform us by returning the document to us within seven days.

© APACS (Administration) Limited 2007