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**Modelling the Implementation and Acceptance of the Police
National Database in UK Police Forces**

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ABSTRACT

The Police National Database (PND) was launched in June 2011 as a direct recommendation from the Bichard Inquiry. Its main purpose is to provide a national platform to share police information and for the first time, the PND will provide a single view of data held in police intelligence, custody, crime, child and domestic abuse systems across the UK. The PND will not replace local police systems, but it will allow all forces to see and share information - that until now has only been available within individual force boundaries.

The implementation process of the PND evoked significant business change, which has not only impacted on the way police officers and staff manage information, but also challenged cultural practices toward the sharing of police information. Delivery of the PND was incremental, and local variations in its deployment have influenced the extent to which the system was adopted. This study explores the inception, implementation and acceptance processes of the PND using a longitudinal and qualitative research design, which focuses on identifying propelling factors that have shown to influence the integration of the system from both a user and stakeholder perspective. Key lessons have been captured throughout this research, which relate to managing system transition, the pivotal role of strategic leadership, the management of police information, and meeting users' technical and business requirements. In terms of sustaining the ongoing use of the PND, the findings of this research suggest that the success of the system is largely dependent on maintaining rigorous and robust data quality standards, so that users' remain confident in the integrity of the PND. The original contribution of this research is the contextual development of a police system acceptance toolkit (P-SAT), which comprises of a conceptual model, an activity flow chart and a strategic alignment map. This is to support the future delivery of national IT/IS projects in the police organisation.

Keywords: Police Organisation; Sharing Information; Technology Implementation and Adoption; Police System Acceptance Toolkit.

ABBREVIATIONS

ACPO	Association of Chief Police Officers
BPR	Business Process Re-Engineering
CEOP	Child Exploitation Online Protection Agency
CT	Counter Terrorism
FIB	Force Intelligence Bureau
HMIC	Her Majesty's Inspectorate of Constabularies
ILP	Intelligence Led Policing
INI	Impact Nominal Index
IS	Information System
IT	Information Technology
MoD	Ministry of Defence
MoPI	Management of Police Information
MPS	Metropolitan Police Service
NHS	National Health Service
NIM	National Intelligence Model
NPIA	National Policing Improvement Agency
NSPCC	National Society for the Prevention of Cruelty to Children
NUG	National User Group
P-SAT	Police System Acceptance Toolkit
PEOU	Perceived Ease of Use
PNC	Police National Computer
PND	Police National Database
PSD	Professional Standards Department
PU	Perceived Usefulness
RUG	Regional User Group
SOCA	Serious and Organised Crime Agency
TAM	Technology Acceptance Model

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CHAPTER 1

INTRODUCTION AND BACKGROUND

1.1 Introduction

Following the tragic deaths of Jessica Chapman and Holly Wells in Soham, Cambridgeshire in 2002 and the subsequent conviction of Ian Huntley, an inquiry was established under the Chairmanship of Lord Michael Bichard. The inquiry was set up to examine the process and effectiveness of intelligence based record keeping and information sharing. Lord Bichard made a number of recommendations, one of which was that a national information technology system to support police intelligence should be introduced as a matter of urgency (Bichard, 2004). The Police National Database (PND) has been developed to meet Lord Bichard's recommendation. It will, for the first time provide a single view of data held in police intelligence, custody, crime, child protection and domestic abuse systems across the whole of the UK. It will not replace local police systems, but it will allow all forces to see and share information - that until now has only been available within individual force boundaries. However, the PND is more than just a powerful research tool; it will facilitate the development of analytical applications that will enable forces to match records and identify new links and patterns in offending at a local, regional and national level. The PND is one of the most important developments in national policing in recent history. For many years, the police service has recognised that it needs to share operational information and intelligence through one system, and the PND provides the opportunity. ¹The National Policing Improvement Agency (NPIA) launched the PND in June 2011. All police forces in England, Wales and Scotland; the Ministry of Defence police; the Child Exploitation Online Protection (CEOP) and the Serious Organised Crime Agency (SOCA) are now connected to the PND. The withdrawal of the Impact Nominal Index (INI) system set up in the interim in 2005 has meant that forces can only seek and acquire national police information on known offenders and individuals of investigative interest from the PND. Media coverage of the PND launch was mostly favourable towards the initiative; however, civil liberties groups and senior MPs expressed concern at the scale of the database and the number of people who will be able to use it (Hughes, 2011).

¹ The NPIA is no longer an organisation and has re-formed as the Police ICT Directorate within the Home Office, and the College of Policing.

Historically, all UK police forces have collected information relating to arrests, incidents, crimes and intelligence and stored this within their own force computer systems. Whilst this has worked well for some forces, a number of high profile incidents in recent years, have demonstrated that forces not only need to share the information they have collected, but also need to see information collected by other forces. Access to police information in traditional communicative forms has been on a strictly need to know basis. Neighbouring police forces were in no more of an advantageous position than forces more geographically dispersed. The point is that physical force boundaries were no more or no less impeding in the sharing of police information (ACPO, 2005). The well known dictum 'knowledge is power' (Henry, 2003), is a contributory factor conceptually, in attempting to understand the various elements inherent to 'organisational culture'; a concept identified in both the Laming Report 2003 and the Bichard Inquiry 2004, as being a crucial factor in recent institutional knowledge failures (Dean and Gottschalk, 2007). The Laming Report was an inquiry following the death of Victoria Climbié, which also carried out a review on child protection measures (Dean and Gottschalk, 2007). Ultimately, there is a greater risk in choosing not to share intelligence than there is to share intelligence in the most basic sense. However, the Bichard Inquiry also found that there were particular recommendations pertaining to the police service's information management practices; more specifically clear guidance on record creation, retention, review and deletion and the sharing of information under the Police Reform Act 2006. The remaining recommendations from the Bichard Inquiry were aimed at Social Services and focussed on improvements in employment vetting procedures, new referral actions for child protection, and further training for staff involved in appointing people to work with children (Bichard, 2004).

Outlining the background events leading up to the implementation of the PND is important for two reasons. First of all, it evidences the purpose of the PND in that it enables the electronic linking of information from a national source of police data and intelligence that has never been so easily accessible before. Secondly, the onus is now fundamentally on police forces and respective agencies to share their data albeit as much as they want to, and without the administrative and authority-seeking burden often required when requesting information from other police forces. The PND is therefore, not only challenging the information management capabilities of people and the existing business processes that are structurally embedded, but also the organisational culture surrounding the context of PND use in the sharing of information

and knowledge across force boundaries; also of importance are the police service's attitudes and behaviours in response to these changes.

1.2 Police National Database – Organisational Context

The PND will be accessed through secure role-based access and will allow sharing, searching, linking and the association of information from police forces in England, Wales and Scotland, and the Police Service of Northern Ireland. All UK police forces including the Ministry of Defence (MoD), the Child Exploitation Online Protection (CEOP) agency and the Serious and Organised Crime Agency (SOCA), which will soon become the newly formed National Crime Agency, will have access to the PND. This is intended to enable forces across the UK to support public protection and in particular to maximise the safeguarding of children and vulnerable adults, counter terrorism and assist in major crime investigations.

The delivery and implementation of the PND is well documented in the NPIA's Business Plan for 2010-2013 (NPIA, [A] 2010). The project sits under the umbrella of the IMPACT programme, which is about improving police performance within the sphere of information, intelligence and science. The management of police information (MoPI) is a significant component of the IMPACT programme, as its guidance ensures that police information is managed appropriately and consistently in all police forces in the UK. The MoPI Code of Guidance (NPIA, [B] 2010) was introduced to forces in 2006, which subsequently informed PND practices in the recording of police operational information and intelligence. It has also provided forces with guidance regarding data management standards and procedures, and has further developed the 5x5x5 intelligence management process - a derivative from the National Intelligence Model (NPIA, [A] 2011)

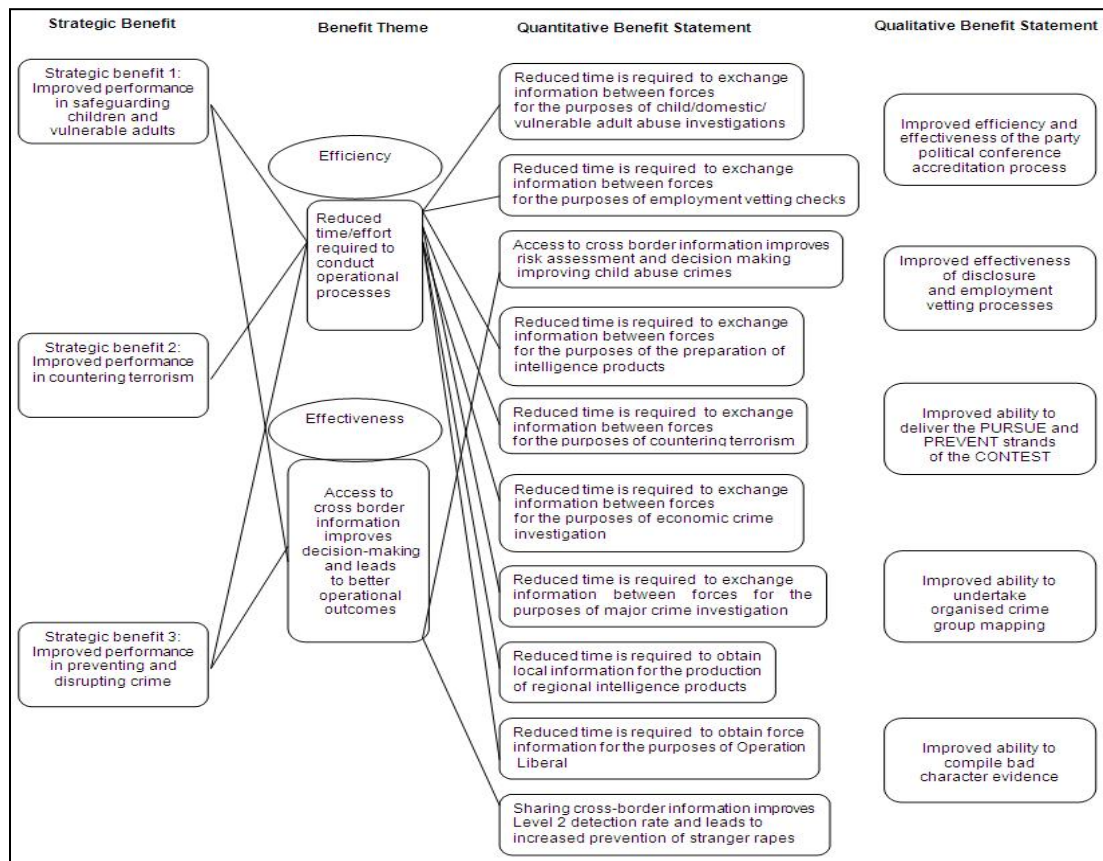
The implementation of the PND was delivered by the NPIA as a PRINCE2 managed project. The methodology adopted to measure the subsequent outputs and outcomes is underpinned by the realisation of measurable business benefits. The PND was a benefits-led project, and metrics were designed centrally for forces to capture data against, which would then enable them to realise their own local business benefits. In collaboration with PricewaterhouseCoopers consultants and the Cranfield School of Management at Bedfordshire University, the NPIA formulated a Benefits Management Strategy and a Benefits Realisation Plan to guide forces in developing their own practices for systematically recording performance-related data. This has led to the formulation of individual force action plans and joint peer reviews with the NPIA to

assist in the ongoing process. Forces were also encouraged to develop their own benefits realisation plans to bring structure and rigour to local benefits management (NPIA, [B] 2011).

Figure 1 illustrates the strategic benefit areas, the benefit theme to which it relates, and the quantification of certain benefits as well as qualitative areas of benefits measurement. Within these three strategic benefit areas, it is hypothesised that two key types of benefits are possible (NPIA, [A] 2011):

- Efficiency: reducing the time and/or effort required to exchange information with other forces; and
- Effectiveness: using information more readily available from other forces to inform decision-making and improve operational outcomes.

Figure 1: PND Benefits Framework



Source: NPIA, [A] 2011.

In planning for the realisation of benefits, the metrics designed by the NPIA were exclusively underpinned by the theme that the PND will demonstrate effectiveness and

efficiency in improving police performance in the policing areas described. The criteria for all metrics designed locally and centrally must be meaningful, attributable to the PND, and practically possible to collect the data within realistic timescales, and at a cost that is proportionate to the benefit itself. The NPIA is using the concept of a tiered approach to measure benefits, including metrics that demonstrate force-specific benefits and service-wide benefits. It is anticipated that the PND will support the following areas of policing:

- Protecting children and vulnerable adults, by being better able to assess risks, and by carrying out more thorough vetting of people in positions of trust and responsibility
- Understanding the threat posed by terrorism of whatever nature, and helping to reduce the risk of terrorist activity
- Disrupting and preventing major, organised and serious crime (Baumber, 2009).

Some of the challenges that arose as a result of forces developing their own force action plans for benefits realisation, were in relation to national data collection mechanisms and the data analysis process thereafter. The template designed by the NPIA for forces to capture and record data for realising benefits was thorough and detailed and therefore, provides qualitative information about the benefits the force perceived they had achieved. Forces were asked to populate 'Benefit Profiles' to capture their local PND benefits for each strategic area. The 'Benefit Profiles' included the detail and description of each benefit, including risks, dependencies, metrics and benefit(s) owners (NPIA, [A] 2011). For forces to complete a benefit profile for each benefit realised was a time-consuming process. From an analytical perspective, extrapolating and analysing data derived from these profiles would also be time-consuming, as the profile template has been designed to mainly capture qualitative information, but with a quantitative emphasis on whether the PND reduced the time it takes to acquire the information compared to the ²Impact Nominal Index (INI) system. Staffordshire Police produced a 'PND Business Benefits Benchmarking Results Report' for the NPIA. Staffordshire Police devised a series of local workshops, with representatives from each strategic business area to effectively enable the collation of data direct from PND users, project managers and PND regional coordinators. Interestingly, for Staffordshire Police, all of the benefits

² The INI system was created in the interim until the PND was constructed

profiles selected “*effectiveness*” in terms of timesaving as a key PND benefit result, and stated how “...*a national picture could be gained very quickly live-time, particularly intelligence that had not been recorded on the police national computer,*” (Staffordshire Police, p. 6, 2011).

From a national perspective data collection and data analysis for measuring business benefits, may present issues of data quality in terms of the non-standardised and inconsistent data gathering methods evident across police forces. The author had recommended to the NPIA that they communicate to forces the importance of developing robust research and analytical methods to achieve a realistic level of data standardisation nationally, and that the benefit of this will be ultimately to assist in developing an in-depth national picture of PND business benefits. Another recommendation for forces was to deploy and utilise staff with research and analytical capability to take ownership for collating evidence in respect of the PND benefit profiles. Apart from capturing business benefits, forces were also expected to report on other areas of the PND, such as physical accessibility, the system’s usability and its performance capability. Furthermore, there are practicality issues involved in realistically assessing the benefits, and whether these are directly attributable to using the PND, and whether these benefits can be described as tangible. Policing is a complex environment with a vast array of business processes, practices and priorities. Lessons learnt and sharing best practice are fundamental components of the PRINCE2 project management methodology, and in particular key reporting requirements are essential for monitoring organisational progress (NPIA, [A] 2010). Within the context of PRINCE2, benefits and disadvantages can only be identified if a series of project-led outputs have lead to a series of outcomes. In PRINCE2 “*a benefit is the measurable improvement resulting from an outcome that is perceived as an advantage by one or more stakeholders*” (Prince2, 2009, p. 111). Some of the complexities discussed in gathering and analysing data to measure PND benefits and its performance, suggest that traditional evaluation methods may be unsuitable for evolutionary information systems like the PND, due to the multiple elements and variables that need to be measured, and the challenges of designing unbiased metrics that can accurately provide causal connections between independent and dependent variables. The digitalisation of police records on a centralised database does not necessarily equate to a more efficient and effective organisation. The PND is not just an investment in new technology, but is reliant on people to use the system, in order to achieve a high standard of service delivery and productivity. However, until forces are in a position where they are using the system

routinely and have the appropriate business processes and leadership to support its internalisation, then the realisation of business benefits will undoubtedly evolve. Most important at that stage was to recognise that delivering the PND was not simply about the delivery of information technology (IT), but was essentially about business change enabled by IT and it is therefore, a complex process. It is important to ensure not just the right IT capabilities and functionality are delivered, but also that the data are prepared and the necessary supporting business change elements are in place. This requires time and careful planning if the police service is to realise the benefits from the PND (Nunn, 2001 and Baumber, 2009).

1.3 Operation YEW TREE – Jimmy Saville Investigation and HMIC Review

In early 2013, the police service was under the spotlight in relation to the Jimmy Saville investigation, and the child abuse allegations made against him during his lifetime. Commissioned by the Home Secretary Theresa May, HMIC's (Her Majesty's Inspectorate of Constabularies) review of these allegations identified that "*mistakes were made by the police*" (HMIC, 2013, p.3), in terms of the way the alleged offences were handled, and how the police managed their information between 1964 and 2012. The context surrounding this particular case was significant to HMIC; the historical, environmental and cultural factors inherent to the police organisation were explored in order to identify any police practices that may have contributed to the "*perceived failings*" by the service (HMIC, 2013. p.4). Whilst there were systems available that could have enabled the three forces involved in investigating Saville, namely Surrey, Sussex and the Metropolitan Police Service (MPS) to 'join the dots' and spot patterns, these were either used incorrectly, or not at all (HMIC, 2013). This resulted in a series of failings: to understand the potential depth of Saville's criminality; to encourage other victims to come forward; and to bring about an appropriate prosecution. The HMIC report also found that although policies and practices designed to improve the experience of child victims are now available, serious concerns were raised as to why so many victims felt unsupported by the police, and therefore unable to come forward and report what had happened (HMIC, 2013). The MPS and the National Society for the Prevention of Cruelty to Children (NSPCC) following Operation YEW TREE, claimed that 450 allegations were specifically made against Saville during 1955 – 2009, of those victims, the MPS considered 214 allegations to be crimes that were capable of being recorded against Saville at the time of their commission. However, in total, HMIC considered seven incidents – two based solely on intelligence records and five based on complaints made

by Savile's victims (HMIC, 2013). Following the introduction of the INI system, both Surrey and Sussex police forces made available the details of their reports, but the MPS did not, and as a result Surrey and Sussex were unaware that the MPS held historical reports on Savile. HMIC now believe that this impacted on the scale and priority of the investigation. At the time the MPS classified locally held reports on Savile as either "sensitive" or "restricted" due to his celebrity status. Furthermore, the failure to connect the various allegations was critical to the eventual outcome of the investigations, and although intelligence was available in disparate force systems, the intelligence was never linked, and because of that failure, the extent of Savile's criminality was never understood. HMIC state, *"it is clear that the potential for further investigation and a prosecution of Savile was missed"* (HMIC, 2012, p.7).

Whilst this report illustrates police errors made in terms of managing, sharing and reacting to information, the concern over the capability of the police service to protect children and the vulnerable from dangerous and known offenders has again resurfaced. This is not to be critical, but to be reminded of those deep-rooted cultural and bureaucratic issues that exist in the organisation, which clearly cannot be solved by the introduction of IT systems alone. It is hoped that the issues identified and the recommendations made by HMIC are to be translated into vital and timely lessons that need to be learned, so that improvements made in both policy and in practice, are not just conceived as a result of tragic consequences, but through professional recognition that organisational change in respect of the management of police information are needed as a matter of urgency. Furthermore, it is also important to acknowledge mitigating issues such as police autonomy, discretionary powers, and their decision-making processes, and how these relate to a much broader discussion of police accountability.

In relation to intelligence, HMIC concluded that, when guidance on MoPI is followed, the system works as intended. However, the review highlighted concerns: that the implementation of MoPI has not sufficiently matched expectations due to the discretion afforded to individual Chief Officers in following MoPI practices, nor were HMIC confident that the guidance is being given full effect in all forces. This is considered to be a potential weakness to MoPI's full implementation and in effect, reverts back to pre-Bichard when each force in the UK produced its own set of local guidance and information management standards and procedures.

As a researcher working closely with the Home Office, the emphasis on MoPI during the preparatory stages of implementing the PND was to ensure that forces were still

compliant with national standards. MoPI, like the PND, was also a direct recommendation from the Bichard Inquiry, and specifically related to improving the way police forces collect, record, evaluate and review their quality of information. MoPI is relevant to the PND as it is essentially about enhancing the ability of the organisation to properly manage and share operational information within a nationally consistent framework. *“The way in which the police service collates, retains and shares information about potential offenders is vital to its effectiveness”* (HMIC, 2013, p.32).

A critical element of MoPI is to prioritise information according to perceived risk factors; information, which indicates children or vulnerable adults are at risk, should receive high priority. Seemingly innocuous pieces of information should be collated in order to build a more comprehensive picture of what might be more sinister behaviour, and patterns of offending (NPIA, 2010). However, different approaches to MoPI may lead to different outcomes as to the handling, reviewing, quality and retention of police records. If police forces have not sustained their level of MoPI adoption or their alignment to its principles since declaring their completion of its implementation in December 2010, there may be adverse implications for the effectiveness of the PND. This key point is echoed by the HMIC report. *“Although considerable improvements have been achieved in the retention and sharing of information, any dilution of forces’ commitment to managing information correctly has wider implications when considered in light of the national intelligence picture and the PND”* (HMIC, 2013, p.34).

It is important to delineate the distinct relationship between MoPI and the PND. MoPI is the guidance provided to the police service, which specifies the way in which information acquired should be handled, in terms of record creation; retention; access by others; and deletion. PND does not create any records of its own: it serves to store copies of records created by police forces in accordance with MoPI. The quality of information supplied to PND from forces, therefore has a direct consequence on the PND’s ability to match and identify critical intelligence links. The prompt and regular downloading of local force records onto the PND would as a result underpin its overall effectiveness (NPIA, 2011). The PND heavily featured in the HMIC report and appeared as front-page news in ‘The Times’ when HMIC released their findings in March 2013. The headline *“Saville case flaws still dog police national database”*, (The Times, O’Neil, 2013, p.1) suggests that although a national intelligence database has been set-up for national intelligence connectivity, the article claimed that forces still have *“some way to go”* (The Times, O’Neil, 2013, p.1), toward efficiently and effectively sharing information with their counterparts. Although the PND provides a mechanism to facilitate the

sharing of local information across force boundaries, nationally inconsistent and locally based information management practices potentially frustrate the integrity of the collective information picture, and as a result can impact on the credibility of the PND. As identified in this research, these frustrations are both real and evidently supported by excerpts from direct PND users and business area managers; however, it remains unclear if these issues are being addressed from a strategic level in individual forces. From an information system transformation perspective, access to police information on a national scale was still unfulfilled because of variations in forces' progress in uploading their data onto the PND automatically. Although, some forces have achieved this such as Humberside, Northamptonshire and West Mercia, "*the operation of a slick, accurate and comprehensive information system remains elusive*" (HMIC, 2013, p.35).

1.4 Impact of this Research on the PND Project

During the management and delivery of the PND project by the NPIA and Home office, the author conducted their research in full transparency. This was to ensure that an effective reciprocal working relationship was established and the aims and objectives of the research were communicated from the start. Their expectations of the author were that the NPIA were frequently updated with the progress of the research, and the author would play a key role in PND post-implementation reviews that were jointly conducted. At each stage of data collection, which mainly centred on these reviews, the NPIA and Home Office played an influential role in the research methods adopted, the design of the questions and the subject areas to address. The logistical approach for the reviews was managed by the NPIA, and the author was responsible for managing the research and data analytical tools to deploy. This was an opportunity to influence aspects of research design, such as sample population size, demographic and geographic characteristics; the exploration of social and cultural factors and how research findings were reported and shared. The impact of this research on the PND project was to provide an independent and holistic perspective on the implementation and adoption of the system, and to contribute to effective research practice with police forces. The author produced all of the reports contained in the 'Appendices' section of this thesis. Furthermore, all Figures and Tables contained were also produced by the author – **EXCEPT for Figure 1: 'PND Benefits Framework'** which was produced by the NPIA IMPACT programme in 2011.

RESEARCH AIMS & OBJECTIVES

1.5 Research Aim - 1

- 1) To explore, identify and model the implementation and adoption factors of the Police National Database in the police organisation

Objectives

- a) Critically analyse literature to develop a conceptual framework of the influencing factors aligned to police acceptance and the use of new technology
- b) Critically analyse the organisational business challenges and issues associated with the initiation and acceptance of new technology
- c) Explore the role and contribution of the PND in assisting information sharing across multiple police forces in the context of contemporary UK policing

1.5.1 Research Aim - 2

- 2) To develop a police system acceptance toolkit that can be conceptually applied to support the future implementation of new information technology/information systems in the organisation

Objectives

- a) Conceptually explore the dynamics and impact of the PND on organisational knowledge and learning processes
- b) Construct a conceptual framework to model system acceptance by conducting post-implementation reviews to explore the utilisation and integration of the PND in various policing contexts
- c) Develop empirical knowledge to contribute and enhance existing theoretical models of acceptance and use of technology, using the PND as a case study example

1.6 Thesis Outline

Chapter 1 of this thesis provides a description of the organisational context in relation to the implementation of the PND, including an outline of the NPIA's approach to identifying and measuring the business benefits from the PND. The PND project is strongly underpinned by the realisation of benefits, and as a result it is crucial that an examination of the NPIA's proposed evaluation methodology is undertaken, so that the challenges and complexities of a benefits-led approach is both operationally and conceptually explored as part of the literature review. Chapter 1 also provides a proposed outline of the research aims and objectives for this research study;

Chapter 2 provides a critical review of literature from various interdisciplinary and interconnecting perspectives, and starts by exploring the NPIA's project-management approach in measuring the business benefits from the PND. Chapter 3 describes the overall research design and methodology, including a discussion of various research approaches undertaken on the study of IT/IS acceptance. Chapter 4 explores system transition from the INI to the PND; Chapter 5 and Chapter 6 explore the analytical findings following the two PND post-implementation reviews that were conducted in collaboration with the Home Office. Chapter 7 presents the development and refinement of the police system acceptance toolkit, which involved engaging with police stakeholders' to gather their feedback on the representativeness and suitability of the toolkit. Chapter 8 describes the original contribution of this research, and details the theoretical propositions generated. Existing literature is also discussed to compare and contrast the findings from this research. Chapter 9 discusses the implications of this research and concludes the thesis.

CHAPTER 2

LITERATURE REVIEW

2.1 Evaluating Information Systems in a Complex Context

Analysing appropriate methodologies for evaluating the effectiveness and efficiency of a newly designed and implemented national information system for the police service, requires consideration of several disciplines and paradigms; for example, information science, computer science, criminology, sociology, organisational change management and even anthropology. This is partly due to the various business processes involved in delivering a national information system like the PND, as well as the wider social and environmental mitigating factors associated with implementing new technology in large organisations. It is, therefore necessary to explore the role of information systems and technology in organisations and the reasons why organisations such as the police service, need to continually adapt and respond to change and uncertainty.

Central to the discussion of developing an evaluation framework for the PND is to understand both the business context of the information system, as well as the information technology that is to be used to improve new business processes and support business change. In the context of policing, the PND has the capability to become an invaluable investigative tool, but the measurement of its 'value', 'performance', 'impact' and 'benefits', are as discussed earlier, dependant upon the creation of appropriate evaluation metrics (Gottschalk, 2005). The fundamental human element of using and interacting with an information system or database is what can be primarily relied upon to make sense of the data - not information technology; and that the technological aspect can only succeed or perform adequately if it is with the combination of their use - *"that is the crux of the matter"* (Dean and Gottschalk, 2007, p.246). This means that without the important tacit knowledge of people and their professional judgement and experience, implementing information systems with sophisticated technology and without measuring the process of engagement between users and technology, can suggest that the development of a suitable performance evaluation framework could well be difficult. In policing, the architectural infrastructures of information management systems are based on specific data handling and business procedures. Data held on systems are classified information and only becomes intelligence when it has been deciphered and analysed, for either tactical or strategic purposes. Knowledge creation is the end result coupled with a high level of

interpretation, so that it can be used in some form of action (Dean and Gottschalk, 2007). The NIM regards intelligence as information that has been subject to a defined evaluation and risk assessment process in order to assist with decision-making: all intelligence should be actionable (ACPO, 2005). This continuum or layered nature of police data is to be recognised, as it further contributes to identifying the challenges and complexities of measuring benefits that are directly or indirectly attributable to the use of a new information system, such as the PND. The point being made is that a 'knowledge system' or 'knowledge base' of an individual's actions, knowledge, experience and judgement will also be simultaneously created alongside the PND, and it is this knowledge system that will take the captured electronic data and create extensive user knowledge, which could therefore inform the very basis of a sound evaluation framework for realising PND benefits. In support of this, developing an information system knowledge management strategy, means thinking strategically and planning for the effective long-term application and optimal use of electronically held information to support knowledge management in organisations (Gottschalk, 2005)

Sociological post-modernist theories allude to the importance of understanding personal experience and personal perception, and that one's own interpretation of the world is as valid and realistic as anyone else's. This is particularly relevant to the process of benefits evaluation, and is also relevant to the design of this research, in that the evaluation itself is to be thought of as an interpretation of the value that an information system has, to the person or group using it (Khosrowpour, 2000). Using information systems as a determinant of police performance presents challenges, which need to be explored. Gottschalk ([A] 2007) suggests that by developing a structured approach linking performance to knowledge sharing, occupational culture, leadership roles and the use of information technology, such significant determinants can be identified and applied in improving police investigations by law enforcement agencies. This reinforces the requirement that using information systems as a means of evaluating their performance within a policing context, must also encapsulate contextual determinants such as user requirements and expectations, the operational environment and the overall performance capability and the functionality of the new system (Gottschalk, [A] 2007).

Police culture can influence human behaviour and attitude, and ought to be borne in mind when attempting to evaluate the implementation of a new police information system requiring new business processes (Reiner, 2000). Reiner defines 'cop culture' as a *"subtle and complex intermingling of police officers' sense of mission, action-orientated*

behaviour and cynicism where the emphases on danger, suspicion, isolation, solidarity, pragmatism and authority are the core elements". [2000, p. 85]. Understanding police organisational culture within the context of implementing a new information system is pertinent, because by its very nature police culture could in fact impede the evolutionary development of the PND and what it ultimately represents. The PND will impact upon police culture in terms of challenging its traditional sentiments of exclusivity, and by evoking a significant change in the way police do business; which could initially be a potential barrier toward its use. Other potential barriers to the successful adoption of the PND are in relation to data quality and data assurance. These are not only important aspects of data privacy, but they are also necessary to ensure that the PND is an effective tool and delivers a system that meets the needs of the organisation. Data which are incomplete, inconsistent, not meaningful or misinterpreted due to the different ways forces manage their information can lead to poor decisions, wasted time or missed opportunities (NPIA, 2009).

Research carried out by Shanahan (2000) in South Australia Police, conceptualises the police service as a learning organisation that has the ability to adapt to rapidly changing environments. Shanahan's (2000) research describes the element of leadership as being essential for the building of a 'learning' organisation. In this way the leader connects the organisation to the environment, which in turn leads people to being empowered, and capable of moving toward a collective and shared vision (Shanahan, 2000). Leaders are also required to be able to establish systems to capture and share learning, encourage collaboration and team learning, promote inquiry and dialogue and create continuous learning opportunities. Leadership must be present in order to bring all of the 'learning' organisation elements together into a cohesive whole (Shanahan, 2000). These findings support Gottschalk's research results (Gottschalk, [B] 2007), in that leadership is a significant determinant to improving police investigations by law enforcement agencies, and can greatly assist in developing a structured approach towards police performance and in promoting organisational learning, by building on the essence of effective leadership and teamwork. This is particularly relevant to discussing both the delivery approach to implementing the PND service-wide, and in relation to the training element and the selection of appropriate learning methods for PND users. Shanahan's (2000) research emphasises the importance of open communication between those in leadership roles and operational officers and police staff, to enable a cross-section of the organisation to work together, and to create collective thinking, knowledge and

experience. Shanahan (2000, p. 6) states that, *"...this gives a sense of the potent energy that could be spread throughout the organisation."*

One of the key characteristics of the PND is that of an information system that will continue to evolve in the future. PND Release 1 is mainly concerned with data reconciliation whereby forces are loading their data onto the PND (custody, crime, intelligence, child abuse and domestic abuse), and includes some functionality. For PND Release 2, which will be delivered in two stages, there will be enhanced functionality including a much more rigorous and in-depth searching tool. Forces will then be able to use the PND to generate lines of enquiry, increase operational effectiveness as a result, decrease operational risk and improve the way police research and acquire nationally sourced information. This provides a strong basis to suggest that the PND is an evolutionary information system, which will require evaluation throughout the life of the system, and that the management of benefits, risks and costs are fundamental aspects of the PND's performance and evaluation framework.

Khosrowpour (2000) suggests that traditional evaluation methods for information systems may be unsuitable for evolutionary information systems, partly because of the number of multiple variables involved, and the difficulty in quantifying individual and organisational tangible or intangible benefits to information systems. Thus, there is a gap in existing research in the evaluation of evolutionary information systems. Khosrowpour (2000) proposes that the adoption of a much broader, post-modernist view, which encompasses perspectives on recent developments in information technology, as well as considering societal changes and human issues. This view does allude to some of the complexities involved in effectively measuring the performance of a new information system or database. It also reinforces post-modernist sociological views in that the modernisation of society and subsequent social anomalies such as rising crime rates, has led to the development of advanced and industrialised forms of information technology and information systems by law enforcement agencies. In devising an appropriate performance and evaluation framework for the PND, relativism or cultural relativism – an inherent perspective of post-modernism - will need to be relied upon to gauge individual user's experiences in evaluating evolving information systems such as the PND.

Research carried out by Chen and Chen (2004) discusses the importance of evaluating knowledge management systems in organisations. The questions addressed in the research are in relation to organisational investment, measuring the success of the new information or knowledge system and ascertaining whether the system is productive,

effective and beneficial. These questions are very similar to the kind of research required to measure PND benefits, where ultimately the focus is not just on the performance of the system, but also on the design of metrics that can rigorously demonstrate whether the initiative has justified the investment. Chen and Chen's (2004) research recognises how the technological aspect of implementing new information systems ought not to be the primary focus, but rather the creation of a robust methodology that can evaluate information systems' performance and impact. A quantitative approach was adopted to carry out the evaluation; this was to enable survey results to be typically quantifiable, and therefore amenable to statistical analysis. Using statistical inference also allowed the results obtained from the sample of respondents to extend to a large population, therefore enabling a wider remit and application (Chen and Chen, 2004). For the PND a similar quantitative approach could be deployed to measure its business investment and benefits to UK policing. It is envisaged that when the PND eventually becomes part of 'business as usual' for the police service, approximately 60 forces and agencies will be using the system. Traditionally, statistical sampling-based research would be considered more favourably because of the number of forces and agencies involved who have implemented the PND, and because it is often thought that the larger the sample is, the more generalisable, reliable and valid the results will be. Lee and Baskerville (2003) make important contributions in clarifying the concept of generalisability by critically examining its nature, illustrating its use and misuse, and offering a framework for classifying its different forms. Specific to information systems research, Lee and Baskerville (2003) propose that the notion of generalisability can be equally viable and applicable to non-statistical and non-sampling forms of research. The authors strongly argue that qualitative based research approaches in the field of information systems can appropriately consider generalisability because it cannot be improved or further validated by increasing the sample size of the research, but doing so only improves the reliability of the sampling procedure, rather than improving the generalisability of a sample to its population characteristic (Lee and Baskerville, 2003). However, there is justification in concluding that an increase in sample size leads to an increase in the generalisability of one sample to other samples that the same sampling procedure would produce. Thus, whether generalisability was applied inductively or deductively the same issue or truism remains that those descriptive statements cannot be generalisable beyond the setting that the researcher has actually observed. The conceptual application of generalisability in qualitative case study research for example, can therefore be

correctly applied whereby the generalisation of empirical descriptions can be developed into theoretical statements (Lee and Baskerville, 2003).

2.1.1 The Role of Information Technology and Knowledge Management

The amount of information that police officers come into contact is astounding and the police service is a highly information-intensive organisation (Gottschalk, [B] 2006). How people acquire and process information is determined by what their information needs are, their methods of information seeking, and its wider purpose of how it is applied (Marchand et al, 2000). Knowledge on the other hand in the context of policing, refers to individuals' knowledge, which does not easily transform into organisational knowledge even with the implementation of knowledge repositories or databases (Gottschalk, [B] 2006, p.387). Empirical studies have shown that the greater the anticipated reciprocal relationships are, the more favourable the attitude toward knowing sharing will be (Bock et al, 2005).

A fundamental process of policing and law enforcement is to conduct investigations. Investigations would grind to a halt if there was scant or limited information to develop or to act upon. Based on the scope of police work, timely and accurate information and knowledge are critical to the success of policing (Luen and Al-Hawamdeh, 2001). The well-known data to knowledge continuum establishes the importance of making distinctions between data, information and knowledge (Gottschalk, 2005). For policing 'intelligence' is an inherent step in the 'knowledge ladder', and refers to actionable information that has been organised, validated and analysed (Newburn, 2009). Knowledge creation is therefore, a continuous process of dynamic interactions between capturing the tacit and explicit knowledge of police officers and police staff; and is a nurturing and engaging process, which relies on access to relevant and appropriate information sources and systems (Newburn, 2009). Arguably, knowledge in the context of policing *is* 'intelligence' to some extent, and both terms can be understood interchangeably. Knowledge management can be discussed as a process or method to simplify and improve the process of sharing and understanding knowledge within an organisation, to effectively ensure activities are in place, which facilitates the systematic and collective leveraging of knowledge throughout the organisation (Middleton, 2002). From an interdisciplinary perspective, knowledge management can be defined as *'the effective learning process associated with exploration, exploitation and sharing of human knowledge (tacit and explicit), that use appropriate technology and cultural environments*

to enhance an organisation's intellectual capital and performance' (Jashapara, 2011, p.14).

Developing a coherent knowledge management strategy to ensure that such information and knowledge are made available to police officers in an efficient manner, would enable them to perform their duties at an optimal level, however, in a complex and dynamic policing environment information must be enhanced by an effective and complimentary knowledge sharing system (Luen and Al-Hawamdeh, 2001).

Gottschalk (2006) acknowledges that knowledge management as a field of study is directly relevant to policing as it is essentially about improving the process of sharing, distributing, creating, capturing and understanding knowledge (Gottschalk, [B] 2006). Europol also recognises the fundamental importance of this discipline, and has a dedicated 'Knowledge Management Centre' to ensure that new developments in technology, science and other specialised fields are monitored and researched (Gottschalk, [B] 2006). Within the context of police investigation, Gottschalk contributes to sharing an understanding of the various stages of knowledge management systems, and addresses the role of IT support in each stage. The stages of knowledge growth are regarded as characteristic of the knowledge continuum itself, and conceptualises the role of IT as either being more present or less present in the knowledge continuum (depending on what stage the investigating officer is on). The knowledge management systems stage model is a relative concept concerned with how IT is able to process information for 'knowledge creation work'. The visual depiction of the stage model illustrates that IT at later stages is more useful to knowledge work or intelligence gathering, than the use of IT at earlier stages of investigation. Furthermore, the relative concept implies that IT is more directly involved in knowledge work at higher stages, where the use of a specific IT system such as an intelligence database is necessary, and that IT is able to support more advanced knowledge work, for example intelligence analysis, at higher stages (Gottschalk, 2006]. For description purposes, the knowledge management systems stage model is summarised here (Gottschalk, [B] 2006, p.383): -

- *STAGE 1 – Officer to Technology (end-user tools)*
- *STAGE 2 – Officer to Officer (who knows what)*
- *STAGE 3 – Officer to Information (what they know)*
- *STAGE 4 – Officer to Application (how they think)*

Based on this model, the PND is likely to be positioned at Stages 1 and 3 – the PND provides police officers and police staff with access to information that is typically stored in documents, for example crime incident reports, intelligence reports, victim and witness statements, and judicial process outcomes. Carefully stored and codified data is an inherent feature of the PND, which relates to data and intelligence held on individuals of police interest that can be accessed and used by people in the organisation. However, the PND is limited in what it can achieve as it cannot solve knowledge problems, does not have the capability to statistically analyse crime patterns or cases and neither can it create inferences in the way in which Stage 4 of the knowledge system model proposes. Brown and Brudney (2003), describe the police service as a “knowledge organisation” or as a “learning organisation”, whereby the police endeavour to deter, detect and prevent crime taking place, through the knowledge benefits that can be gained from the acquisition of information and the use of technology. Deploying information technology to effectively store information is relied upon to enable police officers to be informed and to gain a level of control of a situation or environment, and to solve crime-related problems. The primary purpose of such technology is to leverage and advance the intellectual capital of the organisation, and to exploit investigative leads and opportunities. Brown and Brugden’s study (2003) examines the ability of information and technology to support the police organisation’s capability to problem solving, and how it can understand and react to changes in the environment, reduce uncertainty and facilitate enhancements in organisational decision-making.

Relevant questions surrounding the conceptualisation of the police service as a ‘learning or knowledge organisation’ are - to what extent do the benefits of information and technology come to fruition in policing, and how does information and technology promote or facilitate organisational adaptability? In what ways does the use of information and technology in the police organisation increase investigative power, decision-making and problem solving? And what can be learnt from the past in order to gain greater organisational control of the operating environment in the present, in order to strategically influence and plan for the future? Addressing questions such as these requires a holistic organisational approach to assessing the success or value of an information system, with emphasis on the wider impact of new technology implementation, its intended application and the outcomes anticipated.

DeLone and McLean (2003) examine measuring the effectiveness and efficiency of an information system, and regard these as critical success factors, which to varying degree have influenced other evaluation models and approaches towards measuring the

success of information systems. DeLone and McLean (2003) discuss a range of variables that are important, which identify determining causal relationships to assist in the taxonomy of variables to apply during the evaluation process. For example, higher system quality is expected to lead to higher user satisfaction and use, leading to positive impacts on individual productivity, resulting in organisational productivity improvements (DeLone and McLean 2003). A process of understanding information systems and their impact was the basis for the creation of the D&M Information System Success Model. The process model is based on three components that are regarded as necessary to information system evaluation: the creation of a system, the use of the system, and the consequences of the system's use (DeLone and McLean, 2003). The authors conclude that the multidimensional and interdependent nature of information system success requires careful attention to the definition and measurement of variables and that where possible, empirical investigation needs to be conducted so that the variables can be applied and tested in real organisational settings. Empirical testing and validation of the D&M IS Success Model by other researchers have identified further significant relationships and associations and this has helped to confirm the causal structure of the model, in terms of its usefulness and applicability. The D&M IS Success Model is recommended as a common framework to build on and to guide information systems evaluation, however, from the outset; such evaluations need to consider the nature, extent, quality and the appropriateness of system use, and how this usage translates into the realisation of business benefits and organisational impact (DeLone and McLean, 2003).

The IT productivity paradox is significant to discuss in relation to evaluating the success of the PND because ultimately, the design and provision of an innovative IT system is often based on the assumption that a positive and tangible relationship exists between IT investment and organisational performance (Galliers, 2007). However, a clearer understanding of the factors that drive organisational performance could assist organisations such as the police service in better allocating resources that are dedicated to the relevant delivery process (Galliers, 2007). In terms of research approaches and methods used, IT investments and the realisation of business benefits have tended to be underpinned by conventional quantitative measurements of productivity, mostly from an economic perspective measuring the productivity of the technology's contribution to organisational performance. Galliers, (2007) argues that researchers should not overlook 'quality' considerations such as business change and transformation, and the impact of technology on organisational structure and processes. Although quantitative

measurements of IT investment and subsequent productivity would be useful at a macro-level for a Chief Police Constable for example, qualitative individual and group-level measurements at a micro-level would be equally beneficial to end-users and their line managers. This is because measuring IT system success or impact cannot be singularly explained or evidenced by the primary use of tangible 'hard' measures, but would also require consideration of additional 'soft' intangible measures which are often unquantifiable and difficult to reflect financially. From an empirical perspective, the value of an IT system needs to be discussed meaningfully and in context with organisational goals, strategies, structure, environment and culture, so that where appropriate both quantitative and qualitative methodological approaches can be effectively interwoven. A further paradox relevant to the PND is in relation to knowledge sharing and the dual roles of collaboration and competition required by organisations of their employees. Yang and Wu (2008) in a study of knowledge sharing in public-sector organisations found that people are reluctant to share knowledge because knowledge sharing can involve a conflict of interest between individuals and departments. Knowledge can be a source of competitive advantage and consequently people would perceive themselves to be at a disadvantage with others in the organisation; this resonates well with understanding the dictum – 'knowledge is power' (Henry, 2003).

Important lessons can be learnt from the COPLINK information system developed at the University of Arizona in collaboration with the Tucson Police Department and the Phoenix Police Department in America. In response to the 9/11 terrorist attacks in 2001, major government efforts have focussed on modernising federal law enforcement authorities', intelligence collection and processing capabilities. The authorities recognised that despite the increasing availability of data, many challenges were continuing to hinder the effective use of law enforcement data and knowledge, which, as a result limited the crime-fighting capabilities of related government and law enforcement agencies (Chen et al, 2003). One of the main problems identified was the inefficiency in sharing information with other police departments and agencies – a similar problem identified in law enforcement information sharing in the UK. Another problem identified was the lack interoperability and incompatibility between police IT systems, which made the retrieval of information difficult and time-consuming (Chen et al, 2003). Information overload was a key issue and COPLINK was designed to alleviate some of these issues associated with information and cognitive overload. This was resolved by integrating and managing information and knowledge through system

technology and methodology appropriate for capturing, accessing, analysing, visualising, and sharing law enforcement related-information in both social and organisational contexts (Chen et al, 2002). The implementation management of COPLINK was evaluated from a system usability and user acceptance perspective as these factors were identified as fundamental to organisational technology adoption (Lin et al, [B](2002). Overall, the findings from the evaluation study, identified that COPLINK appeared to be effective in connecting police detectives to investigating field officers and vice versa, enabling collaboration and the vital sharing of police information and knowledge. In terms of user-acceptance and assisting decision-making, the fundamental determinants of technological use were specifically, perceived usefulness, perceived ease of use and time efficiency gains. The attitudes of users' was critical in understanding the individual context and the subjective norm of the organisation which were regarded as important characteristics of COPLINK's implementation context (Lin et al, [B](2002). The evaluation was able to suggest several implications from an implementation management perspective, in that efficiency gain or work productivity was an important driver to perceived usefulness of the system and to an extent influences users attitudes and behaviours in accepting the new technology – *“perceived usefulness may be the single most important driver in individual officers' technology acceptance decision-making,”* (Lin et al, [A](2002) p.32). Furthermore, perceived ease of use was regarded as insignificant suggesting that a police officer is not likely to consider a technology or system to be useful simply because it is easy to use. The subjective norm of the organisation was considered to be of influence, in as much as fostering positive or conversely, negative attitudes and behavioural intentions toward new technology acceptance (Lin et al, [B](2002).

2.1.2 Managing Organisational and Business Change

In order to maximise the benefits and use of the PND, the police organisation is to recognise the profound organisational changes evoked as a result. The changes that require particular attention are in relation to how information is shared, how it is stored, retrieved and utilised; and the application of knowledge management initiatives such as the sharing of best practice, performance benchmarking, instilling responsibility and accountability for sharing knowledge, and formalising such processes as part of the organisation's core knowledge management values and principles (Turban and Aronson, 2001). However, there are many challenges associated with designing and implementing knowledge management tools and initiatives in an organisation. Failing to acknowledge

the cultural and change-management dimensions can lead to unsuccessful and futile implementation (Jashapara, 2011). Another challenge would be the failure to adopt an appropriate organisational-wide strategy towards integrating knowledge management. Police forces will have different views as to what is knowledge management and what this practically means in reality. Forces are aware of the central role of intelligence or knowledge to police work, by identifying what constitutes as knowledge management and where this knowledge exists, can assist in the design of a strategy to facilitate the application and acquirement of knowledge (Gottschalk, [A] 2006). Knowledge sharing and exchange is pivotal to successful knowledge management practices (Jashapara, 2011). Research carried out by Seba and Rowley (2010), on knowledge management in police forces identified organisational culture as the main barrier to tacit knowledge sharing and exchange of expertise. On the basis of their findings the authors suggest that the police organisation develop further understanding of their organisational culture as part of the process of understanding how to create knowledge exchange cultures (Seba and Rowley, 2010).

Organisations like the police service need to recognise that new technology is sometimes a convenient scapegoat for workplace dissatisfaction, and it is common to claim that resistance to change is a fundamental human trait (Hughes, 2010). Another perspective would be to focus on the process of making the necessary changes in the police organisation, and the involvement of people in selecting the new technology, or in the way that technology is introduced and used; how the implemented technology is communicated, how much training and support is provided, and how careful the roll-out is planned and executed (Beynon-Davies, 2009). Furthermore, in terms of the technology itself, users will be questioning how well suited it is to their work, how easy it is to learn to use, how 'forgiving' the system is of users' errors, and the system's reliability and efficiency (Boddy, Boonstra and Kennedy, 2005). Steps need to be taken by the police organisation towards managing the effective use of new technology, and that resources and efforts are dedicated to developing appropriate users habits, as well as rewarding and recognising the innovative use of technology, rather than just focussing on what the technology is capable of (Bocji et al, 2003). It is vital that early start-up problems are promptly resolved; otherwise user-issues could potentially lead to rejection of the new technology. In order to optimise effective use of new technology, it requires users' to have the necessary skills and training to be able to exploit the features and functions available to them. One of the most critical determinants of technology effectiveness is to evaluate how people use it to get work done (Boddy,

Boonstra and Kennedy, 2005). User engagement with technology is just one aspect, other aspects relevant to technology usage and acceptance relate to police information behaviour, their information management capabilities and how both tacit ('know-how') and explicit ('know-what') knowledge is captured from police officers and police staff – as this contributes to the intellectual capital of the police organisation. Often individuals may not willingly share information with their peers and supervisors because they believe that what they know provides them with an inherent advantage of competitiveness and negotiation in the workplace (Bell, Dean and Gottschalk, 2010). And despite the availability of sophisticated knowledge sharing technologies, such human concerns may often result in sharing partial or ambiguous information. Even more critical than the absence of information is the propensity of sharing inaccurate information because of competing interests (Bell et al, 2010). In Collier's review of the application of 'intelligent' knowledge in UK policing it was observed that, "...*there remain many examples of tacit knowledge being held by police officers not being converted into explicit knowledge that is used by NIM processes.*" (Bell, Dean and Gottschalk, 2010, p.347).

2.1.3 User Acceptance of Information Technology

The exploration of the key factors that influence the acceptance of information technology is a well-studied area in the domain of information system research. Understanding why people accept or reject a new system has proven to be one of the most important but challenging issues in information technology utilisation (Smith, Caputi and Rawstone, 2007). Theoretical models developed from social psychology have provided foundations on which to conduct research that identify various determinants of technology usage, in terms of investigating users' attitudes, behavioural intentions and technology application experiences (Smith, Caputi and Rawstone, 2007).

The original Technology Acceptance Model (TAM) developed by Davis in 1989, sought to identify the factors that facilitate the integration of technologies into an organisation, and to discover why users accept or reject a technology (Davis, 1993). Based on the adaptation of the theory of reasoned action developed earlier by Fishbein and Aijen (1975) which is a more generalised theory, the TAM is the most widely used model for identifying factors that contribute towards acceptance of a technology (Lindsay, Jackson and Cooke, 2011). The theory suggests that when users are presented with a new technology or system, a number of factors influence their decision about how and when they will use the technology. To explain this, two perceived attributes or measures are

used: perceived usefulness (PU) and perceived ease of use (PEOU). Davis states that PU is whether the technology will enhance the user's job performance, and PEOU relates to whether using the system will be free from effort (Davis, 1993). The two variables are understood to predict and influence users' attitudes – whether positively or negatively. The empirical study based on a survey questionnaire concluded that perceived usefulness has more effect than perceived ease of use, and that people are more likely to cope with a 'difficult' system if it provides them with valuable information, but unlikely to use one whose only virtue is that it is *just* easy to use (Davis, 1993).

The validity and integrity of the original TAM is demonstrated through empirical research, which extends the model in various settings, providing consistency and confirmation of the reliability of the original TAM. For example, Malhotra and Galletta (1999) extended the TAM to account for social influence, built on the supposition that research informing the role of social influence processes in technology acceptance and usage behaviour, is also relevant for understanding the instability of belief structures such as PU and PEOU, in certain contexts of technology utilisation. Other similar examples include Money and Turner (2004) who researched the adoption of a Knowledge Management information System, Irani, Dwivedi and Williams research (2009) on consumer adoption of broadband, and Liang, Xue and Byrd's study (2003) on the acceptance of new technology within a healthcare setting. According to these studies, PU and PEOU are dominant determinants of technology usage.

Legris, Ingham and Colletette (2003) conducted a critical review of TAM addressing a key question of why people use information technology. Their approach is based on identifying significant factors that facilitate technology use, by extensively reviewing published articles relevant to the field. However, analysis of the empirical research using TAM as a research framework, showed that the results were somewhat inconsistent, and although TAM is regarded as a useful model, Legris et al, argue that TAM needs to be integrated into a broader model, which includes variables related to both human and social change processes, and to the adoption of the diffusion of innovations theory (Legris, Ingham and Colletette, 2003).

Sharp (2007) published an article aimed at undergraduate students as a foundation in which to guide students in the area of technology acceptance research. Sharp (2007) provides a critical overview of empirical research carried out on technology acceptance, and dissects pertinent variables associated to TAM and TAM2, to ascertain their significance. TAM2 was developed by Davis and Venkatesh in 2000 and is discussed later in this literature review. Sharp (2007) concludes that the popularity and strength

of the TAM2 model is evident by its flexibility and applicableness. However, Sharp (2007) found that there was mixed results between PU and PEOU as the stronger determinant of intention to use. The majority of studies reviewed were conducted within a volitional environment. That is, the user had the choice of whether to accept or reject the technology. Venkatesh (2000) suggested, *“future research on technology acceptance should examine mandatory usage contexts to test the boundary conditions of the proposed model”* (Venkatesh, 2000, p.358). Finally, Sharp (2007) reveals that the role of attitude in user acceptance is important and all but one of the studies reviewed utilising the original TAM indicated that attitude was a significant direct determinant of behavioural use (Sharp, 2007). Davis (1993) suggests, *“more research is needed to identify the conditions under which attitudes mediate the belief-intention link”* (Davis, 1993, p.479).

Karahanna and Straub (1999) examined the psychological origins of PU and PEOU. The primary aim of their research was to extend the original TAM by offering an explanation for the two attributes, and to explore how and why these beliefs develop and lead to system use. The findings indicate that system use is affected by perceptions of technology usefulness, which are, as a result, affected by perceptions of ease of use, the extent of social influence exerted by supervisors, and perceptions of the social presence of the technology (Karahanna and Straub, 1999). Interestingly, facilitating conditions such as the availability of training and technical support for the use of information technology had no impact on perceptions of ease of use or technology usefulness.

Smith, Caputi and Rawstone (2007) conducted a study to investigate and define empirical evidence for differentiating the concepts of computer attitude, subjective computer experience and objective computer experience. Although the concept of attitude toward technology use has gained recognition as a critical determinant in the use and acceptance of computer technologies, there is no single, universally accepted definition of the computer attitude construct (Smith, Caputi and Rawstone, 2007). The evaluative approach favoured in the research, focuses on contemporary theorising in the general area of attitudes, and is consistent with Fishbein and Aijen’s (1975) theoretical position – the theory of reasoned action. Computer attitude is defined as *“a person’s general evaluation or feeling of favourableness or unfavourableness toward computer technologies (i.e. attitude towards objects) and specific computer-related activities (i.e. attitude towards behaviours)”* (Smith, Caputi and Rawstone, 2007, p.61). Using factor and correlation analyses, the study found that the computer experience is essentially a bi-dimensional concept comprised of objective and subjective constituents. This means

objective computer experience, which is defined as *“the totality of externally observable, direct and/or indirect, human computer interactions which transpire over time”* (Smith et al, 1999, p.228), is conceptualised as an essentially unique concept separate from other forms of experience, namely, subjective computer experience, and should be investigated separately. Subjective computer experience is defined as *“a private psychological reflecting the thoughts and feelings a person ascribes to some existing computer event”* (Smith et al, 1999, p.228]. It appears that the findings from their research would recommend not treating computer attitude and subjective computer experience as if they were interchangeable constructs. Rather, the research suggests that the independent nature of these constructs should continue to be explored in future studies.

As mentioned, TAM2 was developed by Venkatesh and Davis (2000) to include additional key constructs, including *“social influences and cognitive instrumental processes”* (Lindsay, Jackson, and Cooke, 2011, p.391]. Additional items to TAM within the social influence category include subjective norm, voluntariness, image and experience. Within the cognitive instrumental processes, job relevance, output quality and result demonstrability are considered (Smith et al, 1999). However, TAM2 is limited in that it only explores the basis of the PU construct and overlooks the PEOU component, providing a less encompassing view of factors that can be addressed to optimise usage. The TAM3 model proposed by Venkatesh and Bala (2008) combines the TAM2 and the model determinants – MDPEOU to explain PEOU in addition to the PU determinants as shown in TAM2. General beliefs about technologies, which are described as “anchors” by Venkatesh and Bala (2008) in TAM3, relate to *“computer self-efficacy”, “perception of external control”, “computer anxiety”* and *“computer playfulness”*. The *“perceived enjoyment”* and *“objective usability”* are referred to as *“adjustments”* whereby beliefs are shaped on the level of experience with a system (p.275). *“Computer self-efficacy”* relates to the extent of an individual’s belief that they have the ability to perform a task. *“Perception of external control”* determines whether an individual believes the organisational and technical support is available and *“computer anxiety”* relates to the level of fear one may have in using a new system. *“Computer playfulness”* relates to individual motivations for using a novel technology. *“Perceived enjoyment”* is defined as *“the extent to which the activity of using a system is perceived to be satisfying in its own right”* (Venkatesh, 2000, p.351), and is expected to increase with experience whilst computer playfulness will decrease over time. Finally, *“objective usability”* involves an individual making a comparison of the actual level of effort required to complete specific

tasks (Venkatesh and Bala, 2008, p277). Although TAM3 is more detailed and comprehensive, with a focus on interventions, the wider implementation context of organisational issues are not overtly addressed, such as the influence of managers, the level of suitable training provided, the availability of technical support, and users' involvement in the IT interface design process. Other organisational factors could include the need for new business processes to be instigated as a result of new technology, and also the level of communication across the organisation in informing people of the anticipated organisational changes, such as the introduction of new working practices. These factors may also play a pivotal role in determining the acceptance of new technology.

Venkatesh et al. (2003) proposed and tested a unified information technology acceptance and utilisation model, called the Unified Theory of Acceptance and Use of Technology (UTAUT). The model integrates significant elements across prominent user acceptance models and formulates a unique measure with core determinants of user behavioural intention and usage. The constructs of the UTAUT model are: performance expectancy, effort expectancy, user attitudes and technology use, social influence, facilitating conditions, self-efficacy, and anxiety (Venkatesh et al, 2003). These attributes were hypothesised to be fundamental determinants of the user behavioural intention of information technology, and helpful in assessing organisational characteristics that lead to information system success or failure. Research carried out by Sundaravej (2005) empirically validates the UTAUT model examining user acceptance towards an educational technology. However, Sundaravej (2005) identifies a major concern of the unified model in its correlation and consistency among the elements of each variable combined from various other models. Sundaravej's (2005) research aims to investigate and retest the UTAUT model to accumulate further evidence concerning the validity, consistency, and correlation of the model scales for the assessment of the user acceptance of information technology. Using a quantitative approach to data collection and data analysis, Sundaravej (2005) found that social influence, which is combined with attitude toward using technology, produces an insignificant effect on behavioural intention, whereas anxiety and self-efficacy appeared to be correlated with the behavioural intention to use the new educational technology in question (Sundaravej, 2005). In comparison to Venkatesh and Bala's (2008) study, the limitation of this research is in relation to the methodological approach, whereby users' experience, gender, age and voluntariness to use the technology was not accounted for in the research model adopted. Venkatesh and Bala's (2008) study was based on longitudinal

observational field studies across various industries. Nonetheless, such findings do not diminish the value of the UTAUT model but instead challenge information system researchers to further explore the specific influences of factors that may alter the behavioural intention to use an information system in other settings. However, Sundaravej's (2005) study provides evidence that the UTAUT model is an adequately valid and reliable model to measure technology usage behaviour.

2.1.4 Police Acceptance of New Technology

Investigating the main factors that influence the acceptance and usage of information technology within a policing context will enable a critical understanding of the motivational issues that surround the adoption of a technology. The original TAM, plus the revised TAM2 and TAM3 provide a useful theoretical framework for exploring various determinants of technology acceptance. However, Lindsay, Jackson and Cooke (2011) argue that all versions of the TAM focus on the user perspective and do not reflect the broader social and organisational factors within the implementation and contexts of policing.

Technology has had a great influence on police practices and in assisting their knowledge related work (Colvin and Goh, 2005). Technology is currently used to support policing in several ways, such as database systems to record crime details, geographic information systems to profile the characteristics of local policing environments, and the creation of analytical products such as Target and Problem Profiles (Ashby and Longley, 2005). Police organisations are information-intensive and 'intelligence-led' organisations. Information is crucial to police officers carrying out their daily duties, not only in terms of obtaining the right information on time and in an adequate way, but also with regard to sharing information with colleagues and providing information to relevant information systems (Boumnan and Wijngaert, 2009). The decision to adopt specific technologies and systems is not usually made by end-users, but often by managers and stakeholders within the organisation. Once the decision to adopt a specific technology has been made and the associated systems are implemented, it is up to individual police officers and police staff to decide whether they will actually use the technology; it is only then that the anticipated benefits can be realised (Lindsay, Jackson and Cooke, 2011). It is difficult to assess the potential usefulness of an innovative technology coupled with unfamiliarity of the new technology or system, can act as a barrier toward user adoption (John et al, 2011). As a result initial usage levels are likely to increase slowly, and may even fall slightly, or users may re-

create and adapt their use of the technology in ways information technology designers and management had not anticipated (Boumnan and Wijngaert, 2009). A fundamental question therefore, is what are the contextual and organisation related characteristics or factors that play a role in the use of a technology by police officers and police staff? Despite the greater use of intelligence and information technology to support a more proactive approach to investigating criminal activity, in general, criminal investigations are reactive, with police responding after the criminal event has occurred (John et al, 2011). Criminal investigations are complex and sometimes tedious that requires a certain knowledge base, skills and a methodical attention to detail. Each case that is investigated is unique, and should be treated individually while adhering to standard policies, guidance and procedures. Criminal investigations are reliant upon investigators to conduct all investigations in a thorough and structured manner (Newburn, 2009). Criminal investigations have been the subject of considerable attention both publicly and politically. Since 1980, there have been two Royal Commissions and a number of miscarriages of justice, which have received both public and high media interest (Newburn, 2009). More recently, there have been a number of high-profile inquiries such as Lord Laming's inquiry into the death of Victoria Climbié and Lord Macpherson's inquiry into the death of Stephen Lawrence. Both of these inquiries identified problems in the way criminal investigations were carried out, particularly in relation to inter-agency partnership working, sharing information and policy guidance on both (John et al, 2011).

As discussed in Chapter 1, the Bichard Inquiry was highly critical of the way the police forces concerned – Humberside Police and Cambridgeshire Constabulary acquired, managed and shared information. The inquiry's findings subsequently shaped the setting up of the IMPACT programme, principally the Management of Police Information (MoPI), the interim INI system and, the implementation of the PND in UK police forces (Bichard, 2004 and Newburn, 2009). A key finding of the Bichard Inquiry related to the management of police information and associated with the reliability, quality and handling of information obtained from police intelligence systems (Bichard, 2004). The inquiry made explicit reference to the implementation of a national IT system – which is now the Police National Database, to improve the management and sharing of information and intelligence by the police service, and for IT systems to support this. It highlighted that there was no common understanding of what was meant by 'weeding', 'reviewing', 'retention' and the deletion of electronic police records, and while it was

impossible for the inquiry to determine how many records had been lost, it was concluded that a significant number had been deleted (Bichard, 2004).

It is important to distinguish and define information and intelligence in the context of policing. Intelligence is created from pieces of information; it is a process that converts raw data that might have little or no apparent value until the data is processed, analysed and connectivity is made with other pieces of information. The end result is intelligence that most significantly can be actionable and used to determine risk factors, operational viability planning and so forth (John et al, 2011). Pieces of information are the building blocks of intelligence; they are the raw material of the intelligence process. The police have a tremendous range of information sources available to them – whether obtained overtly or covertly and from open and closed sources. The factors that may influence the perceived value of a particular type of information to the police are: the provenance and source of the information; whether that information is known to the police; the age and currency of the information; and whether it is likely to add value to a particular priority or task within a policing area at that particular time (Newburn, 2009). Assessing the veracity of information is only the first stage in developing it into actionable intelligence. Even if every piece of information were verifiable, it would still require sifting to determine its value and usefulness. Without such a process, any intelligence system would be swamped with non-actionable information. One of the fundamental purposes of an intelligence database is that it should be used for proactive analysis and action (John et al, 2011). Too much reliance on factual, verifiable information such as that contained in criminal records can detract from the purpose of proactive analysis by concentrating on the past, rather than on current or the likely criminal actions of the suspect in the future (Gottschalk and Solli-Saether, 2007).

Studies into the use of intelligence databases in the police service have suggested that they are frequently used as an electronic library of information – i.e. as a reactive tool rather than for the production of proactive actionable intelligence (John et al, 2011). One of the concerns identified in the intelligence gathering process is ensuring that sufficient information enters the system so that trends, patterns, links and associations can be identified and corroborated; and that intelligence packages prepared by investigators and analysts are not considered as final or as the end of the intelligence gathering process (Gottschalk and Solli-Saether, 2007). However, there is also another concern, which is perhaps the most significant, which is cultural resistance to the sharing of information – whereby individuals choose to prefer to hold back information so that they themselves get credit for resulting successes (John et al, 2011). This has been

recognised within the police service – a policing culture that traditionally rewards individual initiative in achieving good results and being identified as a “good thief taker”. It can consequently be difficult to encourage investigators to share information – to enter it into a process in which they may have no involvement or recognition for the eventual result (John et al, 2011). Although progress in developing an intelligence culture has been made with the introduction of the NIM, variations in local interpretations of it have detracted from national uniformity, and therefore the ability for intelligence to be shared. Possession of knowledge is of little value if it is not disseminated.

Reiner (2010) argues that the introduction of any new type of technology should be considered as a challenge, because it directly impacts on established working practices within the police organisation, which also has a strong occupational culture. This fact is to be considered when planning to conduct an evaluation of this kind. Chan (2001) and Manning (2008) suggest the introduction of new systems and technologies into the police service can often destabilise the power balance between organisational departments by altering communication formats, roles, responsibilities, business processes and working relationships. Chan’s (2001) study argues that supervisors were closely scrutinising staff and their work as a result of new technology being introduced. This finding is supported by research carried on in the UK by Lindsay, Jackson and Cooke (2011) on the acceptance of technology for mobile policing. The study found that management style was an important determinant in officers’ acceptance of mobile technology, in terms of supervisors becoming more aware of the day-to-day activities and workloads of officers under their supervision, which may cause them to change their behaviour towards their officers’. This point is clarified further and refers to changes in employees’ behaviour in response to new technology: *“The needs of employees and their behaviour in the workplace modify dramatically following the introduction of ICT. It is further suggested that cultural change within any organisation is needed to cope with the introduction of new technology and the skills and training required to make full use of it”* (John et al, 2011, p.69).

Disruption to the established power balances in the police organisation may lead to tendencies to resist change and therefore, reduce the motivation to use a particular new technology. However, there may be other possible reasons to why resistance to change may develop. Mullins (2005) argues that there are both human and social consequences in relation to new IT being introduced and that *“staff may become resentful, suspicious and defensive, and people’s cognitive limitations, and their uncertainties and fears, may*

result in a reluctance to accept change", (Mullins, 2005, p.134]. Furthermore, resistance to change can affect the quality of work generated by police officers and police staff, which reflects the quality of change management techniques, deployed during the implementation of the new technology. Communicating anticipated changes to roles, responsibilities and working practices is important in minimising levels of change resistance, as well as communicating the relevant rationale behind the planned changes and the anticipated business benefits (John et al, 2011).

Colvin and Goh (2005) addressed the question of whether or not information technology made any difference to policing. Although the potential benefits of information technology were well recognised in studies on the police, empirical studies on the impact of information technology on the social organisation of policing were generally lacking. Smith, Caputi and Rawstone (2009) found that the impact of technology was dependant upon the extent to which employees accepted the new technology. The purpose of Colvin and Goh's (2005) study was to develop a basic theoretical model that would explain why police officers embraced or rejected the new technology introduced. The authors utilise the original TAM in order to validate its appropriateness and application within the policing context. Interestingly, the research methodology involved the collation of observational data obtained during car patrols with on duty police officers and focus groups with officers, stakeholders and "subject matter experts". The research findings indicated that the factors of 'information quality' and 'timeliness' were the most important constructs of technology acceptance by police officers (Colvin and Goh, 2005). Nevertheless, 'ease of use' and 'usefulness' were also regarded as important components – thus validating the TAM to some extent, but with an additional two constructs directly related to the police acceptance of new technology. Information quality and timeliness emerged as new factors and it was understood that both of these factors relate to the occupational nature of police officers, in terms of their training, skills, activities, roles and responsibilities. The timeliness element largely reflects the importance of police officers having access to quality information in a timely manner. Colvin and Goh (2005) give emphasis to the following point based on their findings: *"Given the potentially dangerous situations in which police officers performed their jobs, attributing importance to the quality and timeliness of information might prevent fatal outcomes in their encounters with the public"* (Colvin and Goh, 2005, p.94).

The strategy and policy implications for those responsible for procuring and implementing new technology within the context of policing must ensure that the anticipated benefits of the new technology are aligned to both user and business

requirements. The organisation's vision of what the technology is expected to achieve ought to share the utopian vision with those that are expected to use the technology. Police officers rely on technology to carry out their work; therefore officers who readily accept new technology would optimise their capability to carry out their duties more effectively.

Research carried out by Ellahi and Manarvi (2010) was in relation to understanding attitudes towards computer use in the police department of Pakistan. The authors recognise that technology in policing is developing at an "extraordinary rate", however, it is suggested that organisations such as the police often fail to acknowledge both the users psychological reactions and organisational factors in the design of a new technology or system. The research explores the key factors that influence police officers' acceptance and attitudes through a research survey and by gathering empirical evidence based on an integrated framework developed by Ellahi and Manarvi (2010). In terms of the use of technology enhancing work productivity, Gottschalk and Holgersson (2006), indicated that information technology has a part to play in improving the effectiveness of police work, when it is integrated with certain organisational practices. Ultimately, the authors suggest that if police officers accept information technology, it can increase their performance and value (Gottschalk and Holgersson, 2006). Matching the needs of police work with information technology is considered vital for officers' in embracing the use of new technology and for managing users resistance; this reinforces the importance of users being involved in the design and implementation stages of information technology to ensure that both users and organisational requirements are mutually satisfied. Ellahi and Manarvi (2010) state that: *"Despite of the fact that information systems are widely available; many organisations do not achieve the full benefits of their information systems because of resistance by some individuals while using them"* (Ellahi and Manarvi, 2010, p.2). It is thought that if information technology systems are not used as expected then this becomes an impediment toward organisational performance. The acceptance and integration of information technology into routine daily activities – depending on the type of technology and its purpose, is a good indicator for assessing and explaining the adoption success of a technology. Although, as suggested by Colvin and Goh (2005) the implementation of new technology within the context of policing, can create disturbances in their social structure, which may cause some resistance to technology use.

Ellahi and Manarvi's (2010) research framework consists of various core constructs or adoption metrics taken from three models relating to technology use and acceptance.

These are 'The Diffusion of Innovations Theory', 'Model of PC Utilisation' and the 'Technology Acceptance Theory'. The research findings indicate that if police officers value the technology as a way of increasing their work productivity and performance, then they are more likely to have a positive attitude towards its usage. The positive effect of PEOU on attitude confirms the validity of TAM, as PEOU indirectly relates to behavioural intention toward use and acceptance of technology (Ellahi and Manarvi's, 2010). Therefore, if police officers find the technology to be easy to use and easy to understand then they are more likely to develop a positive attitude towards its usage. Furthermore, according to the results the provision of technical and managerial support for police officers' influences technology utilisation; this means that technology accessibility is also important. The findings also concluded that users with high computer literacy are more likely to exploit the features, functions and tools available which results in "*maximum use of computer applications thus opening ways for exploring more benefits of information technology in carrying out police tasks*" (Ellahi and Manarvi, 2010, p.20).

Most research studies on police acceptance and use of technology discuss the importance of developing an appropriate business strategy alongside the project implementation process. This is to help organisations understand users' experiences, attitudes and patterns of use. It is thought that this will also help to maximise the use of a technology, and hence will enable maximum business benefits to be realised. Organisational environments are increasingly complex and dynamic; traditional bureaucratic organisations such as the police struggle in such environments because they cannot change rapidly (Grant, Hackney and Edgar, 2010). In respect of organisational change which often occurs when new technologies or systems are being implemented, technology alone cannot be the driving force for managing organisation change; rather it is often the case that both organisational practices and the deployment of technology to enhance working practices are both mutually intertwined (Beynon-Davies, 2009). Therefore, it is difficult to predict how information technology will be used in practice and why so often information technology has unintended consequences due to the interpretive flexibility afforded to its users. As a result organisations without an IT strategy in place may struggle to guide the appropriate use of the technology, and the subsequent changes to working practices and organisational processes will not be clearly addressed and defined. From a technological perspective, organisations may also struggle to fully exploit the features and functionality of the information system. This may be partly because implementing a new system or technology is a socio-technical

system that depends on users altering their working practices in order to do things differently, which would be a positive step toward fully exploiting the functionality and benefits of the new system (Grant, Hackney and Edgar, 2010). The implementation of information technology projects is therefore as much about organisational change projects as they are technical projects; the view of IT implementation being a linear process is both unhelpful and unrealistic in this context.

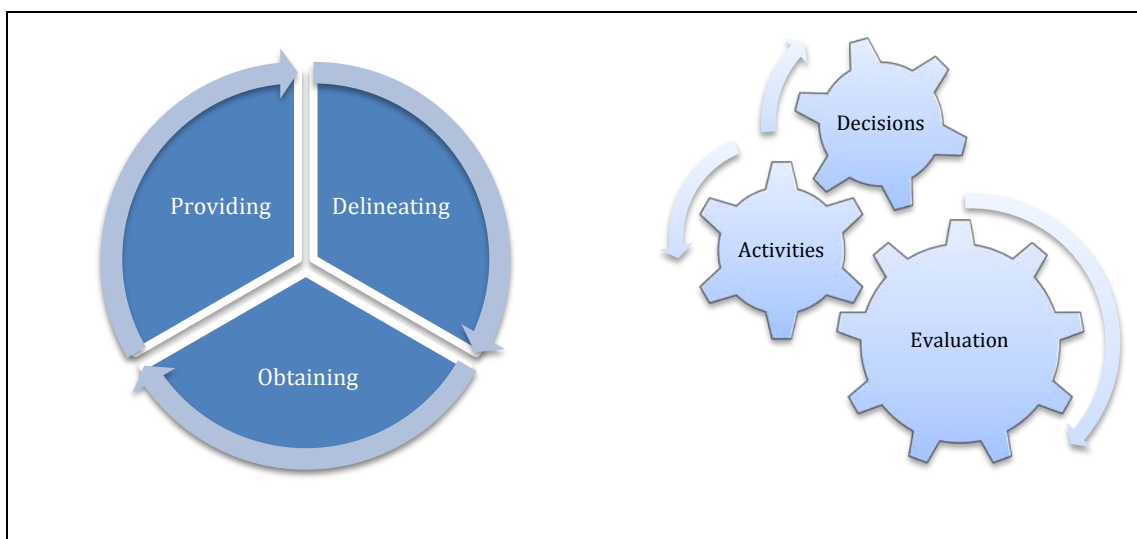
Practice theories are useful as they discuss what people actually do in their everyday activities. This includes defining best practice working, which are those workflows regarded as the most effective for fulfilling particular business processes rapidly and are context specific (Grant, Hackney and Edgar, 2010). A definition of 'practice' is "*socially recognised forms of activity, done on the basis of what workers learn from others, and capable of being done well or badly, correctly or incorrectly*" (Grant, Hackney and Edgar, 2010, p.42). Most importantly, the introduction of a new information system can change how various organisational departments operate and communicate, which may disrupt the balance that may exist between interconnected sets of practices (Curtis and Cobham, 2008). Therefore, working practices are usually well established and reinforced by departmental and organisational guidance. For this reason, practices can be difficult to change and resistance to such change should somewhat be expected. Mellor (2011) suggests that organisational working practices are 'socio-material'; in that people's activities are entangled with 'material' objects such as computers. This means that the boundaries surrounding the use of technology must be drawn, so that individuals are aware that it is they who are expected to interpret data and exploit the technological features, but most importantly that such practices are underpinned by a purposeful information technology strategy in support of its use as well as guidance on any new or altered business processes created as a result of the new technology.

In developing a police system acceptance toolkit (P-SAT) in order to assist in the implementation and acceptance of new IT systems in the police organisation, engagement with police stakeholders' was carried out. This was to ascertain the model's validity, accuracy and its applicability to the police organisation. This provided rigour to the development of the toolkit, and facilitated fundamental learning on what needs adjusting or improving in terms of objectively identifying any limitations of the toolkit. Furthermore, stakeholder engagement provided quality assurance using carefully selected case study criteria, to enable effective judgements to be made. It also assisted in identifying whether the model is fit for purpose and can realistically support the implementation and adoption of new technology in police forces This process can be

described as a form of quasi-evaluation, and Stufflebeam and Shinkfield (2007) describe this as “a process that gives attention on matters such as reliability, effectiveness, efficiency and eases of use, and is ubiquitous in its application to a range of objects, services and entities (p.4).

Theory development is critically important to this research, and evaluating the development and refinement of the toolkit will further cement its reliability and credibility as a result. Theory development is a complex and difficult process to undertake, and involves close scrutiny of multiple layers that a research project such as this entails. Typically, this can include, the study of practices, which in this case is about organisational and business practices associated with the use of the PND; and it can most certainly include the study of context, which enables conceptualisations to be made as an ongoing, cyclical and practice-based approach (Stufflebeam and Shinkfield, 2007, p.66). Similar to theory development, the stakeholder engagement and evaluation process is also regarded as a systematic, cyclical and continuing process that involves the delineating of questions to be answered and the information needed to be obtained. Figure 2 depicts an interpretation of the cyclical nature of conducting an evaluation and the obtaining of relevant information for decision-makers (Stufflebeam and Shinkfield, 1986), and feedback from stakeholders. Although theory development can be an arbitrary process, it is also an important opportunity to creatively explore conceptualisations and insights discovered during the research process in a holistic manner, whilst characterising essential theoretical elements and attributes that are specifically unique to this research.

Figure 2: The Relationship of Evaluation and Decision Making



2.2 Key Findings and Considerations

In order to manage the most critical determinants of technology acceptance in organisations, it is important to understand the role of the technology, and how people use it to get work done. Technology is not valuable, meaningful, or consequential by itself; it only becomes so when people engage with it in practice (Marchand, Davenport, and Dickson, 2000). Therefore, it is important not to neglect technology use, as such neglect may encourage the onset of simplistic assumptions – that if people have technology they will use it, that they will use it as designed, and that such use will produce the expected outcomes. With this in mind, the rationale underpinning this research design is based on gaining an understanding of end-users' experiences of the PND and, to identify the factors, which influence the adoption of it. The implementation process will be examined as part of the research process; this is because the delivery of the PND as an IT project began with a national strategy to prepare forces to undertake activities prior to and in preparation for the implementation of the PND. This included managing organisational and business change, at a strategic level, and the production of national standards and guidance to support PND use.

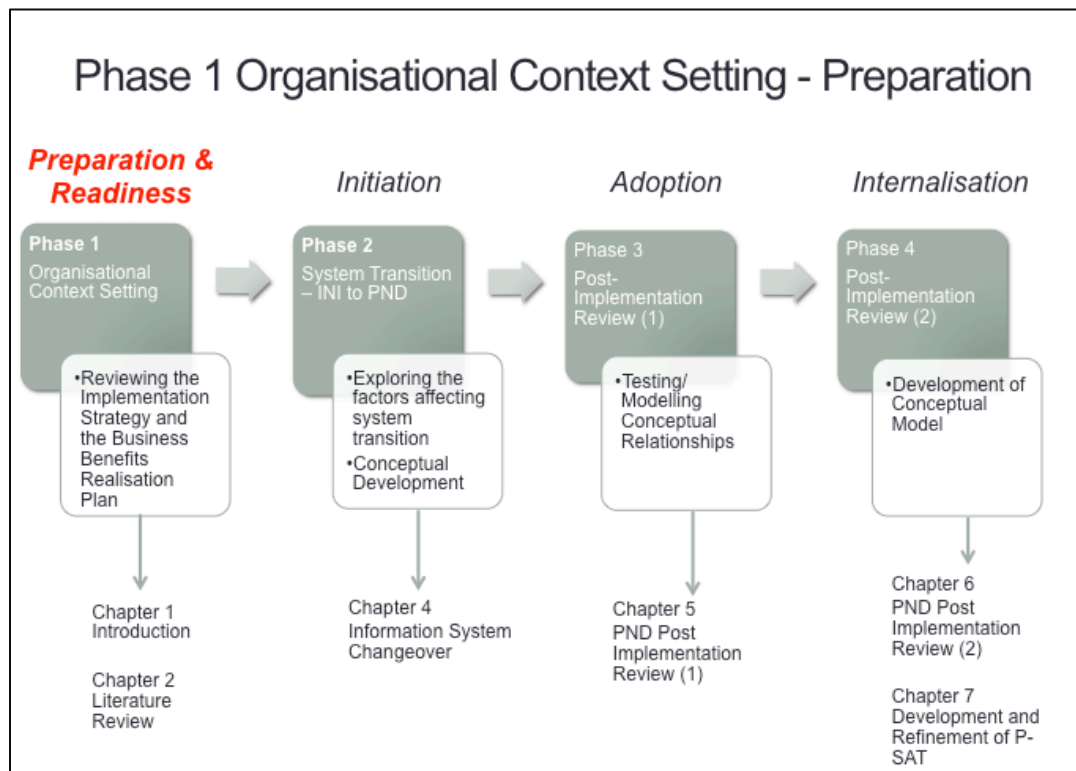
As a result of reviewing extensive literature surrounding the implementation, management and evaluation of information system success there are several key findings that can be identified. First of all investments in IT are primarily based on achieving greater organisational capability to collect and store accurate and up to date information that is accessible and usable by an organisation's employees (Marchand, Davenport, and Dickson, 2000). Information and knowledge management are vital to policing, and effectively enable organisations like the police service to acquire information - but most importantly, to interpret the information and to transform it into knowledge or intelligence using a hybrid of explicit and documented information, combined with the skills, experience and expertise of knowledge creators. Although organisations may be increasing their capacity to manage information electronically, it requires human skill in interpretation and analysis to create actionable knowledge; otherwise information systems like the PND will merely be a tool that harvests information. Therefore, additional investment needs to be directed in developing specific people skills that can make the best use of the information available assisted by complimentary technology and strategy that is intuitive to the business demands, processes and structure of the organisation (Hughes and Jackson, 2004).

The PND represents a significant component of the knowledge creation journey or process, and its success can only be pragmatically measured or assessed if it is evaluated

in a real working context, whereby human competency, intellectual insight, system functionality and data availability are equally regarded as essential elements of the evaluation. As the review of literature suggests, knowledge resides in the user and not in the collection of data held in an information system, and while IT systems like the PND have a significant role to play in the police organisation, it cannot at this point in time identify either tactical or strategic links with data, and therefore cannot generate or provide new knowledge – as both a means and an end without a cognitive process triggered (Hughes and Jackson, 2004). Knowledge and knowledge management within a policing context is not a new phenomenon – the creation of intelligence and the management of intelligence has been a fundamental part of policing. However, in modern times, intelligence-led policing has been articulated and conceptualised as a new policing style and consequently this has caused some discrepancy as to what this style or new model of intelligence-led policing means, and how it differs, if at all, from previous policing models (Gottschalk, [B] 2006). In general, policing styles can be described as either reactive or proactive but both are fuelled by intelligence (Bell, Dean and Gottschalk, 2010). The provision of a strong knowledge base to guide the police organisation in how to respond and meet demand as appropriate, requires the development of an equally strong knowledge support infrastructure, and an organisational culture which is less focused on IT capability and more focussed on the human and social role of IT interaction.

From a future planning perspective the longevity of the PND requires consideration particularly in relation to avoiding system futility. It is important to identify the critical success factors that will indicate how well the PND has become embedded into routine police activities, and to simultaneously discover the vital signs of system rejection and failure. Addressing these issues requires exploratory research in the form of conceptual and contextual analysis to assess both user-engagement and organisational adaptability in sharing police information on an unprecedented national scale. Furthermore, as a national system, it is crucial that both the PND and the information obtained from it are used consistently across the police service and in compliance with legal and policy requirements. This will provide chief police officers with further confidence that information provided to the PND is being appropriately and effectively used. Figure 3 shows the overall research and data collection process, with each phase exploring specific stages of the PND's development. Phase 1 examines the organisational context setting for the PND, and examines how it has evolved since the Richard recommendations. The process also mirrors a longitudinal and temporal approach.

Figure 3: Research and Data Collection - Phase 1



CHAPTER 3

RESEARCH DESIGN & METHODOLOGY

3.1 Philosophical Framework - Phenomenology

The philosophical framework underpinning this research is based on the principles and paradigms of phenomenology. The central tenant of phenomenological research is that in order to understand people's perceptions, observations and experiences, it is philosophically relevant to explore the 'subjective realities' of participants as part of the data gathering process (Denscombe, 2010). It is therefore, recognised that people's experiences are individual and unique to them; and it is these experiences that are of interest to this research.

Phenomenology is a tradition of social research and theory, which views the experiences of the world from the perceptions of the people who undergo them. Phenomenology investigates the ways in which events appear, by studying the ways a person's world is inevitably formed and in part, by the person who lives it (Huberman and Miles, 2002). Empirical events are what make up the research evidence or data that is to be described and judged, in order to conceptually make sense of it. Therefore, descriptions of reality are dependent on the perspectives of research participants, and from observations carried out, which will be subject to contextual interpretation (Huberman and Miles, 2002). The epistemological position of this research is based on the notion that the social world is subject to individual interpretation, and that knowledge about life can be meaningfully captured through social interactions, which create an understanding of how relationships between individuals, institutions and organisations are mutually sustained (Weber, 1949). Subjectivity is regarded as an unavoidable consequence that will undoubtedly feature in this research because of the philosophical stance adopted. Nonetheless, this inherent subjectivity that is a core feature of phenomenological research is actually valued in terms of acquiring naturally occurring data that is unique, and meaningful to the research participants themselves (Weber, 1949 and David and Sutton, 2004).

Phenomenology is somewhat critical of realist and positivist approaches to research, which normally refer to causal processes as external and uncontrollable toward generating social insight (David and Sutton, 2004). Phenomenology and its close association to constructionism regards the social world as a social construction or a set of institutionally constructed social realities, and therefore, a product and achievement

of people (Hubrman, 2002). The basic premise of phenomenological ontology is that for humans at least reality is not something separated from its general 'appearance', meaning that humans are conscious beings and their consciousness shapes their reality (Denscombe, 2010). In the realm of phenomenology, humans and their world around them are not separate but intrinsically linked together. This leads us to the belief, that to understand humans it is necessary to discover how they think and why they behave as they do, and to see the world from their point of view (David and Sutton, 2004).

Understanding the philosophical roots of phenomenology is important in clarifying the critical arguments surrounding social existence and interaction from the perspective of phenomenological discourse. Immanuel Kant in his *Critique of Pure Reason* (1781) distinguishes between "phenomena" (objects as interpreted by human sensibility and understanding), and "noumena" (objects as *things-in-themselves*, which humans cannot directly experience). In its most basic form, phenomenology thus attempts to create conditions for the objective study of topics usually regarded as subjective: consciousness and the content of conscious experiences such as judgments, perceptions and emotions. Although phenomenology seeks to be scientific, it does not attempt to study consciousness from the perspective of clinical psychology or neurology. Instead, it seeks to systematically reflect, in order to determine the essential properties and structures of individual or collective experience (Macann, 1999).

Phenomenology has been practiced in various guises for centuries, but it came into its own in the early 20th century by the works of Husserl, Heidegger, Sartre, Merleau-Ponty and others. They individually contribute to phenomenological thinking, based on the philosophy of existence, logic, consciousness and ethics, and each present an epistemological framework that captures knowledge of being, or what is knowledge, in the natural world (Macann, 1999). In terms of defining philosophical perceptions of phenomenology, Macann (1999) explores the notion that "*phenomenology is both a philosophy of essences and a philosophy of existence, both a transcendental and an ontological philosophy*" (Macann, 1999, p.202). Ontological phenomenology examines the 'truth' of existence and consciousness, and asks questions like: what can we say exists? What categories can existing 'things' or phenomena be sorted out into, if any? By the virtue of logic, which is intrinsic to the development of phenomenological thinking, understanding the characterisation of being is dependant on understanding the natural world from the ontological vision perceived and experienced by the being in question (Macann, 1999). Heidegger modified Husserl's conception of phenomenology because of what Heidegger perceived as Husserl's subjectivist tendencies. Whereas Husserl

conceived humans as having been constituted by states of consciousness, Heidegger countered that consciousness as peripheral to the primacy of one's existence, which cannot be reduced to one's consciousness of it. From this angle, one's state of mind is an "effect" rather than a determinant of existence, including those aspects of existence that one is not conscious of. This is described as "*shifting the centre of gravity*" (Macann, 1999, p.195), from consciousness (psychology) to existence (ontology). Heidegger altered the subsequent direction of phenomenology, making it at once both personal and mysterious. Sartre, however, created an awareness of the existential implications of that world view, which most would assume as the 'truth'. Hence, subjectivity is both inherent and unavoidable if we are to adopt the perceptions and beliefs of ontological phenomenology. The two essential components needed for analytical philosophy which phenomenology is conceptually relevant to, is science and common sense (Macann, 1999). These components essentially represent attempts to investigate the worldview with the upmost objectivity, while appreciating how views and perceptions differ, and to understand how these different aspects are constituted, is an essential part of understanding the actual 'thing' as experienced, by the person experiencing it (Macaan, 1999). The scrutiny of subjective experience is fundamental to phenomenological methods of inquiry, and nothing is taken for granted or disregarded. Phenomenology is the reflective study of the essence of consciousness and experience from the first-person point of view (Huberman and Miles, 2002). Phenomenology takes the intuitive experience of phenomena (what is presented as phenomenological reflection) as a starting point, and tries to extract from it the essential features of experiences. When this is generalised into the essential features of any given experience, it is termed 'transcendental phenomenology' (Macann, 1999), which is what this research aspires to develop. Phenomenology studies the structure of various types of experience ranging from perception, thought, memory, imagination, emotion, desire, embodied action, and social activity, including linguistics. The structure of these forms of experience typically involves what Husserl called "intentionality", that is, the directedness of experience toward things in the world, the property of consciousness that it is a consciousness of or about something (Hycner, 1985). According to Husserl's philosophical position, our experience is directed toward - represents or "intends" things - only through particular concepts, thoughts, ideas, images, etc. These make up the meaning or content of a given experience, and are distinct from the things they present or mean (Macann, 1999). Developing meaningful descriptions of emerging concepts in order to build theory involves a process of phenomenological reduction, which teaches how to interpret

subjective meanings of events (Hycner, 1985). This also goes in hand with accepting that 'pure objectivity' is not an intended feature of the approach, instead it is important to stay true and faithful to the phenomenon, which allows for greater comprehension in responding to the whole phenomena (Hycner, 1985).

3.2 Qualitative versus Quantitative Methodologies

In the early 20th Century, Max Weber's study of Protestantism in Western Europe argued that people's beliefs played a crucial role in driving people toward radical and social change, just as beliefs play a key role in the maintenance of social roles, institutions and relationships (Weber, 1949). Phenomenological philosophy has been extended and enhanced by various authors, in particular the work of Husserl (1962) and Schutz (1972). Both authors assert that institutions are perceived as a set of relationships held together by certain actions and beliefs, which are subsequently taken for granted by individuals. What is clear is that although there are different methods for conducting social research, they are simply different ways of facilitating insight into the realities of human life. However, there are apparent differences in how theorists and researchers attempt to understand humans, and as a result, prefer to use particular research methods of their personal choice (David and Sutton, 2004). This is what has caused much debate over whether to employ qualitative or quantitative research methods. In terms of classifying, categorising and analysing data, this occurs in both qualitative and quantitative design approaches; ultimately the decision to choose which approach to follow normally depends on the size of the population sample, the preferred research methods of the researcher, and how the data will be subsequently analysed; whether depth or generalisability will determine the extent of identifying the existence and prevalence of emerging themes and patterns. There are parallels and distinctions in quantitative and qualitative research. In both approaches, there are various degrees of quantification whether this would be in the form of quantifying qualities or by using quantifiable measurements in order to generate descriptive statistics. According to David and Sutton (2004), qualitative research provides the capacity to also generate classifications following the analysis of qualitative data. In this way, the authors regard classification as a means of making distinctions within the data so that differences, similarities and interconnected associations between variables can be made. However, the formulation of such classifications depends on whether the researcher chooses an inductive or deductive approach to their research.

Pursuing deductive forms of research, which would traditionally involve the testing of hypotheses, requires that classification occur before the data collection phase of the research takes place (Silverman, 2005). The purpose of this is to test the relationships regarded by the researcher as important. More inductive forms of research endeavour to allow classifications or themes to emerge during the course of the data collection process. Inductive research allows for exploration and a greater insight into social structures and processes, whereas the deductive approach allows for greater generalisability (Robson, 2011). The advantages and disadvantages that are apparent here relate to common issues of depth, generalisability, reliability and validity. Researchers who create hypotheses before the data collection process takes place may be accused of imposing their own priorities. Similarly, those who prefer to allow their data categories to emerge during the research process would be unable to use the data collection period to test their subsequent theories, because their analytical interpretations will be difficult to substantiate as no 'testing' would of been done (Denscombe, 2010). Pilot or early explorative and phased studies have proven to be useful in attempting to dispel the inherent drawbacks in both research design approaches. In qualitative research, pilot studies can take the form of focus groups, open-ended unstructured interviews and observations. In quantitative research, this may be in the testing of hypotheses into two distinct phases – a pilot phase for deductive hypotheses testing to inform the final data collection and analysis phase, or by using a triangulation of research methods that will contribute to enhancing the research conditions in understanding the phenomena being studied, using a combination of research methods and theoretical perspectives (Denscombe, 2010).

As discussed there are no straightforward distinctions between quantitative and qualitative approaches to research, both have their uses and limitations and both approaches can get 'close' to their research subjects. For this research, the distinctions between both approaches relate to their philosophical and epistemological positions, and phenomenology has been used as the theoretical framework for this study. The explorative and discovery-led nature of this methodology is supported by a qualitative research design, not only because there was no 'prior instrumentation' that was created prior to the data collection process taking place, which is what traditionally is used in quantitative research; but because of the small samples of population being studied (Robson, 2011). In the context of policing and technology acceptance, the formation of case study data will emerge inductively as part of the data collection and analysis

process, and will provide a relevant and meaningful understanding of the significant themes which are pertinent to the research participants and to the wider context.

The reasons why a qualitative case study research design was chosen as opposed to adopting a quantitative approach was based on two main factors. First of all, the literature review has shown that there is a knowledge gap in existing research that investigates social and organisational factors in the context of system and technology acceptance in the police service, and secondly, studies on systems adoption in organisations have generally utilised quantitative research methodologies (Schutt, 2006). There have also been comparative studies using both quantitative and qualitative methods on the reasons why people use information technology, for example, Colvin and Goh, (2005), Venkatesh and Bala, (2008) and Ellahi and Manarvi, (2010), and others, have provided a critical review of all versions of TAM using qualitative methods (Cornford and Smithson, 2006). Therefore, this study aims to address this identified knowledge gap by adopting a qualitative research approach using a triangulation of research methods that will capture the historical, contextual, social and organisational factors and influences surrounding the implementation and acceptance of the PND. This research could further facilitate new hypotheses to be tested and theories to be constructed in exploring the processes, practices and the various mitigating facets of police IT/IS acceptance in the future.

3.3 Theory Building Methodology for Developing P-SAT

Building theory from case study research, which is essentially the main objective for this study, often follows an inductive logic, and the process involves defining research questions or problems and construct validation, which are all features of the design for this research. Overall, the process is highly iterative and reflexive, and tightly linked to the data, so that the developed theory is testable, original and empirically valid (Eisenhardt, 1989). It is recognised that no construct is guaranteed a place in the resultant theory because focal areas of the research can expectantly change. The method of building theory from case studies, relies on the continuous comparison of data and theory, and facilitates a conceptual and dynamic interactive process. This emphasises the emergence of theoretical concepts and categories solely from the evidence generated using an incremental approach to case selection and data gathering (Eisenhardt, 1989).

In developing a conceptual model that can be used to assist the police organisation in the implementation and adoption of IT, is ultimately the original contribution of this

research. In terms of theory generation, using a well-established method is important because it provides credibility and validity to theory construction, in terms of describing core constructs and thematic relationships identified from individual and wider organisational experiences. In developing the P-SAT toolkit, Dubin's (1978) theory building methodology was used because it complements both case study research, and supports its underlying philosophical principles, which are based in the social sciences. Dubin (1978) provides a conceptual framework for building an empirically based model. The features of Dubin's (1978) framework begin with the subject matter, which is the main focus. The research components that were specifically investigated were the implementation strategy; the use of the PND in the context of police work; business process re-engineering to support PND use; information management practices and data quality standards, and organisational and cultural challenges in relation to the sharing of information. Dubin's (1978) model requires that the theorist identify the manner in which the variables or units of study interact with one another, and the significance of these interrelations. Dubin's (1978) reference to defining the theory's system states is reflective of the police operational environment and its characteristics, which are unique to the building of the P-SAT toolkit. In terms of Dubin's (1978) propositions of the model elements, these are discussed further in Chapter's 5 and 6, which detail the analytical findings from the post-implementation review conducted in collaboration with the Home Office. This analysis was used to conceptually develop a propositional model based on the findings and provided the opportunity to refine the toolkit in the empirical world. Refinement of the conceptual model was conducted during Phase 4 of the data collection process and empirically underpinned its theoretical contributions. So far, the theory building aspect of the theory-research process has been discussed. The final stages of Dubin's (1978) process is essentially about *operationalising* the theoretical model to determine whether the model does represent the real world by generating further testable hypotheses to allow refinement or enhancement of the theory. This consists of creating and measuring empirical indicators and comparing results to the theoretical model, to determine whether the model was created with scientific rigour and demonstrates alignment to real world events and experiences. Dubin's (1978) approach specifically identifies four components that provide both necessary and sufficient conditions for the development of a theoretical model, these are:

1. The units of variables whose relationships are of interest to the researcher
2. Laws of relationships among units of the model, how they are linked together and associated
3. Boundaries within which the laws of relationship are expected to operate
4. System states within which the units of the theory take on characteristic values that are deterministic and have persistence through time (Dubin, 1978, p. 242).

Fry and Smith (1987) argue that congruence and contingency are central features of Dubin's (1978) conditions for constructing and testing a theoretical model, and are essential to understanding and predicting organisational behaviour. Acknowledging interdependencies and interconnections between constructs and variables that are inherent to the structures of the organisation, enables examination of the unique organisational behaviours that relate to tasks and individuals, and the situational characteristics in which individuals operate (Fry and Smith, 1987). Dubin's (1978) model of theory building is based on systems analysis, which has been recognised as appropriate for the development of scientific models in the social sciences (Fry and Smith, 1987). It views organisations as social systems existing in different environments with various units or variables that must be interrelated or associated if the organisation is to be effective (Gioia and Pitre, 1990). Understanding organisational behaviour and developing theory that conceptualises the abilities and practices of an organisation of how their goals and functions are achieved, requires a typology that can describe the key elements or units that are interesting from the point of view of associations and irreconcilable differences (Fry and Smith, 1987). The acquisition of data using a purposeful approach helps to consolidate human thought and action into a unique set of knowledge, which is a fundamental feature for the development of any theoretical model (Fry and Smith, 1987). Gioia and Pitre (1990) propose that traditional approaches to theory building are not entirely consistent with the assumptions of alternative research paradigms that are becoming more relevant to the study of organisations. Multi-paradigms approaches are regarded as relevant to the construction of theory because it is just as important to explore conceptual similarities as well as differences between variables and other units of analysis (Gioia and Pitre, 1990). This is because different paradigms are grounded in fundamentally different assumptions, and as a consequence produce markedly different ways of approaching the building of theory.

3.4 Validating Qualitative Research

"All field work done by a single field-worker invites the question, why should we believe it?" (Bosk, 1979, p.193). Quantitative and experimental research designs are usually based on positivist assumptions, whereas the validation of qualitative research is more reliant on generating an authentic and interpretivist understanding of what is assessed *"relative to the purposes and circumstances being studied"* (Huberman and Miles, 2002, p.47). The adoption of specific typologies or procedures is important to qualitative research because validity is like confirming the integrity of the research, and both need to be present if constructions of reality are to be reliably perceived. As observers and interpreters of the world, people are inextricably part of it and cannot step outside our own experiences totally, in order to obtain an independent account of what is observed (Schutt, 2006). Therefore, it is plausible to have different, equally valid accounts from different perspectives researching the same or very similar phenomena. Data in itself cannot be construed as valid or invalid, what is at issue in terms of general validity, are the inferences drawn from them, and whether the methods used for a particular purpose and in a particular context derive valid accounts or conclusions as a result (Robson, 2011). Huberman and Miles (2002) succinctly describe the critical differences between positivist and realist research: *"This concept (critical realism) specifically differs from positivism in that it does not take statistical tests to be critical for validity, but only as fallible means for generating evidence about the relationship between the account and its object"* (Huberman and Miles, 2002, p.49). It is clear that the existence of an absolute truth to which an account can be compared against, is dependant on acknowledging that there are different ways of assessing the validity of inferences. Therefore, increasing generalisability in qualitative research is based on consistent interpretation and description of the rich variety of human behaviours and attitudes by encapsulating context, culture and practice (Schutt, 2006).

As discussed, the construction of the toolkit undertook a process of refinement in order to ascertain that the end product, which is the development of a police system acceptance toolkit, is tangibly evidence-based and robust enough to gain organisational credibility and applicability. The primacy of this was centred on identifying both research limitations and constraints, and to delineate and illuminate the dominant themes and issues at multiple levels of the research project - but in an overarching and holistic manner (Madeus, Scriven and Stufflebeam, 1986). For clarity purposes, what differentiates case study evaluations to case study research is the fact that an evaluation examines the entire research design and process retrospectively and objectively, with

emphasis on intended and unexpected outcomes that have become notably influential (Robson, 2011). However, the methods employed to carry out an evaluation are the same in principle to a typical qualitative case study design, and can include interviewing, focus groups and participant observation. The similarities between case study research and case study evaluations are that no attempt to control the project or its participants are apparent, and naturally occurring phenomena taking place within various settings are considered to be both interesting and invaluable to operationalising conceptualisations (Madeus, Scriven and Stufflebeam, 1986). Triangulating multiple perspectives and research methods and information sources is also a significant similarity that complements the overall design of this research.

Case study research can also be described as a questions and methods-oriented approach, and therefore regarded as a quasi-evaluation study (Stufflebeam and Shinkfield, 2007). Ultimately, both case study research and case study evaluation in general, provide stakeholders and other relevant audiences with an authoritative, in-depth, well-documented explication of the research project in question. Furthermore, both approaches should be focused on questions that are not only relevant to the project but also to the audiences that are anticipated to gain the most out of the research, which in this case is the police organisation. As a researcher, it was imperative that engagement with stakeholders such as senior police officers and police managers including PND users, takes place during the research process to ensure that the research design processes demonstrates sufficient appreciation of the issues and factors that are relevant to contextual setting.

3.5 An Interpretivist and Case-Study Approach

Using a case-study research design is appropriate for this research in that case studies allow in-depth exploration of factors holistically, and do not regard important relationships and processes as isolated factors, but rather as interconnected themes (Denscombe, 2010). It is necessary to recognise that although a case study approach to social research may be limited to a particular set of interactions, it can still allow examination of how particular actions and perceptions are embedded in particular patterns of social organisation (Silverman, 2005). Furthermore, a case study approach also enables detailed and complex phenomena to be unravelled and explored using peoples subjective realities to inform the basis of our understanding of the research problem (Robson, 2011).

Case studies have been used for a wide range of purposes. Predominantly, they have been used in relation to the discovery of information following an inductive logic, which is closely aligned to the explorative and comparative nature of this research approach. A case study approach that is less technically oriented and reflects a broader and more social and organisational focus (Cornford and Smithson, 2006) is suitable to this research. Case studies allow in-depth exploration of one particular situation, and facilitate the obtainment of 'rich' data by multiple means (Robson, 2011). The rationale for adopting a case study approach is that it can provide a preliminary position of acquiring data out of which potential theories can be developed and future research considerations can be identified (Cornford and Smithson, 2006). Conducting case-study research is based on gaining an in-depth and a holistic view in a natural setting, through exploration of the key issues pertinent to PND users'. This will enable a description of the business processes undertaken prior to the PND, and the subsequent changes to business processes as a result. Of interest will be how the PND as an information system has empowered individuals, in terms of enabling direct or indirect users to be more productive and effective in their work, and whether the PND supports their inherent needs as information gatherers. Semi-structured interviews, focus groups and participant observation were carried out with direct PND users, indirect users' and departmental managers in order to gauge how the PND is meeting demands and expectations from both a user and business perspective. In the case of the PND, end-users will play a significant role in illustrating how useful and important the PND is to their work, and how effective the PND is in facilitating the sharing of information from a national pool of data; as well as how the use of the PND assists in police recruitment and vetting procedures, in identifying cross-border criminality and for ensuring risk assessments are adequately informed and appropriately assessed. One of the attributes of the case study approach is that it allows the use of a variety of information and evidence sources, a variety of data to be considered; and a variety of research methods as part of the investigation (Denscombe, 2010).

Carrying out interviews in qualitative research is particularly useful for small samples (Creswell, 1996). Choosing to conduct semi-structured interviews was a decision based on allowing exploration and flexibility, in how interviewees responded to questions and to give them the opportunity to answer and to elaborate, on the issues addressed. Interview questions will be intentionally designed to be 'open-ended', and will serve the purpose of a checklist - guiding the topics to be covered during the interviews (Creswell, 1996). The crucial point is that whatever the source of influence on what is already

known about the topic of research, the concepts used to inform the design of the questions will be treated as 'provisional' and open to some alteration in how the questions are answered and in what order (Denscombe, 2010). The emphasis is on "seeing things through the eyes of others", a concept aligned to phenomenology and associated with humanistic research (Denscombe, 2010). The gathering of empirical fieldwork data in this way, aims to unravel and gain insight of the multiple realities that would exist, as phenomenology recognises that there is not a universal view of reality, but several which are just as individually valid (Robson, 2011). The quest for achieving a representative sample is not definitively required for the purpose of this small-scale case study research. Based on the qualitative nature of this research, the primary objective is to obtain empirical data using a cumulative sample approach, whereby non-probability sampling is applied, namely purposive and snowball sampling to produce an exploratory sample, not a statistical representative one. The sample process for this proposed study will be essentially 'discovery led' and the size and composition of the sample will not be predictable from the start. This is a similar method used for theoretical sampling, which is closely aligned to the grounded theory research approach (David and Sutton, 2004).

Interpretivists reject the position of the researcher as neutral and emphasise interpretation and understanding as part of the knowledge acquisition and validation process (Cornford and Smithson, 2006). Cornford and Smithson (2006) argue that the research potential of 'interpretivist and ontological case studies' is a means to develop deeper understanding of information systems phenomena. They continue to assert that the validity of an extrapolation from an individual case or cases depends not on the representativeness of such cases in a statistical sense, but on the plausibility and cogency of the logical reasoning used in describing the results from the cases, and in drawing conclusions from them (Cornford and Smithson, 2006). However, there are clear limitations of the case study approach, which include the lack of individual variables and the difficulty in locating causality (David and Sutton, 2004). Nevertheless, the main principles of idiographic research are still relevant to this research methodology. Idiographic research positions itself in exploring particular events and providing the richest picture of what transpires (Cornford and Smithson, 2006). The aim is contextually to understand phenomenon with emphasis on analysing subjective accounts, and is concerned with studying people's behaviour in an everyday 'natural' environment, with more emphasis on offering descriptive insights, rather than explaining causation (Silverman, 2005).

Following the application of a qualitative case-study approach, which is interpretivist in nature, qualitative data analysis methods were utilised. However, qualitative methods largely differ from the deductive reasoning process often aligned to quantitative methods of data analysis. The fluid and cyclical tendencies in qualitative anti-positivist data collection analysis can generate impressions that qualitative data analysis is rather an *ad hoc* process of data accumulated and transcribed in textual form (Denscombe, 2010). However, by and large, interviews of whatever nature will need to be recorded and transcribed whether for qualitative research purposes or for more prescriptive and statistical data analyses (Robson, 2011). For this research, qualitative data analysis was used to enable the extraction of meaningful and occurring concepts that are distinct to the social system and business setting being investigated. As such, the collection and analysis of data followed an inductive and logical approach, which was 'discovery led', and concerned with drawing wider inferences and arriving at more generalised statements about the topic (Denscombe, 2010). However, this can lead to some degree of crossover, often found in grounded theory approaches. The emergence of 'theory' and 'explanation building' generated from the research data provides some reinforcement of the findings being directly linked to 'real-world facts' as much as possible (Robson, 2011).

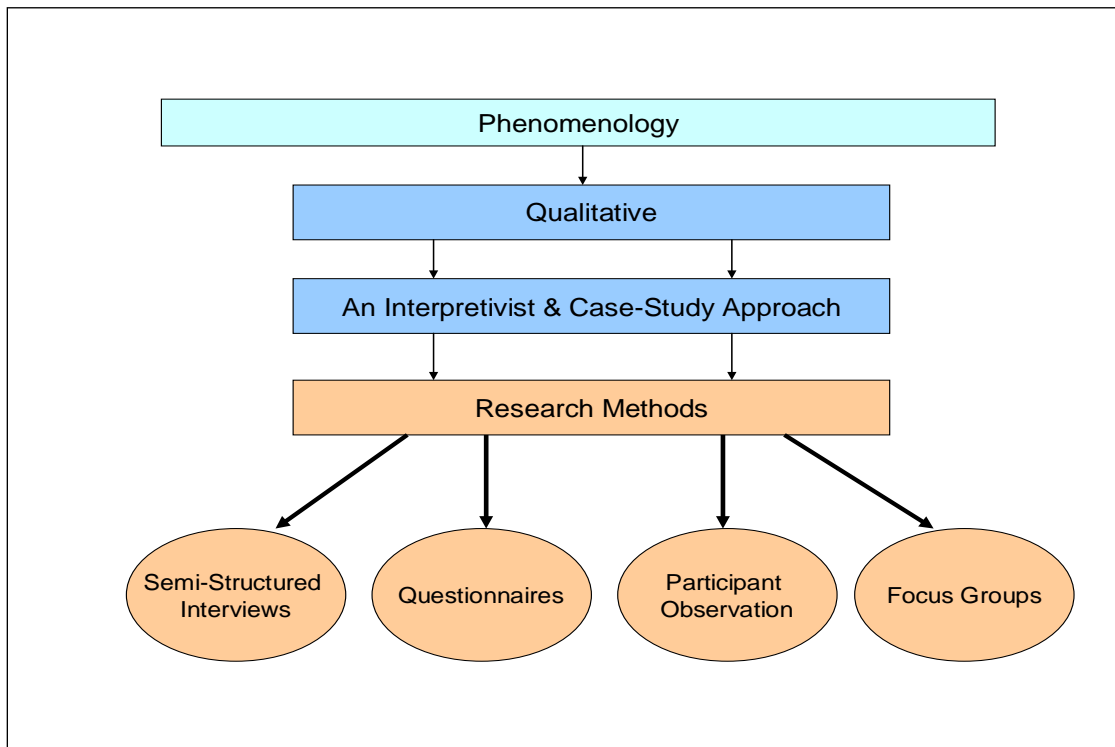
Whilst it is appreciated that case studies cannot achieve representativeness, they can however, generate understanding of a 'broader class of things', as well as unveiling the various intricacies and subtleties of complex situations (Creswell, 1996). This means that case studies can reveal factors or variables that are unexpected. The limitations or disadvantages of using a case study approach toward research and data analysis thereafter is in relation to the credibility of the generalisations made from its findings. For this research, efforts were made to minimise this vulnerability by emphasising the need to capture reality and experience with 'unique' and pragmatic evidence that can help to develop and build theory; and as a useful starting point for future research planning and design (Creswell, 1996). The building and maintaining of effective working relationships with police practitioners and system users has been paramount since the start of this research, mainly because of the collaborative nature of the research and the unique insights gathered during the course of the data collection process, whilst potentially minimising access limitations that may have been imposed by police gatekeepers.

3.6 Participant Observation

Participant observation is a frequent activity undertaken during the research process and provides unique opportunities to observe and take part in the data collection process, which compliments the study of people in naturally occurring settings whilst in the 'field'. Furthermore, these opportunities allow the capture of social meanings and in understanding work-based activities, whereby the researcher also participates in the setting and takes part in the activities (Silverman, 2005) As a participant observer, the intention ultimately is to immerse and 'blend in', so that the researcher's presence and participation mirrors where possible, the same activities within the 'natural' setting. Primarily, police force events and NPIA meetings enabled real-life insight of what PND users' thought of the system, their experiences of using the system and whether it provided them with tangible and useful information that was previously unknown or difficult to obtain. They also facilitate an understanding from a strategic perspective in terms of how the PND has brought about changes to business processes and to people's job functions and roles, and whether business change was effectively managed throughout the organisation.

In summary, the research methods that are being used for this study include semi-structured interviews and questionnaires, participant observation and focus groups. Using such tools facilitates an understanding of the research topic from a variety of perspectives and as a means of comparison and contrast, by approaching data collection 'in the field' as well as through direct conversations with business users, departmental managers and PND regional coordinators. Figure 4 shows the overall research design and the methods that will be used. Based on the principles of phenomenological research, the collection and analysis of data will be iterative and an evolving longitudinal process where both these phases will often occur simultaneously (Silverman, 2005). The overall research design is complimented by the research methods chosen. Based on the central tenets of qualitative research, interactional research activities are often concerned with a discovery-based approach that allows the researcher to have in- depth conversations with their research subjects in a non-clinical or highly formalised manner. Also of relevance to the research approach is having access to documentary sources; formal documents have proved invaluable for learning about organisational progress on a number of issues such as business change and organisational challenges following the implementation of the PND.

Figure 4: Research Design and Methods



3.7 Research Methodologies on the Acceptance & Utilisation of Technology

Following the extensive review of literature in relation to the acceptance and utilisation of information technology in organisations, a multitude of influential factors were discussed. Experiential research in the context of policing has been most relevant because of the dynamic and unpredictable nature of policing and the role of information technology in managing policing priorities and supporting information management. The literature highlighted the importance of the technology implementation process in maximising its adoption and reducing obstacles to its use, such as poor communication and limited marketing of new business processes to staff, whilst recognising organisational challenges and recognising any impact of technology on the social organisation of policing.

Studies on technology acceptance in organisations have generally utilised quantitative research methodologies, which have involved the creation of testable hypotheses for statistical data analyses. For example, Smith, Caputi and Rawstone's (2007) study on differentiating computer experience and users attitudes toward computers, used factor analysis and statistical correlations to analyse results from a Likert scaled questionnaire. Colvin and Goh's (2005) study on the validation of a technology acceptance model in a policing context similarly used exploratory and confirmatory

factor analyses to assess the content validity of a theoretical model and its 'good fit' with the data.

Colvin and Goh's (2005) study identified its limitations, which was the lack of criteria to further evaluate the model in alignment with external influencing psychosocial contextual factors. From a psychosocial perspective Karahanna and Straub's (1999) study, explored the psychological origins of the original TAM constructs of perceived usefulness and perceived ease of use. Using hypotheses to test their theoretical model, the study utilised likert scaled questionnaires for respondents to complete. The data were analysed using T-Tests and Cronbach Alphas to indicate the reliability of the constructs identified. One of the main limitations of this study is that the research focuses just on post-implementation evaluation without measuring prior expectations; this could increase the theoretical validity of the model. Second, the choice of self-reported use has important implications for theory, as results may be different if objective measures of usage were deployed (Karahanna and Straub's, 1999).

Legris, Ingham and Colletette's (2003) study on the reasons why people use information technology as well as providing a critical review of the technology acceptance model, utilised a longitudinal research design that involved the testing of hypotheses from various studies on technology acceptance, using content analysis to identify the frequency of constructs featuring as significant. This was mainly a comparative study, which also contributed to exploring the validity of research carried out on technology acceptance by other authors, and helpfully explores conceptual relationships between variables and constructs identified from research. The study also supports the debate that the acceptance and use of technology is part of a much wider context, which includes organisational dynamics and the impact it can have on outcomes. Furthermore, it is important to acknowledge that the effectiveness of any change process relies on the interdependence between the technology, the organisational context and the business change model used to manage change (Legris, Ingham and Colletette's, 2003).

Bouwman and van de Wijngaert's (2009) study on a reassessment of TAM within the context of mobile technologies in policing utilised a quantitative research approach. The study particularly examined the role and value of technology in relation to organisational characteristics and individual task-related requirements. Similar to other research on technology acceptance, the study was based on the testing of hypotheses generated prior to commencing the data collection process. The limitations of this research are in relation to the relatively low variances that are explained in the linear model developed following the research; this may have been improved with additional

research methods being used from a qualitative perspective to perhaps facilitate an in-depth exploration of issues pertinent to both users and organisational stakeholders (Bouwman and van de Wijngaert's, 2009).

Lindsay, Jackson and Cooke's (2011) study utilised a qualitative research approach to investigate the factors affecting police officer acceptance of mobile data technologies. The research was based on an ethnographic longitudinal design, which included focus groups, observational work shadowing, interviews and questionnaires. The main influences of the research design were based on allowing an in-depth exploration of the factors affecting user-acceptance; whilst contextualising the UK police force involved in the study "*as a social environment rather than a laboratory environment, with many changing factors*" (Lindsay, Jackson and Cooke, 2011, p.394). The study clearly states that there is a gap in existing research which looks at technology acceptance from a qualitative and in-depth perspective, as well as there being a lack of research within the policing context which address such fundamental issues. These issues include recognising the impact of technology on policing, as well as contextual factors that co-exist alongside the use of technology. Studies that address the relationships between these factors may suggest additional strategies for enhancing technology acceptance (Lindsay, Jackson and Cooke, 2011).

Addressing external variables that are often intangible as definable constructs is important to this research because of their influence on people's perceptions and behaviours, which to an extent are unaffected by the features and functionality provided by a newly implemented technology. A general theme from the literature is that wider social and organisational factors play a significant role in the adoption or rejection of new technology, and that further research is needed to address these factors as independent variables worthy of investigation. For example, management practices, peers' influences, accessibility to the technology itself, information quality and timeliness were all regarded as important factors in Legris, Ingham and Collette's (2003) and Colvin and Goh's (2005) studies, whereby they did not hypothesise the significance of these factors at the beginning of their research until these findings emerged. An exception to this is in relation to (Lin et al, [B](2002) on examining user acceptance of COPLINK. The study addressed organisational factors such as the influence of peer's on their decision to utilise the new technology. Although the study acknowledged the influence of external organisational factors within a law enforcement context, the study aimed to assess the acceptance of the COPLINK system and does not test its findings in comparison with other theoretical models on user acceptance.

Nevertheless, because the study is a large-scale empirical survey it provides an interesting contribution to user-acceptance research in a policing environment, and offers a unique insight into appropriate variables and constructs that could be developed and utilised in further research of this kind.

3.8 Data Collection Process

Figures 5 and 6 illustrate a linear and longitudinal data collection process that was used for this research. Phase 1 involved a critique of numerous documents produced by the NPIA to support forces during the implementation process. Included was the business benefits realisation strategy and the PND performance management framework. The challenges and complexities in operationalising the benefits realisation plan were explored, and the findings from this exercise are discussed both in the introductory section and in literature review of this thesis. This phase also involved participant observation through attendance at various local, regional and national meetings with the NPIA and police forces, where it was essential to develop good working relationships with the national project delivery team, with system end-users and with key organisational stakeholders such as the PND regional coordinators. The Home Office produced a dossier of guidance documents, which outlined a national methodology for realising and measuring PND business benefits. A Benefits Management Strategy and a Benefits Realisation Plan were produced to guide forces in developing their own practices for recording and capturing data systematically. This has led to the formulation of Force Action Plans and Peer Reviews to assist in the benefits realisation process. Forces were also encouraged to develop their own benefits realisation plans to help bring structure and rigour to local benefits management. Following analysis of these documents, various challenges and complexities were identified in relation to implementing and evaluating the benefits of the PND due to the metrics presented in the realisation plan, and the difficulties in practically acquiring the data from police forces. This helped to inform forces and the Home Office of the benefit realisation issues identified, which were mainly in relation to recognising that depending on the use of the PND and the nature of the policing 'problem', different metrics and parameters will be required for different departments, therefore an all encompassing approach to realising and measuring benefits would be inappropriate. A good example of these differences in how the PND was used is in relation to force vetting units, whereby the emphasis would be on receiving a 'negative' hit from the PND, as opposed to a force intelligence bureau, which would be seeking a 'positive' hit for the purposes of intelligence gathering. The

NPIA regarded the paper as informative, and assisted the agency in altering their approach toward benefits realisation, allowing forces to adopt their own approaches but with a caveat that forces will be accountable for measuring their own business benefits. Following this, a research paper was produced and presented at the ‘Software Quality Management’ conference held at Loughborough University, in April 2011. The paper was published as part of the conference proceedings and is included as appendix 7 of this thesis. The remaining three phases of data collection involved conducting telephone interviews, one to one semi-structured interviews and focus group discussions with members of the PND police community. The findings from each phase are presented respectively as individual chapters. Chapters 3, 8 and 9 do not feature in the data collection process in Figure 5, as they are not dependent on conducting fieldwork. Chapter 3 outlines the methodological process for data collection and discusses the philosophical rationale underpinning this research. Chapter 8 focuses on presenting the refined Police System Acceptance Model, following stakeholder consultation and feedback. Chapter 9 concludes with the contributions and limitations of this research in its entirety, and provides suggestions for further research within the field of organisational behaviour and the implementation and adoption of new technology.

Figure 5: Data Collection Process

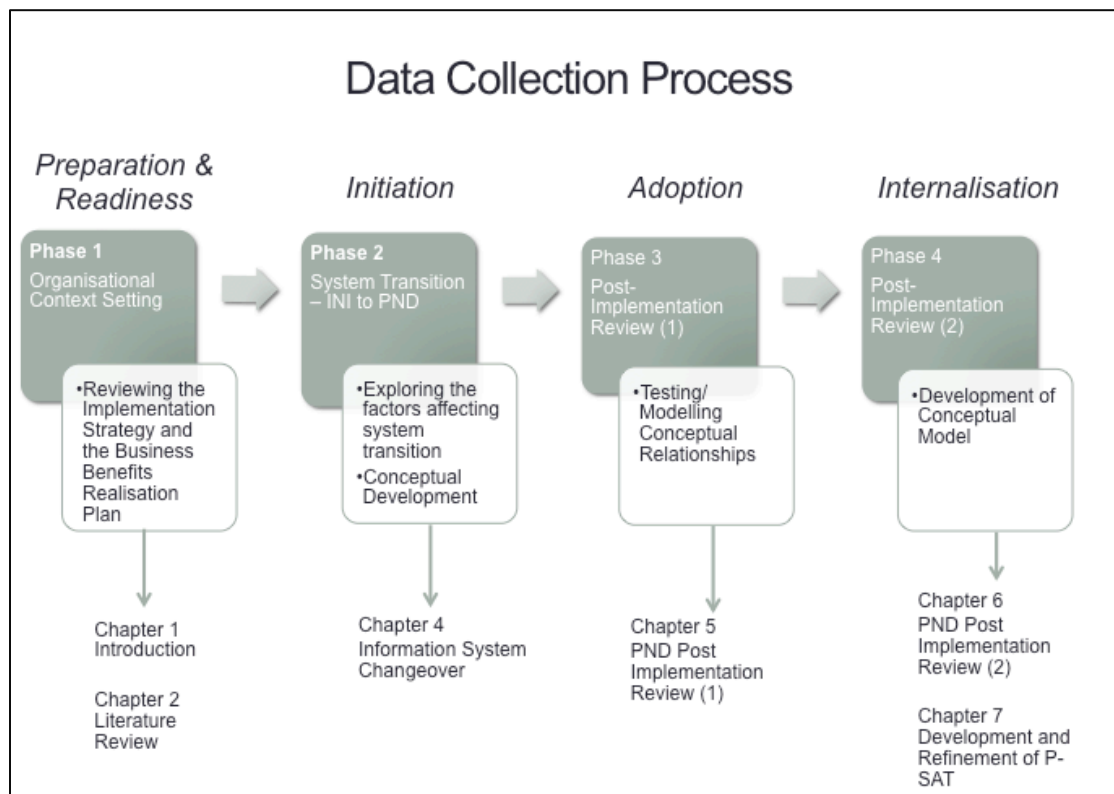


Figure 6: Data Collection and Research Methods

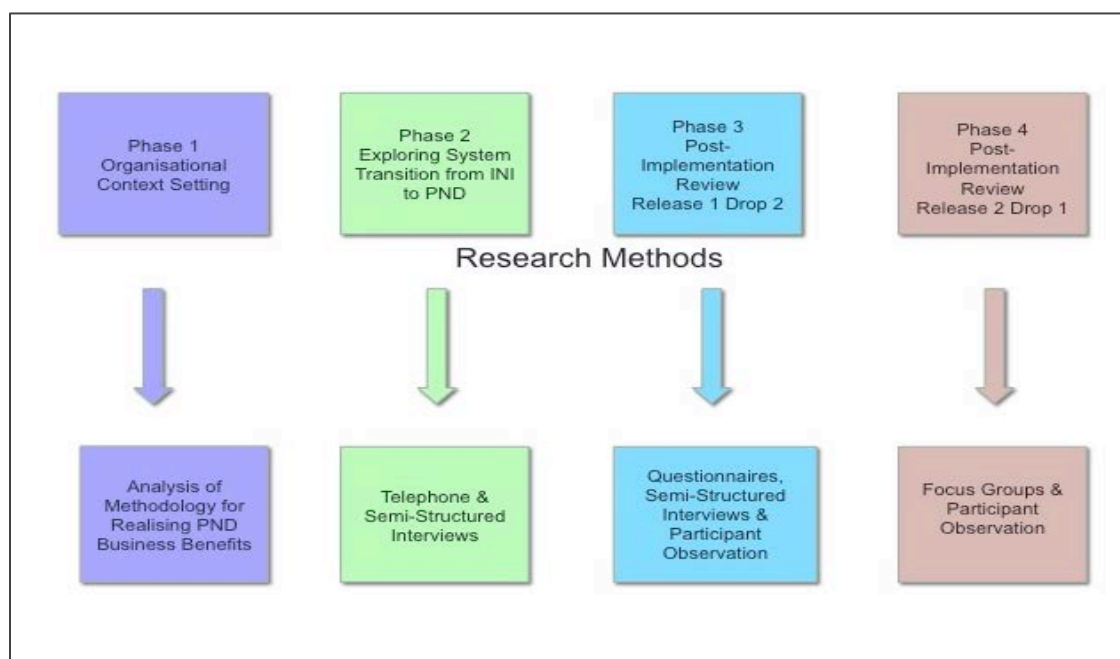


Table 1: Data Collection Attributes

Data Collection Phase	No. Of Participants	No. Of Police Forces	Research Focus	Research Outputs
Phase 1	N/A – Project Documents	N/A Home Office/ NPIA	National implementation process & PND business benefits delivery strategy for police forces and agencies	<ul style="list-style-type: none"> Examination of the national methodology for business benefits Organisational context
Phase 2	15	12	Exploring organisational culture & business change management and business process re-engineering	<ul style="list-style-type: none"> Exploration of factors affecting system transition Conceptual Development
Phase 3	96	16	National post-implementation review (PIR): technical capability, system adoption, business use & integration, data quality standards, PND training	<ul style="list-style-type: none"> National PIR analysis for the Home Office & police forces Test/Model Conceptual Relationships
Phase 4	45	12	The development of the conceptual framework; ascertain levels of PND adoption, business rules organisational impact and business benefits realisation	<ul style="list-style-type: none"> National benefits analysis Development of Conceptual Model

The second exploratory phase of this research was in relation to exploring system transition from the INI system to the PND. This involved carrying out semi-structured telephone interviews with both direct and indirect users of the PND. Twelve police forces took part and fifteen people were interviewed. At the time, the PND was at a critical stage of its implementation and in order to maximise the benefits and use of the PND, the police organisation needed to recognise the profound organisational changes evoked as a result. The research identified the changes that required particular attention and were in relation to how information is shared, how it is stored, retrieved and utilised; and the application of knowledge management initiatives such as sharing best practice, performance benchmarking, instilling responsibility and accountability for sharing knowledge, and formalising such processes as part of the organisation's core knowledge management values and principles. Initial results indicated that there were important change-management issues, which required consideration, such as effectively communicating to staff how their roles and responsibilities could be affected following the implementation of the PND. Information sharing is at the heart of the PND; the research identified mitigating factors, which cause difficulty in the dissemination of police information. Following this research, a paper was produced entitled 'Exploring System Transition in the Police Organisation: The Case of the UK Police National Database', which features as appendix 8 in this thesis. This paper was presented at the United Nations in New York City in August 2012. The theme of the conference was 'Economic Development, Armed Violence and Public Safety'.

In terms of maximising the PND's potential in the police organisation requires acknowledgement of the various organisational and cultural changes evoked as a consequence; this will play a role in ensuring that the PND is sustainable, that it has longevity like other core police systems, and that it has the ability to cope with the evolutionary demands of policing. Post-implementation reviews were considered to be pivotal in determining the initial adoption success of the PND, and whether it has delivered the anticipated business benefits. An additional reason for performing a post-implementation review was to enable project insights to be captured, so that best practice lessons can be applied to similar projects in the future. Following this, a collaborative post-implementation review was carried out with the NPIA with 10 police forces around the UK. These formal reviews were designed to establish whether the programme achieved in Release 1 what it set out to do, and the results are discussed in detail in Chapter 5. The objectives of the review were to (Lambri, 2012):

- Gather information on critical elements of PND implementation
- Establish the current position in relation to benefits realisation
- Inform the programme concerning any potential barriers to the roll out of PND Release 2
- Look for opportunities to communicate lessons learned to forces

It is important to recognise the worthwhile investment of a post-implementation review on new IT/IS projects. It is a significant period in which support for practice-based learning through actual use of the system can be evidenced in an operational setting. There are often opportunities in conducting a post-implementation review to modify or customise the configuration based on users' actual experiences of using the PND, which has been demonstrated during the preparations for PND Release 2. This also assists in the realisation of benefits and increasingly more benefits that were previously unanticipated. Therefore, the 'go-live' date of a new system should also be viewed as an indication of the impact of business change processes and solutions to issues to be addressed particularly in relation to identifying any barriers of use (Curtis and Cobham, 2008).

CHAPTER 4

INFORMATION SYSTEM TRANSITION: PND INITIATION

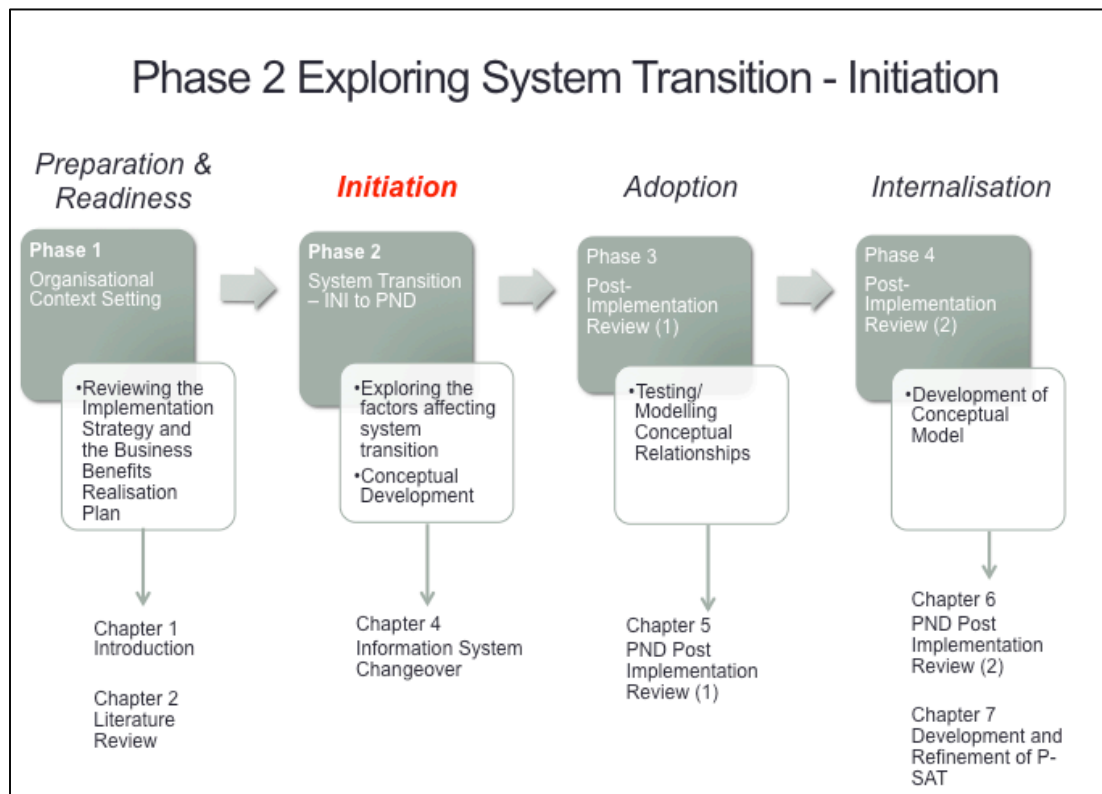
4.1 Introduction

This chapter explores the decommissioning of the INI system and the initiation of the PND, and the activities and processes surrounding the organisation's management of system transition. To examine this transitional phase, 15 semi-structured interviews in 12 police forces in England and Wales were conducted. The interviewees were INI users who were soon to become PND users. At this stage of the implementation process, the project's focus was on managing the transition from one system to another, and initiating the PND into the police environment. It was therefore a critical stage in the project delivery process in terms of managing system changeover, forces and observing forces adoption of the PND. From this perspective, the system transition stage was regarded as one of the most challenging because of the extent of preparation activities required prior to the initiation of the PND.

Figure 7 shows the linear approach of this research and a brief synopsis of the key contents of each chapter. Logically, the approach to data collection is in alignment with the national delivery process for the PND. From a research perspective, the review of literature suggests that the initial installation of a new technology is considered to be significant in hypothesising whether it becomes successfully adopted Lin et al's [A](2002), Chutter (2009) and (Ellahi and Manarvi (2010). For example, Tyre and Orlikowski (1994) assert that initial experiences of technology use create insights about the technology and the context of its utilisation. Disruption to working habits and business processes was also of interest to the research, in terms of how well people were adapting. Bocij et al (2008), suggest that organisations implementing new IT systems and involves significant business change; need to ensure that change-management activities are being actively pursued.

This phase of data collection was instrumental in developing a conceptual framework about the changeover, which brought to attention other issues of pertinence, such as localised variations in implementation and forces conformity to sharing information. The resultant outcomes from this phase of data collection, assisted in preparing for the next phase, through incorporation of the conceptual relationships identified during system transition.

Figure 7: Phase 2 - Data Collection



4.2 Preparing for Information System Changeover

In the system build phase of the PND, development of its software, which included programming and testing, data reconciliation and data migration were essentially the main activities that took place whilst preparations were underway for the PND's implementation. Technical change management was a key feature, which specifically looked at meeting technical change requests for software enhancements, whilst managing the transitional changeover from the INI system to the PND.

During the implementation phase of the PND, supporting infrastructure was being put into place, such as the secure technical environment; other activities included staff vetting and training to use the database. The introduction of business rules to support use of the PND was an emerging theme that was recognised as part of the broader organisational change management strategy. This included policy guidance on managing information from the PND, the design of intelligence sharing protocols and proformas for third party agencies, and the standardisation of business structures and practices (NPIA, NUG, 2011).

It was evident that during this process, collaborative working between the PND's suppliers Logica, the NPIA, and PND end-users in forces was important in order to

provide remedial solutions to the teething problems commonly shared by forces (NPIA, 2011). It was also apparent that for the NPIA deciding when to transfer from the operational use of one system to another was a difficult decision. This 'big bang' changeover was deemed to be high-risk' by some police forces, as there would be no fallback position should there be a need to use the INI system during the transitional stage (NPIA, 2011). Nevertheless, a 'now or never' decision was eventually taken, and some forces such as the MPS and GMP decided that based on their own local risk assessments, they were able to continue to use the INI slightly longer than other forces (NPIA, 2011).

4.3 Research Sample

The forces that contributed to this research were identified through purposive and convenience sampling. All forces in England and Wales were invited to participate via their respective regional PND co-ordinators, who were asked to nominate key INI users who would subsequently become PND users. Police forces in Scotland were at the data reconciliation stage, and were not preparing for system transition at this time. The forces that responded within the given timeframe represented the research sample. Arrangements were then made to contact participants in each force to conduct the interviews. Snowball sampling began to develop; participants suggested other key users to interview, and so the sample began to increase in both size and scope. A mixture of police officers and police staff were interviewed, including office administrators, departmental managers, intelligence researchers, police detectives and uniformed officers. A series of 15 individual semi-structured interviews were carried, and these were recorded and transcribed for analytical purposes. The following 12 police forces participated:

- Bedfordshire
 - Cambridgeshire
 - Devon and Cornwall
 - Dyfed Powys
 - Essex
 - Gwent
 - Hertfordshire
 - Leicestershire
 - Northamptonshire
 - Norfolk
 - South Wales
 - Wiltshire
- Force Departments:**
- Force Intelligence Bureau
 - Professional Standards – Force Vetting Units
 - Police National Computer (PNC) Bureau
 - Public Protection Teams - Children and Vulnerable Adults

4.3.1 Participants Questions

The interview questions were devised as a result of participant observations at national, regional and local PND user groups, and capture the main issues that emerged during the transitional stage from the INI system to the PND. The questions were designed to allow comparisons to be made between both systems, mainly from the perspective that the INI was set up in the interim as a direct recommendation from the Bichard Inquiry, and that it was a temporary tool that would enable forces to identify information held in other forces. Expectations of the PND, its perceived advantages and disadvantages, and the impact on staff roles and business change were explored.

The questions were also designed in alignment with the aims and objectives for this study. In particular, research aim 1, which is about exploring the implementation and adoption factors of the PND in the police organisation. The corresponding objectives 1B and 1C, specifically relate to researching the role of the PND in assisting information sharing, and involves conducting a critical analysis of the organisational and business challenges. It was therefore, pertinent to explore how the INI has contributed to instilling information sharing values and practices as a precursor to the PND. It was also important to understand what people's expectations were of the database, in terms of its technical capability, users' training needs and the impact on existing business processes. Furthermore, examining the process in the decommissioning of one system, and managing the changeover to another, was beneficial to identifying the organisational influences and business requirements associated with the initiation of new technology.

4.3.2 Interview Questions

1. What are the advantages of the INI?
2. What are the disadvantages of the INI?
3. What are your general perceptions and experiences of the INI?
4. What are your general expectations of the PND?
5. What are the potential advantages of the PND?
6. What are the potential disadvantages of the PND?
7. In your current role, what skills do you envisage are required for retrieving data from the PND?
8. What impact or change, if any, do you anticipate on working or business processes as a result of the PND?

4.4 A Case-oriented Approach to Data Analysis

Computer assisted qualitative analysis software was used to analyse the data. Atlas.ti uses grounded theory as its analytical framework, and its main objective is to assist researchers to generate a conceptual model and develop theory. The techniques used to analyse the data are based on coding and categorisation, as part of an inductive analytical process. The reasons for choosing this particular method of analysis was based on requiring a systematic approach for managing large data sets. Atlas.ti provides a consistent framework to manage and decipher data thematically at both a conceptual and interpretive level, to facilitate the building of theory. The case-oriented approach of this research attempts to understand phenomena from the standpoint of the participants, and reflects an interpretivist methodology toward data analysis. Theory development using Atlas.ti and its underpinnings with grounded theory means that the emergent model will be “grounded” in or based on the insights, observations and conceptual relationships, which are directly tested in the research setting (Schutt, 2006). Furthermore, during the data analysis stage, observational and field notes were taken during the interviews on participants’ general attitudes and behaviours in the context of the PND were reflected on, so that refinement of the issues and concepts and causal indicators were clearly and continuously identified. The principles of phenomenological research influenced the process of analysis, in terms of managing the data holistically, and incorporating observational and field notes as equally insightful. Keen (1975) suggests that there is reluctance by phenomenologists to focus attention on specific steps in research methods because *“unlike other methodologies, phenomenology cannot be reduced to a ‘cookbook’ set of instructions. It is more an approach, an attitude, an investigative posture with a certain set of goals.”* (p.41). Nevertheless, Hycner (1985) argues that there are other manners in which to apply phenomenology in the analysis of data, and as a result, Groenewald’s (2004) procedure was used. This analytical process was also used to analyse the interview transcripts following the PND post-implementation reviews, and the procedure is discussed in more detail in chapter 5.

Analysis of all the data was carried out in two stages; the first stage involved data analysis in relation to the INI system. The second stage analysed data relating to the PND. The purpose was to compare both systems’ capabilities and usability, whether the PND will be able to deliver the features and functions as anticipated; and how the PND system will likely require the introduction of new or altered working practices to support its use. The analytic query tool in Atlas t.i was used to generate and test hypotheses by examining relationships between concepts, codes and categories. The

building of complex 'expressions' using various operands was a key part of the analytical process, which also enabled the retrieving of quotations that were semantically associated. This technically enhanced the progressive focussing of analysis, and contextually allowed exploration of the text in an inductive and holistic manner. Super-codes were created, which were a combination of codes conceptually tested to ascertain whether there are causal relationships amongst them. The subsequent emergence of co-occurrences found within the data determined the identification of categories. In order to critically examine these relationships a matrix was produced, which showed a structural breakdown of each concept identified during the analysis, with corresponding codes and categories to support their presence. This was a fruitful way of generating an understanding of the socio-technical organisational setting, and how people are reacting to the implementation of the PND. This phase of data collection laid the foundations for the next stage of research, once the PND is expected to become a fully operational system in a business as usual environment.

Stage 1: INI - Analytical Themes and Trends Identified

1. Business Processes

- a. Request Generator – a time consuming paper exercise, which is used to record the purpose of the INI request to the receiving force(s)
- b. Seeking authorisation to complete the request generator in the first instance
- c. Delays in receiving information from forces (some have a backlog of INI requests to complete)

2. System Usability and Capability

- a. Restrictive searching capability/ Limited technical features and functions
- b. Data not instantly available or accessible
- c. Generally easy to use
- d. Unintuitive System
- e. Reputational issues i.e. technically unreliable

3. Operational and Intelligence Value

- a. Identifying and linking previously unknown intelligence
- b. Often used for vetting
- c. Often used for child protection i.e. risk assessments
- d. Identifies information not available on PNC

4. Communication and Collaboration

- a. Assists joint-working with other forces/agencies working on similar (or same) enquiries
- b. Aids communication with other forces for preventative policing purposes

4.5 INI Usage– Advantages, Disadvantages and Resistance to Change

The themes emerging from the analysis of the interview transcripts revealed the advantages perceived by INI end-users, which were mainly in relation to accessing a national tool that locates information of interest held in other forces. Although there were often delays in receiving information from forces, the information derived from the INI was usually not available from another national police system. The findings from this research suggest, that in general, the INI system was both easy to use and was operationally useful. However, a common disadvantage of the INI system was the inherent administrative task for operators using the request generator process to contact forces for information. In terms of technical capability, the INI's searching parameters were regarded as restrictive and unintuitive, and this has led to poor reputational issues. To an extent, this may have impacted on the limited business use of the INI system across other policing areas.

In terms of maximising the use of the PND, the realisation that certain skills sets were required by PND users, which differed from the skills required for conducting INI checks was gradually emerging as a common theme in police forces. Resistance to change was also a feature during the transitional phase; some people commented that *"things should remain the same"*, and some even opposed the PND completely. Others however, recognised the policing need for the PND and some wondered why the capability was not in existence in the organisation long before. However, operationalising resistance to change into specific constructs was important at this stage because it illuminated the barriers, which could potentially minimise the adoption success of the PND. Prospective PND users expressed feelings of anxiety and their lack of confidence in adapting to the *"ways of a new system."* Deciphering large quantities of information from various sources, and information overload were also raised as a concern.

Stage 2: PND - Analytical Themes and Trends Identified

Organisational Factors

- a. Information Technology Strategy for the PND
- b. Re-education on rationale for business process changes
- c. Training on new business processes required by the PND
- d. Confidential environment and strict access security measures
- e. An agreed national data sharing protocol for the PND

1. System Usability and Capability

- a. Easy to use interface
- b. Over complicated - unintuitive
- c. Better functionality compared to the INI system - wider search criteria includes people, objects, locations and events
- d. No 'copy and paste' or printing functionality which impedes the electronic dissemination of data
- e. Automatic updates for forces are essential for business continuity and system credibility/reliability and data integrity reasons

2. Operational and Intelligence Value

- a. Better access to data from a national pool
- b. Benefit risk assessments
- c. Benefit intelligence assessments
- d. Can identify patterns of offending – nationally, regionally, cross-border
- e. Assist decision-making and problem-solving
- f. More emphasis on proactive policing

3. People Impact

- a. Implications for working practices (and on roles and responsibilities, particularly administrative operators who are 'passive' users)
- b. Analytical/Intelligence handling skills required to assess/evaluate information from the PND
- c. Time gained in retrieving data, will be spent deciphering relevant data

4. Information Management Capabilities

- a. Managing information in accordance with guidance and national policy on the ‘Management of Police Information’.
- b. PND gives greater emphasis on assessing the relevance and value of data from the PND – but with information overload concerns
- c. The misuse of information and the potential ramifications –information dissemination and disclosure practice.

4.5.1 PND User Expectations and Information Management Capabilities

In contrast to the views expressed regarding the INI system, which were mainly in relation to time lapses in receiving data from the requested forces; the system’s lack of technical functionality and the ‘paper burden’ of requesting an INI search, prospective users of the PND were mainly concerned about the quality and currency of data held on the database. This raises an important issue in sustaining the ongoing use of the PND, which is largely dependent on forces regularly refreshing the database. Concerns were also raised by police staff working in business support roles regarding their newly acquired responsibilities for deciphering and disseminating PND information for indirect users. This meant that they would be responsible for managing police information from a range of sources and in different formats and intelligence handling codes. In terms of managing operational risk, changes to individual roles and responsibilities without sufficient training may have implications for policing and safeguarding overall. By conducting this phase of research, it alluded to the anxieties felt by some users of the PND, relating to information overload and concerns over the lack of experience in managing large amounts of police data. John et al (2011) suggest that professionalism and ethics in the gathering of information are fundamental elements in training those in intelligence-based roles. There are specific skills and taught practices in handling and disseminating intelligence, and it is clear from these findings that the deployment of PND licenses to previous INI users should only be a short-term measure. The following quote supports the point:

“The real work begins once you’ve performed a PND search. The onus is put on us to see what might be relevant in response to the request. I can see other administrators and myself seeking reassurance from managers and police officers as to what to choose to pass on - I didn’t need to do this before with the INI system. We need training on how to do this for ourselves.” Administrator, Vetting Unit

Gathering information to create actionable intelligence is often a continuous and evolving process and it is therefore necessary to ensure that information is collected in a logical and structured manner (John et al, 2011). Furthermore, the obtainment and management of police information has to be done in a manner that complies with the MoPI code of practice and the NIM (John et al, 2011). Under 'key principles' of the code, it identifies the police duty to obtain and manage information needed for police purposes. They were also aware that MoPI is a legislative framework relating to data protection, human rights and the freedom of information.

Police officers were generally aware of the information management guidelines and practices required for using the PND. The extrapolation of police data in electronic form was a regular activity for the majority of participants. In response to the question "In your current role, what skills do you envisage are required for retrieving data from the PND?" Police officers commonly replied "none" or stated, "managing information to us is our bread and butter", meaning that the PND would not be demanding new or different skill-sets as a result. Other officers expressed that managing information and adherence to intelligence handling codes was tacitly stored experience that was not formally captured but resided in 'peoples heads'. The following quote supports this finding:

'As an officer with 30+ years of experience a lot of it comes down to common sense in terms of using the PND how we supposed to. I can't really explain what I do or how I do it, essentially it's all in my head! But other users wont necessarily share the same skills.' Police Constable, PND/PNC Bureau

Unlike information systems, the problem with tacit knowledge is that it is not a stable component in the structure of the organisation. However, this does not mean that less credence should be given to the tacit knowledge of individual police officers, but rather to acknowledge the difficulties in formally capturing this knowledge. This is because such knowledge is generally skewed, static, context dependant and biased. Dean and Gottschalk (2007, p.239) argue that "given the dynamic and multi-faceted nature of tacit knowledge it may be of little use to 'explicitly store' static representations of individuals' tacit knowledge in databases and knowledge repositories because such a transfer changes the very thing about tacit knowledge – its dynamism – that makes it so valuable."

This also supports the premise that individuals can not only interpret different 'meanings' out of the same collection of data, but can do so at different times and in different contexts. It is this variation that makes tacit knowledge so valuable and unique,

and characteristically different from explicit knowledge. Moreover, capturing tacit knowledge is only possible at the time of its occurrence (Collier, 2006). In terms of technological capability supporting information-intensive police work, interpretational 'power' strongly relies on the tacit knowledge of the individual. Therefore, the burden of police work requires not only knowledge but also wisdom in how to manage and make best use of such knowledge in policing and law enforcement (Dean and Gottschalk, 2009). The use of technological systems in policing, whether 'high-tech' or 'low-tech' are arguably facilitating platforms that will never replace the sense-making capacities of human ability (Snowden, 2006).

Another important issue that was identified was in relation to how data from the PND was to be disseminated once records of interest were located on the database. At this time, printing capability from the PND was very limited, and records could not be extracted in any electronic form. This was mainly due to how each force prepared and managed their localised implementation of the PND. Potentially, this may have evolved into a barrier toward the PND's use because of the difficulty in electronically sharing information. This would totally contradict the very essence and purpose of the PND.

"The PND is on a confidential network and this actually makes the sharing of police information quite cumbersome, especially when you have to prepare for Case Reviews with the Social Services or if you're liaising with another department in your force. You can't get the information out of the system once you've got it, and you can't print it either. There could be loads of records that I would need to go through and write down – it's not exactly a good use of my time and energy." Supervisor, Public Protection Unit

Business managers positively regarded the concept of a newly created national intelligence database, which for the first time allowed the retrieval of police records from all UK police forces. The enablement of intelligence connectivity on a national scale was underpinned by the importance of MoPI in ensuring that forces abided by data quality standards, particularly data supplied to the PND. The following quote highlights the operational value that was expected from using the PND, and also highlighted the discretion afforded to forces in deciding the depth and breadth of data to share.

'I don't foresee any real disadvantages with using the PND, the more information you share amongst forces the better in my opinion. Up until now forces have kept their information to

themselves but now things are changing and having a national intelligence system will benefit our investigations hugely. Some colleagues have expressed the issue that going through all the information will take longer than actually doing the searches – but as far as I'm concerned its better to have more information than less'. PND - Point of Contact

There was uncertainty in some forces about whether to share information relating to victims based on the principles of data security and confidentiality. Although a national data sharing protocol was being developed at the time, there were forces that were facing ongoing challenges with reconciling data for uploading onto the PND. Agreement on when access to local force records would be granted was also an ongoing issue, and pressure on forces was placed to ensure that their data was up to date and properly indexed. Based on observations and interactions with PND user group members, sharing information on a national scale was still a relatively new concept. Some forces were concerned that not enough was being shared and this had caused concern at the national PND user group about public and security risks. As was evident in the Saville Review (HMIC, 2013), the sharing of information is vital for generating patterns of activity across geographical force areas. However, the consequences of withholding sensitive information in the context of crime prevention and security are equally important. The following quote refers to a further issue in relation to data security and confidentiality rules, which was a concern for a supervisor in a force-vetting unit.

'There needs to be a data sharing protocol agreed by all forces that allows us to retrieve quality information. I think that the level of intelligence is currently in discussion within our force, as to what classification of intelligence will be shared with PND. This is very important I believe to have in place, to ensure that we know what our boundaries are. Also, if confidentiality breaches occur, it protects our force credibility and makes us work better with forces locally and nationally.' Supervisor, Force Vetting Unit

The following segment was a common theme identified whilst exploring the data quality issue, and refers to police forces not being able to truly know the extent of information available if other forces do not regularly update their data. Furthermore, if security flags and warning markers are not being effectively used to notify operators about sensitive or further 'access denied' information, this could also yield operational risks for the police. The Organised Crime Coordination Centre (OCCC) has responsibility for three functions on the PND, which enhance existing processes in relation to investigating

cross-border organised crime. Flagging is the process of identifying which force or agency owns the intervention against a particular individual, location, event or object. This is in line with the searching parameters used for retrieving information from the PND (NPIA, 2012).

'What concerns me is that forces can choose what they want to upload onto the PND, and I know that the way my force is doing it is that we are uploading all of our information but not the sensitive information, we are putting flags on those records so that forces can contact us, but I understand that some forces aren't even doing that so they are withholding that information so we don't know what they have got and what's potentially missing. I think the disadvantage could be is that forces are not doing all the same thing. Some forces are downloading everything others not. Another disadvantage is that there are regular downloads uniformly so that information is up to date.' Detective Constable, Force Intelligence Bureau.

During this phase of research, a national PND engagement event took place at the College of Policing. The event was essentially an opportunity to market the PND, and to increase awareness of its capability across all policing areas. Engagement with senior officers and strategic leads in forces was considered to be vital at this stage. The NPIA, which hosted the event recognised that one of the drawbacks of training INI users to become PND operators meant that the PND was predominantly being used in vetting and child protection (as was the INI), and consequently PND usage at this time was generally low in all other policing departments. In the initial four months of the PND's inception from June – September 2011, analysis of management information supplied by the NPIA revealed that 148,561 searches were conducted nationally (Hollingsworth and Lucas, 2011). Vetting checks represented over half of the total number of national searches at 60 per cent and child protection were the second most prolific users representing 17 per cent; only 5 per cent of users carried out PND checks in force intelligence units (Hollingsworth and Lucas, 2011). The business area of domestic violence, which falls under the business category of public protection and includes child protection, represented only 2 per cent of the total number of searches.

These usage figures are further explored in phase three of the data collection process, and are discussed in Chapter 5. However, for the purpose of highlighting the main issues raised at various user groups meetings, these were in relation to the different deployment approaches adopted by individual forces. Several forces chose a centralised

bureau approach, whilst others deployed PND access points across most of their business areas. Further issues related to the lack of departmental business rules to guide users as to when a PND check should be conducted, and how the information should be disseminated thereafter. Because of significant variations in how forces implemented the PND, there was not a uniformed approach to which forces were adhering, and at this stage there were no official business rules in place to support use of the PND once the system was initiated. Various actions were undertaken by the NPIA to alleviate some of the problems that forces were experiencing. This included the setting up of local PND user groups, which facilitated the cascading of issues to the national PND user group based at the Home Office. This provided a formal communication mechanism for direct and indirect users, business area managers and force strategic leads, to share their initial experiences of the PND, and to facilitate remedial action. In response to rigorous demand, the NPIA produced a 'Business Rules Catalogue' for the PND in 2011/2 for all forces and agencies to adopt. This included an intelligence sharing protocol with external agencies, intelligence request forms for internal use, and detailed rules and procedural guidance on managing information and handling intelligence (NPIA, 2011/2, Business Rules, Brian Douglas). It also became apparent that forces needed to demonstrate to prospective users, how the PND will complement routine policing tasks, so that staff could begin to associate the features and functions of the PND with their work activities. Bagozzi (2007) asserts that technology adoption should be conceived as a process constituted by goal striving, whereby the actual attainment of technology benefits are identified in the context of goal achievement. Perhaps the role of user intention in predicting technology use behaviour can be logically understood from this perspective.

In the development of new theory, existing boundaries of knowledge from various disciplines become integrated. Lippert and Davis (2006) propose that the integration of new ideas and concepts enable new theoretical relationships to be proposed, as a result new knowledge is created and a new heuristic view emerges. They also argue that the influence of trust is an important consideration in information science research, because the introduction of new technology in an organisation represents a typical example of organisation change (Lippert and Davis, 2006). Manning (2008) argues that policing is about establishing and maintaining trust, and assessing trustworthiness. So far, the data has shown that trust is a valid determinant in influencing police forces to share information, and therefore, may impact in the adoption process of the PND. This is

because trust is characteristic of the interpersonal skills required in a differentiated and unpredictable occupational environment.

Table 2 presents a breakdown of the emerging concepts identified during interaction with the data as part of progressive focusing. The iterative and reflexive processes of qualitative data analysis allow meanings to be captured about the data, and conceptual links are observed and refined to inductively examine the influences and relationships that will enable data interpretation (Schutt, 2006). As a result, the concepts identified are shown in relation to their corresponding codes, categories, and supporting quotes. Figure 8 shows a pictorial representation of the concepts and themes identified during analysis of the data using Atlas t.i. The chart is a network view showing how the concepts relate to each other and the meanings of the conceptual associations. This has helped to formulate theoretical insights about the data, which facilitated the creation of propositions that can be conceptually explored in the subsequent phases of data collection.

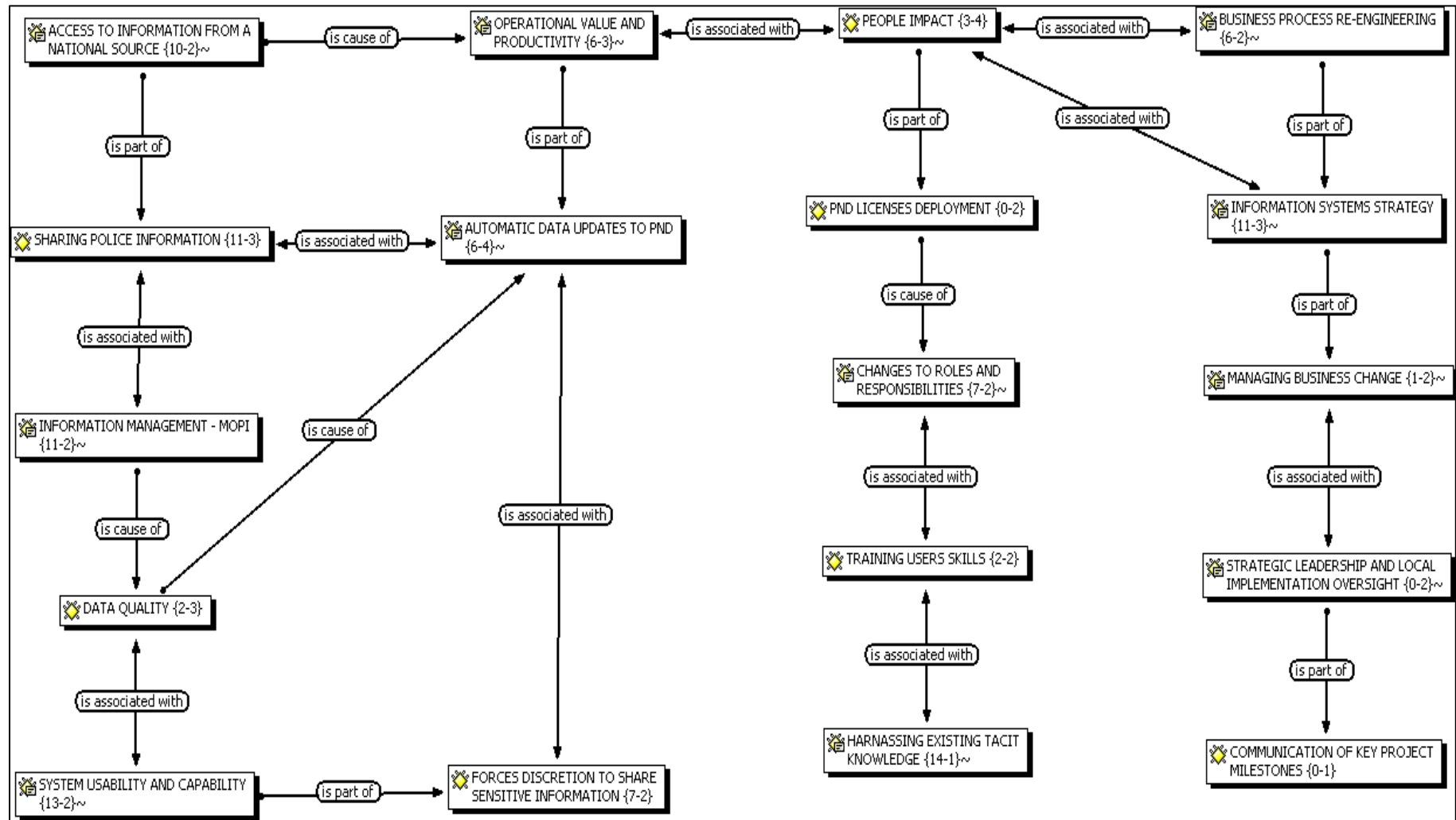
Table 2: Presence of Supporting Concepts, Codes & Categories

Concepts	Codes	Categories	Supporting Quotes
Advantages of gathering information from a national police source	<ul style="list-style-type: none"> • Enables Intelligence Connectivity and Investigative Opportunities • Identifies patterns of offending 	Operational Value & Productivity	<i>'The PND will greatly reduce the time it takes for forces to gather intelligence from a national source. It will enable us to pick out what's relevant to us, and in urgent cases you could get an immediate synopsis.'</i>
Sharing Information	<ul style="list-style-type: none"> • Contributes to effective decision making and problem solving i.e. for compiling risk assessments for public protection 	Operational Value & Productivity	<i>'As an analyst its really good to find out about the geographical movements of nominal in whatever business area. Most of which wouldn't be on the PNC unless the nominal was or has been arrested in the past. PND gives you a lot of background information for risk assessments too.'</i>
MoPI Alignment to the PND	<ul style="list-style-type: none"> • Data Quality & Integrity – ensuring high data standards in police records 	Information Management	<i>'I can't emphasise enough how important it is to have national data standards in the police, so that not only are our systems up to date and fit for purpose, but also our quality of data is assured though national and shared practices.'</i>
Forces discretion to share sensitive information	<ul style="list-style-type: none"> • Automatic updates from forces is essential for the credibility of the PND 	System Usability & Capability	<i>'What concerns me is that forces can choose what they want to upload onto the PND, I would suspect that a lot of forces are not sharing their sensitive records and are not using PND flagging. We then don't know what they have got and what's potentially missing and I think that can be a real problem.'</i>

Concepts	Codes	Categories	Supporting Quotes
Managing Business Change	<ul style="list-style-type: none"> Introducing new or enhanced business processes to support PND use Business Integration 	Organisational Factors	<i>'Working practices and processes will change because the PND requires this. For example, how do we disseminate requests to officers effectively, so that they can respond in a timely way? Also how much do we share – all of it? This can take us hours, and which information would be most important to prioritise? I have questions about how much we share with partner agencies like social services.'</i>
User Licenses Deployment Plan (Local and National). INI users replaced as PND use	<ul style="list-style-type: none"> Managing changes to roles and responsibilities Identifying skills required by users to decipher Information from the PND PND Training – handling and disseminating information 	People Impact Information Management	<i>'The real work begins once you've performed a PND search. The onus is now on us to see what might be relevant in response to the request. I can see other administrators and myself seeking assurance from our managers and police officers as to what to choose to pass on – I didn't have to do this before with INI. We need training on how to do this for ourselves.'</i>
National and Strategic Leadership - Consistent and accurate communication with police forces during the critical stages of organisational delivery	<ul style="list-style-type: none"> Managing peoples expectations –of the system's capability, project timeline and the impact on peoples roles and responsibilities 	People Impact Organisational Factors	<i>'When I first heard about the PND I was told that everyone will have access to it so I won't be doing everybody's checks. At the moment it's going to be down to people in child protection as previous INI users to carry out PND searches, and the referral unit, and also some in the intelligence unit. There is more pressure on us now. Our expectation was that everyone would be able to do a PND check like PNC that was how it was first sold to us.'</i>

Concepts	Codes	Categories	Supporting Quotes
Restrictive Searching Capabilities – INI	<ul style="list-style-type: none"> Better technical features & functions expected from the PND 	System Usability & Capability	<i>'You can't do searches on a date of birth unless you are 100% certain of the date. If you are not specific or misspelt something it will just say 'not known' and therefore you have to be very precise in how you search in case you miss something. The INI is not intuitive, I am hoping the PND is lot better and I think it will be fingers crossed.'</i>
Maximising opportunities for the adoption of PND	<ul style="list-style-type: none"> Harnessing Users' Tacit Knowledge & Experience 	People Impact Organisational Factors	<i>'As an officer with 30+ years of experience a lot of it comes down to common sense in terms of using the PND how we supposed to. I can't really explain what I do or how I do it, essentially it's all in my head! But other users wont necessarily share the same skills.'</i>
Information System Strategy (System Design, Implementation and Adoption)	<ul style="list-style-type: none"> Proactive Policing IT Methods Adapting to new ways of working (i.e. sharing information) Changing attitudes and behaviours and challenging embedded working cultures MoPI Requirements and National Data Standards 	Organisational Factors	<i>'More emphasis on proactive policing rather than reactive policing, I think the police are evolving with the PND, in terms of better risk assessments and communication with forces; as we know offenders don't respect force boundaries and it will help to build that information on nominals that we did not have before. Data quality standards need to be high so we have a complete picture, and the introduction of MoPI has helped but human nature will tell you that none of us are perfect and mistakes can still happen.'</i>

Figure 8: Identified Concepts and Themes - A Network Diagram



4.5.2 Managing Transition & Business Change During Technology Initiation

The literature in respect of organisational behaviour and the adoption of new technology emphasises that although organisations continue to upgrade or invest in new technological solutions, resistance to change by employees can threaten or limit levels of technology adoption (Lippert and Davis, 2006). This further extends importantly to recognising that the organisation's culture must be prepared and receptive to the new technology, whilst at the same time, accepting organisational change as a likely by-product. Nunn (2001) asserts that information technology or systems continue to offer public sector organisations the promise of improved productivity, and becomes the rationale for most IT/IS investments. Police agencies, for example, should be especially sensitive to IT productivity issues, and ought not to equate IT/IS investments as solutions to improving service delivery information management. These would essentially be propositions that would need empirical testing so that realistic evaluations could be conducted with the system being used and applied in its intended operating environment (Nunn, 2001).

Tyre and Orlikowski (1994) propose that the process of technological adaption is not gradual and continuous, as is often argued in the diffusion of innovation literature, but is instead highly discontinuous. Evidence from their research on the adaptation of technologies to support service production and manufacturing operations, found that there exists a relatively brief window of opportunity to explore and modify new process technology following initial implementation (Tyre and Orlikowski, 1994). The authors continue to assert that the process of technological adaptation is an important research area, worthy of exploring organisational patterns and the temporal timing of adaptation. This is offset by one of their identified premises, which indicates that technology adoption during the initiation stage is the most active periods, and thus organisational efforts in encouraging the use of new technology should be intensified at the initiation stage (Tyre and Orlikowski, 1994). Based on these results, it would be sensible to also recognise that decisions and directions taken during this time may transpire into major determinants of how the technology will be used by the organisation over the longer term. Based on the literature discussed, identifying concerns and problems with both the technical capability of the technology and the business processes and structures designed to support its use, are essentially natural to the technology acceptance process. This phase of research has found that the early stages of technology adoption in an organisation are significant, because optimising the use of technology in organisations such as the police, is dependent on understanding not only business requirements, but

also the intended and unintended consequences of technology-driven solutions to both the problem of crime and the police's response to crime (Byrne and Marx, 2011). In the wider context of crime management, the innovative use of police technology to solve crime is internationally recognised as a promise to improving police productivity and delivering effective public service (Custers, 2012). During this research phase, it was also interesting to observe that the promotion of PND success stories was an important feature toward marketing the system and the benefits it can deliver. Although there are success stories often highlighted in the media about the valuable role of technology in detecting crime with the use of DNA profiling and scientific forensic analysis for example, statistically it would be extremely difficult to prove that the use of a particular technology was a decisive or contributory factor in solving a crime (Byrne and Marx, 2011). Other confounding factors may have been present such as the use of more than one technology, witness statements, perpetrator confessions and so forth. Nevertheless, even without reliable statistics and validated causal relationships, successful police results in detecting and solving crime evidence the important role of technology and its contribution to better, cheaper and faster policing (Nunn, 2001). That is why increasing efforts are made by police forces all over the world to maximise the use of technology in policing and to remove any existing organisational, technological and legal obstacles (Custers, 2012).

Research carried out by Custers (2012) identified information systems such as intelligence databases as one of the most prevalent technologies being used in police agencies in the Netherlands. With regard to the obstacles of using technology in policing, these were similar to those identified during the stages of system transition from the INI to the PND. For example, insufficient guidance and management, insufficient long-term implementation and insufficient adaptability of colleagues were cited as the most common obstacles from an organisational perspective. Furthermore, in terms of the technological obstacles identified, insufficient user friendliness of an IT system was a key determinant toward using a particular technology. The most prevalent legal obstacle that respondents were experiencing was in relation to not knowing the proper legal basis for using a technology in terms of the lack of legal clarity surrounding what data is allowed to be retrieved and shared and how personal data should be handled (Custers, 2012). Other research that support the findings from the INI to PND transition, relate to variations in how the same technology is applied in different business areas in the police organisation, and as a result influence how the technology is utilised and to what extent it is integrated into normal and routine practices (Byrne and Marx, 2011).

4.6 Summary

This chapter has presented the results from phase 2 of the data collection process. The findings have focused on how the police organisation has coped with managing system transition, and how it has responded to business change. The conceptual relationships identified are indicative of the range of significant factors that are emerging and deserving of further exploration. So far, the following propositions have emerged that are specific to managing system changeover, and initiating new an information technology system:

1. In order to minimise potential resistance to change, it is important to communicate in advance the anticipated impact to staff roles and their work responsibilities
2. The standardisation of business rules to support use of the PND should be introduced alongside the database's initiation, in order to minimise disruption to business continuity
3. Alignment to MoPI principles and guidelines is essential for the development and sustainment of police information systems. This is to ensure high standards in the quality and currency of data held on the database
4. With the introduction of a new information system, a significant change management strategy needs to be generated alongside to direct and support business change activities
5. Initiating new police IT on a national scale requires centralised and consistent communication, particularly during the critical stages of project delivery. This is to ensure a uniformed approach in how the same or similar issues are being addressed.

Chapter 5 will present the results from the first PND (Release 1 - Drop 2) post-implementation review, and explores the adoption stage of the PND, approximately six months after its launch. The review's findings are discussed in context with the NPIA's business benefits and performance management framework, as well as from an empirical case study perspective. During this time, the majority of police forces had connectivity to the PND, and the primary uses of the PND was in the business areas of vetting, public protection and child protection.

CHAPTER 5

PND POST-IMPLEMENTATION REVIEW (1): ADOPTION

5.1 Introduction

This chapter discusses the results from the PND Release 1 - Drop 2 (R1D2) post-implementation review that was conducted for six weeks during November to December 2011. In collaboration with the NPIA, a total of 100 semi-structured interviews were conducted in sixteen police forces, including the Child Exploitation Online Protection agency (CEOP). As part of the NPIA's Benefits Realisation Plan and Performance Management Framework, the background context for this formal review was to establish whether the IMPACT programme achieved its objectives for this stage of the project. Post-implementation reviews were considered an essential part in the realisation of business benefits, and in supporting the sharing of best practice (Baumber, 2009).

5.2 Exploring Conceptual Relationships Empirically

In fulfilling the aims the objectives of this research, participating as an IMPACT programme interviewer in the review, was a perfectly timed data collection opportunity. Prior to the post-implementation review, observations of the implementation process focused mainly on preparing the organisation for the introduction of the PND, into the business environment. During this time, the majority of police forces had connectivity to the database. Following consultation with police forces, the NPIA anticipated that use of the PND would be steadily widespread (NPIA, [B](2012)). However, usage figures indicated that the PND was being predominantly used in the business area of public protection, mainly child protection and vetting. Although this was positive progress and demonstrated use of the system, the figures continued to be monitored on the basis that the PND needed to feature alongside the routine use of other national police systems, and should be adopted across the organisation.

As shown in Figure 9, phase 3 of the data collection process examined the organisational adoption of the PND, approximately six months after its launch in June 2011. The aim of phase 3 was to consider the propositions built from phase 2, to enable taxonomies of the factors that are influencing the PND adoption process to be generated. The literature suggests that the development of organisational taxonomies has proven to be a popular approach for thinking about organisational structures and strategies (Fry and Smith,

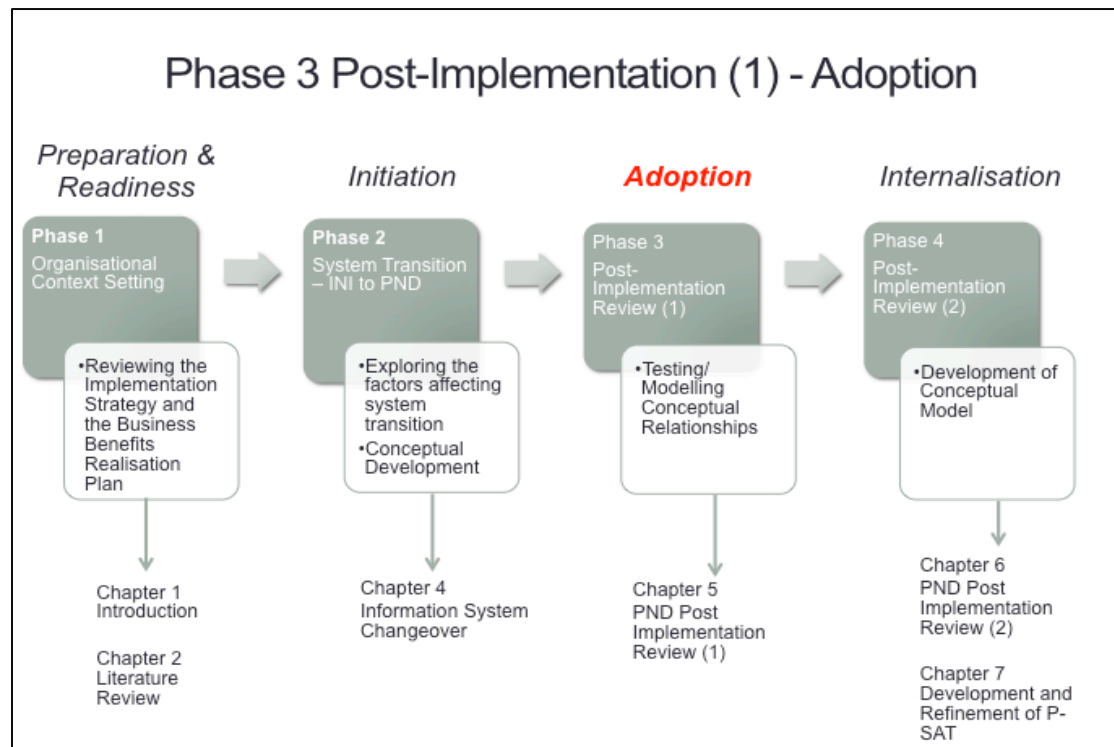
1987). Doty and Glick (1994) propose that generating taxonomies incrementally as part of the data collection process, will assist in the classification of the contextual, structural and strategic factors, which are important in understanding complex causal processes of phenomena holistically. The development of theory that is based on the interpretative analysis of qualitative data, is to contextually recognise that people socially and symbolically construct their own organisational realities, whether as an individual or as part of group (Lynham, 2002). Therefore, the aim of theory building in the interpretive paradigm is to generate descriptions and explanations of events, so that the system of interpretation and meaning, are revealed (Gioia and Pitre, 1990). This is a crucial feature of this research; and as shown in the applied nature of IS/IT adoption studies, phenomena must not be disconnected from real world practice. Dubin (1978) and Lynham (2002), suggests that good theory building should result in two kinds of knowledge: outcome knowledge, usually in the form of explanative and predictive knowledge, and process knowledge, by increasing understanding of how something works and what it means in reality.

Parallel to the implementation of the PND, information sharing between forces, and the inherent advantages of this, are important from the view that the PND has precipitated changes in both organisational behaviour and business process. Examining which contextual organisational characteristics are dominant in information sharing processes was relevant toward gaining an understanding of the motivations and cultural values of the police organisation. For example, Willem and Buelens (2007) suggest that identifying the positive effects of contextual organisational characteristics on information sharing for example often includes interpersonal features of trust and social identification. This is based on the notion that the more people identify with a group of individuals performing certain tasks, the more likely they are to adopt group behaviour and leverage toward information sharing (Willem and Buelens, 2007). Furthermore, in terms of applying a research methodology that can contextually describe the complexities of information sharing processes and behaviours, Brynjolfson and Hitt, (2000) argue that the use of a qualitative research design is considered more appropriate than the use of quantitative methods, in explaining more in depth about what is occurring.

One of the objectives of this research is to *'explore the role and contribution of the PND in assisting information sharing across multiple police forces in the context of contemporary UK policing'*. This involves a discussion of the critical factors identified following the post-implementation review. One of the factors was the influence of cultural values in

shaping police management attitudes to stimulating information sharing practices. Berg et al, (2008) purport that information sharing within an organisation is a process of trial and error, feedback and mutual adjustment of both the source and the recipient of information. Luen and Al-Hawamdeh (2001) reinforce the crucial point that tackling the willingness of police officers to share information is a crucial but difficult task.

Figure 9: Phase 3 - Data Collection



5.3 Post-Implementation Review Objectives

The objectives of the post-implementation review were set by the NPIA IMPACT programme, and these were (Hollingsworth, 2012, p.1):

- *To gather information on critical elements of the PND's implementation*
- *To establish the current position in relation to benefits realisation*
- *To inform IMPACT of any potential barriers to the roll-out of Release 2*
- *To identify opportunities to share best practice to forces.*

5.3.1 Research Sample

Forces were selected to represent each ACPO region in the UK to ensure a wide geographical and demographical spread of both rural and urban police forces.

1. Child Exploitation Online Protection (CEOP)
2. Derbyshire
3. Greater Manchester Police
4. Gwent
5. Leicestershire
6. Lothian and Borders
7. North Yorkshire
8. Sussex
9. West Mercia
10. Wiltshire

In order to identify the research sample, team members from the IMPACT programme contacted various police forces to identify participants wishing to take part in the review. The request from the NPIA was that there would need to be representation from different job roles and business areas. As a result, 100 participants were identified, which included direct users, indirect users, project managers, trainers and business heads from the PND community.

5.3.2 Designing the Interview Schedules and the Interviewing Approach

The author and members from the IMPACT programme jointly designed the questions for the semi-structured interviews. Decisions on the style of questions and the subject matter to address were based on the prevalence of issues that appeared to be common to forces. The setting up of an online discussion forum for the PND community via POLKA encouraged users to share their own experiences and concerns with others. This was an effective mechanism for communicating the post-implementation review process to forces, not just those participating, and also allowed the interview questions to be piloted. Appendices 9 and 10 provide the final interview schedules that were used during the first post-implementation review for phase 3 data collection. The questions for the review, examined key areas such as database functionality and use; business change; information management; business benefits; training and technical service management. Indirect users were specifically asked about their level of awareness of the PND, and business heads were asked for their views on the national coordination process for the PND, and managing the impact on business change. The IMPACT programme decided that forces in the East of England region would be subject to a different methodological approach in the collection of data for the review. The Eastern

region was provided with semi-structured questionnaires via their regional coordinator. However, for consistency reasons, the same questions were used for the Eastern forces, therefore, the answers obtained from the questionnaires were included as part of the overall post-implementation review analysis. All forces in the Eastern region took part and included the following:

1. Bedfordshire
2. Cambridgeshire
3. Essex
4. Hertfordshire
5. Norfolk
6. Suffolk.

The post-implementation review was carried out by four members from the IMPACT programme, in addition to the author of this thesis. The respective regional coordinator and additional members from the IMPACT programme also attended the interviews, to either assist or to act as observers. The interviewing team was split up into two, and each team of two were responsible for conducting fifty interviews. The author was in one team and carried out fifty interviews together with a colleague. For verification purposes, all the interviews were recorded on Dictaphones and were subsequently transcribed for data analysis purposes. Briefings and debriefings were held at the start and end of each day during the review process. This was to discuss any urgent issues that needed to be addressed, and also to capture significant themes identified during the interviews. Following each force visit, a nominated member of the interviewing team was responsible for producing a short report for the Chief Constable outlining the review's early observations of their force. These short reports were produced by the author of this thesis, and were used to enable comparisons to be made with other forces', and to report on the progress of the PND's adoption from a holistic perspective.

5.4 Analytical Process

Qualitative data analysis techniques can adopt various theoretical approaches such as content analysis, discourse analysis and narrative analysis, for example. In order to organise, explore and interpret the data obtained during the review process, computer assisted qualitative data analysis software was used. Atlas.ti was used to enable the data to be coded, categorised and analysed so that emerging patterns, relationships and connections with the datasets could be systematically structured. As discussed in Chapter 4, Atlas.ti uses the principles and processes of grounded theory as its inherent analytical approach. It was considered to be suitable to the phenomenological and

interpretive nature of the overall research design. However, Atlas.ti was not entirely relied upon to 'analyse' the data, because contextual significances and factors that were noted during participation in activities and observations also influenced the analytical process in understanding the concepts and themes identified during the collection of data. The analytical process of Atlas.ti that was adopted is described below:

1. Text files and documents are uploaded to Atlas.ti and a new Hermeneutic Unit is created. Quotations and segments of text are highlighted to represent the pertinent issues raised in line with the aims and objectives of the research.

} Data Level

2. Codes are assigned as key words to the quotations, to enable similar and common issues to be captured. Categories or groupings begin to emerge of the factors identified as significant. **} Data Level**

3. Data segments, Codes and Categories are compared to one another and the data is explored thematically. This part of the process begins to unravel the various concepts emerging from within the data. **} Data Level**

4. Using the Query Tool, quotations are retrieved using the codes assigned during the process of coding. The tool allows complex queries to be incrementally built, facilitating the thematic analysis of the data and the identification of associations, patterns and relationships. Super codes and Super families are created to categorise and link the quotations to the query for provenance purposes. **} Conceptual Level**

5. The Co-occurrence Tool works on a different logic than the Query Tool in that it is used to determine and select codes using various query operators. The co-occurrence tool explores all the codes that co-occur in the margins of the data files using a combination of analytical operators. **} Conceptual Level**

6. The gradual development of building theory, which is one of the main objectives for using Atlas.ti, began earlier in the analytical coding process. Ideas developed further during the process of querying the data. The Network View Tool allows further exploration of the data and the opportunity to visualise the concepts and

themes identified. The creation of a network chart represents conceptual links and semantic relations within the data, and intuitively displays these graphically.

} Conceptual Level

The inductive analytical process used to formulate the codes and the subsequent clustering of categories, was underpinned by the requirement to scrutinise the text methodically, so that concepts would gradually derive to critically explore and understand the data (Denscombe, 2010). The systematic procedure used to identify essential features and conceptual relationships, follows Hycner's (1999) process. This was also used for analysing the data obtained from phase 2: exploring system transition.

1. Bracketing and phenomenological reduction
2. Delineating units of meaning
3. Clustering of units to form themes
4. Summarising each interview
5. Extracting general and unique themes from all the interviews and making a composite summary

The first step of the procedure refers to the "bracketing" of the researcher's views and preconceptions. This was achieved by focusing on participants' experiences and their perceptions, whilst maintaining a sense of neutrality in interpreting their responses. As a way of transforming the data, it was important to be mindful of one's presuppositions, which could influence the meanings inferred by participants. The second critical step was to identify the units of analysis that could illuminate the phenomena being studied. Hycner (1985) and Groenewald (2004) assert that following the list of features identified during the analysis of interview transcripts, including observational notes and field notes, it is important to consider both the literal content and also the number of times a meaning or expression is mentioned, and in what context these are stated. One of the essences of phenomenological research is to regard the analysis of data as an investigation of the constituents of a phenomenon while viewing the context from a holistically whole perspective (Groenewald, 2004). By this, it is meant that the intensive coding and categorising of data can lead to "*a loss of the whole phenomenon*" (Groenewald, 2004, p.17). The thematic coding of quotations that were commonly shared by participants was treated as units of analytical significance, which could allow the formation of composite themes, which was the third stage of analysis. Therefore,

familiarity with the content of the interviews was a fundamental part of the analytical process, which enabled the delineation of concepts and the clustering of thematic relationships. The fourth stage of the procedure involved summarising and validating the interviews to facilitate a holistic and contextual interpretation. This was achieved by regularly consulting with colleagues from the IMPACT programme, who were also part of the post-implementation review team. As stated earlier, briefings and debriefings were held with the interviewing team following during each day of interviewing, and a report on the findings of the review, was produced collaboratively with the team. The fifth and final stage of the process involved devising a composite list of the features and themes identified. A total of 21 features were identified, which were clustered into three themes: “technology factors”; “organisational factors”; and “implementation factors”, and are shown in Table 3.

Table 3: Identified Categories (3) and Features (21)

Technology Factors	Organisational Factors	Implementation Factors
1. Database Capability	8. Resistance to Change/Cultural Values	15. Business Process Re-engineering
2. Database Productivity & Task Fit	9. Strategic Leadership	16. User Groups & Super-users
3. Database Reliability	10. Peer Influences	17. Licence Deployment Model
4. Database Usability & Efficiency	11. Management Style	18. Managing Expectations
5. Technical Helpdesk Support	12. Information Sharing Processes	19. Promoting Success Stories
6. Data Management (MoPI)	13. Data Quality Standards	20. Holistic Training
7. Database Accessibility	14. Partnership Working	21. PND Guidance & Policy

Although Atlas.ti was used to systematically manage and explore the data, there was great emphasis on reconstructing the subjective realities of participants in complete context of their roles, responsibilities and organisational environment, which computerisation techniques would not necessarily capture. Therefore, descriptions of

the constructs or features discovered to be influential in causing either a facilitating or inhibiting effect on the implementation and adoption processes of the PND, were discussed in context with the cultural and business values of the police, more specifically in terms of how receptive the organisation was in adapting to a new technological innovation and developing supporting working praxis.

5.5 Phase 3 – Post-Implementation Review (1) Findings

The findings from the review will be discussed by category; these categories represent the themes that emerged following the analysis of data. However, where there are dynamic overlaps and intertwining conceptual relationships within the categories, these will be also examined holistically and contextually. Critical inhibiting and facilitating factors found to be influential are illustrated in Figures 10 and 11, to assist understanding of the key emerging issues. Figures 13 provides a provisional conceptual model that was developed to synthesise and theorise the review findings, and a network chart using Atlas.ti was produced, to demonstrate the thematic and semantic relationships identified.

5.5.1 Technology Factors: End-Users Skills, Data Management & Disclosure

In terms of navigational layout, direct users of the PND generally perceived the usability of the database to be difficult. In some instances, the PND was described as “*unintuitive*” and “*clunky*”, with data records not easily accessible using the POLE searching mechanism. However, there were users, who recognised that “*teething problems*” were generally to be expected, and that user-confidence in the database was regarded as an incremental process. Information overload was often stated as a potential barrier toward PND use, and this related to two issues: the information handling capabilities of administrative users, and their ability to retrieve and decipher data records, because overload can detract from effective interpretation (Huber, 1990). The findings also indicated that as a result of the PND, administrative staffs’ workloads were increasingly affected.

“I don’t find it that intuitive, but I do understand that the whole idea of having the POLE entity and everything, but it doesn’t seem like it’s presented in an intuitive way. In order to progress through a search logically, you are constantly going backwards and forwards, it doesn’t feel easy to navigate. It’s quite often difficult to know if you’ve looked at a piece of information already, because you are constantly going back to a previous screen. But I

think some of it was confidence as well because it's a complete new system and everyone gets nervous on new systems and you get your teething problems and I think that as well as the confidence." Indexer - Force Intelligence Bureau

A common factor that had emerged during phase 2 data collection - exploring system transition, was in relation to the deployment of PND licenses. This was also found to be a factor in the post-implementation review. The majority of direct users were previously INI operators. Similarly, it was identified that the deployment of PND licenses to these users was a cause of concern for these staff. Of particular concern, was the adoption of additional tasks as a PND operator, which required more responsibility and cognitive processing capability, compared to using INI. Other important issues were in relation to information disclosure and information handling skills, which echo the findings from phase 2. Providing holistic PND training that recognises the competences required to support optimal use the PND, may influence users' receptiveness toward positively adopting the PND. The following excerpt from a child protection point of view, highlights how paramount it is "*not to miss something*", whilst viewing information records, particularly when compiling child risk assessments for multi-agency conferences.

"I complete an INI request, it was gone. I am a Scale 4 Civilian. In my opinion - I don't have the rights to decide what is pertinent to a case or not. And that's an issue for me individually, and how happy I am to be delving into information, that I may not have complete access to, on a Scale 4 basis. That for me has been an issue from the outset. Q. Is it the confidence or the skills? A. Well skills and confidence, because I'm not an intelligence officer, I've not come from that background either, I know what is important, and I know what information people want to see and don't want to see, I'm not that restricted, but I still have a niggling doubt of 'have I missed something' and if I've missed something that's really important, who's going to protect me, where do I come in that line?" Administrator, Child Abuse.

The capability and reliability of the database was discussed in context with data management issues. This emerging concern was in relation to the quality and currency of data held on the PND, and the effect this had on users confidence. Although, the POLE searching facility facilitates targeted information gathering; navigating and deciphering information from a number of force records from 230 police force systems, and with

ever-increasing data records, which currently stands at 2 billion records, will not be an easy task.

"It's not the quickest system, but there's that much information on there, it's not going to be, and when you're going into all the forces and things like that, you're not going to have a very fast system are you? Because it holds too much data; all of varying quality and gaps." Administrator -Public Protection

Continuing with the data quality and currency theme, the issue of information gaps was highlighted as a barrier toward using the PND. The problem resided in not knowing whether the data presented on the PND was up to date and whether more information existed in respective forces, but was not uploaded. The phrase "knowing the unknowns" was frequently expressed by end-users, who were unsure whether this was a project issue or an organisational wide problem with forces not regularly refreshing their data loading (NPIA, 2012). During phase 2 data collection, one of the main requests from forces was to ensure the existence of a national data sharing agreement to maintain information sharing obligations and standards by forces. This was further reiterated as a finding in phase 3.

The usual gaps, just not being uploaded, forces individually let the system down by failing to pass the information on for uploading but I'm sure it's there; it's just not on there yet. It's kind of difficult really, because you don't know what you don't know, if you see what I mean. If you do a search and it doesn't come up, what I would say that I don't think the match groups still work perfectly, I think that's still a work in progress. Researcher, Force Intelligence Bureau

So far, the findings indicate that a degree of organisational learning needs to take place about the changes in behaviours that are required as precursors to the PND's adoption. Huber (1991) argues that organisational learning does not necessarily demand complete changes in behavioural practices, but rather promotes conscious recognition that people may need to change their cognitive process maps to develop new understandings. This extends to discussing how use of the PND is contextually task-related, and must also fit the task requirements of users'. But there are two dynamics here in play. The first relates to individual information sense-making abilities and the other relates to the organisational learning capability of the police to support and adapt

to technology innovation. Dishaw and Strong (1998) assert that the abilities of an individual, the ability requirements of a task and the provision of technology to match these demands satisfactorily, each support and can explain what determines users to accept or reject new technology. Thomas, Sussman and Henderson (2001), recognise that information technology alone does not necessarily contribute to improving organisational learning and capability in information management, but simply facilitates a clear process of information acquisition. Information interpretation is based on a range of techniques, systems, interactions and sources, however, information retrieval databases area are used to calibrate and enumerate the vast array of data (Campbell, 2004). Huber (1990) defines interpretation as *"the process through which information is given meaning"* and also has *"the process of translating events and developing shared understandings and conceptual schemas"* (p.102). Although MoPI was an attempt to define national standards and processes for managing information, the recent setting up of a 'Data Assurance Group' for the PND to address data matters is another attempt at trying to get this major organisational problem resolved. In the case of the PND, the police organisation now has a national pool of data and a wealth of information records, but lacks critical understanding of the organisational learning that is required to foster 'knowledge asymmetries and distillation' using information management tools, processes and common standards that could enhance the organisation's capability in managing its information (Hughes and Jackson, 2004). Knowledge management and knowledge sharing initiatives could subsequently be introduced to accumulate and categorise information, and to generate systematic linkages with information and intelligence. Such knowledge enhanced practices could lead to innovative methods of scientific analysis that could be developed to promote collaborative working with multiple levels and specialism's across the organisation (Hughes and Jackson, 2004). Research carried out by Seba and Rowley (2010) found that although there was widespread recognition of the importance of intelligence and knowledge sharing to successful policing, none of the police forces that took part, which included the NPIA, had an overarching knowledge management strategy. The study found that forces were facing major issues in encouraging knowledge sharing as a result of police culture, the sizes of forces and variable recognition of the value of knowledge management principles (Seba and Rowley, 2010).

5.5.2 Organisational Factors: Information Sharing, Leadership & Peer Influence

It is not surprising that one of the key theme's that emerged following the post-implementation review was information sharing. This related to sharing information with third-party agencies such as Social Services that often work with the police on domestic violence and child protection cases. In particular, the concerns raised were in relation to the depth and breadth of information sharing, and the risks in inadvertently sharing police information. Although the same intelligence handling criteria would still apply, police detectives in supervisory roles were concerned with *"dropping yourself in the sticky stuff and sharing information that you haven't got permission to do"*. Detective Constable, Public Protection. In order to overcome this, the MPS Intelligence Bureau devised a national pro-forma to assist decision-making, which detailed the processes and procedures for sharing police information with local and national partnerships. The guidance continues to exist, and is currently used by police forces and agencies. It has maintained standardised practices in sharing information with partner agencies.

- Multi-Agency Public Protection Arrangements (MAPPA)
- Multi-Agency Risk Assessment Conferences (MARAC)
- National Offender Management Service (NOMS)
- Youth Offending Team (YOT)
- Prolific and Other Priority Offenders (PPOs)
- Integrated Offender Management
- Dangerous Persons Database (VISOR)

In relation to national project leadership, forces were asked several questions about the support activities in place to prepare the organisation for delivery of the PND. The questions focused on the timing of the INI's decommissioning, and the subsequent setting up of the confidential environment for the PND. Some forces commented that the delivery of the PND was generally well coordinated by the NPIA; however, variations in leadership style also played a role in how well the PND was implemented in individual forces. At the time, forces were managing competing priorities, ranging from data reconciliation to preparing for business change. The following interview excerpt refers to the IMPACT programme and whether their national direction was sufficiently received by forces.

“To be honest with you, I'm torn between ‘good’ and ‘very good’. I will say ‘good’ because I don't want to overdo it. On the grounds that... to some things it doesn't matter how good or bad you were, it [the PND] was desperately needed. My big bugbear was, yes 43 forces and agencies could go away and do this, but we need centralised control and guidance standards, otherwise we will all do different things and we will get it wrong! So it's absolutely essential that we have central direction”. Force PND Project Manager

Lindsay, Jackson and Cooke (2011) found that management style was an important determinant in officers' acceptance of mobile technology, and King (2005) argues that it is important to conceptualise the hierarchical nature and cultural values of the police organisation, in terms of understanding the complexities surrounding technology acceptance. King (2005) also argues that hierarchical position determines to an extent, the perspectives and attitudes commonly shared by close peers. These hierarchies can provide insight on the distribution of power, formal structures and influence, and how decision-making and efforts are accounted for. According to Greenhalgh et al (2004) the defining theoretical base for the spread of innovation in public service organisations can vary in its success depending on whether the innovation will function in an unprogrammed operating environment, or in highly scientific and ordered surroundings. Based on this review's findings, the spread of the PND in the policing environment is arguably positioned in the middle of this spectrum. Furthermore, the findings from the review indicate that management style characteristics have to some degree, determined local approaches to assimilating the PND. Hence, it is important that multi-dimensional organisational learning on the PND takes place throughout the hierarchical structure of the police organisation, and which also address the cultural values that the PND inadvertently challenges.

Lin et al's [A](2002), empirical examination of user-acceptance for the COPLINK system in the Tucson Police Department in the USA, identified similar results to those found in the review process for the PND. Lin et al's [A](2002) study also identified probable areas that can hinder technology acceptance and use. Similar to the aims and objectives for the PND review, the foundations for conducting the study of COPLINK use and acceptance are based on developing effective implementation management strategies and organisational intervention mechanisms that could be applied in the planning of future IT projects in law enforcement environments Lin et al's [A](2002). Based on the unique characteristics of law enforcement settings, the COPLINK study resonates with the review's findings from several perspectives. First of all, peer influence was a common

feature in both Lin et al's [A](2002) study and in the review, which revealed how peers can influence one another based on their perceptions and experiences of the PND. This has shown to impact on PND users' attitudes and behaviours toward deciding whether to use the database. Manning (2008) asserts that the introduction of new technology can dramatically change routines and practices in police organisations, and as a result can create uncertainties about its applicable use and whether technology's features and functions are commensurable to the information needs of users. The functionality of R1D2 was mainly providing capability to search persons of interest, until the remaining POLE search entities were finalised by Logica. This level of capability affected users' perceptions of the database, and some questioned whether the PND at the time was entirely fit for purpose. The following comment encapsulates a widely shared sentiment in relation to the PND (R1D2) functionality delivered at the time of the review: *"I think it was sold as, here's your all singing and dancing technology, but it's like buying a brand new car and there's no engine in it"*. Detective Sergeant, Public Protection.

Research conducted by Bouwman and van de Wijngaert (2009) examined the role of information technology in relation to policing tasks. The study revealed similar findings to the review in the context of task-related characteristics. More specifically, the way information is retrieved and prioritised plays a prominent role in explaining people's attitudes in choosing to use a particular technology (Bouwman and van de Wijngaert, 2009). The review found that the PND was not being used for routine police enquiry, but only if there was intelligence suggesting activity at a regional or national level, or if the person(s) of interest was known to other police forces. From an intelligence point of view, it was a little surprising that a national information source was not routinely used. This was questioned in the review; participants emphasised three main reasons: their lack of confidence in deciphering information from the PND; the unspecified nature of the request; and working time constraints. Another key influence was that internal communications and marketing to promote the PND was minimised, so that expectations could be better managed (NPIA, 2012). Some indirect users commented on their lack of awareness of the PND, and whether an internal process for requesting PND checks existed. The following excerpt from an interview contextually explains this finding.

Q: What are your feelings about people's knowledge about when they can and can't ask for a PND check? A: I don't think it's very good. I mean, people send the checks in and they think it's just like doing a PNC check and they think you can give them their reply straight away. I don't think there's been enough communication about what PND can do and what

it actually entails, you know. I've had people phone up and say 'I've heard this PND is up and running, that sounds really good, could you do a check for me?' and you say 'Well, you have to fill in a form' and they say 'Oh, I didn't realise you had to fill in a form, oh, how long is it going to take?' PND/PNC Bureau Clerk

5.5.3 Implementation Factors: Business Processes, PND Guidance & Training

Attitudes and behaviours toward the use of the PND varied considerably during the review; PND guidance rules did not exist in all the forces visited. This could have impacted on the assimilation of the PND into normalised activity, particularly for departments that were not prolific users of the INI. Most forces expressed the desire for commonality in both working practices and business guidance for supporting use of the PND. However, during the review it was recognised that not all departments have the same expectations of the PND, and there are departments such as vetting units, which by the nature of their work, will use the database differently. Also, in terms of information sharing differences in working practices will make the boundaries of sharing information difficult in certain aspects of policing tasks and job roles. Attempts to change practices will be resisted sometimes, especially from those who may be adversely affected (Manning, 2008). The review found that resistance to change and cultural issues played a role in the adoption of the PND because of the vigorous demands placed on police forces to share information on an unprecedented scale. It may also influence how the PND will become internalised, which will be explored in the next chapter - 6.

The introduction of a new information technology can alter the connections between different departments in an organisation, and can disrupt the balance between well-established and interconnected sets of practices (Thomas, Sussman and Henderson, 2001). As discussed, it is important to acknowledge that attempts to change practices can be met with levels of resistance especially from those whose role and responsibilities were unexpectedly affected by change. This was a significant finding from the review, which highlighted the importance of communicating change to staff how their roles would be impacted on. Grant, Hackney and Edgar (2010) support the review's findings in terms of recognising that organisations implementing new IT assume a linear process in its implementation and adoption processes. However, organisations may be required to change their business practices to fit in with the use of the new technology, and as a result organisational change on the whole becomes

underestimated and difficult to manage. Organisations like the police service, may also struggle to fully exploit their new IT functionality, because the technology has not been entirely recognised as a socio-technical system that depends on people changing their working practices in order to do things differently. Grant, Hackney and Edgar (2010), also discuss the importance of organisations recognising that implementing large-scale IT projects are not just about technical projects but also organisational change projects, and effort and resources must be focussed on sharing practice-based learning, to encourage sustained use (Huber, 1990).

Sharing best practice and defining business guidance and policy for the PND, were reoccurring themes expressed by the majority of participants in the review process. This referred to the design of business rules to support the PND that were standardised throughout the organisation. To ensure common understanding of terms, a definition of working or social practice is the '*socially recognised forms of activity, done on the basis of what members learn from others, and capable of being done well or badly, correctly or incorrectly*' (Grant, Hackney and Edgar, 2010, p.42). Organisational working practices are essentially human activities that are mutually entangled with technological objects like the PND for instance. It is therefore, important that the boundaries of an IT system are set in accordance with the practices required to interpret the data output from the database for some purposeful end (Bocij et al, 2008). Understanding the essence of information was perceived as equally important as the technology used to store it, and a consequence of this, the PND may be used more frequently by some, than by others (Grant, Hackney and Edgar, 2010). Based on their information needs, information is interpreted by those that receive it in different ways and on their intentions of how to apply it. There is then a process of sense making, where this process is influenced by embedded routines and practices and taken for granted assumptions of the organisational context (Bocij et al, 2008). This is particularly reticent of the views expressed by administrative staff during the review, whereby these users suddenly become information handlers with little or no experience of how to make sense of the information they retrieved from the PND. Possible solutions to the cross-functional use of newly implemented IT is to encourage inter-departmental working and partnerships; this could enable efficient working relationships to be developed, the creation of innovative working practices and the sharing of knowledge, and expertise. Organisational environments are increasingly complex and dynamic, traditional bureaucratic organisations like the police service are not very effective in implementing

and sustaining change because they find it difficult to change rapidly (Beynon-Davies, 2009).

As a result of the findings from the PND post-implementation review, the NPIA produced a 'Force Readiness and Business Rules' document to support use of the PND nationally. It is a detailed document that includes the PND Code of Practice, the overarching Business Rules, and operational knowledge on Warning Markers, Risk Alerts and Flagging Notices, which prevent 'blue on blue' police scenarios. The reasons for creating the document were to also make explicit the legal and policy requirements that are to be consistently applied and referred to by the police organisation. It was also created to provide chief officers with confidence that other forces were appropriately using the information their force was providing to the PND. It was anticipated that the guidance would also support its widening deployment into other business areas because of the standardisation of PND business practices. Furthermore, in terms of supporting wider adoption of the PND, the review found that those forces, which formed local PND User Groups, had shown greater progress. Senior officers or staff predominantly chaired the user groups, and overall, these were considered instrumental in sharing best practice with other forces, and addressing local issues. (Hollingsworth and Lucas, 2011 and Lambri, 2012). The majority of users commented on the important role of PND super-users that were able to guide and reassure newly trained users. Both user-groups and super-users were regarded as contributory measures that could provide a force wide uniformed approach to usage standards and practices. Training was discussed on numerous occasions mainly from the perspective that the training database provided by the NPIA and Logica did not adequately represent the real database, and there were instances when, for technical reasons, the training database was unavailable to use for training purposes. The length of courses varied from force to force, however, it was mandatory that force trainers completed and passed the three-days course at the College of Policing. Accessibility issues with the 'IAM cards' frustrated new users, as was the delayed issuing of the cards following users' training. Most participants expressed a preference to having bespoke training relevant to their business department, this evidences the earlier point made about the variations of PND use depending on different information and business needs. The prerequisite e-learning modules that needed to be completed prior to the classroom based training was less favoured, most users preferred 'hands-on' learning to allow interaction with the

³ Information Access Management

database. The module topics that were covered during the classroom training included 'understanding data sources'; 'how to conduct POLE searches'; 'interpreting results from POLE'; 'printing and redaction'; and 'national business rules' (NPIA, [B](2011).

5.6 Post-Implementation: Critical Review Factors

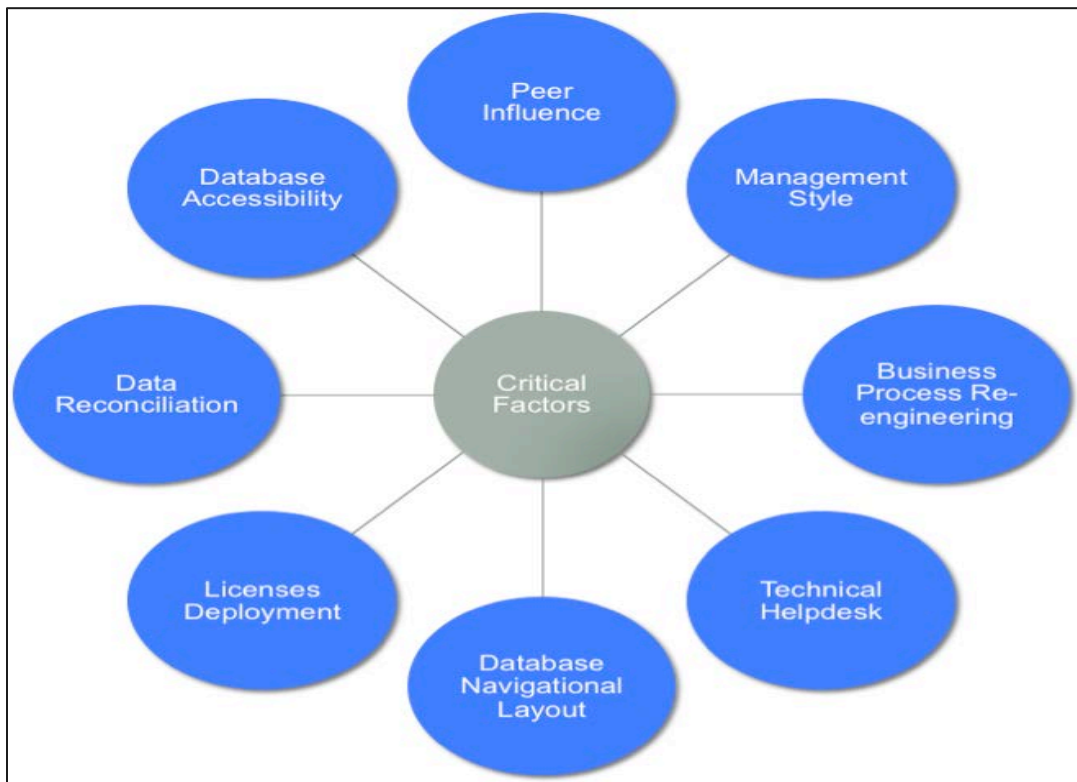
For illustration purposes, Figure 10 shows both the positive and negative factors that were identified during the PIR process. These factors were significantly regarded in developing a police system acceptance model for the organisation, and for critically learning key lessons and in sharing best practice. Figure 11 presents those critical factors that received both positive and negative views, and were therefore, identified as facilitating and inhibiting factors. It was apparent that in some aspects, the views of participants were similar, but in other instances participants' views differed greatly. These factors confirm that people generally see things differently depending on a number of influencing factors, environments and experiences. Therefore, the appropriateness of applying a case-study phenomenological design is relevant based on the philosophy's inherent emphasis on "*seeing things through the eyes of others*" (Denscombe. 2010). Moreover, it also emphasises the transformation of everyday participants' expressions into expressions that are appropriate to the scientific discourse supporting this research (Groenewald, 2004).

The promotion of success stories was a positive feature in the review, from the perspective that it encouraged recognition of the database's capability and value. The reporting of good news stories is currently one of the metrics in the IMPACT programme's benefits management strategy. Since the launch of the PND in June 2011 to December 2012, approximately sixty PND success stories have subsequently emerged. The majority of these stories relate to public protection, child protection and serious and organised crime. The PND demonstrated its invaluable contribution in generating risk assessments for missing persons, newly released prisoners; and for putting in place officer safety contingencies. Appendix 2 provides a detailed report produced for the Home Office as part of the national plan for the realisation of PND business benefits.

Figure 10: Post-Implementation Review Critical Factors - Positive & Negative



Figure 11: Post-Implementation Review Critical Factors - Facilitating & Inhibiting



5.6.1 Developing a Conceptual Model-PND Post-Implementation Review (1)

Research conducted by Colvin and Goh (2005), specifically studied the validation of TAM in a policing context. Their findings suggest that TAM constructs are influential in understanding adoption attitudes and behaviours of technology end-users in the police organisation. Following the analysis of data from the review, and using the original TAM model as a theoretical framework, Figures 12 and 13 are diagrammatic representations of the influencing features, which were identified as a result of the review. Figure 12 represents the semantic relationships identified following the analysis of data using Atlas.ti. Furthermore, these features have assisted in gaining an empirical understanding of the factors that have played a role in the implementation and adoption processes of the PND. The findings from the review indicated that the constructs from the original TAM model were relevant in relation to understanding the motivations toward PND use. PEOU was a significant concept that the majority of participants expressed as influential in determining their use of the PND, and for instilling users-confidence in the performance of the system. In the review, this was identified and described as 'Database Usability', and participants perceived this as an influencing factor. The TAM construct of PU was also significant for determining ongoing use of the PND. This is described as 'User Productivity', which essentially means how productive the system is in enabling users to search the system for task-related purposes (Lambri, 2012). The constructs of the original TAM were used to contextualise the findings, as it is notably one of the most parsimonious models on IT/IS adoption research (Bagozzi, 2007 and Venkatesh and Bala, 2008). Also, the legacy of TAM and its general shortcomings has been subjected to extensive critique, modification and theoretical validation, that it was considered both relevant and rational to refer to the TAM constructs as an initial paradigmatic framework. The conceptual relationships that emerged whilst exploring various operands in Atlas.ti support the findings and connections shown in Figure 13. For instance, the organisational factors identified as important to users are depicted in both charts as having an impact on users' attitudes and behaviours toward adopting the PND. Information sharing processes with partner agencies was discussed in detail with participants because of the uncertainties they felt in relation to how much to share with social services. Implementation factors are also significantly displayed in both charts. PND user-groups and super-users were regarded as instrumental in formalising local business processes to support PND use. This is inextricably linked to promoting the capability of the PND by sharing good news stories, and addressing issues from a strategic perspective. These factors were considered to be influential toward increasing

the receptiveness of forces and for encouraging acceptance of the PND. It is recognised from the review of literature that new variables and constructs are required to deepen our understanding of the technology adoption process, particularly bespoke models that can develop such unique insight into different organisational environments. For example, Lindsay et al (2011) developed a mobile technology acceptance model – m-TAM, for policing to account for a key shortfall in all three versions of the TAM, in that they focus on the user perspective and do not examine the broader organisational factors within the implementation and social contexts of mobile policing. In the context of this research, it has become clear that adoption of the PND is complex, whereby its use is contoured by the unpredictable and responsive demands of police work, and obscured by variations in traditional, symbolic, ‘tools of the trade’ and modern policing practices. This also supports the proposition that information technology in the narrow sense, is not the fundamental technology, or means of accomplishing work for policing, but rather it creates a channel to rationalise police work efficiently and effectively (Manning, 2008). Therefore, organisational investments in information technology cannot automatically yield improvements to business performance, because of variations in utilisation behaviours, the focus and nature of the task-technology fit, and the way in which new technology is integrated.

Figure 12: A Semantic Network Chart – PIR1 (Atlas.ti)

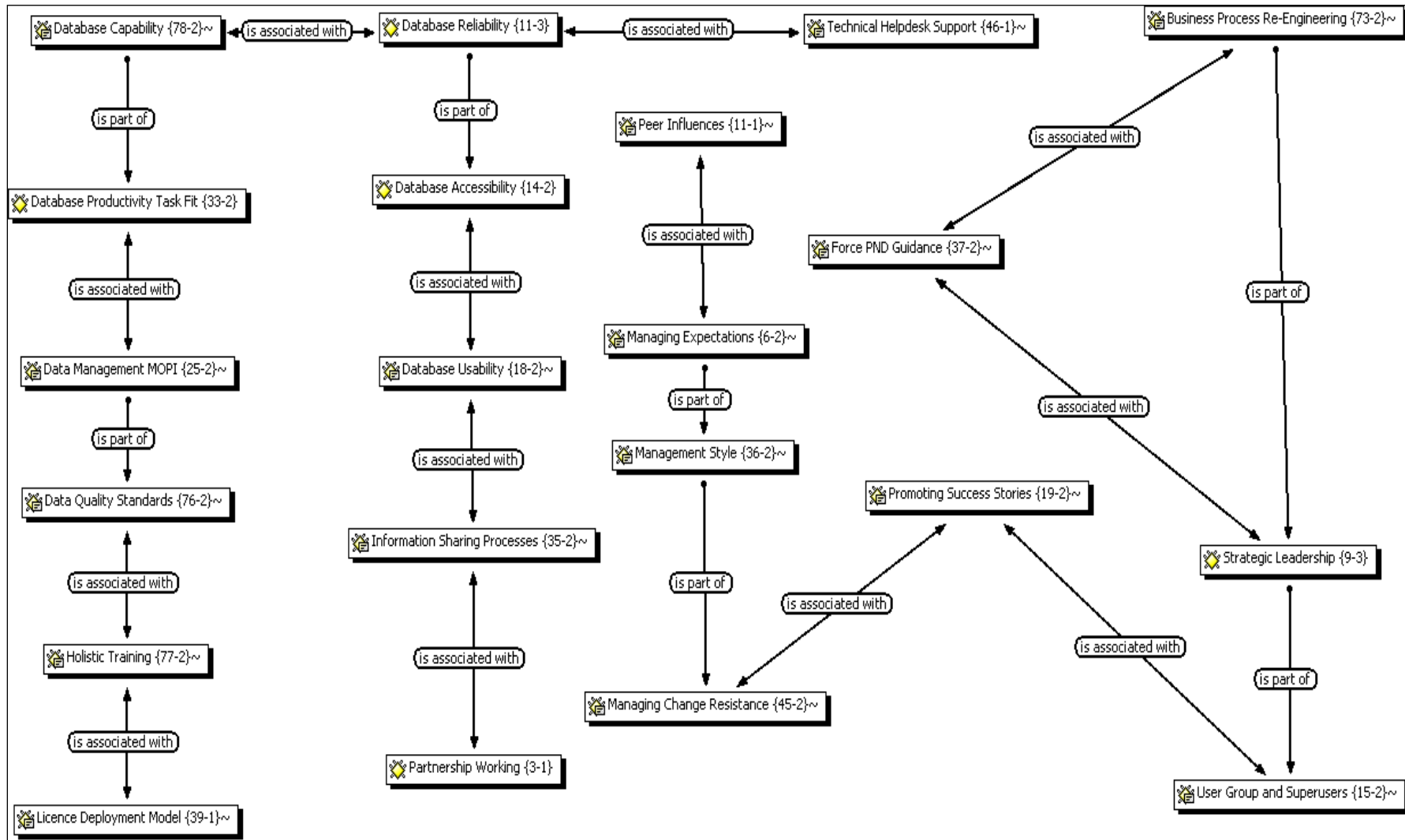
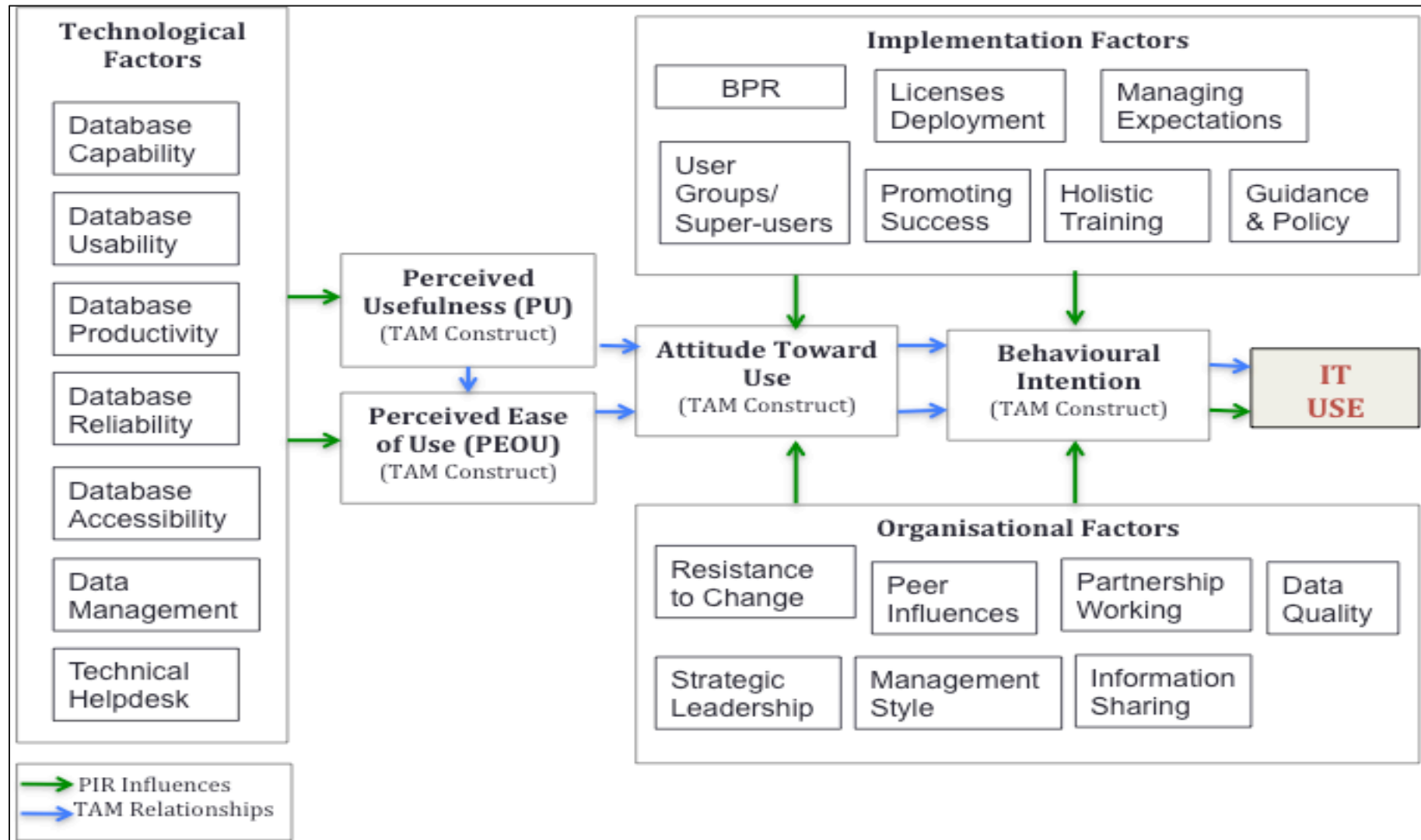


Figure 13: An Initial Conceptual Model - PIR1



5.7 Summary

There are numerous research papers and literature, which generally support the findings from this review process. For example, the constructs from the original TAM model have influenced the conceptualisation process for structuring the review's findings, which relate to database usability, and ease of use. The reviews findings indicate that there was variation in PND utilisation behaviours. The cross-functional use of the PND was also evident, and this was discussed because of the effect this could have on the continued adoption of the PND in different business areas. Furthermore, references to the complex organisational environment alluded to the intricate tasks that are pivotal to managing the ongoing assimilation of the database. The setting-up of local user groups in forces, did not only facilitate the sharing of best practice and the learning of key lessons, but also encouraged the unification of PND users to actively address common issues and to promote the PND. The theoretical perspectives used to describe the findings have included organisational change theory, knowledge management, information systems analysis and the diffusion of innovations, – discussed within the context of UK policing.

The next chapter – 6, will present the results from the second PND (Release 2 - Drop 1) post-implementation review, which explores the final integration stage of the PND, sixteen months following its launch. The review's findings are discussed in a practical and contextual view with a number of recommendations provided, for which to either remedy or improve specific service and project delivery functions. One of the recommendations directed to the IMPACT programme and the NUG was the creation of a 'restricted' version of the PND for frontline police officers. This will soon be made available nationally in 2014.

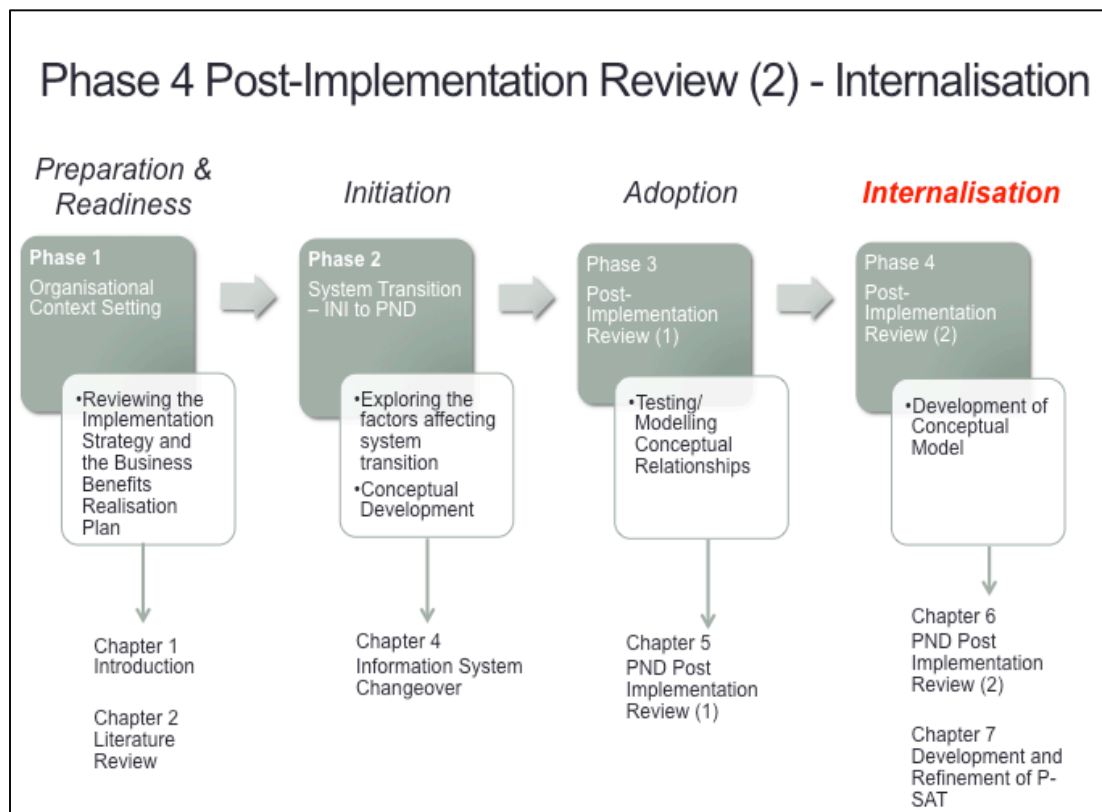
CHAPTER 6

PND POST-IMPLEMENTATION REVIEW (2): INTERNALISATION

6.1 Introduction

This chapter will discuss the results from the PND Release 2 - Drop 1 (R2D1) post-implementation review that was conducted for a period of four weeks in September 2012. Figure 14 shows the current position of the data collection process – phase 4. The aim of the review was to critically assess the utilisation and internalisation of the PND across business areas in the police organisation. The findings from this phase enabled a critical analysis of the factors that contribute toward technology adoption success, and that supported the IMPACT programme in addressing local issues and barriers. The review also provided invaluable insight into how forces were managing business change and integrating the PND into routine practices.

Figure 14: Phase 4 - Data Collection



The overarching approach involved organising and facilitating three focus groups: in the Eastern region, in the East Midlands region and in the London region. These regions were chosen because a), the metropolitan police did not participate in the first post-implementation review, b), only one force in the East Midlands region participated in the first review, and c) the Eastern region voluntarily chose to take part. Prior to the focus groups taking place, a post-implementation review plan was produced, which outlined the logistical process (see Author Publications - Appendix 1). In consultation with the Home Office, the plan urged for participant representation from the 'intelligence community', in order to identify the strategic business benefits in line with the PND Benefits Realisation Framework. It was considered highly important by the IMPACT programme that insight into how the PND was being used for intelligence gathering purposes was captured. The plan also discussed the main findings from the first post-implementation review, and detailed the subsequent activity that has taken place to overcome the issues identified. Members of the IMPACT programme including respective regional coordinators, attended the focus groups; in total twelve police forces were represented, and sixty individuals participated from the following forces:

6.2 Research Sample

1. Eastern Region: Bedfordshire, Cambridgeshire, Essex, Hertfordshire, Norfolk and Suffolk (20 participants)
2. East Midlands Region: Derbyshire, Leicestershire, Lincolnshire, Northamptonshire and Nottinghamshire (20 participants)
3. London Region: Metropolitan Police Service – MPS (20 participants)

Participating Directorates:

- Public Protection
- Vetting & Firearms Licensing
- Local & Regional Intelligence
- Counter Terrorism
- VIP & Royal Protection
- Serious & Organised Crime
- Major & Violent Crime

In order to prepare participants for the focus groups, the review plan also included the key areas for discussion and the questions that will be addressed. The questions were designed in collaboration with personnel from the IMPACT programme, and focused on the topics that were identified following the first post-implementation review. For the purposes of this research, it was crucial that the data collection process coincided with the programme's incremental delivery of the PND. This was critical to developing an in-depth and longitudinal understanding of the PND's journey - from its inception through to its integration into a business environment. It was also pertinent to use this as an opportunity to explore the validity of the initial conceptual toolkit that was developed following the first post-implementation review for R1D2 (Chapter 5 - phase 3 data collection). The main crux for conducting the focus groups was to address important questions, such as, what are the influencing factors that have impacted on the adoption and integration of the PND? What are the dynamics of interaction or the relationship between new technology and managing organisational change? Does the deployment and use of the system i.e. voluntary or mandatory use, affect levels of change management processes required? Does the PND mandate new or altered business rules or guidance for how the police organisation shares, manages and acquires out of force information? The questions below were addressed during the focus groups, and the discussions that took place were recorded using a Dictaphone. The recordings were subsequently transcribed for data analysis purposes.

6.2.1 Focus Groups Questions

The questions were designed to address the common themes that emerged during the research process. A review of the literature also contributed to this, and revealed other relevant factors to explore, in context with the implementation and adoption of the PND. The questions were categorised to represent particular aspects of the PND project; this supported the structuring and analysis of participants' responses. Prior to conducting the focus groups, the questions were shared with the IMPACT team for their ratification.

Technological Factors

1. What are your views in relation to the **system's usability** such as the ease and speed of searching and retrieving information?
2. What are your views in relation to the **system's capability** in terms of its features and functionality (such as the filtering of results, ability to cut and paste output into other software etc.)?

3. What are your views in relation to the **quality of data** held on the PND?
4. Do you think that your force has appropriately **deployed its PND Licenses** to ensure that the **system's potential is fully utilised?** I.e. is it in the appropriate business area, and is the PND **accessible** in your unit?

Implementation Process Factors

5. What do you think were or perhaps still are, the **main stumbling blocks** or challenges in the implementation of the PND?
6. What are your views in relation to the extent of specific **business rules and guidance** in your force/unit to support use of the PND?
7. To what extent has your force **PND User Group** and **Super-users** assisted in raising awareness and acceptance of the PND?

Organisational and People Factors

8. Do you think that forces have a strategy for **managing the necessary process and cultural change** in the organisation?
9. Do you think that the PND has assisted in breaking down **cultural barriers** with regards to **sharing information** and **collaborative working?**
10. What are your **overall perceptions** of the PND and how influential are colleagues in sharing their own experiences of the PND?
11. Has the PND become **adopted** as a system that is **routinely** used in your force/unit?

6.3 Theoretical Considerations in Adopting Innovations

Heracleous and Hendry's (2000) research on the discourse and study of organisations from a structural perspective, highlight the nature and influence of human relations in technological development and use, and emphasise the critical role of humans in shaping (whether deliberately or inadvertently) how technology is used in organisations. While this work acknowledges the importance of technology's material properties, analyses of such properties remain underdeveloped. In addition, empirical studies have focused on micro level interactions within specific organisations, largely ignoring the broader institutional influences – for example industrial, economic, political, global factors - that significantly shape the role and influence of technology amidst during organisational change (Seddon, 1997). The diffusion of innovation theory suggests that individuals are seen as possessing different degrees of willingness to adopt

innovations and therefore, it is generally observed that the portion of an organisation's population adopting an innovation is approximately normally distributed over time. Seddon (1997) argues that the infusion of new technology is an important antecedent to the adoption of innovations.

Perspectives from workplace studies, computer supported cooperative work (CSCW), and distributed cognition, have generated detailed knowledge about how technologies ranging from complex systems through to mundane tools, feature in the practical accomplishment of organisational activities (Schmidt and Bannon, 1992). Generating rich data about the micro and macro practices of technology interaction, has informed the design and development of new technologies. CSCW focuses on how interactions among people, as well as those between people and artefacts, dynamically coordinate the transformation of knowledge through mental, social and technological representational states (Schmidt and Bannon, 1992). These theories offer detailed, up-close and in situ examinations of how knowledgeable practical action is accomplished through engagement with organisational activities and information technology. However, these advantages are also limiting, as they preclude focus on larger institutional contexts within which the interactions are situated. Many of these studies consequently fail to consider, and thus underestimate the broader social and political dynamics that are produced and changed through recurrent technology interactions. Orlikowski and Robey (1991) describe both the subjective and objective treatments of information technology by exploring the interaction of organisations with new systems. In information systems research, the subjectivist approach is based on a 'social action' perspective, which assumes that social interpretations of information technology can enact various consequences that are not governed by cause and effect relationships. The objectivist approach to technology in information systems research, is regarded as more popular than subjectivist perspectives, and presumes that technology is an object capable of having an impact on social systems. Such research treats both technology and organisational structures as objects, and ignores the social interpretations and actions that may modify the impact of particular systems (Orlikowski and Robey, 1991).

Instead of attempting to argue which approach is best or more suitable for describing the phenomenon of information technology usage in organisations, it is reasonable to suggest that the integration of these perspectives would develop a theory that encompasses social action, interpretation and social structure as equally significant. Giddens (1976, p.118-119) describes this theoretical integration as the "*duality of structure*", which refers to the structure and "*institutional properties*" of social systems,

as created by human action, which then serve to shape future human action. This means that on the one hand human action can establish the institutional properties and mechanisms of social systems in an organisation, whilst on the other hand, social systems can be established by existing organisational properties (Giddens, 1976). So far, the findings from the research suggest that the PND has undoubtedly challenged existing business processes, as well as cultural values and sentiments that may have not been recognised as influential in the adoption of the database. Using perspectives from structuration theory, the human actions of users are determining to some extent, when and how the PND is used, whereas from the organisation's perspective, the focus has been on encouraging greater and wider use of the PND by the creation of business rules to support its integration. Based on these emerging insights, the need for an integrationist approach in information systems research is evident.

6.4 Analytical Technique and Process

Analysis of the data was carried out using Atlas.ti. Using the same principles and analytical approach for all phases of analysis, data was segmented and structured into thematic categories as they emerged during progressive focusing. Atlas.ti is a powerful workbench for the qualitative analysis of large datasets, and provides a variety of tools for accomplishing tasks using a systematic approach to managing unstructured data (Atlas.ti 6, 2011). The software has the ability to uncover phenomena that may not be formally identified using statistical approaches, and neither could statistical software packages creatively allude to the meaningful conceptual associations that this research principally explores. A related term to understanding the outputs of Atlas.ti would be 'knowledge management', which emphasises the transformation of data into captured knowledge. The main principles of the Atlas.ti philosophy are encapsulated by the acronym VISE, which stands for Visualisation, Integration, Serendipity, and Exploration (Atlas.ti, 2011). The **visualisation** component of the programme means it directly supports the way humans think, plan, and approach solutions in creative, yet systematic ways. Another fundamental design aspect of the software is to **integrate** all pieces that comprise a project, in order not to lose sight of the whole when going into detail. The term **serendipity** can be equated with the intuitive approach to data management. A typical operation relying on the serendipity effect is "browsing". This information-seeking method is a genuine human activity. The process of **exploration** is closely related to the above principles. Through an exploratory, yet systematic approach to data analysis, it is assumed that especially constructive activities like theory building will be

of great benefit. The entire programme's concept, including the process of getting acquainted with its particular idiosyncrasies, is particularly conducive to an exploratory and discovery-oriented approach.

6.5 Phase 4 – Post-Implementation Review (2) Findings

The findings from the review are discussed by category; these categories represent the thematic issues that emerged following the collection and analysis of data. Table 6.2 presents the conceptual features and categories identified.

Table 4: Identified Categories (4) and Features (24)

PND Capability	Managing Information	PND Deployment	Business Benefits
Match Groups – Unreliable	Data Quality – Duplicated Records	Regarded as a Useful Research Tool	Access to Centralised Data Source
Wild Card Searching – Unreliable	Data Currency Issues	User-Groups and Super-Users	Time-Consuming for Rigorous Searching
POLE – Consolidated Searching Requirement	Comprehending other Forces Data Records – Provenance	Limited Use in Serious & Organised Crime and Major & Violent Crime Units	Good News Stories Increase Users Confidence
Incorrect Records Returned compared to Navigational Bar	Information Overload Issues	Communication of PND Business Processes	Time-Reducing for Vetting Units to Undertake Force Checks
Cumbersome Interface/Usability Difficulties	Information Records Decipherment Skills	Promotion of PND Capability	Supports Production of Risk Assessments
Printing – Arduous Process for Multiple Prints.	Disseminating Information – No Copy/Paste facility	Confidential Environment Set-Up Potential Barrier	Supports Production of NIM Analytical Products

6.5.1 PND Capability

Users were generally satisfied with the performance capability of the PND, in terms of the efficiency of the database in returning complete searches. However, certain features and functionality of the PND were affecting users confidence, and some questioned the reliability of the database. For example, the 'Match Groups' feature was not performing as stated in the 'PND Manual of Guidance', and data records returned by the PND were not correlating with the search criteria entered. Although, Logica was addressing this as a matter of urgency, the impact on users was a concern from the perspective that the PND was returning inaccurate results. The concept of 'Match Groups' is based on using an algorithm and sound phonetics, to determine whether the records returned by the PND indicate that it is likely to be the same person linked to various records (College of Policing, 2012). This is to assist users in identifying whether a person of interest uses alias names or different dates of birth, for example. Hence, it is clearly important that the PND must be capable of performing this functionality, with the highest degree of accuracy possible. Another feature that was under scrutiny was 'Wild Card' searching, which undertakes a search on fields with missing or partial information. This is particularly beneficial to searching telephone numbers and vehicle registration numbers. This functionality is highly useful to policing and investigation tasks, and requires a certain level of accuracy if results are to be relied upon. Logica were to urgently address this issue.

The POLE searching capability, which allows users to search Persons, Objects, Locations and Events, was questioned in terms of users wanting to be able to conduct multiple searches on POLE fields simultaneously. This meant that users wanted to perform searches concurrently, for example, searching for persons and objects at the same time, without having to conduct two or more searches on individual POLE entities. This was an issue that led to a discussion on the intuitiveness of the PND, and its ability to perform both effectively and efficiently. Although, action was deemed as necessary by the IMPACT programme to remedy this, this issue currently remains unchanged. The majority of users that participated in the focus groups expressed dissatisfaction of the PND's navigational layout, in particular, how search results were displayed. Most users favoured a 'golden nominal' approach, which is common to most national IT systems in the police organisation. The following interview excerpts validate this key point, with reference to extracting data using the POLE structure:

“The POLE concept and consolidated view is clear and allows you to quickly evaluate the amount of information held on that record. However, there may be several nominal records. This would be greatly improved if either one nominal record was displayed from each force, which in turn contained all their information or as is on PNC there is one nominal record, which contains all force data. Researching the system would be done quicker if the information appeared in chronological order too.” Police Constable - Domestic Abuse.

“I don’t like the way it navigates – not very user-friendly in respect of the POLE structure. I think the POLE layout is clunky and time-consuming, and not what we are use to. Plus, it’s frustrating because there’s so many routes to go down and it becomes such a long process.” Police Sergeant – Public Protection.

However, because the PND is unprecedented in its configuration, and in terms of the depth and breadth of data it contains, this was considered a training issue for users, and simply a matter of getting use of the database’s layout over time. Printing multiple data records from the PND was considered an arduous and repetitive process. Most users preferred the availability of a ‘print basket’ similar to that of Microsoft Office, which collates documents for printing. The PND requires that the printing of data records be done individually, which again, questions the efficiency of the database in meeting users’ needs.

6.5.2 Managing Information

Data quality, the duplication of records and the currency of data were considered to be important factors that were influential in the adoption of the PND. This echoed the views of users throughout the data collection process. The reliance on forces to maintain and upload up to date data onto the PND, was paramount to both direct and indirect users. Users were also finding it difficult to comprehend individual forces record formats and their various uses of non-standardised acronyms, which were also causing some confusion for operators in administrative roles. Comments made by an intelligence manager raises a further issue in relation to staff effectiveness and efficiency and the poor quality of data records shared by some forces.

“The quality of data and information gaps varies greatly between forces. Those records which are poor quality, or contain little or incomplete information generate additional

work for our researchers who are having to verify records via the respective force PND contact". Its also a cause for concern if forces don't regularly refresh their data, this is potentially a barrier for not using the PND that we all need to be mindful of". Intelligence Manager.

However, users in intelligence roles appeared to overcome this issue, probably due to experience of managing information on a consistent basis. As stated in chapter 5, the setting up of a 'Data Improvement Group', is intended to begin to resolve some of the data quality issues. However, forces have a responsibility to ensure their data is compliant with the Data Protection Act 1998, and that they also adhere to the principles of MoPI. The following excerpt highlights the important link between MoPI and data quality.

"MoPI needs to be applied more rigorously by all forces prior to submitting data for the PND. This will assist in alleviating data duplications, data currency and data provenance". Detective Chief Inspector, Professional Standards Department.

Information overload was regarded as a critical issue for most users that were previously unaccustomed to managing and deciphering large volumes of information. Users described this a *"time-consuming data trawling process"*, which to some extent was underestimated by their line managers and indirect users that requested PND checks. In order to overcome this, the IMPACT programme suggested that forces must not only promote the capability of the PND, but should also widely communicate the internal process for requesting PND checks, and the time required to perform intricate searches. The final issue that related to managing information was in relation to the dissemination of data, whereby some forces were still unable to copy and paste from the PND. This was mainly because of the confidential network environment created to securely store the PND. However, direct users and indirect users considered the interoperability of the PND as vitally important, particularly when the technology was newly created to support 21st century modern policing. It is anticipated that this problem will be overcome in the next maintenance release for the PND.

6.5.3 PND Deployment

Users regarded the PND as a useful research tool, however, those in management positions thought that the PND would be unable to support live operations in a critical

policing environment. This was because the database was considered to be “*still under construction*”, and since many forces were lagging behind in regularly uploading and refreshing their data, as well as the ongoing issue of data quality; the PND was deemed operationally unreliable during this time. On a positive note, it became apparent as a participant observer that the PND was gradually being deployed more widely in the organisation, for example in force intelligence bureau, counter terrorism units, firearms licensing and royal protection. However, at street level, it was suggested that officers needed further awareness and knowledge of the PND.

“Almost every unit which involves risk assessing individuals or developing intelligence has access to the PND. There are constant media releases in force to remind officers of the use of the PND and which departments to have the capability. I believe PND searches are accessible to all police officers and police staff but I think there remains a lack of understanding of how the PND can assist officers on the street”. Force PND Project Manager and Business Lead.

Of particular interest from a technology adoption point of view, was to explore ways of maximising the potential of the PND, by deploying PND licenses to suitable users, and in appropriate business areas. It was also important to ascertain if the PND was easily accessible to staff in forces, and whether they were aware of how to request a PND check internally. Most forces did have standard operating procedures in place to support use of the PND, and based on the number of PND licenses purchased, this informed how licenses were shared in forces. However, in the MPS, non-standard services (NSS), which carry out protective security operations, expressed concern that they did not have enough PND licenses to support their business demands. Another concern was in relation to NSS users preferring not to use the PND because of fears that non-NSS staff would be able to identify highly sensitive searches being undertaken by NSS users. The following except evidences this issue.

“There are not enough NSS licenses and this has become a barrier for us. Plus more people need to be trained and allocated licenses. Others in NSS have stopped using the PND altogether because of the likely footprint-this is a major no-no!” Counter Terrorism Detective Constable.

The MPS was in the process of addressing these concerns, and was also conducting a force review to identify prolific PND users, and those that hardly used the database. Such reviews were also being conducted in the Eastern region and in the East Midlands forces. This was to ensure that licenses were appropriately allocated.

All forces in the East Midlands had created force user groups; in the Eastern region, four out of six forces had set up user groups and in London, the MPS were in the process of doing so. The significance of user groups from a research perspective is based on the understanding that they encourage greater awareness and adoptive behaviour because of the union it provides for users to express common concerns and also to share success stories that have emerged as a result of the PND. User-groups have also been instrumental in formalising internal business guidance and practices to support use of the PND, which was also influenced by the leadership and accountability structures that these forums have evidently provided. A recurring theme throughout this research process has been in relation to the marketing and communication of the PND. The majority of forces that participated in the focus groups commented on the need to re-promote the PND, in particular the challenges it has evoked in re-engineering business processes, and clashes with established cultural values. This was particularly aimed at raising the awareness of senior police officers and staff management. Naturally, a top-down approach was favoured as being more influential in streamlining business processes, based on the principles of police hierarchy, authority and leadership. However, some forces decided to focus less on communication, and more on managing the physical practicalities of implementing the PND.

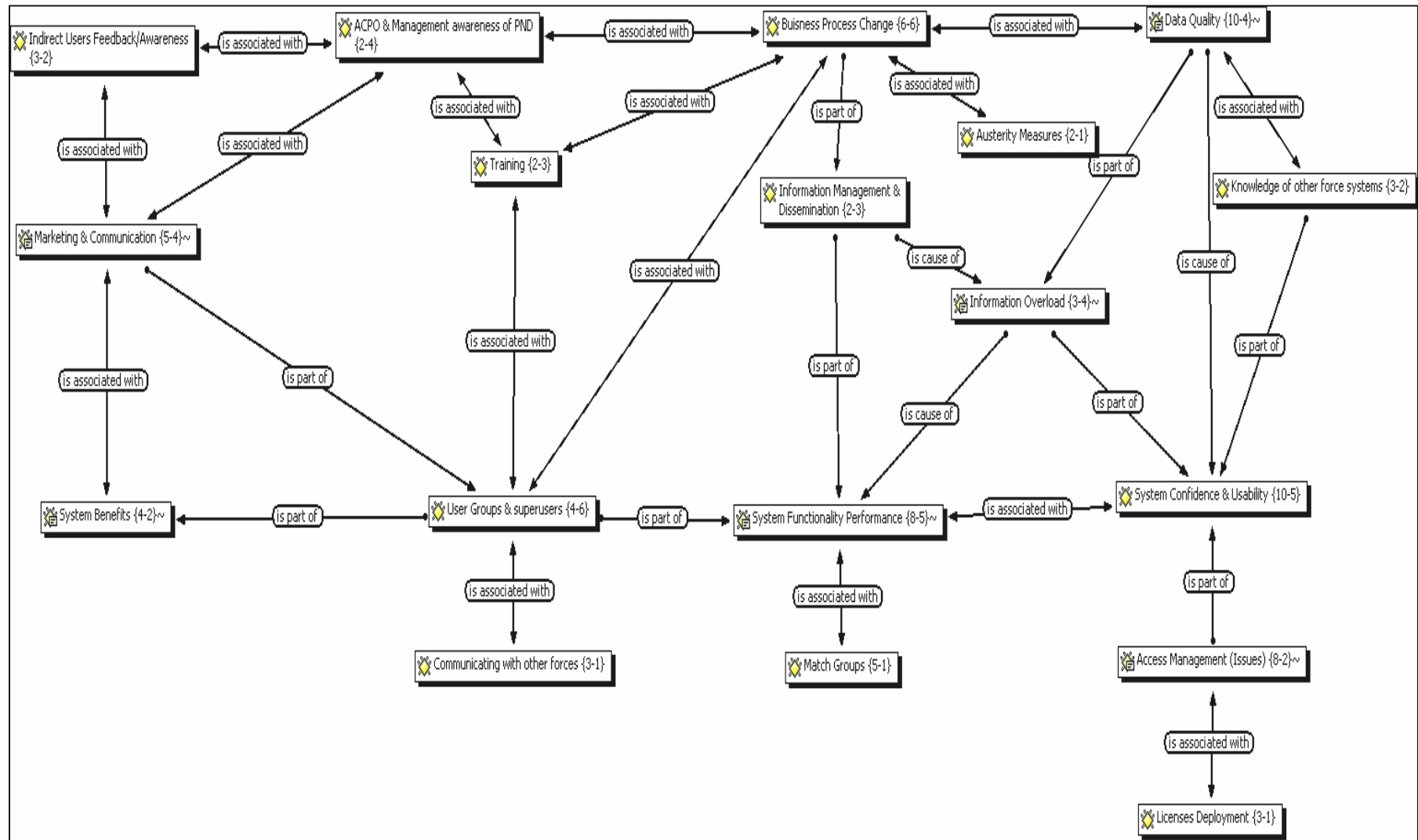
“We appear to have concentrated our resources on enabling physical access to the PND, and providing data from our force systems, therefore we have probably not spent sufficient resources on marketing the PND and preparing for business change. However, in hindsight, with the system having issues and other delays affecting roll-out, it would not have been suitable to extend communication and making promises that we may have not been able to keep’. Force PND Project Manager and Business Lead.

6.5.4 Phase 4 – Atlas.ti – A Network View

In the form of a network diagram, Figure 15 was produced using Atlas.ti to demonstrate the identified conceptual relationships and interconnected themes. Atlas.ti was invaluable in intuitively managing the identification of recurring concepts and in highlighting prominent data characteristics. The diagram assisted in ascertaining the factors, which conceptually overlap and that are therefore, mutually influential. An example of this is in relation to the confidential environment that was created specifically for the PND. Users' generally perceived this as a barrier toward its use, because of the various mandatory processes that needed to be overcome. This was a common issue expressed by several participants. Participants also discussed other barriers to the confidential infrastructure, in terms of disseminating information obtained from the PND, and the difficulties this presented. The diagram assists in understanding cause and effect relationships, such as users experiencing information overload due to the volume of data stored on the PND. The effect of this is shown to impact on users' perceptions of the system, in terms of its usability and capability. Managing business change is evidently associated with maintaining management awareness oversight, and highlights one of the main findings of this research, which relates to the strategic ownership of projects that are heavily underpinned by organisational change. From an external point of view, austerity measures were also associated to business change; this was in the context of budget constraints and managing resources to support both the implementation and adoption processes for the PND. Austerity measures were considered by middle managers to be a contributing factor in understanding an organisation's readiness and receptiveness to adopt new technology, this may be due to staff being re-deployed to other roles, a lack of financial resourcing or line managers choosing to use their staff to perform other duties.

The diagram shows several connections associated to force user-groups and super-users. Throughout this research, it was recognised that these positively influence levels of PND adoption, by facilitating communication, sharing best practice and standardising force processes. In several forces, user groups were used as forums to organise training for force-users, and have been instrumental in the collation of PND success stories to support the realisation of business benefits.

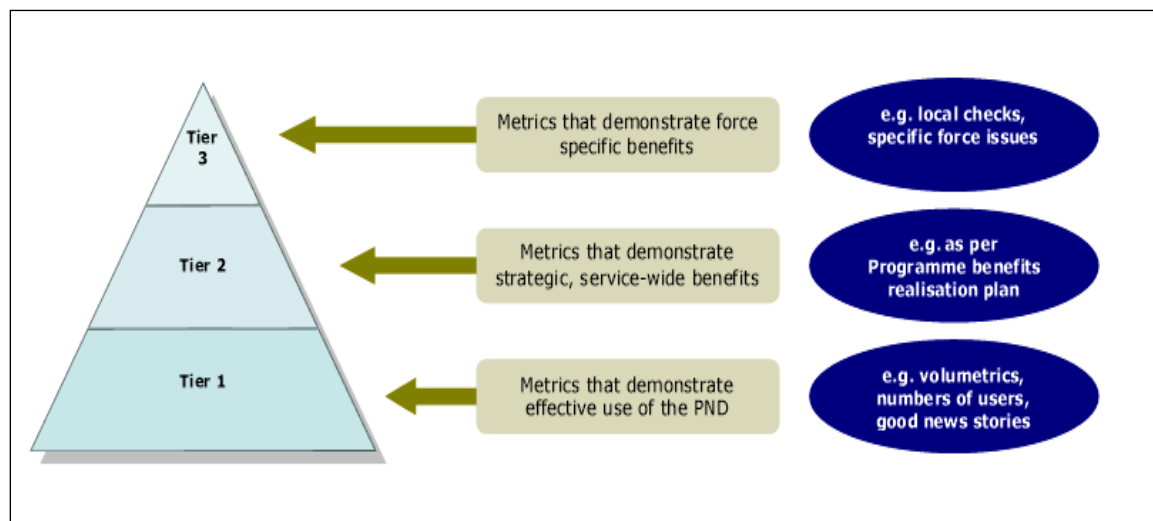
Figure 15: A Semantic Network Chart - PIR2 (Atlas.ti)



6.6 Business Benefits – Good News Stories

During the focus groups, the IMPACT programme actively encouraged forces to share good news stories that have emerged as a result of using the PND. This was mainly for the purpose of sharing positive messages about the database's capability, and to demonstrate tangibly how the PND is making a impact. The reporting of good news stories is a metric in Tier 1 of the IMPACT programme's benefits management approach as shown in Figure 16. Additionally, Tier 2 metrics also include the collation of good news stories, as well as post-implementation reviews, which is part of the wider organisational benefits realisation strategy created by the NPIA.

Figure 16: IMPACT Programme's Tiered Approach to Benefits Measurement



Source: NPIA, 2010.

There were several good news stories in relation to child protection that emerged. For example the PND was instrumental in accelerating progress for a joint investigation with the police and CEOP. As a result of identifying a historical crime report from the PND, CEOP were able to reassess the priority of the investigation. Subsequently, the risk assessment was revisited, and following consultation with Social Services, immediate action was taken toward protecting the child. Further good news stories in the child protection area evidenced the efficiency of the PND in gathering intelligence, without the delays inherent to the INI system. The excerpt provided, is another example of a potential child abuse investigation that was expeditiously resolved as a result of finding previously unknown information on the PND held in other forces.

“As a result (of using the PND), the investigation was quickly dealt with. In the past, even with the use of INI, the delay between a request for information and the response could have put the child at greater risk. In comparison the PND makes relevant information immediately accessible to officers and staff.” Detective Constable, Child Abuse Intelligence Unit.

In police vetting units, the use of the PND differs from its wider utilisation in the police organisation. In general, the PND is used as a useful source of information that could potentially enhance investigative leads and intelligence development opportunities. The primary purpose of conducting a PND check in vetting is to establish whether an individual, has been of interest to the police. Usually, these security checks take place in the context of staff recruitment. The good news stories that emerged demonstrated the capability of the PND, in bringing to attention pertinent information about people wishing to work with vulnerable adults or children. The excerpt given, demonstrates how the PND prevented the recruitment of potentially dangerous individuals, and has also highlighted the importance of sharing information across the police organisation. This good news story relates to an application for the role of a PCSO working in the police service and in partnership with local schools.

“A PND check on the individual revealed a trace in another force, where this individual had been subject of investigation into allegations of sexual assault and had received a caution for gross indecency. Although this matter was historic it was considered particularly pertinent to the nature of the post/role applied for.” Vetting Manager – Force Vetting Unit.

Contrary to this, information sharing was perceived by some participants as a communication barrier between forces and negated collaborative working to some extent. The following excerpt from an analyst clarifies the point:

“Cannot relay on phone-calls anymore as people don’t assist you. They say, “Have you looked on the PND first?” before they offer to help. Communicating with local forces has reduced because of the PND. People are daring to share and it is gradually being recognised that it is better to share than to not.” Senior Analyst, Major Crime Unit

Although it was suggested that the use of the PND was limited in the serious and organised crime business group, several good news stories have emerged. They have

evidenced how the PND facilitated cross-border operations with other forces investigating organised crime networks. An example provided by an urban force, relates to an ongoing operation, which led to the arrest of an individual in possession of Class A drugs. Call data obtained from the PND was analysed, which identified an associate with previous convictions for drugs trafficking. This was previously unknown to the investigation, along with vehicle details. The 'Object' searching option also assisted in identifying previous and current telephone numbers of individuals that were also relevant to the investigation. One of the forces involved in the cross-border operation commented on the benefit of being able to obtain "*a rich intelligence picture*" efficiently, without the delay of obtaining an authorised RIPA consent that would have been required in this instance.

6.7 Theoretical and Contextual Considerations

Adopting a new kind of information technology can be described as a learning process, which is underpinned by social dimensions. Perceiving the police organisation as a knowledge system, with its unique set of knowledge processes and structures, assists in developing an understanding of the connection that exists between organisational learning and information technology. Pentland (1995) argues that at each stage of a technology's implementation a specific set of learning requirements are evoked that must be achieved in order to adapt, and allow scope for the following learning criteria to be met. In the context of the implementation of the PND, changes to individual skills, cognitions and expectations, as well as changes to formal processes and roles have occurred in parallel to technical preparations and data reconciliation activities. Managing business change was also a key feature during this process; however, the impact of the PND on challenging cultural norms may have been slightly underestimated from an organisational learning perspective. This view is based on the preliminary findings of this research, and from literature, which explores both traditional and more recent approaches to organisational learning practices. Pentland (1995) and Gottschalk (2006) suggest that organisations like the police need to perceive themselves as a social knowledge system, with emphasis on the socially constructed nature of knowledge that is embedded in social and cultural paradigms, and influenced by politics and power struggles. However, the heterogeneity of police organisational culture makes it difficult to assign a single criterion for all individuals (Attewell, 1992 and Shanahan, 2000). In a complex organisation such as the police, learning to adopt new technology will vary from different groups of users, depending on their role and epistemic criteria. Thus, the

complexities involved may be treated conceptually as a collection of overlapping knowledge systems and processes, which are critically shaped by the introduction of information technology (Shanahan, 2000). Attewell (1992, p.6) argues, *“the organisation learns only insofar as individual skills and insights become embodied in organisational routines and practices”*. When participants were asked whether the PND had assisted in collaborative working and cultural change, this excerpt frames the underlying ethos of the PND in terms of challenging cultural attitudes.

“I don’t know if the PND has been breaking down cultural barriers but I think it does make me think of the police as a whole body rather than lots of individual forces. It makes me feel that we share a common purpose to fight crime and protect; which sounds like a line from a Batman movie!” Force PND Trainer.

In line with the philosophical principles of this research, Holzer and Marx (1979), refer to phenomenological traditions in their analysis of the sociology of knowledge. Their framework seems particularly appropriate to the analysis of organisational knowledge and learning, because it focuses on pragmatic knowledge that is intended to achieve a certain result. Holzer and Marx (1979), identify a set of five ‘knowledge processes’, which are essential components to any effective learning process in a social collectivity, these are: *“construction, organisation, storage, distribution and application”* (p.91-2). Huber’s (1991) organisational learning framework, uses four constructs, which are integrally linked to improving responsiveness to organisational learning such as technology change and adoption; these are: knowledge acquisition, information distribution, information interpretation and organisational memory. In terms of both of these typologies, their common denominator refers to an organisation’s ability to recognise that information technology cannot perform the role and tasks of individuals, because of the socially interpretive framework that interacts in some way with technology. Each knowledge process entails, by necessity, some degree of social influence, even if only through the use of language. From a criminological perspective, Campbell (2004, p.695) posits that interest in *“textual-discursive”* forms of police practice encourages a critical discourse analysis of police narratives, which influence the way in which the police view and treat the *“risk society”*. What this means is that the police are predominantly risk-managers, in that they are especially responsible for understanding and communicating assessed risks that are present in society. The use of

technologies and systems are a key part of the risk management process, and the onus is on police officers and staff to interpret and respond to these perceived risks.

The link between conceptualising the police as a learning organisation in its ability to adapt to new technology, is based on critical access to information about dangerous places and suspect populations, so that they sustain a pivotal role in ensuring that risks are visible to society, and can remain informed to be able to effectively respond. The findings from this post-implementation review were indicative of the organisational learning processes that were occurring simultaneously with the implementation of the PND. It became apparent that although the PND was delivered and was being used by forces, users continued to face challenges that were mainly associated with the organisation's ability to adapt to new ways of working. The inherent values of the PND were still unfamiliar to some users and stakeholders, and due to the magnitude of change the PND evoked; resistance to fully adopting the database was evident. On several occasions users inferred that as a general rule, in some departments, the PND was not routinely used for all enquiries, but on an exception basis only. Certain managers may have sufficient authority to influence levels of learning behaviour of their staff in adopting the PND. Such insight enables further discussion on conceptually distinguishing between individual and organisational learning. This could mean that the PND has yet to be fully grasped as a new social knowledge system with distinct information management capabilities and processes. From a technology epistemology, the PND has certainly had a profound effect on altering the social epistemology of police practice, it may be relevant to question whether technology per se, reduces social interaction and involvement with other members of an organisation, by restricting the range of inquiry and experience that information technology is supposedly meant to enhance.

6.8 Summary

This chapter discussed the findings from the second post-implementation review that was conducted in three police regions in England. The findings suggest that the technical capability of the PND was an issue for the majority of users. This largely related to the 'Match Groups' and 'Wild Card' functions, which were generally perceived as unreliable. Data quality remains an issue, and the need for forces to adhere to MoPI was discussed on numerous occasions. The deployment of the PND is gaining momentum; it is gradually being deployed much more widely across the organisation. This has encouraged better use of the database, and the emergence of good news stories has

instilled greater confidence in the capability of the PND. Continuing to promote the PND was considered important in raising awareness locally, particularly for senior and chief officers, who were regarded as instrumental in ensuring the adoption of business practices to support and sustain PND use. Various recommendations were suggested. These were also primarily aimed at the IMPACT programme, to facilitate a centralised and coordinated approach to managing the issues identified. Technical concerns were cascaded to Logica for action, and some of these have been resolved; for example, improvements have been made to the printing feature. The next chapter will outline the systematic process used to develop the police system acceptance toolkit, based on the findings from the overall research and data collection process. The P-SAT toolkit is presented and contextually discussed. The next stage will involve seeking stakeholders' feedback from forces and the Home Office, which will determine and refine the processes and core constructs of the toolkit as a final end product.

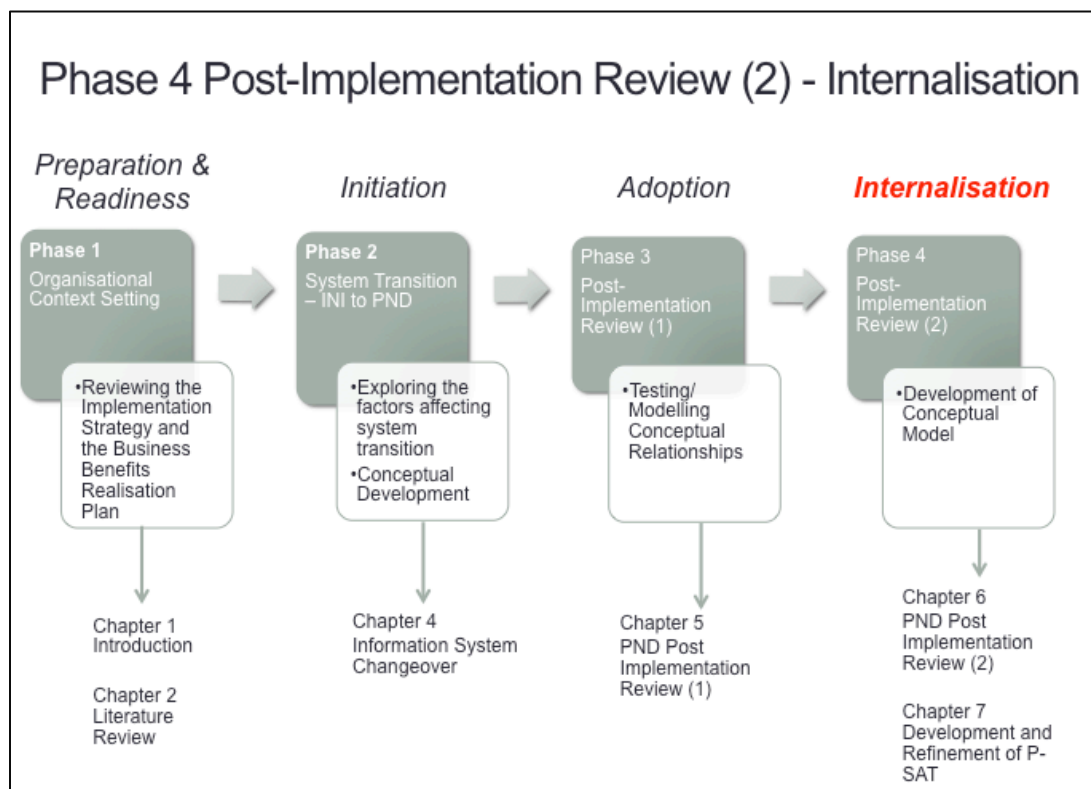
CHAPTER 7

DEVELOPMENT AND REFINEMENT OF THE POLICE SYSTEM ACCEPTANCE TOOLKIT (P-SAT)

7.1 Introduction

This chapter will discuss the development of the police system acceptance toolkit (P-SAT), which is one of two research aims for this study. The purpose of developing P-SAT is to provide systematic guidance for the police organisation to support the future implementation of new information technologies. The corresponding objectives for this research aim focus on exploring the dynamics and impact of the PND on organisational knowledge and organisational learning processes. In achieving this, the obtainment of empirical and experiential insights was central to creating P-SAT. From a research perspective, it was important to understand the usage of the PND and its alignment to business priorities. It is anticipated that the development of P-SAT will contribute and enhance existing knowledge on technology use and acceptance. Figure 17 shows how the development of P-SAT is positioned in the overall research process.

Figure 17: Phase 4 - Data Collection



7.2 Toolkit Development Process

Eisenhardt (1989) describes an iterative process of inducting theory using case study research, and provides a systematic framework for achieving this. For consistency purposes, this approach was also used in generating the conceptual frameworks developed in the preceding chapters, which contributed to the development of P-SAT. Overall, a triangulation of research methods was used for this study comprising of semi-structured interviews, participant observation and focus groups, which is a strong feature of Eisenhardt's (1989) theory building process. This suggests that using a triangulation of methods may strengthen the theory's validation from having a synergistic view of the data or evidence collected. Three stages of fieldwork took place, which explored system transition from the INI to the PND; and two post-implementation reviews that were carried in collaboration with the Home Office.

Gaining familiarity of the data fostered an in depth understanding of divergent and polar perspectives as well as patterns emerging from the data. This facilitated the identification of defined constructs, which provided a preliminary platform to start the toolkit building process. Iterative tabulations were produced for each stage of the data collection and data analysis process and these were used to compare and contrast the findings from each data gathering stage. This assisted in building internal validity, sharpened construct definitions and guided toward theoretical saturation and closure. A conceptual model was produced to denote the concepts and relationships identified throughout the analytical process. The three analytical charts produced in Atlas.ti, and the conceptual frameworks created during the stages of data collection and data analysis, have contributed to the development of P-SAT. The process in constructing the toolkit began with using the original Technology Acceptance Model (Davis, 1993), as a theoretical framework (see Chapter 5 – Figure 13). This was because the constructs of the original TAM model were considered to be both robust and relevant to this research, and served as a useful starting point to explore the concepts and conceptual relationships identified throughout the analytical process. The four grey boxes are the constructs that underpin the original Technology Acceptance Model (Davis, 1993), which was used as a theoretical context to explore the conceptual relationships identified from this research. Lindsay et al (2011) also used TAM to conceptualise the underlying relationships in developing a mobile policing technology acceptance model. The theoretical categories, which were inductively generated to represent the grouping of factors, were: Technological, Implementation and Social and Organisational. The factors within the categories were determined by their perceived significance by end-

users, managers and stakeholders, as well as by the evidence collected which explained the reasons why these factors were considered to be influential in the adoption of the PND. The creation of the conceptual model was also beneficial in highlighting unique case features and assisted the author to look beyond initial impressions and to see the evidence through multiple lenses. This approach emphasised the emergence of theoretical categories from the empirical evidence and provided an incremental process to case selection and data gathering (Huberman and Miles, 2002).

7.2.1 Developing Models for Piloting/Conceptual Development

Figure 18 is a conceptual model that shows the factors, which relate to and influence behavioural outcomes toward the use of the PND. There are clusters of factors that as a collective determine specific outcomes, whereas in other cases, some features co-exist and are mutually dependent. For example, based on Dubin's (1978) theory building approach, it is important to define *"the units of variables whose relationships are of interest..."*(p.242). These are the key determining factors, which are grouped by their respective category. Within the categories are factors that can also relate to one another, based on characteristic or causal association. For example, in the context of this research, conducting MoPI reviews may have a positive affect on raising data quality standards in police forces, which could propel forces to formally standardise their electronic information management review processes. However, there are boundaries within which this relationship is expected to operate and that is dependent on people's commitment and a collective willingness to improve organisational capability. The functionality and performance of the PND directly influenced users' perceptions of the usefulness of the PND, but did determine whether users considered this to influence how easy the PND was to use. However, other technological factors influenced its perceived ease of use that was associated with the PND's navigational interface, technical reliability, and the ease in which the PND is accessible in its bespoke security environment. The factors in the social and organisational category emphasise the influences that relate to cognitive acceptance. Organisational culture, peer influence and developing trust in the reciprocal sharing of information were recognised as mitigating issues, which influenced the agility of the organisation in normalising and internalising PND working practices. As a result, users cognitive acceptance of the PND is to an extent determined by social factors inherent to organisational culture and context. Lippert and Davis (2006) state that trust in the context of information or knowledge exchange *"is often influenced by the degree of trust between organisational members... and is critical*

for sustaining individual and organisational effectiveness” (p.437). Socialisation is therefore, a mechanism that can shape behaviour and influence trust, which can affect individual’s motivations and their perceptions of worthy situations (Zaheer, McEvily and Perrone, 1998). The main feature of the implementation category focuses on business change management. Strategic leadership, business process re-engineering, training, super-users and technical support were identified as the key elements to consider during the business change process. In totality, these factors influence both attitude and behavioural intention toward technology use. This research has found that in parallel to the deployment of the PND, managing business change was contingent on the creation of national business rules; training that addressed the skills-set required; and super-users and technical support to work alongside the implementation process to provide tried and tested working solutions to end-users.

Figure 19 is an activity flow chart, which represents a linear process for the implementation and adoption of new technology. It was contextually developed to provide guidance for the police organisation, in terms of outlining main actions, planning activities and the production of key supporting documents. Lessons drawn from the post-implementation reviews were captured and contributed to creating the flow-chart process. The conceptual frameworks developed following analysis of the data revealed themes and patterns, which influenced the progress of implementation and the adoption process. As a result, a provisional sequential structure of concepts emerged and a flow chart was produced to represent key milestones and events. Social and cultural factors also feature in the flow chart; these are indicative of the contextual considerations, which are often intangible and difficult to capture and monitor. However, these factors are also relevant to the technology adoption process, particularly, when significant business change is introduced simultaneously. This research has found that optimising the use of technology in the police organisation, is dependent on ongoing leadership and system ownership, throughout the project delivery process and beyond implementation, which is linked to how well police forces respond to change; the creation of technology user groups has encouraged users to share best practice and learn from each other’s experiences; regional coordinators have played an invaluable role in managing the tactical deployment of the PND in various localised business areas and were instrumental in ensuring local force structures and processes were in place for the PND. The realisation of business benefits requires planning at the beginning of the project, however, the research findings suggest that benefits analysis should take place during the final stage of the technology

internalisation process. This is because both direct and indirect users need a period of time to adjust to the disbandment of one technology and the take up of another. This can induce varying levels of uncertainty and apprehension during this transitional phase. Furthermore, forces emphasised the need for evidence-based benefits that were tangibly measurable. However, it was also recognised that there were challenges and complexities involved in directly attributing the success of an investigation to the sole use of one technology.

Figure 18: Conceptual Model - PND Implementation and Adoption Factors (Pilot Version 1)

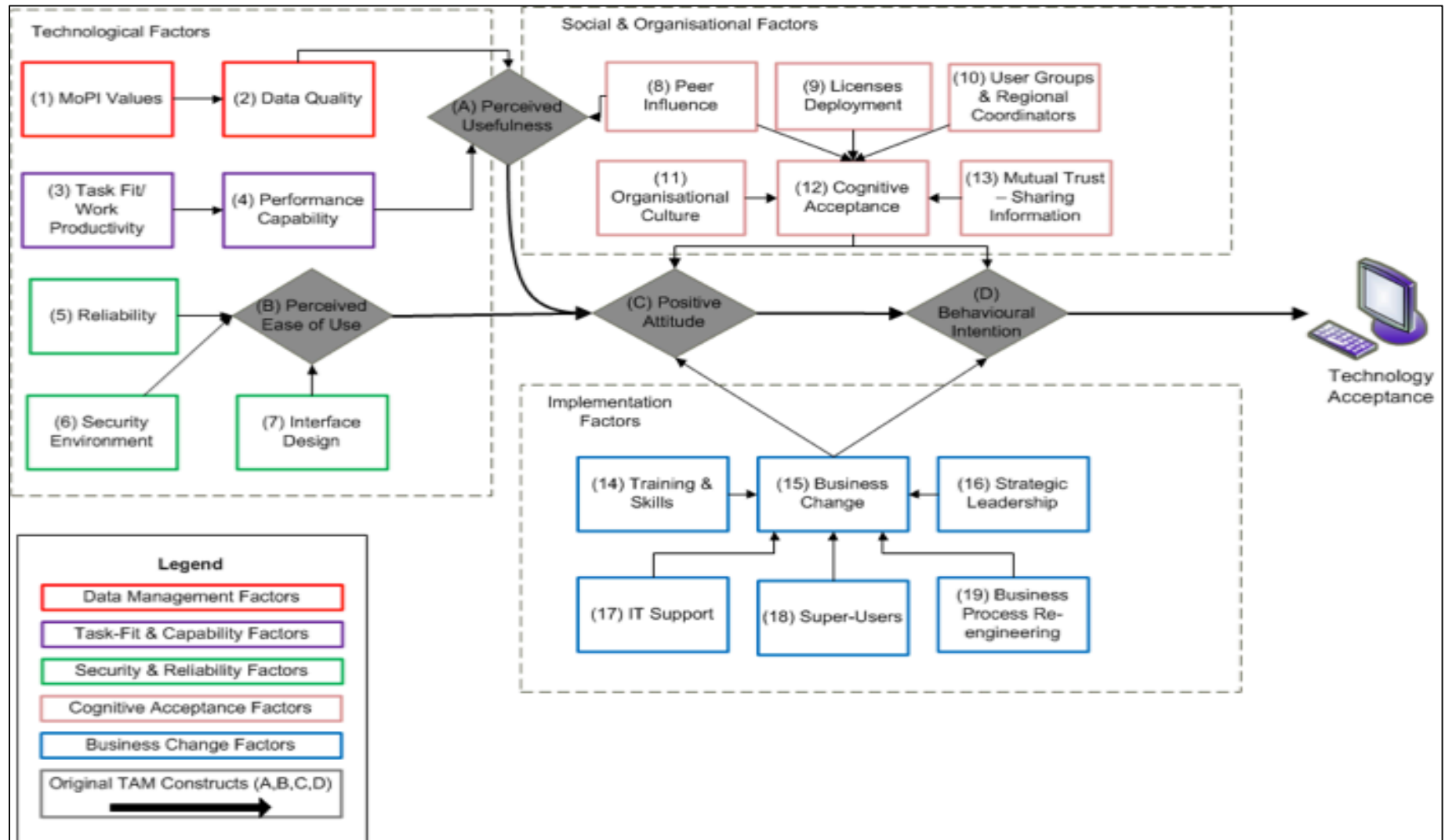


Figure 19: Police System Acceptance Process (Pilot Version 1)

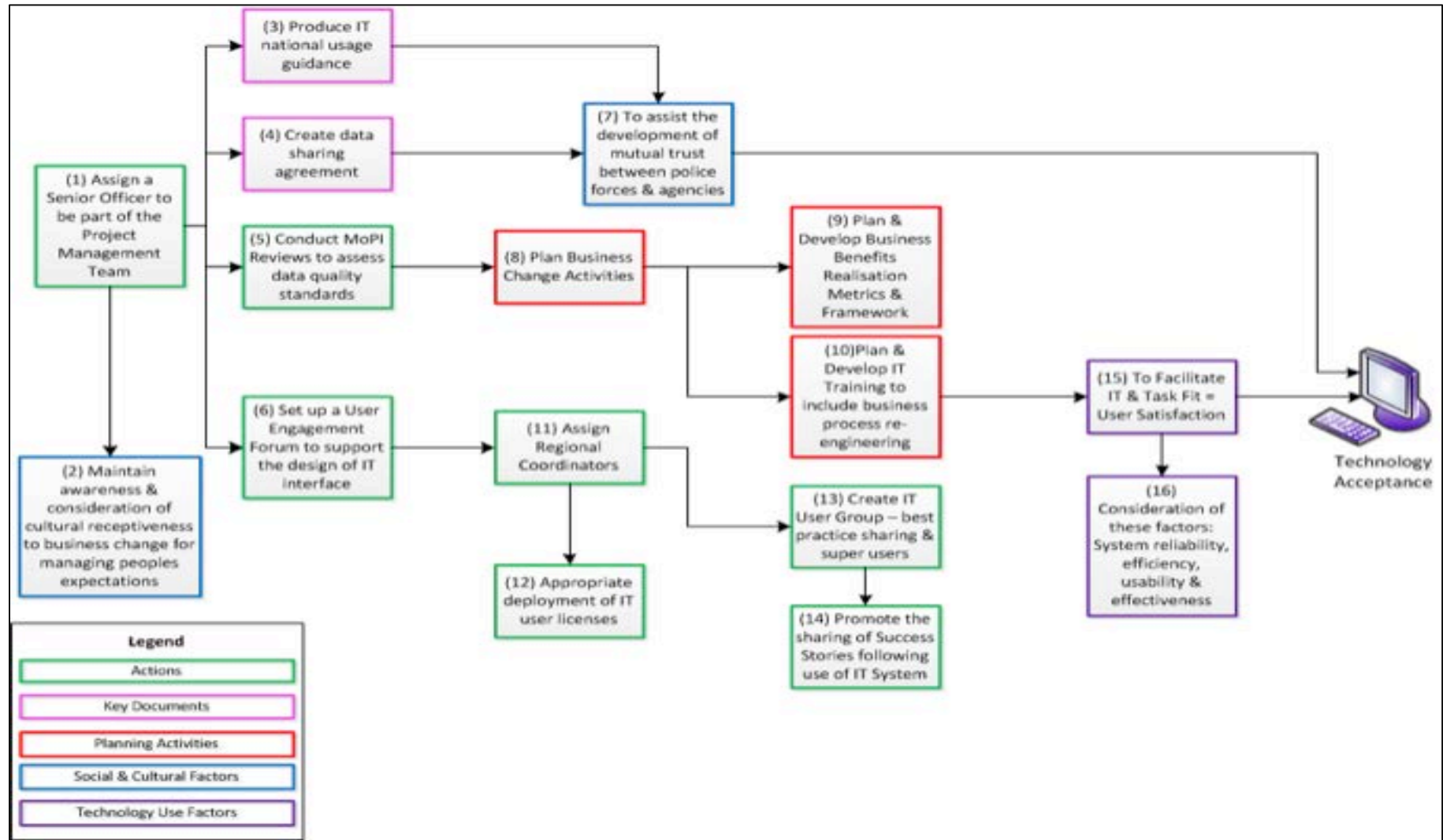
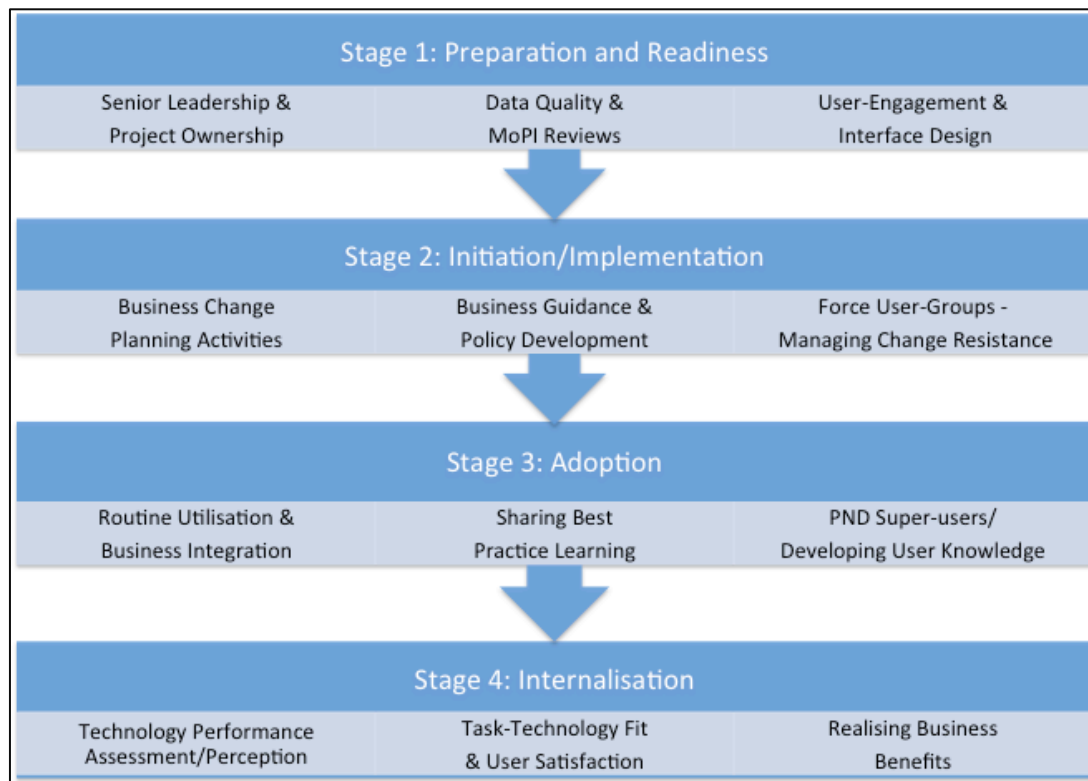


Figure 20 is a provisional strategic alignment process, which is supplementary, and was developed alongside Figures 18 and 19; it presents the four stages of the implementation and acceptance process based on the delivery of the PND. It facilitates a structured and orderly approach for managing key aspects of the organisational coordination process, and identifies the focal areas for each stage. It is intended to be a useful guide for project management teams delivering new technology in the police organisation to consider in the future. Grant, Hackney and Edgar (2010) refer to the importance of aligning organisational activity and processes to developing information systems, which balances the capacity and capability of technologies with the goals, aspirations and objectives of the business. In the case of the PND, the design of a strategic alignment process for the police organisation implementing new systems, was in acknowledgement of the influencing factors that surrounded the implementation and utilisation of the PND, which highlighted the need to integrate the working practices of the PND with business priorities, whilst at the same recognising the challenges to both social and cultural norms. Therefore, the main dimensions of IT use are whether the technology drives organisational efficiency and effectiveness, which are the core business benefits anticipated as a result of the PND.

Figure 20: Strategic Alignment Process (Pilot Version 1)



Sections 7.2.2 and 7.2.3 provide individual definitions/descriptions for each of the constructs identified in Figures 18 and 19. These provide individual clarification and justification of the boxes shown and demonstrate how certain constructs are linked. It also serves the purpose of providing future users of the toolkit with definitive summaries that may be subject to alteration.

7.2.2 Definitions and Descriptive Text for Figure 18: Conceptual Model - Pilot Version 1

Technological Factors

1. MoPI Values – To align and instil the principles of MoPI, which should influence the standard and quality of police data stored on IT systems and databases.
2. Data Quality - This factor relates to how data quality has a direct influence on users' perceptions of technology usefulness.
3. Task Fit/Work Productivity – This is closely aligned to 'performance capability', suggesting that the use of technology is influenced by its ability to support the completion of police tasks.
4. Performance Capability – This relates to the functionality of IT and the tools available, suggesting that the use of technology is influenced by its usefulness.
5. Reliability – This factor relates to users' perceptions of its ease of use and concerns the reliability of technology.
6. Security Environment – This factor relates to the bespoke security environment set-up for technology use. It is important that IT security does not interfere with users' gaining physical access to the technology.
7. Interface Design – This factor relates to the navigational and interface design of technology, which has a direct influence on users' perceptions of its ease of use.

Social and Organisational Factors

8. Peer Influence – Both direct and indirect users' were to an extent influenced by peer perceptions and their experiences of the PND. This impacted on users' perceptions on the usefulness of the technology.
9. Licences Deployment – The deployment of PND licences to appropriate users' was evidently crucial to enhancing the acceptance of the PND.
10. Force User Groups and Regional Coordinators – The creation of local IT user groups and the leadership of regional coordinators highly assisted the adoption of the PND.

11. Organisational Culture – This is an important social factor, which although can be intangible and difficult to substantiate, was shown to influence the acceptance of the PND. This is essentially about the organisation adopting positive attitudes and behaviours toward the use of new technology.
12. Cognitive Acceptance – This is a critical construct, which was identified both in the literature and in this research as having a direct influence on the adoption of new technology. Generating positive attitudes and behavioural intentions are to an extent determined by the organisation’s ability to internalise and normalise technology use practices.
13. Mutual Trust Development for Sharing Information – In the context of sharing sensitive police information, this was evidently influenced by mutual trust building between organisational members, suggesting that levels of trust can impact on the acceptance of new technology.

Implementation Factors

14. Training and Skills – This factor relates to supporting business change by training users’ that have the appropriate knowledge and skills to optimise the use of technology.
15. Business Change – This is a critical construct, which was identified both in the literature and in this research as having a direct influence on the acceptance of new technology. Generating positive attitudes and behavioural intentions are to an extent determined by the organisation’s ability to effectively manage business change. User engagement for example is just one aspect.
16. Strategic Leadership – Participants of this research agreed unanimously that senior and strategic leadership was an essential requirement in national IT implementation projects. This was to ensure ownership and accountability throughout delivery and beyond.
17. IT Support – Levels of IT support following the implementation of new technology had a direct influence on business change management. This was because users’ encountered technical issues early on, which needed resolving to ensure continued use and confidence of the new technology.
18. Super-Users – Experienced super-users’ of the PND were invaluable in their advisory roles and in raising awareness of the PND. They also contributed to supporting business change by resolving local issues relating to internal practices.

19. Business Process Re-engineering – This is a key factor that has a direct influence on the organisation’s receptiveness to business change. The creation of business rules and practices are fundamental to supporting the adoption of new technology in the police organisation.
20. Technology Acceptance – This is the desired result anticipated by organisations implementing new technology. The police organisation may now be able to use this model to conceptualise and create an alternative approach to managing the process of technology adoption in a police environment.

7.2.3 Definitions and Descriptive Text for Figure 19: P-SAT Process - Pilot Version 1

1. Assign a Senior Officer to be part of the Project Management Team – This was considered by participants to be an essential factor for the beginning of the implementation process. It also features in the conceptual model under ‘social and implementation factors’.
2. Awareness of cultural receptiveness to organisational business change – This is the responsibility of the senior lead to maintain acute awareness of the social and cultural elements inherent to managing new ways of working.
3. Produce National IT Usage Guidance – One of the key documents that the senior lead should own and oversee its production is the business guidance designed to support the use of new IT.
4. Conduct MoPI Reviews – Data quality standards was identified as being a crucial factor for users’ in deciding whether to use the PND. Conducting MoPI/data quality reviews prior to the implementation of a new database would minimise the risk of finding widespread data errors on records.
5. Create Data Sharing Agreement – Another key document, which should also be owned by the senior project lead, is the creation of a ‘data sharing agreement’. This can assist in establishing formal rules and practices and in the building of trust toward sharing information.
6. Set-up a User-Engagement Forum – This was highly favoured by the majority of participants in terms of assisting the design of the technology interface. It should be a formal part of the IT delivery process and managed by the senior project lead.
7. Mutual Trust Development – The crux of the PND was about sharing information using a centralised information database. Developing trust between sharing

parties was identified as a fundamental attribute and a challenge to both social and cultural norms.

8. Plan Business Change Activities – This is a critical construct, which highlights the need to balance the capacity and capability of a technology with the goals and objectives of the business.
9. Plan and Develop Business Benefits Realisation Framework – alongside business change management, there should also be planning work being undertaken to support the design of a business benefits framework. This is often an essential feature of IT investment projects.
10. Plan and Develop IT Training (BPR) – Training to support the use of new IT training should also consider whether there are elements of business process re-engineering that needs to take place in parallel.
11. Assign Regional Coordinators – The role of regional coordinator proved to be an invaluable asset to police forces. They encouraged the sharing of best practice, resolved localised issues and coordinated regional activities to encourage use of the PND.
12. Appropriate Deployment of IT User Licences – It is important that the role of regional coordinator is also instrumental in how user licences are deployed locally in police forces. This is to ensure a coordinated and uniformed approach to IT implementation and usage.
13. Create IT User Groups – The creation of PND user-groups was an effective forum to discuss force concerns from a variety of business areas and job roles. It enabled a coordinated approach for managing local tasking and encouraged the sharing of best practice.
14. Promote the Sharing of Good News Stories – Local PND User Groups regularly promoted the sharing of good news stories to encourage use of the system and as an opportunity to market the capability and performance of the system.
15. Facilitate Task-Fit and User Satisfaction – Users’ were highly influenced by its perceived usefulness and efficiency in the context of police work and intelligence gathering.
16. System Performance – User satisfaction was considered highly significant by participants, which determined the extent users’ adopted the new technology. The reliability of the database and its credibility were important factors.
17. Technology Acceptance – This is the desired outcome anticipated by organisations implementing new technology. The police organisation may now

be able to use this process to conceptualise and create an alternative approach to managing the process of technology adoption in a police environment.

Technology Acceptance Model Constructs (Davis, Bagozzi and Warsaw (1989))

- A. Perceived Usefulness – is defined as the prospective user’s subjective probability that using a specific application system will increase his or her job performance within an organisational context.
- B. Perceived Ease of Use – refers to the degree to which the prospective user expects the target system to be free of effort.
- C. Attitude (Positive) – people form intentions to perform behaviours toward which they have a positive affect.
- D. Behavioural Intention – the anticipated result of the belief and intention link demonstrating intentions toward means-end behaviour based on cognitive decision rules to improve performance
- E. Technology Acceptance – Actual system use

7.3 Piloting Process

A key objective of the majority of IT/IS research is to examine the adoption and usage of technology. Whether this is to assess the value of IT in terms of enhancing organisational performance or for more macroeconomic reasons, the focus on use is of paramount importance to organisations investing in new technology (Taylor and Todd, 1995). Identifying adoption determinants, which directly influence behavioural intentions, to either accept or reject new technology in the police organisation, is an interesting stream of research, because of its distinct context. Therefore, in order to refine the development of the system acceptance toolkit for the police organisation, and to define its key influences, it was important to engage with PND stakeholders by inviting their participation in a pilot exercise. It was considered necessary to examine the extent to which the models could help understand usage behaviour, and the drivers that contribute to this. However, it is relevant to highlight that the PND is not only about the implementation of IT but it is essentially about sharing information and adapting to new ways of working. Furthermore, this research has indicated that the institutional context surrounding the organisation, which regulates its decisions, plays a formative role in directly or indirectly, encouraging receptive attitudes and behaviours. Chen, Chuang and Chen (2012) discuss behavioural intentions toward the adoption of new knowledge sharing processes and technologies in various organisations. Their research

concluded that organisational climate and promoting individual self-efficacy, were the primary factors in promoting and using knowledge sharing technology.

Stakeholders' with whom good working relationships had been formed, were contacted via email asking for their participation in the process. Out of the twenty that were contacted, nine responded within the set deadline. They were questioned about the diagrams produced and it was emphasised that these were draft versions and provisional. The stakeholders that participated in the pilot process were from various working backgrounds and performed different roles on the PND project – they are listed below. In total, nine stakeholders took part and these individuals represent both strategic and tactical roles in policing.

Stakeholders' Roles

- National PND Auditor
- Regional Intelligence Manager
- Regional PND Coordinator (2)
- Force PND Project Managers (2)
- National PND Implementation Coordinator & Performance Manager
- National PND Programme Manager
- Regional Head of Learning and Development

The stakeholders were asked to review the provisional models produced, and to comment on their suitability and accurate representation of the PND implementation and adoption process, as well as, which model they would engage with in real life scenarios. It was important to gain feedback from potential users of the models, in the real policing world, as well as to establish a level of empirical validity for the models. Robson (2011) describes pilot research as a *“try-out of what is proposed so that its feasibility can be checked”* (p.141). The purpose of this pilot exercise was to gain an understanding of the stakeholders' initial perceptions as potential users of the toolkit, and to utilise this feedback to confirm or alter the initial model formulations. Therefore, the main objective for this exercise was to refine the model by seeking practitioners' feedback prior to constructing a finalised version of the toolkit.

7.3.1 Analysing Stakeholders' Feedback

Overall, the comments received from the stakeholders' were very useful, and provided interesting and valuable suggestions to the models. The idea of creating a conceptual

model as a theoretical baseline was recognised as an important step in the model building and theory development process. However, it was clearly expressed to the stakeholders' that the conceptual model was not aimed for a police audience per se, but as an audit trail to demonstrate the rationale used in generating both the activity flow chart and the strategic alignment process. The stakeholders' widely commented on the issue of leadership, and the following comment echoed such views.

"Senior direction must be present throughout implementation, as the work just doesn't stop when we have the new technology in our departments". Projects might have an end-date, but when it's about business change and new technology, we need that ongoing senior direction." Regional Intelligence Manager

Furthermore, *the* stakeholders' were united in the decipherment of key tasks for the national delivery programme and for police forces, so that responsibilities, work streams and reporting structures can be explicitly defined. In terms of information sharing, there were several drivers that were deemed as necessary. These were in relation to national auditing standards to ensure that forces have reassurance that their data will be securely stored and searches monitored effectively. This was considered essential to developing mutual trust and was regarded as an ongoing and long-term commitment. Producing national business rules to support use of the PND was also considered to be a primary factor; this was to ensure that police forces were adopting robust and standardised procedures, which could be enforced and not subjected to broad interpretation. From a social and cultural perspective, regional PND coordinators were advocates for the promotion of success stories as a significant determinant toward cognitive acceptance. This was described *"as a means of reinforcement concerning positive messages"*, which was considered to have *"a big affect"* on end-users adoption of the PND. It was generally accepted that the findings from this research indicated that the planning and realisation of business benefits should be conducted as two separate events. This was because end-users frequently commented during the post-implementation reviews that measuring benefits was complex and challenging because of the difficulties in capturing tangible outcomes solely based on the use of the PND. It was felt by the stakeholders' that planning the expected business benefits at the start of the project was imperative, however, the realisation of business benefits was more appropriately achievable towards the end of the implementation phase, following the

adoption and internalisation of the technology with supporting standardised rules and business processes.

Regional coordinators were common to express that business process re-engineering needed to consider tactical application; in terms of where and how will the technology is to be deployed, particularly in context of a phased implementation process. This also takes into account that some business areas may use technology in different ways, and departmental managers at a local level may impose restrictions on when the technology is used. The revised conceptual model as shown in Figure 21 acknowledges this requirement, in terms of being aware of variations in the tactical deployment of the PND. This research supports this view and has found that forces have deployed the PND differently, however, to an extent this may have been influenced by the non-prescriptive approach at a national level, which gave forces the discretion to deploy the PND based on their individual deployment strategy and requirements. Post-implementation reviews were considered to be important when new technology has been implemented in the police organisation. The majority of stakeholders' commented on the usefulness of IT reviews in assessing adoption and business internalisation. The stakeholders' this to be a useful opportunity for forces to comment on other internal issues such as financial and staff resources, which may be impacting on the use of a new technology. Over half of the stakeholders' expressed preference in having a model, which denoted the tasks and responsibilities for the national project and for forces implementing a new technology or system. As a result, a revised version is shown in Figure 22, which can be described as an activity flow chart. This is aimed at national project teams and police forces, and provides a linear and structured approach for the implementation and adoption of new technology in the police organisation. The flow chart provides a logical approach for the initiation and management of key actions, planning activities and the production of key documents. It acknowledges the instrumental role of senior leadership and project ownership, and considers technical, social and cultural factors, as being equally important to the technology adoption process. Ultimately, the activities and processes shown in Figures 21, 22 and Figure 23 contribute to developing an evidenced-based understanding of how to support forces in preparing and responding to change following the implementation of a new technology.

Following the modifications that were made to Figures 21, 22 and 23, the stakeholders were again contacted via email to request that they independently re-evaluate the models as a result of their feedback and assessment. All nine stakeholders responded and they collectively agreed to the revisions made to the toolkit overall. The

stakeholders had recognised that Figure 21 the conceptual model, was a prerequisite and part of the process in formulating the strategic processes shown in Figures 22 and 23. They were unanimous on the belief that the organisation required practical and tangible guidance that is definitive, role-specific and accountable to reporting progress on key activities. Conducting an independent evaluation of the toolkit was important not only to maintain consistent scientific rigor for this research, but also so that the stakeholders had an opportunity to confirm the realistic potential of the toolkit in pragmatic terms; and also that the toolkit mirrored the real demands of the business, and enhanced the organisation's capability to effectively manage the delivery of national IT projects in the future. From a conceptual standpoint, it is important to make a key distinction from pre-adoption and post-adoption stages, and to look at variations in individuals' beliefs and attitudes toward the technology in question. This may also help to monitor changes in IT adoption behaviour and the organisation's ability to sustain use. Furthermore, from a future perspective, P-SAT provides an understanding of empirical reflection, which goes beyond individual determinants, but instead presents a more encompassing view of IT project management, which takes into account both short-term and long-term dimensions.

Figure 21: Conceptual Model - PND Implementation and Adoption Factors (Post- Pilot Version 2)

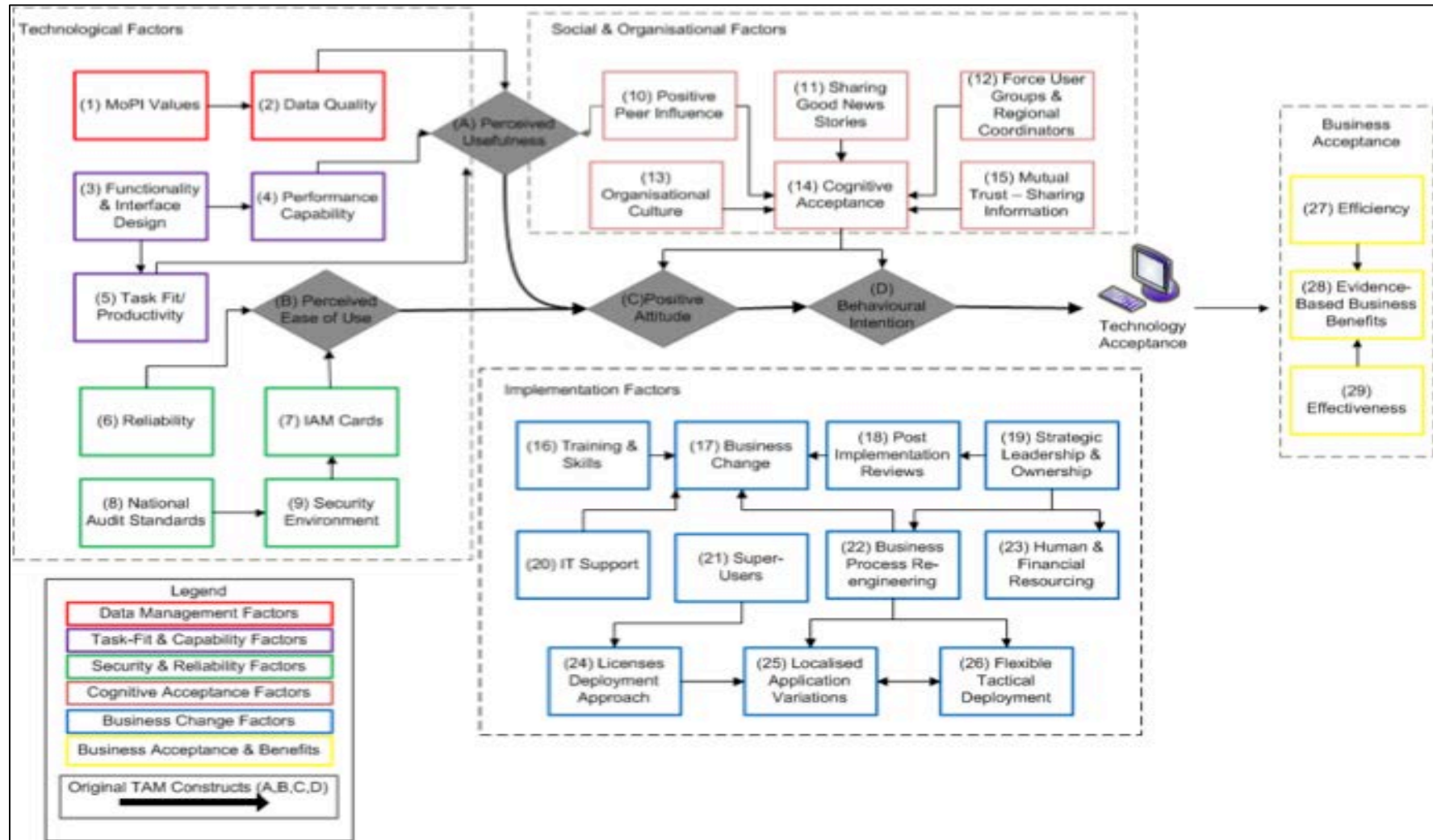
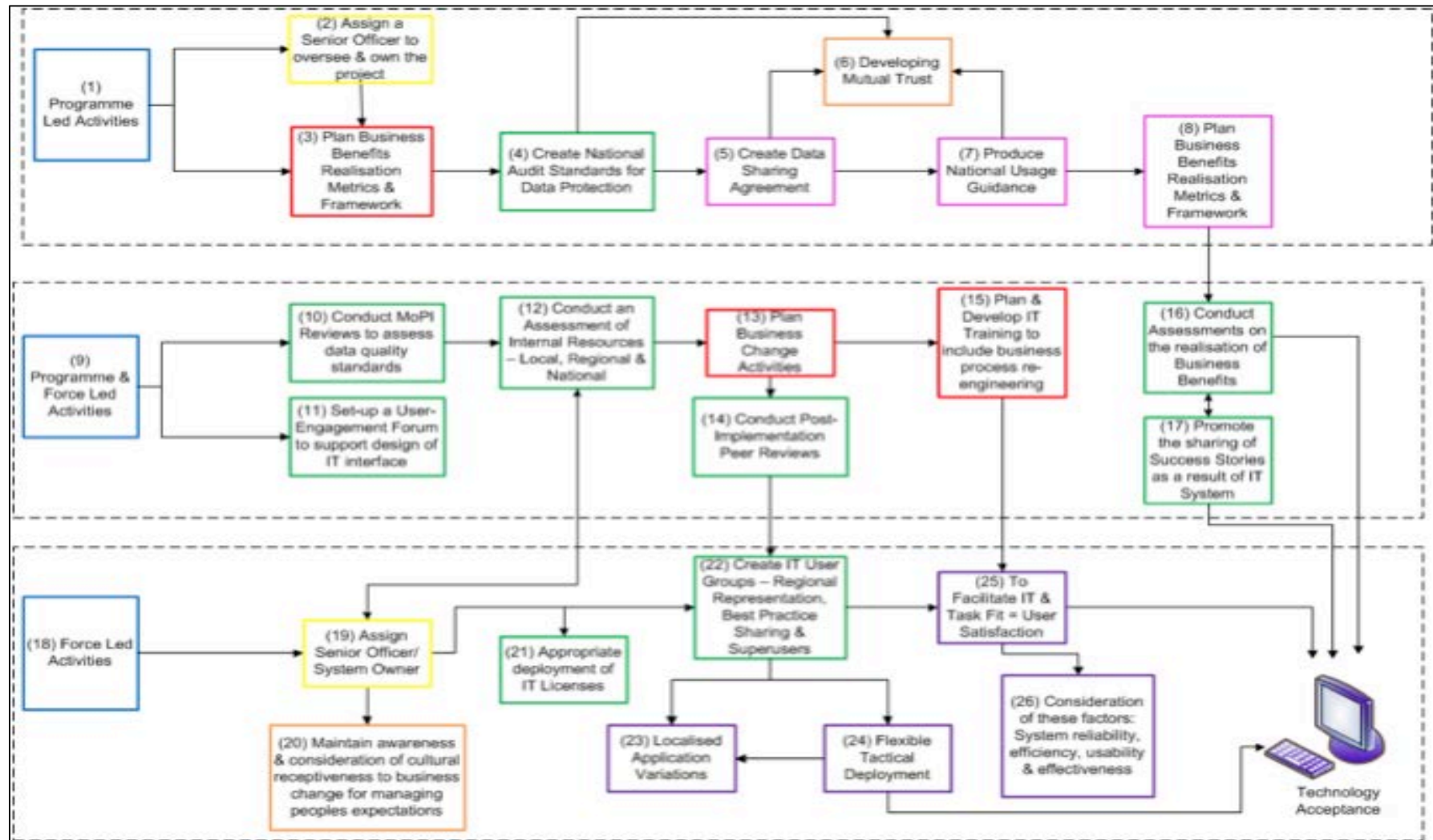


Figure 22: Police System Acceptance Process (Post Pilot Version 2) - Legend on next page 159



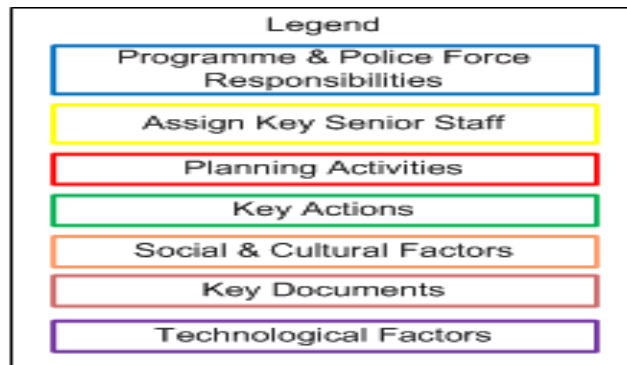


Figure 23: Strategic Alignment Process (Post Pilot Version 2)

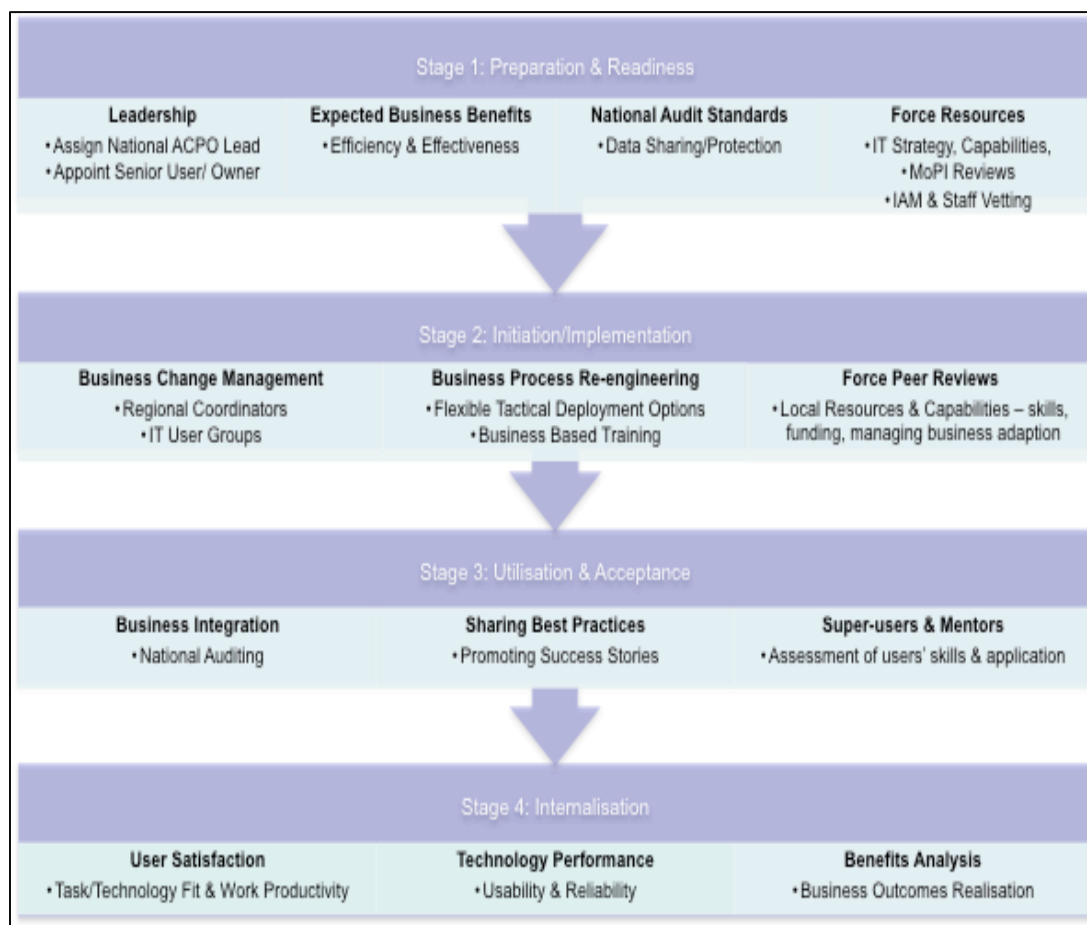


Figure 23 was designed as an aide memoir, and to specify major tasks at a strategic level, and represents a modular structure. It consists of manageable parts, which in some instances are interrelated. The separate modules are intended to assist the deployment of specific resources, based on the nature of the task. Figure 23 is a strategic alignment process that is to be viewed alongside Figure 22. Its purpose is to provide a consolidated 'snapshot' of activities to assist in strategic planning. For each stage of the project delivery process, a set of activities is shown. These represent the critical success factors

that were identified throughout the research process. Although critical success factors are often regarded as performance measurements for organisations (Bocij et al, 2008), Figure 23 can be described as a set of critical success factors that are not to be measured, but are to be considered from a functional perspective as relevant to managing the implementation and adoption of new technologies. Stacey (2007) argues that qualitative modelling is essentially about critical thinking, whereby the immediate concern is ascertaining the problems or issues of a situation from the perspective of the people involved, in order to bring about some improvement. Therefore, developing models provides some intervention to the situation by propositioning how the issues should be addressed, how decisions should be taken, and how it should be implemented. The purpose of modelling key factors and activities is to specify a procedure that the organisation could follow, so that the desired or intended outcomes are optimised (Bocij, et al, 2008). Grant, Hackney and Edgar (2010) suggest that the implementation of new technology in organisations can be viewed as a standalone commodity, with limited consideration of how the technology will be aligned to business objectives. The alignment of business and IT infrastructure is fundamental to organisations like the police service, because it demonstrates recognition of the value placed on technology in enhancing and improving organisational performance. However, Figure 23 does not attempt to align the business priorities of the police organisation to the PND, as this would require extensive research of tactical and strategic assessments produced by a number of different forces. Also, this would serve a different purpose to what this research intended to investigate. Nevertheless, creating an IT/business strategy, which assesses the organisation's business context in alignment with the capability of new technology, is a key recommendation from this research. It is anticipated that development of P-SAT will contribute to this. Stacey (2007) states that *"the benefits of having IT/business alignment are organisational agility, operational efficiency, IT cost reduction and risk management"* (p.127). Grant, Hackney and Edgar (2010) assert that a IT/business strategy assists in distinguishing between the information requirements of an organisation, the technology required to facilitate the processing and delivery of information, and the management direction involved. This will also allude to identifying technologies that are unsuitable to the police organisation and incompatible with their existing systems and structures. Recent drives for technology change and advancement in policing is an international occurrence (Manning, 2008). It is therefore imperative to maximise opportunities for intervention in a complex policing environment, which

requires appropriate technologies that are able to support and respond to emerging and unpredictable threats.

Post-implementation reviews were favoured by all stakeholders; this was because they regarded this as an opportunity to compare the new technology as it actually with what was intended in its specification and to examine usage and whether this is increasing and evolving. (Curtis and Cobham, 2008) assert that such audits are to be made customary where possible, so that organisations investing in innovative technologies are able to assess its integration from both an organisational change perspective, and from a socially deterministic point of view. Jones and Orlikowski (2009) discuss the role and influence of technology in facilitating organisational change, which importantly relates to understanding the dynamics and intricacies of technological determinism. However, this would depend on the standpoint adopted by the organisation, for example, whether they believe that organisational change is driven by deployed technologies or viewing organisational change as driven by social forces for which the performance of the technology has little, or no influence. In the context of this research, the police organisation would favour the former approach as its philosophical basis for conducting a post-implementation review.

Sections 7.3.2 and 7.3.3 provide individual definitions/descriptions for each of the constructs identified in Figures 21 and 22. These provide individual clarification and justification of the boxes shown and demonstrate how certain constructs are linked. It also serves the purpose of providing future users of the toolkit with definitive summaries that may be subject to alteration. The sections also highlight, which constructs were added following consultation and evaluation of the toolkit with participants. This was described earlier in section 7.3.1 – ‘*Analysing Stakeholders’ Feedback*’.

7.3.2 Definitions and Descriptive Text for Figure 21: Conceptual Model – Post Pilot Version 2

Technological Factors

1. MoPI Values – To align and instil the principles of MoPI, which should influence the standard and quality of police data stored on IT systems and databases.
2. Data Quality - This factor relates to how data quality has a direct influence on users’ perceptions of technology usefulness.

3. Functionality & Design – **This is an additional construct.** This factor relates to the navigational and interface design of technology, which has a direct influence on users’ perceptions of its ease of use.
4. Performance Capability – This relates to the functionality of IT and the tools available, suggesting that the use of technology is influenced by its usefulness.
5. Task Fit/Work Productivity – This is closely aligned to ‘performance capability’, suggesting that the use of technology is influenced by its ability to support the completion of police tasks.
6. Reliability – This factor relates to users’ perceptions of its ease of use and concerns the reliability of technology.
7. IAM Cards – **This is an additional construct.** Managing physical security access was a common factor associated with users’ perceptions of the PND’s ease of use. Security should not have an adverse effect on technology usage.
8. National Audit Standards – **This is an additional construct.** This is a factor, which is part of the bespoke security environment set-up for the PND. National auditing increased levels of reassurance for forces, knowing that the sharing of police data practices are being monitored independently.
9. Security Environment – This factor relates to the bespoke security environment set-up for technology use. It is important that IT security does not interfere with users’ gaining physical access to the technology.

Social and Organisational Factors

10. Peer Influence - Both direct and indirect users’ were to an extent influenced by peer perceptions and their experiences of the PND. This impacted on users’ perceptions on the usefulness of the technology.
11. Sharing Good News Stories and Local PND User Groups - **This is an additional construct.** Regularly promoting and sharing success stories encouraged use of the system and was invaluable in marketing the capability and performance of the system.
12. Force User Groups and Regional Coordinators – The creation of local IT user groups and the leadership of regional coordinators highly assisted the adoption of the PND.
13. Organisational Culture – This is an important social factor, which although can be intangible and difficult to substantiate, was shown to influence the acceptance

of the PND. This is essentially about the organisation adopting positive attitudes and behaviours toward the use of new technology.

14. Cognitive Acceptance – This is a critical construct, which was identified both in the literature and in this research as having a direct influence on the adoption of new technology. Generating positive attitudes and behavioural intentions are to an extent determined by the organisation’s ability to internalise and normalise technology use practices.
15. Mutual Trust Development for Sharing Information – In the context of sharing sensitive police information, this was evidently influenced by mutual trust building between organisational members, suggesting that levels of trust can impact on the acceptance of new technology.

Implementation Factors

16. Training and Skills – This factor relates to supporting business change by training users’ that have the appropriate knowledge and skills to optimise the use of technology.
17. Business Change – This is a critical construct, which was identified both in the literature and in this research as having a direct influence on the acceptance of new technology. Generating positive attitudes and behavioural intentions are to an extent determined by the organisation’s ability to effectively manage business change. User engagement for example is just one aspect.
18. Post-Implementation Reviews – The findings from these reviews revealed important factors and recommendations for the project team and for police forces to consider. The reviews provided invaluable opportunities to learn lessons and share best practice.
19. Strategic Leadership – Participants of this research agreed unanimously that senior and strategic leadership was an essential requirement in national IT implementation projects. This was to ensure ownership and accountability throughout delivery and beyond.
20. IT Support – Levels of IT support following the implementation of new technology had a direct influence on business change management. This was because users’ encountered technical issues early on, which needed resolving to ensure continued use and confidence of the new technology.
21. Super-Users – Experienced super-users’ of the PND were invaluable in their advisory roles and in raising awareness of the PND. They also contributed to

- supporting business change by resolving local issues relating to internal practices.
22. Business Process Re-engineering – This is a key factor that has a direct influence on the organisation’s receptiveness to business change. The creation of business rules and practices are fundamental to supporting the adoption of new technology in the police organisation.
 23. Human and Financial Resourcing – This is a responsibility for the senior project lead both at local and national levels, to ensure that adequate provisions have been made to meet the needs and demands of the project.
 24. Licences Deployment Approach – It is important that the role of regional coordinator is also instrumental in how user licences are deployed locally in police forces. This is to ensure a coordinated and uniformed approach to IT implementation and usage.
 25. Localised Technology Application Variations – The implementation of the PND varied according to the nature of the business area. Both police forces and the project team need to be aware of the working differences in different areas of policing.
 26. Flexible Tactical Deployment – This is similar to the above, but emphasises flexibility in the tactical deployment of the PND to enable users’ to develop individual working styles and practices to suit the demands of the business.

Business Acceptance Factors

27. Business Efficiency – **This is an additional construct.** One of the key business benefits that most organisations expect to realise following the implementation of new technology is business efficiency. The police organisation considered the relationship between technology and business efficiency as an indicative outcome of IT adoption success.
28. Evidenced Based Business Benefits – **This is an additional construct.** The PND project team, including the Home Office and police forces, were highly focused on developing a business benefits framework to measure the business productivity of the PND using both qualitative and quantitative data.
29. Business Effectiveness – **This is an additional construct.** One of the key business benefits that most organisations expect to realise following the implementation of new technology is business effectiveness. The police

organisation considered the relationship between technology and business effectiveness as an indicative outcome of IT adoption success.

30. Technology Acceptance – This is the desired outcome anticipated by organisations implementing new technology. The police organisation may now be able to use this process to conceptualise and create an alternative approach to managing the process of technology adoption in a police environment.

Technology Acceptance Model Constructs (Davis, Bagozzi and Warsaw (1989))

- F. Perceived Usefulness – is defined as the prospective user’s subjective probability that using a specific application system will increase his or her job performance within an organisational context.
- G. Perceived Ease of Use – refers to the degree to which the prospective user expects the target system to be free of effort.
- H. Attitude (Positive) – people form intentions to perform behaviours toward which they have a positive affect.
- I. Behavioural Intention – the anticipated result of the belief and intention link demonstrating intentions toward means-end behaviour based on cognitive decision rules to improve performance
- J. Technology Acceptance – Actual system use

7.3.3 Definitions and Descriptive Text for Figure 22: P-SAT Process – Post Pilot Version 2

1. Programme Led Activities – Recommended by the majority of stakeholders that took part in evaluating the P-SAT toolkit. Delineating activities in the process was highly favoured.
2. Assign a Senior Officer to be part of the Project Management Team – This was considered by participants to be an essential factor for the beginning of the implementation process. It also features in the conceptual model under ‘social and implementation factors’.
3. Plan and Develop Business Benefits Realisation Framework – alongside business change management, there should also be planning work being undertaken to support the design of a business benefits framework. This is often an essential feature of IT investment projects.
4. Create National Audit Standards for Data Protection – **This is an additional construct** that was added following evaluation of the P-SAT toolkit. This was

perceived by participants has providing a level of reassurance for data sharing parties.

5. Create Data Sharing Agreement – A key document, which should be owned by the senior project lead, is the creation of a ‘data sharing agreement’. This can assist in establishing formal rules and practices and in the building of trust toward sharing information.
6. Mutual Trust Development for Sharing Information – In the context of sharing sensitive police information, this was evidently influenced by mutual trust building between organisational members, suggesting that levels of trust can impact on the acceptance of new technology.
7. Produce National IT Use Guidance – Implementing IT projects in the police organisation requires the creation of user guidance to support use of the new technology. This is vital to ensuring that users gain confidence in the system.
8. Plan and Develop Business Benefits Realisation Framework – alongside business change management, there should also be planning work being undertaken to support the design of a business benefits framework. This is often an essential feature of IT investment projects.
9. Programme & Force Led Activities - Recommended by the majority of stakeholders that took part in evaluating the P-SAT toolkit. Delineating activities in the process was highly favoured. The toolkit enables an enhanced level of transparency for the responsibility of key tasks to assist the technology adoption process.
10. Conduct MoPI Reviews – Data quality standards was identified as being a crucial factor for users’ in deciding whether to use the PND. Conducting MoPI/data quality reviews prior to the implementation of a new database would minimise the risk of finding widespread data errors on records.
11. Set-up a User-Engagement Forum – This was highly favoured by the majority of participants in terms of assisting the design of the technology interface. It should also be a formal part of the IT delivery process and managed by the senior project lead at programme and force level.
12. Conduct Internal Resources Assessments – **This is an additional construct** added to the police system acceptance process. Recommended by the majority of stakeholders that took part in evaluating the P-SAT toolkit. This was a particular view expressed by PND project managers in police forces, in terms of ascertaining the level of local resources dedicated to delivering the project.

13. Plan Business Change Activities - This is a critical construct, which highlights the need to balance the capacity and capability of a technology with the goals and objectives of the business.
14. Conduct Post-Implementation Peer Reviews – **This is an additional construct** added to the police system acceptance process. The findings from these reviews revealed important factors and recommendations for the project team and for police forces to consider, maximising the adoption of the PND.
15. Plan and Develop IT Training (BPR) – Training to support the use of new IT training should also consider whether there are elements of business process re-engineering that needs to take place in parallel.
16. Conduct Assessments on Business Benefits Realisation – Following the delivery and implementation of the project, conducting local force assessments on business benefits would enable insight into levels of technology use and impact.
17. Promote the Sharing of Success Stories – This is linked to business benefits as providing tangible evidence on how technology has enhanced work productivity. Success stories increased user-confidence of the system and raised its credibility.
18. Force-Led Activities – Recommended by the majority of stakeholders that took part in evaluating the P-SAT toolkit. Delineating activities in the process was highly favoured. Forces involved in It projects have distinct responsibilities, which differ to the activities of national programme teams.
19. Appoint Senior Officer/Owner – Recommended by the majority of stakeholders that took part in evaluating the P-SAT toolkit. Police forces involved in the project, should appoint a senior lead to represent their force and be responsible for the ownership of delivering the project.
20. Awareness of cultural receptiveness to organisational business change – This is the responsibility of the senior lead to maintain acute awareness of the social and cultural elements inherent to managing new ways of working.
21. Appropriate Deployment of IT User Licences – It is important that the role of regional coordinator is also instrumental in how user licences are deployed locally in police forces. This is to ensure a coordinated and uniformed approach to IT implementation and usage.
22. Create IT User Groups & Assign Regional Coordination – The creation of local IT user groups and the provision of regional coordinators highly assisted the

- adoption of the PND. They encouraged the sharing of best practice, resolved localised issues and coordinated regional activities to encourage use of the PND.
23. Localised Technology Application Variations – **This is an additional construct** added to the police system acceptance process. The implementation of the PND varied according to the nature of the business area. Both police forces and the project team need to be aware of the working differences in different areas of policing.
 24. Flexible Tactical Deployment – **This is an additional construct** added to the police system acceptance process. This is similar to the above, but emphasises flexibility in the tactical deployment of the PND to enable users' to develop individual working styles and practices to suit the demands of the business.
 25. Facilitate Task-Fit and User Satisfaction – Users' were highly influenced by its perceived usefulness and efficiency in the context of police work and intelligence gathering.
 26. Technology Performance Factors - **This is an additional construct**, which relates to the overall performance, productivity and innovation of the technology in how it generates user acceptance behaviour by being an effective, reliable and usable system.
 27. Technology Acceptance – This is the desired outcome anticipated by organisations implementing new technology. The police organisation may now be able to use this process to conceptualise and create an alternative approach to managing the process of technology adoption in a police environment.

7.4 Theoretical Insights to Conceptualisation and Model Development

Meredith (1993) argues that the development of conceptual frameworks from empirical research forms a strong methodological base to create conceptual models for the purpose of building theory. Ensuring that the model is relevant and realistically representative of practitioners' experiences is fundamental to the theory generating process. Meredith (1993) continues to purport that a conceptual model *"is a simplified representation or abstraction of reality. It describes, reflects, or replicates a real event, object, or process but does not "explain". The primary difficulty in using models to analyse situations is obtaining adequate simplification, whilst maintaining sufficient realism"*(p. 5). A conceptual model is therefore a set of concepts, either with or without propositions, used to represent or describe (but not explain) an "event", "object" or "process". Logical statements rather than epistemological relationships are identified (Doty and Glick,

1994). It is apparent that the development of a conceptual model overlaps with generating theory, and can be considered as a rational research method to utilise. However, the conceptual frameworks created following each phase of data collection, were intended to provide explanations to events and to increase understanding of meta-issues that were also of relevance to the research. The conceptual frameworks developed from this research, also provided a pre-theory to be developed as part of the inductive and theory building process. Dubin (1978) and Whetten (1989) do not distinguish between a model and a theory because propositions that are generated to rationally describe conceptual relationships, causes and effects of the phenomena are what constitute a theory's theoretical assumptions. Credence to the validity of a model or theory is built on the logic underlying the model and the plausibility of judging conceptual propositions as inherently cogent and reasonable (Whettan, 1989). Contextual limitations and the boundaries of generalisability of core propositions must also be set (Dubin. 1978). Fry and Smith (1987) suggest that authors of inductively generated theories have a particular responsibility for discussing limits of theoretical generalisability. Another aspect that is critical to theory development is to recognise that it is difficult to have complete consensus over a theory's framework, in the same way that it is unrealistic to suggest that a theory is empirically factual, and that it could be applied in different contexts. Whettan (1989) proposes that theory development advancement, which seeks to broaden theory utility and relevance, would require a *"theoretical feedback loop"* (p.493), so that theorists could learn something new about their theory, as a result of its application under various conditions and settings.

7.5 Summary

This chapter has described the toolkit development process, which consisted of creating a conceptual model, a process and activity flow chart and a strategic alignment map. This is to support the implementation and adoption of new technology in the police organisation. In order to refine the initial toolkit, a pilot exercise was carried out with police and project stakeholders'. This engagement proved to be fruitful, in that the feedback obtained was highly useful and provided a rich source of practical enhancements. Following refinement of the toolkit, a platform for building a theoretical framework was optimised, which contributed to forming a credible theory, which is discussed further in the next chapter. A clear and auditable approach was adopted throughout this process, which critically outlines how the toolkit was conceived prior to the pilot exercise, and how it was refined after receiving feedback from the

stakeholders'. This was to demonstrate a logical and inductive approach to developing the toolkit. A key part of this involved a review of relevant literature, in particular model and theory development that is aligned to case study theory building. The research literature was instrumental in increasing further understanding of the essential components of an inductively generated theory, and how this differs depending on the research methodology adopted for a study. For this research, the emphasis of this chapter was to articulate the toolkit generating process and to prepare the foundations for building theory. Influences were drawn from several authors, who have also adopted and applied theory-building models from a range of perspectives. This has confirmed that there is no definitive route toward generating theory, however, there are primary factors that a researcher must incorporate during the process, in order for the theory to gain empirical validity and credence.

CHAPTER 8

BUILDING THEORY FROM CASE STUDY RESEARCH

8.1 Introduction

This chapter will present a theoretical framework that is based on an interpretive research inquiry. The essence of the framework is to inform organisational and local police force practices, by building on their collective experiences, on the implementation and adoption of the PND. The process of theory construction was as a result of practical engagement and in-depth conversations with end-users, managers and stakeholders. It was therefore, paramount that the resultant theory is both useful and practical in its applicability to the real world. The theoretical framework also presents an understanding of how the PND was used in the police organisation, and the extent to which it has become institutionalised. The author purports that technology use in the police organisation is a product of human interaction, which is influenced by the organisation's capacity and capability to internalise business rules. This research has indicated that the implementation of new technology in the police organisation primarily begins with organisational readiness and preparedness, which essentially involves creating a business environment that, is receptive to new technology, and is supportive of innovative business practices. This can be described as the process of 'business acceptance'. The second phase of technology adoption is associated to technology performance and utility. This includes factors linked to cognitive acceptance, such as peer influence, mutual trust building between police forces sharing information, and the evidencing of tangible policing benefits. Furthermore, this research has identified specific consequences that can inform information systems research in the future. Distinguishing between national and local tasking and processes was not only favoured by PND stakeholders, but was also welcomed by some PND end-users, as it would communicate greater transparency and clarity of project timescales, key milestones, national and local responsibilities, by using a structured and accountable approach.

8.2 Articulating Theory Construction

The ontological assumptions of the resultant theory are grounded in subjective human experience and interpretation. Orlikowski and Robey (1991) assert that subjectivist theories attempt to understand phenomena by explaining, "*how individuals create and*

recreate their social worlds through deliberate action and enactment" (p.144). However, to some extent, this research has identified objectivist elements that are specifically aligned to organisational characteristics or properties, which are beyond social and individual control. It was therefore, important to understand phenomena by explaining how institutional properties influence human action and shape social relationships and technology interaction over time. The dichotomy in choosing which ontological assumption to theoretically adopt was difficult to define. This was because the literature suggests that the two positions are mutually exclusive, however, a more unifying approach was considered to be appropriate for this research because of the various levels of analysis carried out, which distinguishes between the organisational perspective, individuals and groups.

Theory building occurs at different degrees and in various applied disciplines, and debates about how idealistic or realistic theories are, are somewhat common. Developing informed knowledge frameworks about how to act on things in the world, formulate ways in which to understand and address issues and problems in the world around us (Alvesson and Deetz, 2000). Although these experiences may be described as personal theories, it may be argued that to an extent they are perhaps generated theories in practice. Put simply, such theories in practice help people to understand phenomena in the world in better and more informed ways, therefore, theories have a very practical role to play in peoples everyday lives (Lynham, 2002). Theory is described as *"a coherent description, explanation and representation of observed or experienced phenomena"* (Gioia and Pitre, 1990, p.587). And *"theory building is the coherent process of producing, confirming, applying and adapting theory"* (Lynham, 2002, p.222). Kaplan (1964) purports that there are two distinct knowledge outputs; these are the logical use and application of a theory in the real world, and second, whether it enables a reconstruction of logic, which follows a logical cognitive process and allows explicit modification opportunities to practically validate the theory's defining constructs. In short, a good theory must reflect both rigour and relevance, which can also be termed as theory validity and utility (Alvesson and Deetz, 2000). The theory building process for this research has been discussed throughout this thesis, and has made specific reference to Dubin (1978) and Eisenhardt (1989). Dubin's (1978) contribution to the development of theory for this research was based on the method's principle components or conditions, which were used to identify significant patterns within the data by the exploration of commonalities, associations and linkages. Dubin's (1978) theory building model was pivotal in differentiating between causal influences,

determining factors, contextual characteristics, and increasing understanding of the dynamic interactions amongst the range of analytical units and expressions. Dubin (1978) also specifies that the boundaries of a theory must be set to avoid over simplistic or broad generalisations, which may go beyond the theory's defining characteristics. However, the exact and systematic process for building theory in accordance with Dubin's (1978) approach was not systematically adhered, this was because Eisenhardt's (1989) work focuses on generating theory through case study research, and uses a less systematic and a more inductive approach, which can be flexibly tailored to the design of the research. Furthermore, for consistency, Eisenhardt's (1989) approach was perceived as highly iterative and tightly linked to the data, and synthesises previous work on qualitative methods by contributors such as Huberman and Miles (2002) and Glaser and Strauss (1967). As discussed in earlier chapters, the philosophical values inherent to Atlas t.i, which was used to analyse all the data collected, is based on grounded theory, which again, is consistent to the design of this research. It was important that the principles and paradigms of this research were reflected throughout the study, particularly in pragmatically generating theory from empirical reality.

8.2.1 Theory Development Process

As discussed Eisenhardt's (1989, p.533) model was used to develop theory from the findings of this research. Table 5 is a summarised version of the process, and starts from the data analysis stage.

Table 5: Process for Building Theory from Case Study Research

Step	Activity	Reason
Analysing Data	Within case analysis and Cross-case patterns using analytical techniques.	Gains familiarity with data and preliminary theory generation.
Shaping Propositions	Iterative tabulation of evidence, identifying logical and conceptual relationships.	Sharpens construct definition and validity. Extends theory and build internal validity.
Enfolding Literature	Comparison with similar and conflicting literature.	Raises theoretical level and sharpen applicableness.
Reaching Closure	Theoretical saturation when possible.	Ends process when improvements to theory become marginal.

The models created in Chapter 7 were developed using Eisenhardt's (1989) process; these provided the essential building blocks required to generate theory. The definitive process used by the author to construct theory is articulated below:

1. Conceptual Development/Concept Building
2. Operationalising Concepts/Conceptual Modelling in Real-World Context
3. Confirmation/Disconfirmation of Theoretical Propositions
4. Theoretical Development and Refinement

This chapter is principally concerned with presenting a final theory that has been contextually confirmed and refined. A series of theoretical propositions have emerged, which are to be examined in parallel to the models shown in Chapter 7. The literature suggests that model development and theory generation are not mutually exclusive (Whettan 1989, Meredith 1993, Doty and Glick 1994), but goes hand in hand in enabling empirical descriptions and explanations to be made about real-world phenomena. It is important to highlight that continual iteration was key to inductively constructing valid theoretical propositions; this was to ensure that theoretical saturation was reached.

8.3 P-SAT Theoretical Propositions

The following empirical propositions are based on the conceptualisations depicted in the conceptual model and the activity flow charts shown as Figures 21, 22 and 23 in Chapter 7. The objective of this is to define and describe the theoretical cornerstones that underpin P-SAT, and to conceptually induce and explain the relationships observed and explored between the elements of the phenomenon being studied.

- Preparatory activity prior to the implementation of national IT in the police organisation requires the identification of a senior leader in each police force, who will be responsible for setting up a team of project roles and responsibilities. The research findings have indicated that the senior leader is to continue their participation until the system is being utilised as intended. Also, forces' receptiveness to adopting new technology was influenced by varying levels of senior accountability and involvement in the PND project. This research has also found that senior leaders are in informed positions to be able to assess their own force's social and cultural adaption to business change and IT

adoption. They would also be expected to have a significant role in the post-implementation reviews.

- Facilitating an effective implementation process that creates a conducive operating environment has been identified as one of the first steps towards maximising technology adoption opportunities. This is because the research has discovered that some forces lacked internal resources and the capability to deliver national project tasking. Conducting assessments of forces' resources would reveal local resource limitations, and would assist in project-planning processes.
- The implementation process requires several key documents to be produced at certain key stages of the project. These are: national business rules to support the use of new technology and a business benefits framework. Formalising data sharing agreements during the early stages of project implementation provides reassurance to product-users that there are data protection measures in place to secure data sharing activities. The research findings indicate that the creation of national auditing standards should also occur at this stage, so that socially and culturally, any concerns about data security are tackled and resolved before they may gain momentum.
- The construction of an information database is heavily reliant on the quality of data it contains. In context of the police organisation, data quality and provenance were one of the main concerns that acted as a barrier toward use of the PND. The findings from this research suggest that poor and inconsistent data records impacted on user-perceptions of the technology's usefulness. In order to overcome this, data quality reviews should be carried out prior to data sharing. This research also found that the lack of standardised information management (MoPI) practices in the organisation contributed to most of the data quality issues identified.
- Prior to the technology being initiated, there are certain business change activities that need to be taking place. This research has found that end-users are likely to respond favourably to adopting a new technology if they have received the appropriate training beforehand. Not only should this be targeted to direct

system users, but to those indirect users that will be requesting information from the operators. Training should also include guidance on information management and disclosure practices as well as new business rules.

- A series of post-implementation reviews were carried out throughout this research process. They have proven to be both invaluable and insightful in understanding levels of business change and for identifying organisational issues that need to be addressed. Parallel to this, the setting up of force user-groups has had a positive impact on the acceptance of the PND. This research found that forces that had local user-groups had greater usage figures and were innovatively optimising the use of the PND. Forces also used PND user-groups as an opportunity to discuss system woes, and to share users' hints and tips. The realisation of business benefits and the sharing of success stories were also well situated in this forum.
- The adoption and internalisation of new technology in the police organisation, is manifested by an effective change management strategy and by the technology's perceived usability and capability. Once the supporting infrastructure, structures and mechanisms are in place, the onus is on the capability of the technology to perform as it was designed to do. The benefits of user-engagement during the design of the system's interface could potentially be realised at this stage, because findings from this research suggest that sustaining the ongoing use of the PND was somewhat dependent on perceptions of the technology's usefulness. Social and cultural resistance to change are also mitigating factors that need to be monitored at local level. The parallel processes identified during this research between business change and technology acceptance, reinforce notions of mutual trust building between police forces. This is this in relation to the sharing of information, and also relates to the extent to which individuals are likely to respond positively to experiencing and adapting to change within their organisation.
- Maintaining widespread, ongoing and effective communication of information concerning the project across all levels of the organisation was identified as an important element throughout the implementation and adoption processes for the PND. Project team interaction with users can be instrumental in identifying

users requirements and skills that will also support the appropriate deployment of PND licences. This research has revealed that the deployment model used by most police forces was inconsistent and uninformed, which subsequently impacted on user attitudes and behaviours toward their adoption of the PND.

8.4 Requirements for a Theory

The propositions generated from the findings of this research were built on critically understanding the unique occurrences of the phenomenon being studied. The objective of conceptual induction is to explain a phenomenon through the relationships observed between the system's elements. The goal is to not only describe the phenomenon accurately, but to also explain how it occurs. The accuracy of the theoretical descriptions are based on the consistency between the explanations inferred and the descriptions of the phenomenon, in particular its critical elements and the relationships identified (Meredith, 1993). Conceptual induction as a research method offers the ability to develop valid theories using an iterative approach (Gioia and Pitre, 1990). Empirical insights and descriptions are essentially part of the iterative process, which naturally leads to synthesising previous research as an attempt to externally validate the findings of this research.

Dubin (1978) purports that good theory building should result in two kinds of knowledge: outcome knowledge, usually in the form of explanative and predictive knowledge, and process knowledge, for instance, in the form of increased understanding of how something works and what it contextually means. Lynham (2002) argues that theory building can involve various logics from multiple research paradigms, and that *"there is no one supreme method of theory building, and nor should there be"* (p.224). However, there are contrasting features of approaches to theory building research, which can be empirical-analytical, critical or interpretative (Whetten, 1989). Based on the philosophical and methodological underpinnings of this research, an interpretive approach to developing theory was naturally inducted. The essence of this approach was to interpret human actions and experiences using the constructed meanings captured during interactions with PND users and project stakeholders. This involved interpreting and clarifying common meanings in order to create a contextual understanding of the overall organisational experience. Case study research is regarded as a method that is able to develop critical understanding of a complex issue, with strong emphasis on detailed and contextual analyses (Robson, 2011). From the perspective of case study research, generating theory can be described as an arduous process. This is because case

study research does not generally intend to provide predictions or generalisability, but instead seeks to critically describe the variables and interacting relationships of a specific phenomenon (Dooley, 2002). Glaser and Strauss (1967) assert that theory building requires ongoing comparisons of data and theory, and continuous refinement between theory and practice. Doty and Glick (1994) argue that case study research can be applied to theory building because it can embrace multiple research paradigms, on a single or multiple case studies. Reiteration and continuous theory refinement is also a feature of case study research, and was used to confirm or disconfirm the emergent theory for P-SAT. This also attempts to convey a balanced and multidimensional representation of the context, participants, and reality of the situation. Dooley (2002) purports that case study research is an essential research methodology for applied disciplines, and can be used for either theory building or theory testing. It is a recognised process of scholarly inquiry and exploration whose underlying purpose is to create new knowledge (Dooley, 2002). One of the unique characteristics of case study research is that it offers the researcher the opportunity to adopt a mixed or triangulation of methodology, which allows insights and observations to be perceived from multiple perspectives. From a theory-building point of view, *“the combination of data types can be highly synergistic”* (Eisenhardt, 1989, p.538), in assisting the development of enriched descriptions from the juxtaposition of contradictory or paradoxical evidence. However, it is important to note that the intimacy between the extensive use of evidence collected and theory building can also produce a high level of complexity (Dooley, 2002). In order to minimise this potential weakness, it was necessary to demonstrate parsimony during the theory building process, so that only the most significant relationships were discussed in detail.

In order to evaluate the validity of the theory’s contribution, Dubin (1978) identifies five requirements for a theory:

1. Allows prediction or increased understanding
2. Is interesting (i.e. non-trivial)
3. Includes attributes or variables and their interactions
4. Does not include “composite” variables (i.e. variables which include a number of other variables, elements, or attributes which are undefined)
5. Includes boundary criteria

Operationally, theory building can be described as a process of modeling real-world phenomena (Whetten, 1989). The purpose for developing P-SAT was to model a realistic and empirically valid representation of the factors and processes that were identified as significant to the implementation and adoption of the PND. Using Dubin's (1978) requirements as an initial baseline, a key question to address, is to assess to what extent does P-SAT constitute as a theoretical contribution? A review of the literature will also contribute to this validation process, by examining the reliability of P-SAT in how well the procedures have been explained, and to ensure that the research can be replicated. According to Whetten (1989) a complete theory must contain four constituent elements – these are what, how, why and who. These elements are considered to be the building blocks required for theory development. The 'what' factors relate to the constructs or factors that have been selected to represent the conceptual landscape. The 'how' element involves demonstrating how these factors are related by explicitly delineating themes and patterns. Together both the 'what' and 'how' elements contribute to developing grounded descriptions, and provide a framework for critical interpretation. The 'why' element offers an additional ingredient - explanation, which justifies the selection of constructs and the proposed causal relationships (Whetten, 1989). This is a critical theory-building component because it addresses a key question – why should credence be given to this particular representation of the phenomena? The 'who' component places theoretical limitations on the propositions generated, and set the temporal and contextual boundaries of the theory in terms of its generalisability and applicableness.

Corley and Gioia (2011) assert that utility and originality are fundamental to developing theories, and highlight the importance of generating a valuable knowledge contribution. Corley and Gioia (2011) also argue that new theoretical insights must have the potential to either *"improve the current research practice of informed scholars or improve the current managerial practices of organisational practitioners"* (p.17). Scientific and practical utility are to offer new insights, either for improving conceptual rigor, or in the form of creating problem-solving solutions. In relation to P-SAT as a theoretical contribution, it is specifically directed toward practical utility and focuses on providing contextual descriptions and explanations from the observation of real-world phenomena. From a science utilisation perspective, P-SAT provides a bridge that usefully links theory, research and practice - both conceptually and operationally. Meredith (1992) considers originality to be just as important as theory utility, because revelatory insight represents theoretical advancement and innovation. Utility and

originality are therefore mutually exclusive, and both of these dimensions provide a necessary platform to develop a cogent theory. This approach was used to decipher the theory-development process in generating P-SAT, and provided useful criteria to ascertain the reliability, validity and comprehensiveness of the resultant theory. During the theory-development process, it was important to apply logic as the basis for evaluating the conceptual relationships identified, and to justify the empirical propositions, which subsequently emerged. The next steps were to delineate and evaluate the construction of P-SAT in order to assess its knowledge contribution. This discussion will begin by addressing Dubin's (1978) theory requirements and Whetten's (1989) essential building blocks for developing theory.

P-SAT does not allow prediction neither does it promote generalisability in the sense of providing a set of tested hypotheses that have been subject to scientific experimentation. Instead, P-SAT offers an increased understanding of the various dimensions that are inherent to technology acceptance in the police organisation. Limited research has been conducted in the UK, which specifically addresses how to optimise the use of new technology in the context of policing. And, whilst UK police forces continue to invest in innovative technological solutions, P-SAT provides an evidence-based framework that can assist police forces in effectively managing the technology implementation process, and its subsequent use. The incremental building of the toolkit demonstrates how important it is to generate a convincing theory, which is both meaningful and applicable to the police organisation. Therefore, it was vital to engage with the organisation, not only to identify research participants but also to seek stakeholders' approval as potential toolkit users, who would be advocating the future use of P-SAT.

The incremental development of the toolkit was conducted in alignment with the delivery of the PND. Following each evolutionary phase of data collection, conceptual tabulations and frameworks were created, which facilitated the building of revelatory and thematic insights and provided a critical understanding of the core organisational issues. As a result, the emergence of key concepts and their interactions have been defined and described to illustrate how they relate and influence one another. This approach was also useful in managing theoretical saturation, in terms of recognising, the appropriate moment to end data collection, and deciding when there are sufficient consistencies in the data, to satisfy the requirements of a theoretical contribution.

The boundary criteria for the application of P-SAT was determined by the police context it represents. The toolkit has been designed solely for the use by the police organisation

and the focus was on modeling the implementation and adoption factors of technology being delivered nationally. The essence of the PND is about information sharing and it is an unprecedented system, which has evoked significant changes to business practices, and has challenged well-embedded social and cultural attitudes and behaviours. P-SAT is highly mindful of this, and has been designed to take account of these important factors. Achieving a synergy between the systematic capturing of data and anecdotal data has also contributed to setting the boundaries for P-SAT. This is because the police organisation is inextricably bound by formal and informal processes, and is influenced by discretionary practices, and social and cultural norms, which cannot always be tangibly captured. It is therefore, important to reiterate that the development of P-SAT was to specifically address the practicalities of implementing and adopting national police technology, and as such, the constructs identified and their relationships are characteristically and organisationally unique.

In terms of Whetten's (1989) criteria for evaluating the construction and comprehensiveness of a theory using the prescribed four elements, P-SAT provides both descriptions and explanations, which have been discussed in the preceding chapters. As suggested by Whetten (1989) the key question to ask is why should credence be given to P-SAT by the police organisations and by researchers and academics in the field? First of all, the answer to this lies in the phenomenological underpinnings of this research, which is essentially reliant on the subjective experiences of end-users, their line managers and national and police force stakeholders that were involved in the PND project. Secondly, the data collection methods deployed achieved a high level of engagement with police forces. This involved attendance at numerous national, regional and local user-groups, project boards, workshops, training courses, strategic steering groups, as well as conducting in-depth one to one interviews, focus groups and participant observation. The author used tried and tested research methods to gain certain closeness to the PND project; this was achieved by producing several reports specifically for Home Office and police audiences, in order to demonstrate recognition and appreciation of the police environment and the challenges faced in implementing the PND, and its adoption thereafter.

8.5 Literature Verification and Validation of P-SAT

In order to sharpen the theoretical applicability of P-SAT, it is important to compare and contrast the structures, constructs and processes of the toolkit with existing literature. Eisenhardt (1989) purports that this raises the theory's credibility, integrity and

relevancy. Jones and Orlikowski (2009) argue that there appears to be a need for approaches that develop accounts of the broader social and organisational context of technology implementation and acceptance, as well as reporting particular local circumstances that shape conceptualisations of how to respond to technological innovations. An awareness of the multiple schemas that can be affected by new technology and how transformations in working practices may be enacted by various technology-based activities requires acknowledgement of the complexities and variability of organisational processes in specific contexts (Tyre and Orlikowski, 1994). P-SAT has fundamentally explored core relationships in relation to the implementation of new technology and the dynamics of technological adoption and organisational change. Using emergent perspectives, P-SAT has accounted for social and cultural influences, whilst recognising the intertwining elements of human action, and the collective ability of the organisation and its willingness to adapt to innovative technology. The new relationships posited by TAM3 (Venkatesh and Bala, 2008) are related to those influences identified during the research process. For example, PND users considered perceived ease of use (PEOU) as being dependent on gaining hands-on experience, coupled with an easy to use interface design. This means that end-users wanted to be part of the interface design process, so that they would be able to comment and contribute to the PND's navigational layout. This is represented in P-SAT and it is recommended that this activity should be initiated by the national project team as part of their engagement with police forces. Users that lacked the skills and experience of using a national information database expressed their anxieties in using the PND, and the deployment model utilised by police forces did not entirely address this issue. Computer anxiety is recognised in TAM3 as having a direct effect on behavioural intention, as is reflected in the police toolkit.

Taylor and Todd's (1995) research on understanding technology usage, purport that the perceived usefulness (PU) of a technology is not determined by its perceived ease of use, which is similar to the findings of this research. However, their research also found that behavioural intention was influenced by both of the original TAM constructs – PEOU and PU, as was found in this research. The findings from this research suggest that the perceived usefulness of the PND was superseded by its perceived ease of use. Cognitive acceptance of the PND was influenced by additional factors, such as the development of mutual trust, which was regarded by stakeholders' as being instrumental in sustaining ongoing information sharing by police forces. Lippert and Davis (2006) also support this

finding and have integrated the concept of trust into planning business change activities, in order to enhance technology adoption behaviour in organisations.

Task-technology fit was identified as a determining factor for users of the PND. This resonates with users' perceived usefulness of the PND, in how it enhances and advances intelligence gathering and investigative work. Dishaw and Strong (1999) support this discovery by extending the original TAM, and by adding task-technology fit constructs to their conceptual model. This reinforces the validity of the task-technology fit construct featured in P-SAT, and it is depicted as being influenced by a) the functionality and performance of the PND and b) the training of users in being able to fully exploit the PND's capability.

Wu and Li's (2007) research on incorporating human, emotional and social influences, also mirror the findings from this research. Positive peer influence was identified as having a direct affect on users' cognitive acceptance of the PND, and also contributed to increasing the credibility and reliability of the technology. Wu and Li's (2007) research supports this discovery, and recognises that emotional factors are to some extent deterministic of the intrinsic relationship that evidently exists between positive peer influences and motivating positive attitudes and behavioural intentions toward technology use.

Manning's (2008) research on the introduction of new information technology in the police organisation supports this study's findings, in that new technology can have a destabilising effect on existing power balances between business departments. The PND altered established communication formats, peoples' roles and responsibilities, business processes and working relationships. This research has also found that the needs of employees and their behaviour were dramatically modified as a result of the PND. Lewis et al (2011) supports this, and suggest that cultural change within any organisation is needed to cope and adapt to the implementation of new IT. Resistance to change was evident during the research process, particularly during the embryonic stages of delivery. As identified by Mullins (2005) there are both human and social consequences when new technology is introduced. In context of the PND, this was in relation to staff recognising their skill limitations, and the subsequent increase in end-users' workloads as a result of new technology being introduced. However, the PND project team and stakeholders' were aware of such resistance to change, and responded to the setting-up of national engagement events and regional workshops.

Colvin and Goh (2005) argue that studies on the impact of IT on the social organisation of policing was generally lacking. This research has addressed this knowledge gap by

identifying a range of influential factors to explain why police officers and police staff embraced or rejected the PND. The quality of data and the timely retrieval of data stored in police databases were the important constructs identified by Colvin and Goh's (2005) research. The findings from this research support this, and have also found that matching the needs of police work with technical capability and performance in improving the effectiveness of police work, was considered to be vital for PND users', and reinforces the importance of user-engagement during the technology design phase. The findings from Mellor's (2011) work on knowledge management and information systems are similar to the discoveries from this research. The development of an intuitive organisational strategy to support the integration of the PND, and to support its alignment to business practices was evidently underpinned by the need to define the boundaries surrounding the use of the PND, so that end-users can understand what is expected from them; and how the exploitation of new technology will contribute to addressing policing priorities and achieving organisational goals.

Benefits management and realisation continues to remain a critical and ongoing requirement for the Home Office and for police forces. This research has revealed that preparing for the realisation of business benefits should occur at toward the end of the implementation phase, when the technology is being used as intended. This is because the majority of end-users, management and stakeholders' that participated in this research expressed apprehension in providing tangible measurements to the Home Office before the technology had become embedded into routine practices. The toolkit acknowledges this concern and has positioned the realisation of business benefits toward the start of the technology adoption phase. Grant, Hackney and Edgar (2010) recognise that IT benefits are often uncertain in the early stages of implementation, and that new innovations, the dynamics of business, social and cultural changes, as well as the inability to point to cause and effect relationships between IT investments and productivity outcomes mean that prospective benefits are difficult to assess with any degree of certainty. However, benefits management is an essential part of IT management, and it is important that if the police organisation is to realise the benefits arising from the use of the PND, it would need to identify how the PND has supported new ways of working; that it has improved the way business practices are carried out; and has enabled the organisation to cease activities that are no longer required (Stacey, 2007).

8.6 Summary

This chapter has discussed how P-SAT was constructed using case study research, and presents the theory building process that was adopted. The theoretical propositions that have arisen in alignment with the models produced, which were shown in the previous chapter (7), are also presented. The requirements for assessing the theoretical contribution of P-SAT have been addressed, to demonstrate its originality, practicality and scientific utility. The propositions generated are discussed in alignment with the literature; this is for the purpose of verifying and validating the core constructs of the toolkit, whilst delineating how the relationships between the constructs interact. Overall, this chapter has articulated the evolutionary process undertaken in building a theory, to support the future implementation and adoption of new technology in the police organisation.

CHAPTER 9

DISCUSSION AND CONCLUSION

9.1 Fulfilling the Aims and Objectives of this Research

The aims of this research were to explore, identify and model the implementation and adoption factors of the PND in the police organisation' and to develop a police system acceptance toolkit that can be conceptually applied to support the implementation and adoption of new IT in the future. In order to achieve this, objectives were designed to describe how the aims of this research would be fulfilled. Chapters 1 and 2 address the development of a conceptual framework in relation to the acceptance and use of new technology. A critical analysis of the literature from various theoretical perspectives enabled the development of a theoretical framework, which subsequently informed an understanding of the common design approaches utilised to research technology adoption behaviour, in various organisational settings (Chapters 2 and 3). A review of the literature also revealed knowledge gaps in existing research models, which, for instance did not address the evolutionary journey of an IT system; and only a few studies accounted for the social and environmental factors that were found to be contextually relevant to the PND. Furthermore, examination of the literature assisted in discovering how the implementation of new technology effects end-users from a variety of different work environments, which contributed to developing a critical insight of potential scenarios that could be relevant to this research. From a practical perspective, the literature strongly suggests that business challenges in most circumstances are unavoidable, particularly for large organisations like the police service. Understanding the wider business issues, assisted in identifying the contextual factors, which influenced users' attitudes toward accepting or rejecting the use of the PND. As a result, developing P-SAT was equally reliant on representing practical and business oriented features, as well as consideration of the conceptual factors that were based on understanding a collective of organisational and individuals' experiences. A critical analysis of the organisation's business challenges was important to contextually examine police forces' receptiveness to the PND, and in terms of exploring the role and contribution of the PND in assisting the sharing of police information. This was an ongoing theme throughout the research process, however, chapters 4, 5 and 6, specifically achieve this objective. It was vital to examine whether the PND was instrumental in modifying social and cultural attitudes and behaviours, and ultimately,

whether the PND was beneficial to policing. This information was captured using a national reporting system introduced by the Home Office, enabling forces to share their PND success stories. Although these outputs have not been discussed in the main chapters of this thesis, a detailed report of these stories, which was produced for the Home Office, is presented in appendix 6. Furthermore, the objective of exploring the dynamics and impact of the PND on organisational learning processes was also pertinent to this research. This area of interest was mainly influenced by the review of literature, which critically discussed organisational learning processes in context with technology adoption. In addition, this was central to gaining an insight of how well the organisation was prepared in allocating resources, and in creating internal structures and mechanisms to facilitate business change. Consequently, this research discovered that adapting to new ways of working is essentially about learning to do things differently, which is characteristic of the PND and the business change it evoked throughout its implementation. Chapters 7 and 8 specifically address the objectives featured as part of fulfilling research aim 2, which is the development of theory to support the construction of the police system acceptance toolkit (P-SAT). Conducting post-implementation reviews to explore the use and integration of the PND, proved to be invaluable and provided unique insight of police forces' experiences, attitudes and technology adoption behaviours in various policing contexts. As a result, it is anticipated that the development of empirical knowledge, which heavily underpinned the creation of P-SAT, will contribute and enhance existing theoretical models of technology acceptance, as well as providing additional and original insights in the context of UK policing.

9.2 Major Themes and Interpretations

One of the major themes that emerged from this research were: managing system transition, which evidently, was not a gradual and continuous process, but highly discontinuous. This research discovered that examining the process of technological adoption temporally was important in exploring early patterns of organisational technology use. Another theme related to the development of a business change strategy, which encompasses the design of standardised business rules to support technology use, and was considered as vital for PND end-users and their line managers. Formalising IT processes in organisations acts as the resource, which enables individuals to accomplish their information processing activities. Furthermore, delivering holistic training that explains formal data handling and disclosure procedures

was also important, as this directly related to the appropriate deployment of IT licenses that match the skill-set and job role of the end-user. Communication and marketing was also prominent feature during the PND implementation process. This was found to not only raise the profile of the PND, but would also ensure that police forces were up to date with their tasking requirements.

The influence of senior accountability and direction was a significant theme throughout all the data collection phases, and was considered to be imperative during the implementation and adoption processes. The findings from this research suggest that it is important to recognise the hierarchical nature and cultural values of the police organisation, in facilitating a critical understanding of the complexities surrounding technology acceptance. Furthermore, conceptualising the police hierarchy can allude to an array of multi-faceted perspectives and attitudes shared by peers. These hierarchies can provide insight on the distribution of power, formal structures and influence, and how decision-making efforts are accounted for. During the implementation of the PND, varying levels of senior leadership to some degree, determined how successful the assimilation of the PND was in respective forces. Hence, it is important that multi-dimensional organisational learning on the PND takes place throughout the hierarchical structure of the police organisation, which also addresses the cultural and social values that the PND inadvertently challenges.

The golden thread that was dominant throughout this research was the importance of maintaining business continuity. However, a barrier to achieving this was the extent to which the organisation as a totality embraced the relevant changes, and whether the individuals directly affected, was informed of the subsequent impact to their working responsibilities. This was also contingent on managing peoples' expectations and communicating realistic timescales and deadlines that were not overly ambitious.

The findings from this research reinforce one of the most important constructs in technology acceptance behaviour, which is the perceived usefulness of a technology. This research discovered that during the initiation phase when the PND was in its infancy, one of the reasons why some users did not often use the database was that it was not perceived to be fit for purpose; others felt that the PND did not exactly mirror what was marketed to them by the national project team. Although, this was heavily influenced by the incremental approach used to deliver different functional features of the PND, the majority of users thought that this was not clearly communicated at the start. In the subsequent phases of data collection, it was revealed that use of the PND had gained momentum, and some of the key findings that emerged during the post-

implementation reviews, was that the PND was delivering key business benefits, and was proving to be an efficient and effective tool to policing. In relation to preparing activities to support the realisation of business benefits, the findings from this research suggest that this ought to occur toward the end of the implementation phase, when the technology is becoming internalised and utilised as intended. A further theme identified was that the sharing of best practice in forums such as force user-groups were instrumental in formalising and internalising local business rules, and also encouraged wider business use of the PND. In terms of data sharing, the PND certainly had a profound effect on altering the social epistemology of police practice. As discussed, the PND challenged both cultural and social norms, and formalising data sharing agreements during the early stages of project implementation provided reassurance to forces that data protection measures were in place to secure the appropriate dissemination of their data. The quality of data uploaded onto the PND was a major issue for police forces. Information gaps in police records were highlighted as a barrier toward using the PND. The problem resided in not knowing whether the data provided was up to date or whether more information existed but was not shared.

9.3 Future Implications for Police Practice, Theory and Research Design

So what are the implications for police practice, theory and the design of research methodologies in the future? In studying the implications of IT, researchers are concerned with how IT is implemented, assimilated, and adopted by users, and what the consequences of such usage are. The police organisation can learn important lessons from this research, in terms of how it manages the implementation and utilisation of new technology, as there are both human and social consequences. There is scope for fostering an organisational culture, which is less focused on IT capability and more focussed on the human and social role of IT interaction, because the use of IT can be described as a medium for human and social action. The use of technological systems in policing, are arguably facilitating platforms that will never replace the sense-making capacities of human ability. User engagement during the interface design stage of the PND was favoured by the majority of end-users, simply because they wanted to be part of designing a system that they themselves would be expected to use. This research also found that end-users' interaction with the PND was influenced by the institutional properties of the police organisation, and this knowledge was utilised to constitute the organisation's structures and conventional norms. The consequences of this interaction can result in the organisation either transforming embedded rules and assumptions, or

sustaining current practices. The introduction of new technology provides an unprecedented opportunity for the redistribution of knowledge, resources and conventions in an organisation, and hence may encourage a shift in individuals' tasks and cognitions. In the case of the PND, managing business change alongside the technical delivery of the PND, created opportunities to invoke and internalise dominant new structures that would ultimately contribute to maximising technology use.

The implications of these findings for theory relate to contributing to a critical understanding of the factors, which influence technology adoption behaviour in the police organisation. The PND was not just about implementing a national police database, but it also represented one of the most important developments in national policing in recent history. The working values of policing challenged the symbolic values aligned to the PND; and the sharing of police information on such a scale remains unprecedented. An important policing value is about establishing and maintaining trust, and assessing trustworthiness. This research identified interpersonal trust as being a crucial factor for police forces sharing information, which therefore influenced forces' behaviour toward adoption of the PND.

This research utilised a case study research approach, which facilitated an in depth examination of the PND implementation and adoption process. The longitudinal design of this study was influenced to coincide with the delivery of the PND, and this proved to work well, particularly in terms of data collection and engaging with police forces. The phenomenological approach used to philosophically underpin this research, allowed explicit focus on the subjective experiences of individuals, and of police forces overall, which gave unique insight into how the police organisation invests in new technology. Consequently, this amalgamation of subjective realities was critically informing, and anecdotal data collected was equally captivating and relevant to understanding peoples' narratives as they emerged. The implications for future methodologies are that case study research explores and takes into account contextual factors, holistically. One of the limitations of a case study approach to social research may be limited to a particular set of interactions, but case study research can still allow examination of how certain actions and perceptions are embedded in particular patterns of social organisation. Another limitation of a case study research approach includes the lack of individual variables, and the difficulty in locating causality. However, whilst it is appreciated that case study research cannot achieve representativeness per se, it can however, generate understanding of a 'broader class of things', and can unveil the various intricacies and subtleties of complex situations. This means that case study research can reveal factors

or variables that were unexpected. The qualitative and inductive nature of this research facilitated themes to emerge gradually, allowing for exploration, and a greater awareness of the social structures and processes of the organisation; whereas a deductive approach would focus on testing hypotheses, and on achieving significant generalisability. Whatever methods are used, the aim of case study research is always to give as complete a picture as possible, so that organisational stakeholders, researchers and academics in the field may develop or enrich their understanding of what was being studied. However, there are disadvantages to inductive forms of research in that, researchers who prefer to allow their data categories to emerge during the research process would be unable to use the data collection period to test their subsequent theories, because their analytical interpretations will be difficult to substantiate as no 'testing' would of been carried out. Nevertheless, the theory building process, which incorporated qualitative data analysis computer software – Atlas.ti; Dubin's (1978) theoretical framework conditions as an influential guide; and Eisenhardt's (1989) iterative process for inducting theory, provided a systematic framework to generate a realistic, tangible and practical theoretical contribution.

The future and ongoing value of the toolkit to the police organisation can only be realistically assessed, if it is to be tried and tested in a real-life project situation. Although, the toolkit was independently evaluated following the modifications made, it was not subject to empirical application. Therefore, in order to achieve practical evidence of its applicability, it is highly recommended that P-SAT and its theoretical underpinnings be evaluated. This will not only give considerable credibility to the toolkit, but will also demonstrate its potential value to the police organisation through effectively learning lessons to create knowledge and make better informed decisions. P-SAT was contextually created to represent the important and distinct processes that were focused on exploring the dynamics of implementing a national police database that was essentially about maximising information sharing. Other IT projects being introduced by the police organisation of a similar nature may also realise the potential benefits of using P-SAT based on bespoke use of the toolkit. Certain model elements could be altered to support variations in business practices and processes, whilst further activities could be added to reflect different organisational requirements. For example, smaller projects may not require extensive business process re-engineering and classroom training for end-users, similarly, projects which deliver specific IT capability such as geo-spatial analysis may not necessarily require regional coordination or regular post-implementation reviews.

Based on the adaptability of P-SAT and its potential to be tailored to suit the scale and nature of projects, other organisation can use the toolkit as a general model to adopt when implementing new IT solutions. A probable scenario for example, may relate to the National Health Service (NHS), whereby the organisation is currently in consultation with peers from the medical profession and patients on centralising patient records on a national database for research purposes. This is to enable the NHS to have better access to information that is to develop into a national dataset of patients' medical histories. There are distinct commonalities with the PND, in terms of sharing information, data protection and security, the performance and capability of the database i.e. its potential usefulness, managing organisational cultural issues and ensuring ongoing strategic leadership in the event of system futility and adoption failure. The NHS could learn invaluable lessons from the PND project and the P-SAT toolkit, in terms of human and financial resourcing, data quality reviews, business change management, business benefits realisation, and most importantly – maximising and sustaining technology use.

9.4 Original Research Contribution

The original contribution of this research is the development of a police system acceptance toolkit (P-SAT) that was constructed as a result of extensive engagement with end-users, senior management, police stakeholders and project team members. It was also novel to study the incremental journey of the PND from its conception as an initial proto-type, through to its national implementation. This facilitated direct observation of work taking place, from national, regional and local perspectives. Therefore, in as much as possible, the findings of this research represent a genuine depiction of events, circumstances and experiences, from the perspective of people in different roles, which were collectively undergoing the relevant changes and processes toward implementing and adopting the PND. Researchers gaining access to policing environments is generally difficult, and this alone constitutes an element of originality to this research. Conducting research that gains direct access to participants in their natural working environment has the potential to facilitate credible and insightful propositions of participants' perceptions and experiences. Again, this is a novel aspect of this research, and the degree and scope that tends to reflect the level of theorising is demonstrated by the parallel distinctions made between human action and organisational practice in driving technology acceptance. The subject of technology acceptance in the police organisation has received little attention in the UK. Although investments in IT and IS will undoubtedly continue to advance, evaluating just the use of

technology as a stand-alone commodity fundamentally ignores the wider implications of technology adoption, such as maintaining business continuity, managing resources and directing staff during radical organisational change. The various elements and processes presented in P-SAT, suggest that there are parallel processes between planning business change activities and IT adoption. The conceptual model featured in the toolkit acts as a precursor to the activity flow chart and the strategic alignment map, by outlining a structured sequence of change steps to better guide and enhance IT adoption. The use of depicting planned activities in this way, specifically addresses the relationship between human work activities and techno-structural change techniques, and facilitates an integration of new techniques into human and business tasks. This research asserts that positive interactions between individuals in an organisation and a new technology, can function as a formative indicator of project success. Therefore, it is reasonable to suggest that effective organisational decision-making encompasses an understanding of what incentives are necessary for individuals to adopt new technology. Incorporating variables such as focusing on resultant goals and objectives of technology use, is important in explicitly understanding the various instrumental steps that exist between forming intentions to use a technology, and initiating actual behaviour. The findings of this research suggest that conceptualising technology as being constituted by goal striving, filling in the gaps between intention and behaviour and goal attainment, which are considered to be crucial for the successful adoption and use of technology in the police organisation.

9.5 Research Limitations and Delimitations

One of the limitations of this research was that it exclusively focuses on the police organisation in the UK, and the findings may not be representative of police forces internationally. This is due to global variations in policing styles and hierarchical structures. The participants that took part in this study, were not randomly selected, but were purposively identified as a result of engaging with police forces and the Home Office in various PND forums. The research methods adopted in the first post-implementation review – semi-structured interviews, were to an extent, determined by the IMPACT programme. On reflection, analysing data obtained from over ninety interviews was both complex and cumbersome for a lone researcher to understand. An unavoidable weakness was that the IMPACT programme shared the themes to be addressed in both of post-implementation reviews. This is regarded as a potential weakness to this research as participants may have prepared their responses in

consultation with their peers. However, in order to minimise this perceived weakness, steps were taken by the author to verify participants' views by conducting participant observation at various PND forums. This assisted in attributing provenance to the views expressed by exploring peoples' perceptions of the PND in a wider organisational context. Although, the PND was observed during its construction, and whilst the author took part in all the PND training courses available to police forces, the PND was not experientially observed in practice. This would have illuminated any variation in how the PND is used in different policing contexts. Another weakness of this research is that it does not fully explore psychological factors, such as the role of emotions as an indirect determinant or co-predictor to technology use. Further research is needed to examine psychosocial and emotional effects.

The delimitations of this research stem from the boundaries intentionally set by the author. For instance, the realisation of PND business benefits did not heavily feature as part of the aims and objectives for this research. This was because it was considered as an antecedent to the implementation and adoption of the PND, and it was therefore, important to explore and identify technology acceptance factors prior to creating mechanisms to capture PND benefits. However, business benefits have been discussed in this thesis, mainly in terms of describing how the IMPACT programme is to approach this activity, and the complexities and challenges involved in realising and measuring PND outputs. The philosophical framework used in this study is also delimiting, in that, participants' subjective accounts were critically relied on to understand their experiences of the implementation and adoption process, and subjectivity is an inherent feature of phenomenological research.

9.6 Closing Comments

The efficiency and effectiveness of the police organisation is heavily reliant on its ability to collate, retain and share information. Often, IT is used to facilitate information management processes, and the PND represents one of the innovative ways toward achieving this. However, this requires an organisational wide effort that not only regulates data quality standards in order to meet business demands, but also a commitment to adapting to new ways of working from all levels of the police hierarchy. Given the dynamic and multi-faceted nature of the police organisation, P-SAT provides a flexible, and structured approach, which aims to guide and enhance the adoption of new technology. This is much dependent on striking a balance between the paradoxical roles of collaboration and competition required by organisations of their employees.

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AUTHOR PUBLICATIONS - APPENDICES

Appendix 1

**Eastern Region PND Release 1
Post- Implementation Review
Report
March 2012**



KEY MESSAGES

- The majority of respondents that participated in the review were **Direct Users representing 54 per cent** of the sample
- In terms of participating departments, **Force Intelligence Bureau's and Child Protection Unit's represented 20 per cent and 18 per cent respectively** of the sample
- Out of 8 Business Area Managers 5 **were satisfied with the guidance documents produced by the NPIA** to support business use of the PND. Only 2 Project Managers out of 8 were satisfied, compared to 6 who were dissatisfied
- Out of 8 Project Managers 5 felt that the **support and guidance given by the IMPACT programme was insufficient for them to prepare their force to implement the PND**
- Half of the Business Area Managers (4) stated that the business area in which they work **have mostly incorporated the use of the PND as routine practice, and 3 had stated that the PND is fully incorporated** for all activities
- Findings from **Direct Users indicate that the PND has been fully incorporated into routine searches** for all activities in which they operate representing 39 per cent
- Business Area Managers and Indirect Users agreed that **the PND enables information to be found in an understandable and manageable way**

- Findings from **Direct Users indicate that almost 30 per cent agreed with the statement** that the PND enables information to be found in a way that is understandable and manageable
- **Indirect Users from Domestic Violence Units agreed that the PND positively influences risk assessing and decision making** for both victim protection purposes and for gathering background information on perpetrators
- Over half of the Training Managers (5 out of 8) **felt that the PND course for trainers did not adequately prepare their staff to undertake training on the PND.**

INTRODUCTION

This report presents an analysis of the findings from the Eastern region PND Release 1 post-implementation review that was carried out in November-December 2011. A total of 100 questionnaires were received from the forces comprising of Bedfordshire, Cambridgeshire, Essex, Hertfordshire, Norfolk and Suffolk. The results are presented under the following headings - Business Change and Assisted Implementation, PND Utilisation and Information Management, Operational Benefits, PND Release 1 Training and PND Release 2. The results from this report will supplement the initial findings from the National post-implementation review which involved 10 additional UK forces.

BACKGROUND

As part of the Benefits Realisation Plan and Performance Management Framework agreed by the Business Design Authority in May 2011, these formal reviews were designed to establish whether the programme achieved in Release 1 what it set out to do, in business terms and if not, what should be done. They are an essential component of the benefits management process and ascertain whether benefits, including those set out in the business case have been achieved, and identify opportunities for further improvement.

The objectives of the review are:

- To gather information on critical elements of PND implementation
- Establish the current position in relation to benefits realisation
- To inform the programme concerning any potential barriers to the roll out of Release 2
- Look for opportunities to communicate lessons learned to forces

PND NATIONAL POST IMPLEMENTATION REVIEW - INITIAL FINDINGS

Overall, the results from this report are consistent with the initial findings report following the national review. Concerns of users' were data quality in terms of how recent the data was and the completeness and accuracy of data records. Information overload was also expressed as a concern, with the additional time required to evaluate searches returned. Forces view the main issue as ensuring that up to date information is available from all forces.

In relation to the allocation of PND licenses, the majority of forces in the review chose INI users as PND users. However, users felt that additional skills are required to conduct and interpret a PND search, which was additional to their job role and duties. PND guidance policy on the use of the PND varied between forces and departments; the IMPACT programme recommends that forces conduct a review of their working practices in alignment with implementation processes.

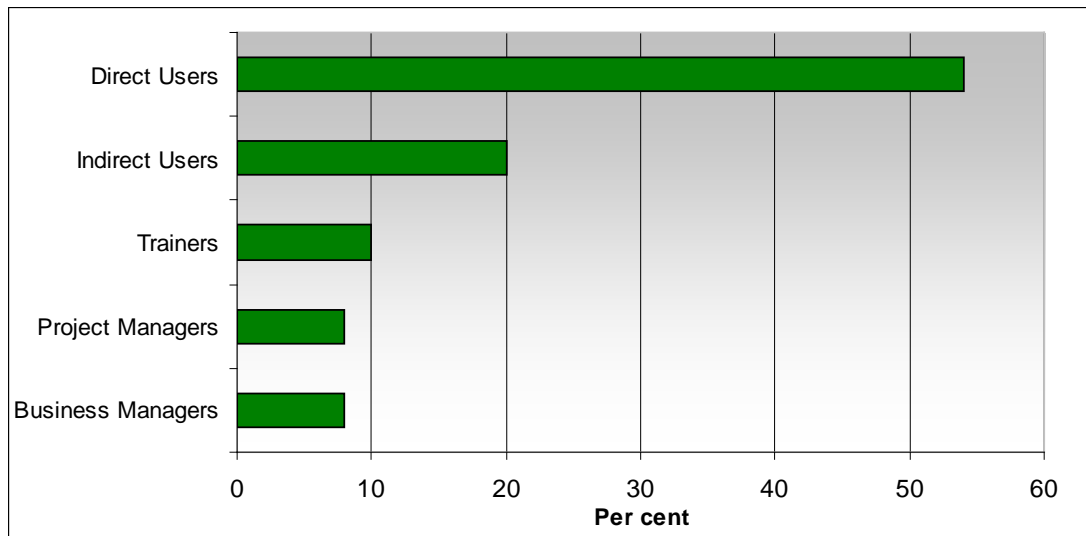
The Training Database presented some problems for forces in that it was unreliable; users also found the data on the database was unrepresentative of the live database. It was emphasised during the review process that the training database should be more realistic with more data included, and this is being addressed.

The initial review findings indicate that the continual implementation of the PND requires rollout into other business areas in the organisation. This will assist in maximising the potential impact of the PND as a valuable research tool by widening its use in various departments and job roles.

Sample Population Characteristics

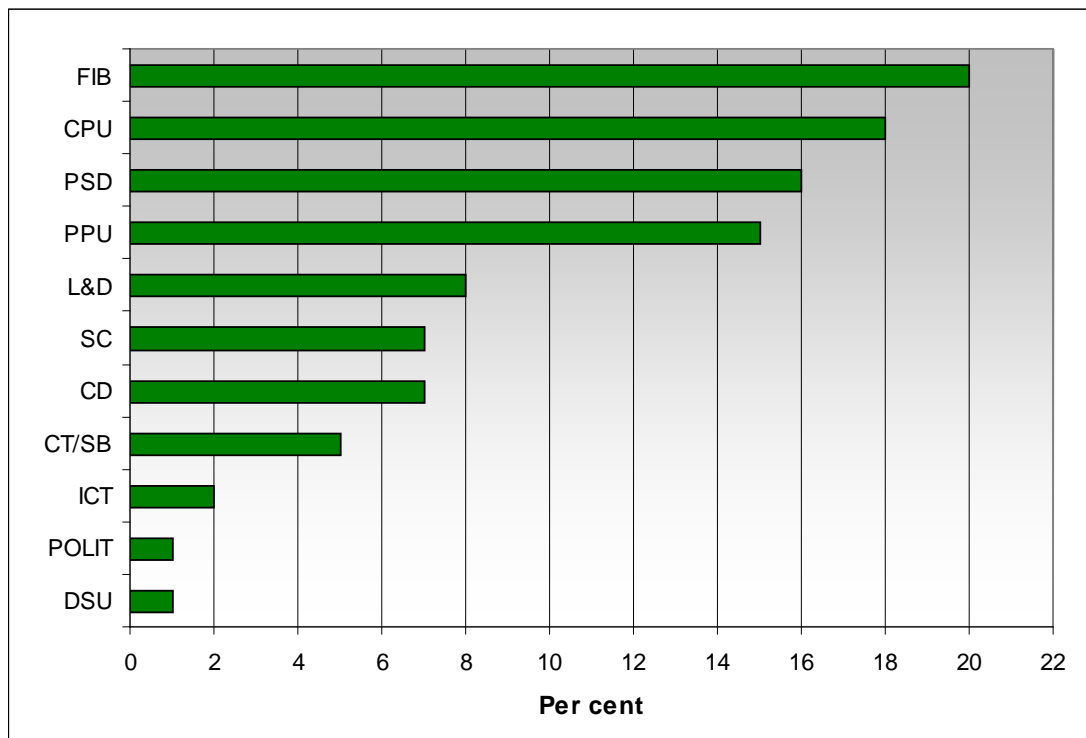
The majority of respondents that participated in the review were Direct Users representing 54 per cent, followed by Indirect Users representing 20 per cent of the total sample population. Trainers represent 10 per cent, and Business Area Managers and PND Project Managers represent 8 per cent of the sample respectively.

Figure 1: Participating roles



In terms of participating departments, Force Intelligence Bureau's and Child Protection Unit's represented 20 per cent and 18 per cent respectively of the total sample, followed closely by Professional Standards Department's with 16 per cent.

Figure 2: Participating Departments



Business Change and Assisted Implementation

Due to the small number of questionnaire respondents for the roles of Indirect Users, Business Area Managers and Project Managers it would be misleading to represent their views as percentage proportions. Therefore, Figure 3 shows the actual number for each response, Indirect Users represent 20 per cent of the sample compared to 8 per cent for Business Area Managers and Project Managers respectively.

Overall, the results indicate that 14 out of 20 Indirect Users expressed 'neutral' as their response in relation to the question, 5 Business Area Managers and 3 Indirect Users were satisfied with the guidance documents produced by the NPIA to support business use of the PND. Only 2 Project Managers out of 8 were satisfied, compared to 6 who were dissatisfied. Figure 4, which gives responses from Direct Users, shows that 50 per cent of respondents chose 'neutral', as their response and 42.5 per cent were satisfied.

Figure 3: Satisfaction levels for NPIA guidance documents on the PND

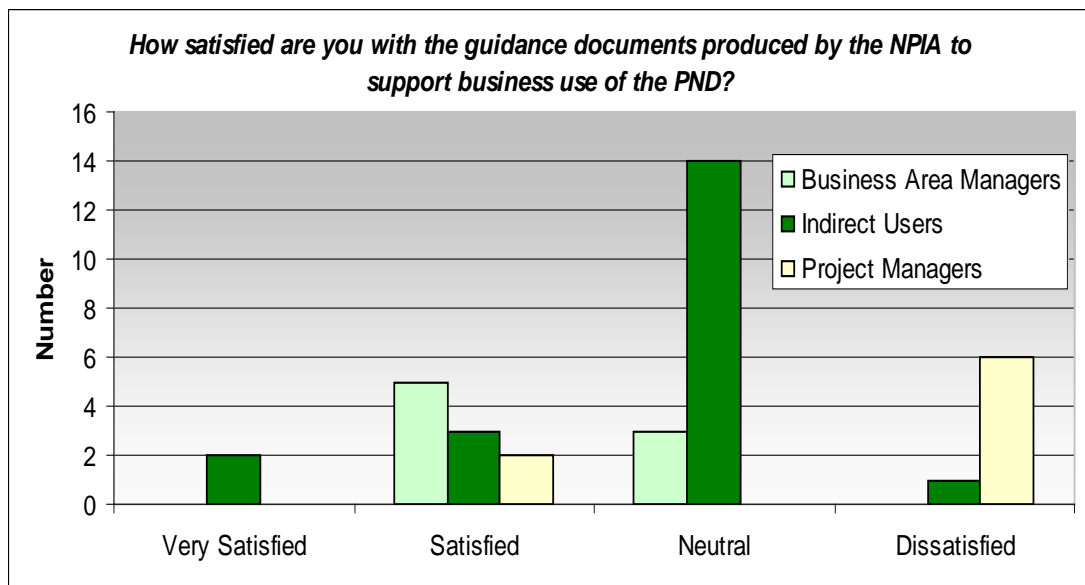
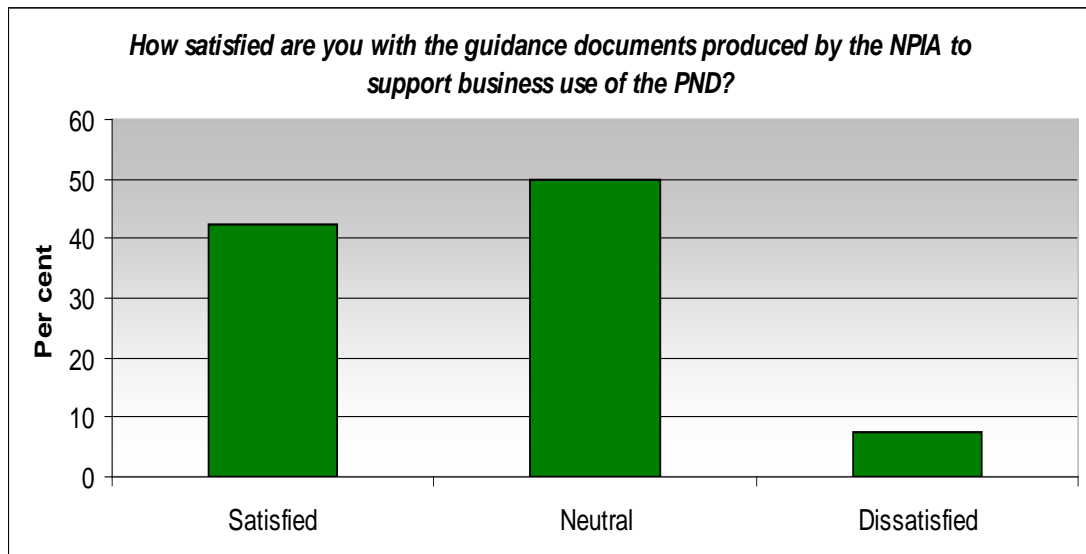
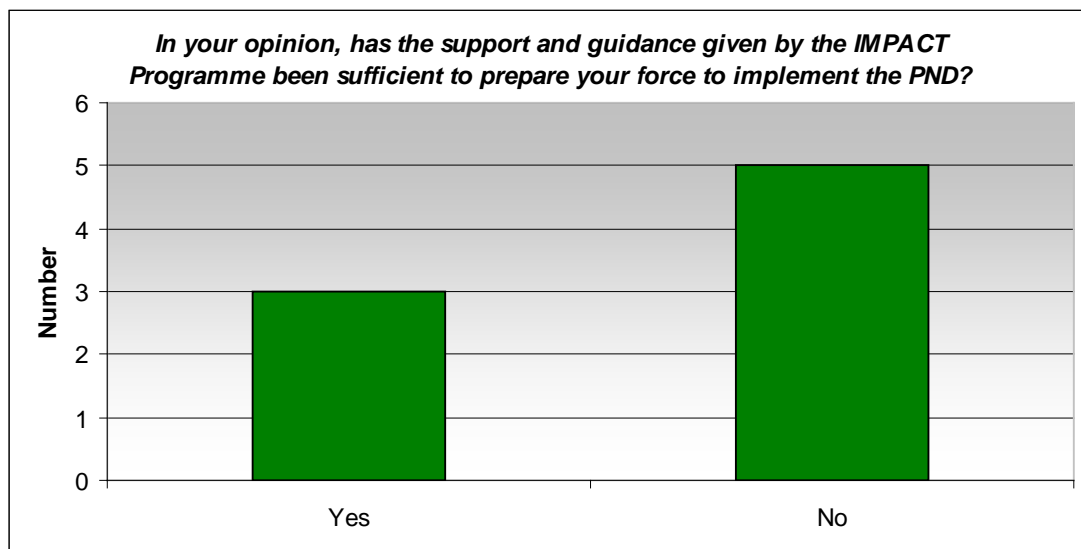


Figure 4: Direct Users - Satisfaction levels for NPIA guidance documents on the PND



Findings from Project Managers as shown in Figure 5 indicate that 5 out of 8 Project Managers felt that the support and guidance given by the IMPACT programme was insufficient for them to prepare their force to implement the PND.

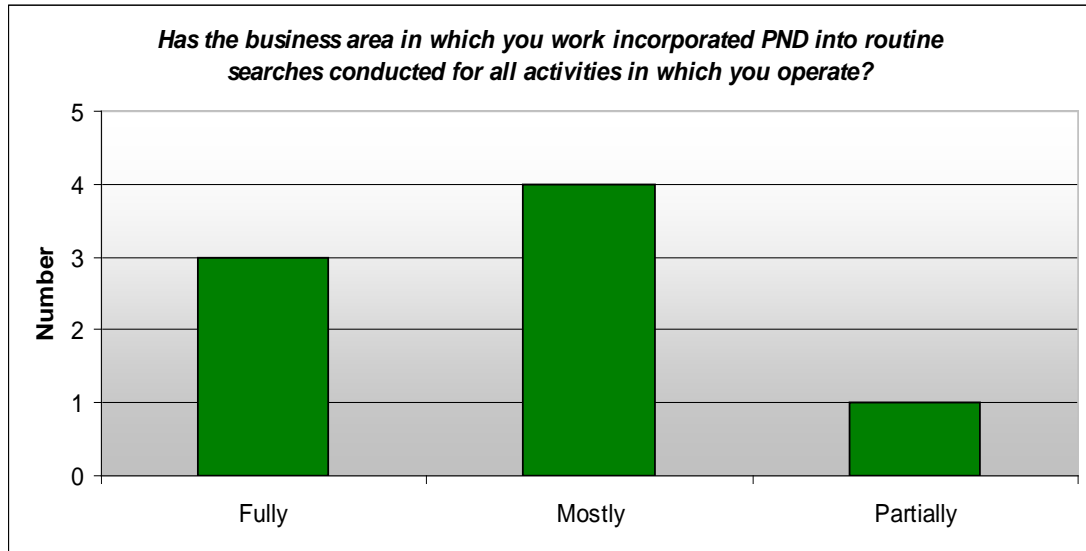
Figure 5: Project Managers – IMPACT Programme Assistance



As explained, proportional comparisons cannot be directly made between Business Area Managers and Direct Users due to the numerical disparity of respondents from each role. However, for the purpose of data analysis findings can be indicative. Half of the Business Area Managers (4) responded by stating that the business area in

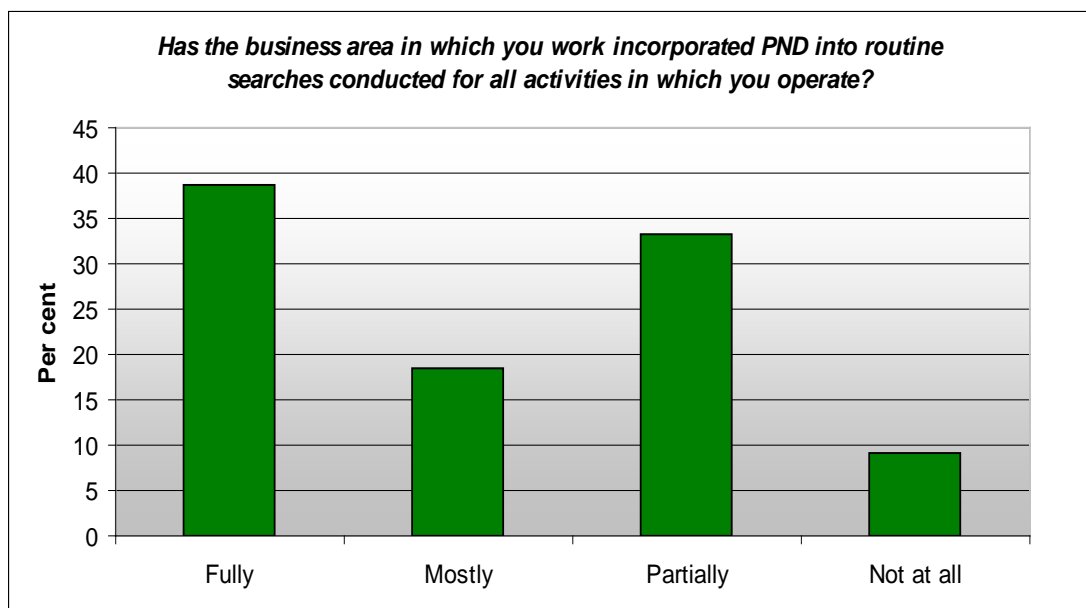
which they work have *mostly* incorporated the use of the PND as routine practice, and 3 had stated that the PND is *fully* incorporated for all activities.

Figure 6: Business Area Managers – Routine Use of the PND



Findings from Direct Users in Figure 7 indicate that they believe the PND has been *fully* incorporated into routine searches for all activities in which they operate representing 39 per cent, however conversely, 33 per cent of Direct Users feel that this has been only *partially* achieved in the business area they work in.

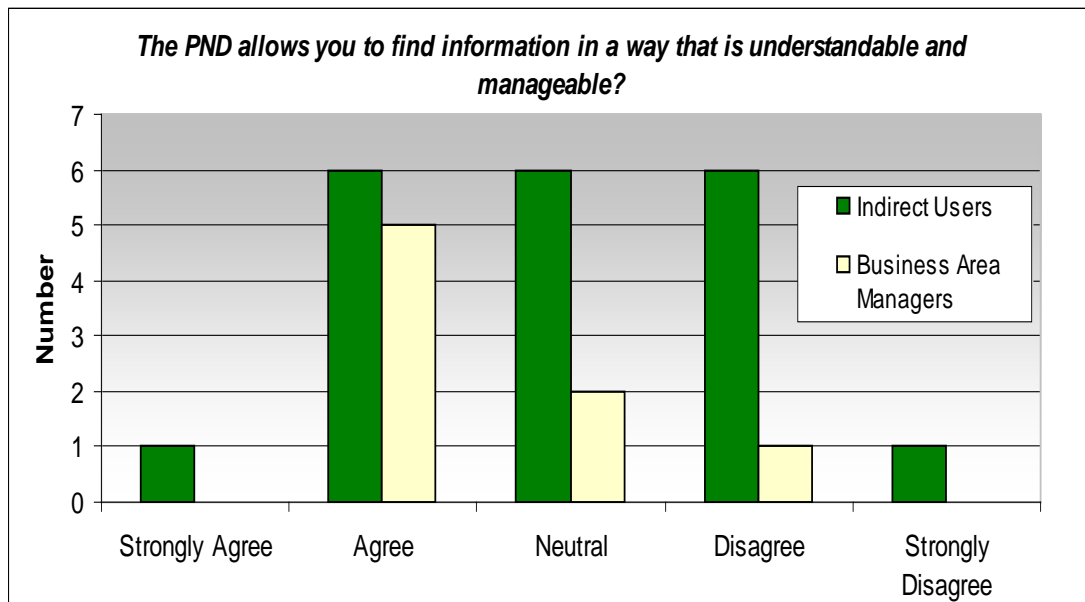
Figure 7: Direct Users – Routine Use of the PND



PND Utilisation and Information Management

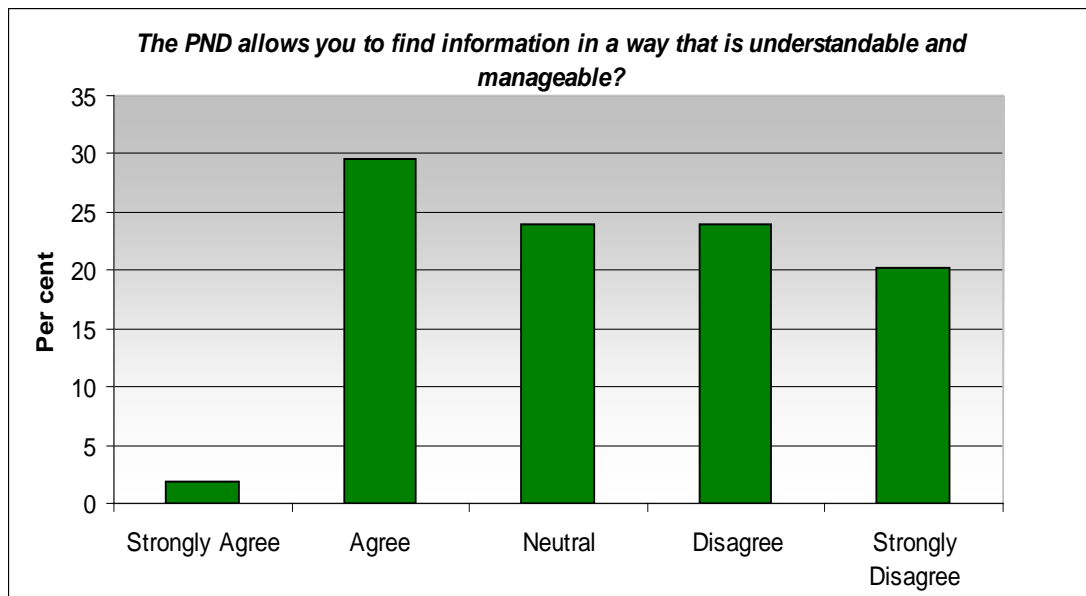
Although there is over twice as many Indirect Users (20) than there are Business Area Managers (8) who took part in the questionnaire on the Post-Implementation Review for Release 1 of the PND, Figure 8 shows that Business Area Managers and Indirect Users agreed that the PND enables information to be found in an understandable and manageable way. However, 6 out of 20 Indirect Users also disagreed with the statement. It is somewhat difficult to comment on why this is because as Indirect Users they would not be accessing the PND themselves; a possible explanation could be that feedback may have been given from Direct PND Users on the time required to search the database and amalgamate findings based on Indirect Users requests for PND searches.

Figure 8: Searching the PND and Managing PND Information



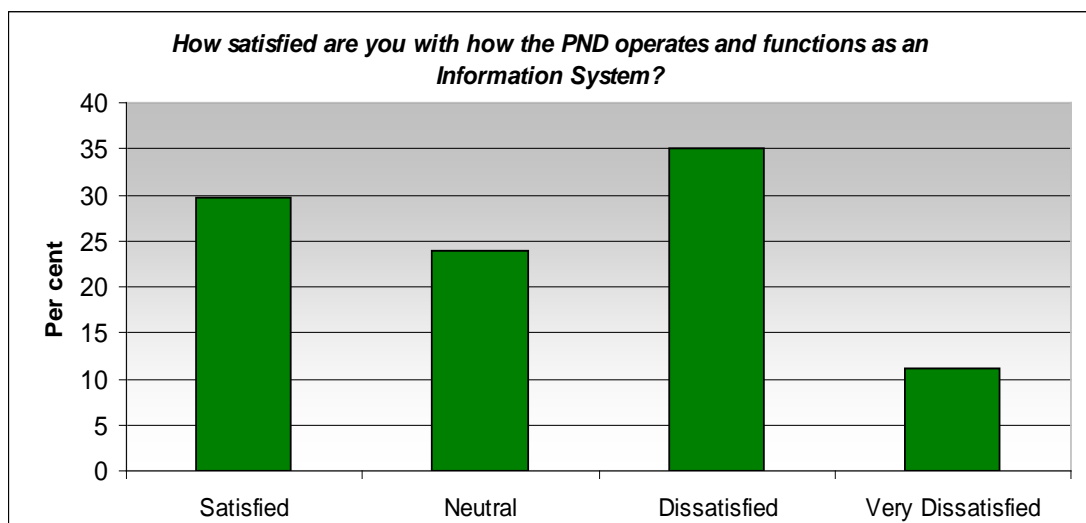
Findings from Direct Users as shown in Figure 9 indicate that almost 30 per cent agreed with the statement that the PND enables information to be found in a way that is understandable and manageable. However, 24 per cent also disagreed with the statement.

Figure 9: Direct Users – Searching the PND and Managing PND Information



Direct Users expressed dissatisfaction with how the PND operates and functions as an information system as shown in Figure 10, this represented 35 per cent of their views. However, at the same time 30 per cent were satisfied. These findings indicate that the PND is perceived quite differently by Direct Users overall; 11 per cent were also very dissatisfied. Possible reasons in relation to dissatisfaction of using the system could be that the functionality and capability for PND Release 1 is limited and that the system may not have met Users expectations at the early stage of the PND’s implementation.

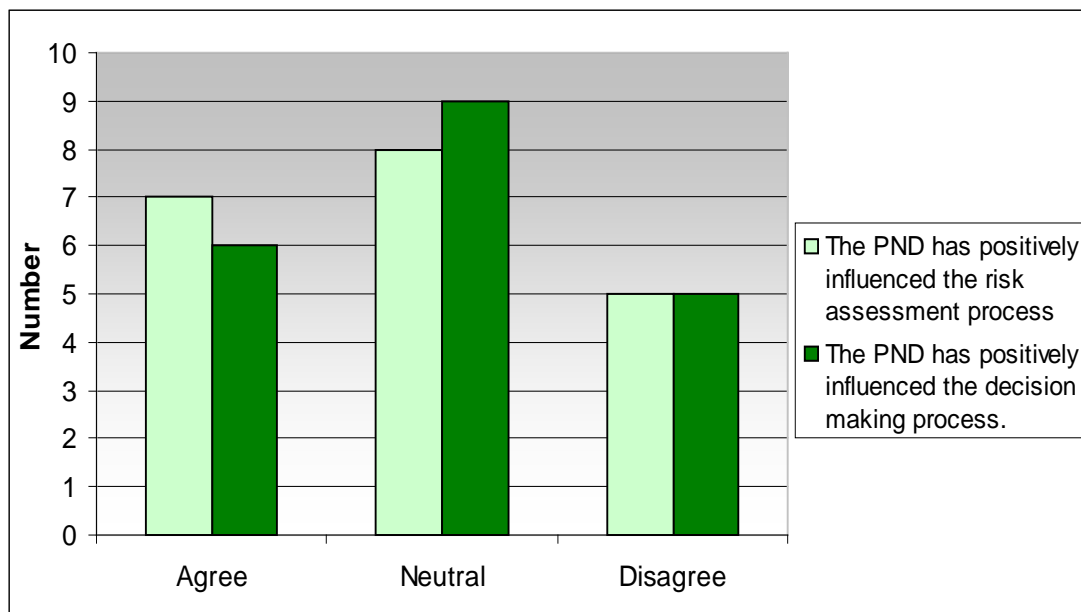
Figure 10: Direct Users – Satisfaction Levels on System Functionality



Operational Benefits

Figure 11 shows responses from Indirect Users' in relation to whether the PND positively influences risk assessing and decision making processes in the business areas of Domestic Violence, Public Protection and Child Protection. Those that disagreed with both statements were mainly from the Child Protection business area. Reasons given were due to other factors and influences associated with Child Protection cases namely multi-agency collaborative working, which as a whole contribute to child risk assessments and decisions being made. However, Indirect Users from Domestic Violence Units agreed that the PND positively influences risk assessing and decision making for both victim protection purposes and for gathering background information on perpetrators.

Figure 11: Indirect Users – PND Influence on Risk Assessing and Decision Making



PND Release 1 Training

Over half of the Training Managers (5 out of 8) felt that the PND course for trainers did not adequately prepare their staff to undertake training on the PND. Reasons given were in relation to the *"...training database not entirely reflective of the live system and the limiting amount of data and the quality of data available on the system for the training environment"*. However, in terms of the mandatory NCALT e-learning modular training on the National Intelligence Model and the Management of Police Information, Training Managers felt that these were relevant requirements for Direct Users of the PND. For PND Release 2 training, trainers expressed preference

for classroom based training as was for Release 1, and that PND User Guides and the training database to adequately mirror the live system as much as possible.

Figure 12: Train the Trainer Courses

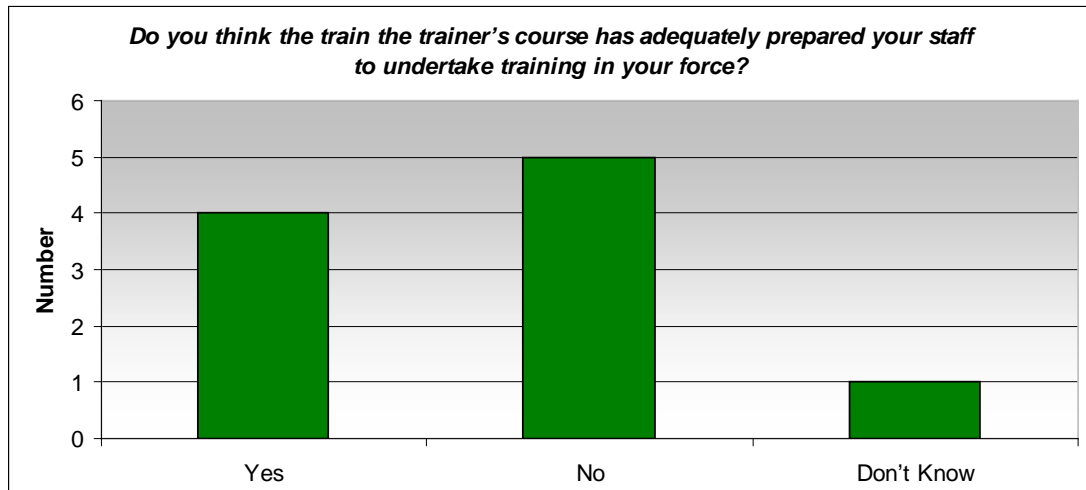
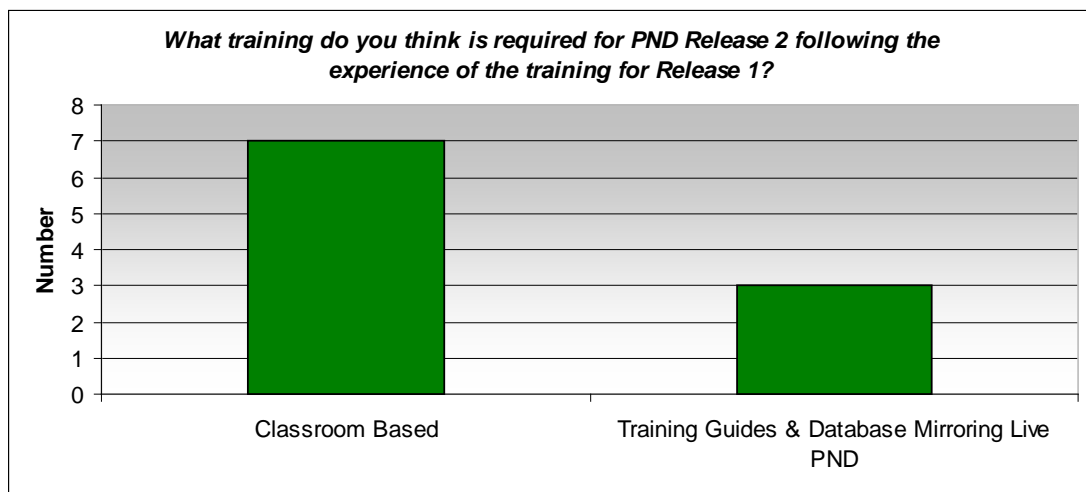


Figure 13: Release 2 Training



PND Release 2

Overall, respondents expressed concerns over forces delays nationally in uploading their systems data, and the quality of data on the PND. Most regarded these issues as instrumental in encouraging its operational use, and in increasing the system's integrity. Forces in the eastern region highly value the guidance and commitment provided by their Regional Coordinator, and also recognise the important role of Senior Officers' in the continual rollout of the PND.

Participating Departments

Department	Acronym
Dedicated Source Unit	DSU
Police Online Investigation Team	POLIT
Information Communication & Technology	ICT
Counter Terrorism/Special Branch	CT/SB
Corporate Development	CD
Special Crime	SC
Learning and Development	L&D
Public Protection Unit	PPU
Professional Standards Department	PSD
Child Protection Unit	CPU
Force Intelligence Bureau	FIB

Good News Stories

Force	Business Area/Department
Bedfordshire	Vulnerable Adults
Hertfordshire	Child Protection
Essex	Police Online Investigation Team
Essex	Child Protection
Essex	Child Protection
Norfolk	Serious Crime
Suffolk	Public Order

**National PND Release 1
Post - Implementation Review
Report
April 2012**



KEY MESSAGES

- This report presents an analysis of the findings from the National PND Release 1 post-implementation review that was conducted in November-December 2011
- As part of the Benefits Realisation Plan and Performance Management Framework agreed by the Business Design Authority in May 2011, these formal reviews were designed to establish whether the programme achieved in Release 1 what it set out to do
- Forces were selected to represent each ACPO region in the UK, to ensure a wide geographical and demographical spread of both urban and rural police forces
- In order to systematically explore, organise and interpret data, computer assisted qualitative data analysis software was used to analyse the data obtained during the post-implementation review
- Most direct users of the PND thought that the PND was a difficult system to navigate, in particular the task of opening information records via the 'POLE' section
- User-confidence in the system was perceived as a gradual process, dependent on the system's search capability and the quality of data held on the PND
- The issue of information gaps was highlighted by direct users of the PND, knowing whether the data held is up to date and complete, and confronts users with the difficulty of establishing whether more information from that force exists

- In the case of the PND, technology-acceptance also infers business-acceptance of new technology and incorporating its use into business as usual working practices. It is recommended that clear local or national guidance on the use of the PND needs to be explicit and available for both direct and indirect users of the PND.

INTRODUCTION

This report presents an analysis of the findings from the National PND Release 1 post-implementation review that was conducted in November-December 2011. A total of 100 semi-structured interviews were conducted in 10 police forces/agencies, however, this report presents the findings from 60 interviews being transcribed.

- Child Exploitation Online Protection Agency (CEOP)
- Derbyshire
- Greater Manchester Police
- Gwent
- Leicestershire
- Lothian and Borders
- North Yorkshire
- Sussex
- West Mercia
- Wiltshire

Forces were selected to represent each ACPO region in the UK, to ensure a wide geographical and demographical spread of both urban and rural police forces. The East of England region also participated in this review, however, data collection was gathered in the form of semi-structured questionnaires and a separate report has been produced for the eastern region's results.

Based on usage figures since the launch of the PND in June 2011, system use was significantly higher in the business area of Public Protection, which includes Vetting, Child Abuse, Domestic Abuse and Vulnerable Adults. Both direct and indirect users were interviewed, as well as Business Area Managers, Project Managers and PND Trainers.

In order for forces to review their own progress in relation to the implementation of PND Release 1, following visits to forces a letter was produced by the IMPACT interviewers for the respective ACPO lead outlining key findings after the interviewing of their staff. This was an important element of the review in providing a timely response and acknowledgement for their force participation.

BACKGROUND

As part of the Benefits Realisation Plan and Performance Management Framework agreed by the Business Design Authority in May 2011, these formal reviews were designed to establish whether the programme achieved in Release 1 what it set out to do, in business terms and if not, what should be done. They are an essential component of the benefits management process and ascertain whether benefits, including those set out in the business case have been achieved, and identify opportunities for further improvement.

The objectives of the review are:

- To gather information on critical elements of PND implementation
- Establish the current position in relation to benefits realisation
- To inform the programme concerning any potential barriers to the roll out of Release 2
- Look for opportunities to communicate lessons learned to forces

DATA ANALYSIS - METHODOLOGY

In order to systematically explore, organise and interpret data, computer assisted qualitative data analysis software was used to analyse the data obtained during the post-implementation review. Atlas.ti is a software package that enables qualitative data to be coded, categorised and analysed in order to identify patterns, relationships and connections with large datasets, such as interview transcriptions.

Following the thematic coding of significant annotations from each interview transcription, a total of 26 codes were identified. These codes were subsequently reduced to 18 following the categorisation of co-occurring concepts that related to one another. The categories in Table 1 were created following the relevant grouping of descriptive codes that emerged from the interviewees' responses, and following the identification of themes and connections. The inductive process of analysis enabled salient aspects of the data to be captured as evidence to develop meaningful theoretical concepts that directly related to the subject areas of the review. To form the basis of the analysis, a network map was produced using Atlas.ti, which showed how each theme identified related to other themes with corresponding text annotations from the interviews to support the relationships.

Table 1: Identified Codes and Categories

PND SYSTEM	POLICE FORCES	IMPACT PROGRAMME
System Performance	Information Management	Training
Role-Based Decision Making	User Group & Super users	Managing Expectations
Access Management	Communication	PND Implementation
PND Benefits	Technology Acceptance	PND Guidance
Knowing the Unknowns	Data Sharing Policy	Establishing New Business Processes
Data Quality	Partner Agency Working	Managing Business Change

It is important to note that there was some overlap between the codes and themes identified in terms of assigning the relevant category. For instance, it is arguable that PND Benefits can only be realised if forces demonstrate technology acceptance - if they are using the system routinely, but this also depends if forces have an adequate number of trained users, if there is local or national guidance on when the PND system should be used, and if the quality of data on the PND is fit for purpose. In this case, it was reasonable to suggest that PND Benefits would be assigned to the 'PND System' category because respondents were generally able to state that as a result of using the system and gathering data, the decision making process was assisted. Also, this demonstrates the various interconnected elements involved which contribute to the successful delivery and implementation of a national IT project like the PND. This will be reflected in the narrative style of the report with the aim of providing an understanding of the data and to allow general conclusions to emerge from the research.

NETWORK ANALYSIS

The analysis shown in Figure 1 represents a network map of the interconnecting themes identified during the review. At the centre of the map are Information Management, System Performance, PND Implementation, Business Processes and Force PND Guidance. Based on the frequency of their occurrence, these themes can be interpreted as important and relevant factors to the PND community. The themes demonstrate a linear relationship of association, and also show how these relate to other themes.

Information management is associated with data sharing which also relates to sharing information with partner agencies which will be explored further in this report. Information management is connected to the 'role-based decision making' theme which relates to concerns made by administrative staff regarding the direct use of the PND and the decipherment of data for indirect users. Managing business change is linked to this theme also, which demonstrates the importance of communicating to staff any changes to their role and functions.

System performance is shown on the map to be linked with 'forces data quality', which was an issue for the majority of the PND community that participated in the review. This was in relation to forces lack of data and up to date data on the PND, and the affect this had on user-confidence, which as a result may affect the acceptance of the PND. System performance also relates to how users considered the navigational layout of the system and the ease in which they found information under the 'POLE' section.

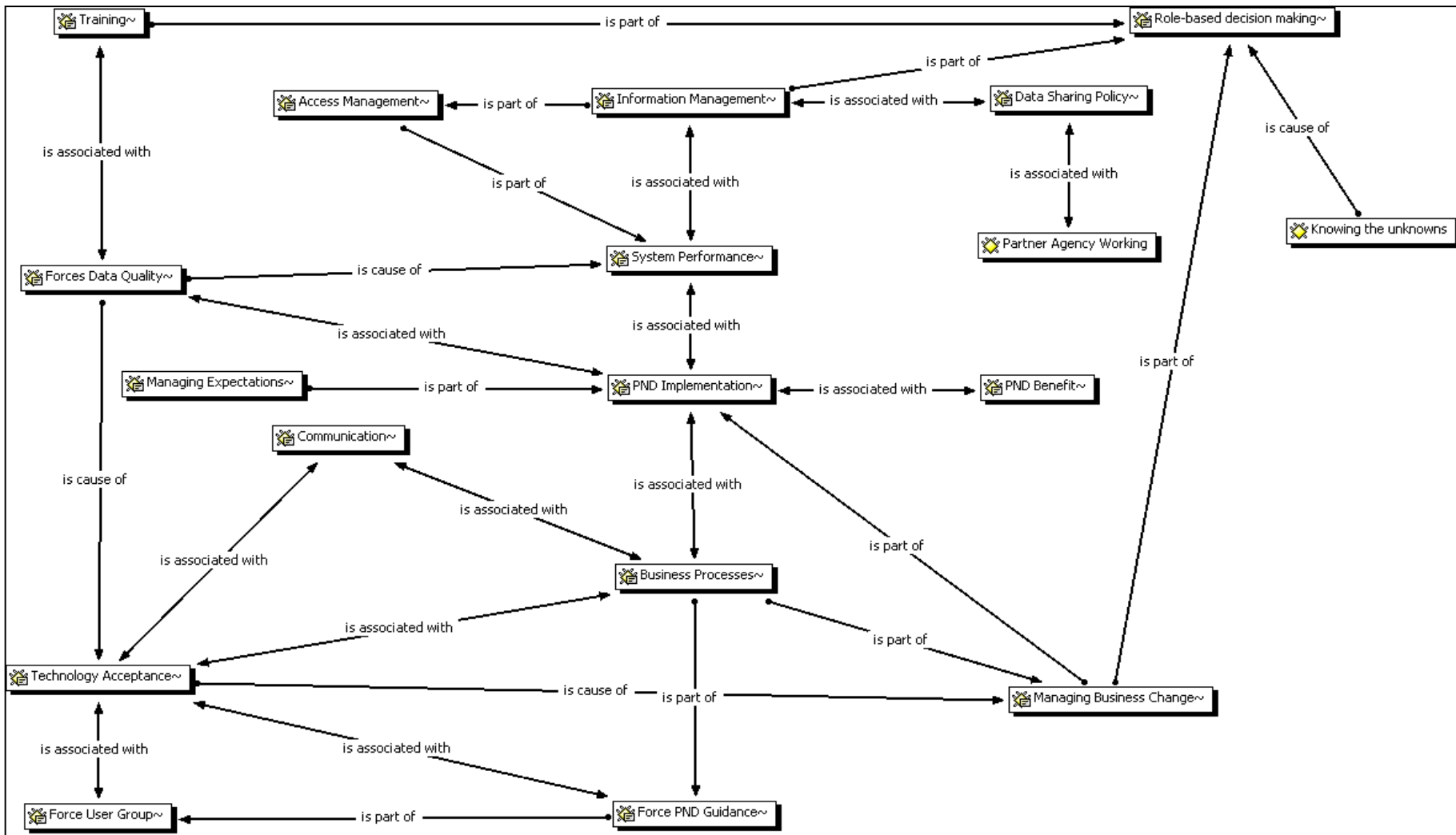
'PND Implementation' was a common theme that was frequently discussed during the review, partly because the review gave great emphasis to this. This has several direct relationships with other themes, for example 'PND benefits', 'managing business change', 'managing expectations', 'system performance' and 'business processes'. The majority of participants commented on the direct relationship between managing business change and delivering new IT capability, and that both components are equally important.

The theme 'business processes' was in relation to national business rules being created that provided guidance on the use of the PND and the management of its data. This would also assist forces in widening the deployment of the PND into other

business areas, and would assist in encouraging acceptance of the PND as a new research tool. The NPIA have since produced a 'Business Rules Catalogue' for the PND. The communication of new business processes evoked as a result of the PND is shown as an association. This relates to forces communication of the PND and the internal processes set-up to manage PND enquiries.

Guidance on the use of the PND is linked to the theme 'force user group'. This review has identified that force user groups are instrumental in sharing best practice and new information, and is a useful forum to generate discussion on issues of pertinence to users. Forces that had a PND user group had evidenced greater acceptance of the PND, and these forces also had a PND policy in place where some discussed business change elements and internal governance processes.

Figure 1: Interconnected Themes: A Network View



DATA ANALYSIS – FINDINGS

The PND System and Data Quality

Most direct users of the PND thought that the PND was a difficult system to navigate, in particular the task of opening information records via the 'POLE' section. On some occasions the PND was described as 'unintuitive', with data not very easily accessible or displayed in an organised and self-explanatory format.

"I don't find it that intuitive, but I do understand that the whole idea of having the POLE entity and everything, but it doesn't seem like it's presented in an intuitive way. In order to progress through a search logically, you are constantly going backwards and forwards, it doesn't feel easy to navigate. It's quite often difficult to know if you've looked at a piece of information already, because you are constantly going back to a previous screen." Direct User, Intelligence.

However, some direct users also recognised that due to the system being newly implemented difficulties were generally anticipated. User-confidence in the system was perceived as a gradual process, dependent on the system's search capability and the quality of data held on the PND, which was a significant factor in how confident users were in using the system and applying its data. Information overload was also expressed as a potential barrier to the system's use, which again related to data quality and further emphasised the need for forces to ensure that their data was comprehensible and up to date. Another perceived barrier was the length of time required to decipher a search return on the PND and the issues this created for individuals' workloads, which was mainly administrative staff, who thought that using the PND was a new and complicated task and additional to their job role.

"It's not the quickest system, but there's that much information on there, it's not going to be, and when you're going into all the forces and things like that, you're not going to have a very fast system are you? Because it holds too much data. All of varying quality and gaps. But I think some of it was confidence as well because it's a complete new system and everyone gets nervous on new systems and you get your teething problems and I think that as well as the confidence". Admin Officer, Public Protection.

Direct users of the PND also highlighted the issue of information gaps. This presents a problem in knowing whether the data presented is up to date and complete, and confronts users with the difficulty of establishing whether more information from that force exists and has just not been uploaded yet. 'Knowing the unknowns' was a frequent phrase expressed by users who were unsure whether this was a data quality issue or a system capability issue.

It's kind of difficult really, because you don't know what you don't know, if you see what I mean. If you do a search and it doesn't come up, what I would say that I don't think the match groups still work perfectly, I think that's still a work in progress.

Direct User, PPU.

The usual gaps, just not being uploaded, I'm sure it's there; it's just not on there yet.

Q: So the fact that every force hasn't submitted up to date data, A: I couldn't comment wholly if anything is missing yet, because there's so much missing in that respect but couldn't really say. PND Force SPOC.

The majority of direct users were generally administrative staff that were previous INI users in their respective forces. During this review process, it was identified that the deployment of PND licenses in forces was causing some difficulty for these users, as they expressed concern in relation to the level of responsibility and accountability placed upon them in having to extract relevant data from the PND. This is a key lesson to be learnt in the future deployment of PND licenses for force users in PND Release 2.

"I complete an INI request, it was gone, I am a Scale 4 Civilian... My opinion - I don't have the rights to decide what is pertinent to a case or not. And that's an issue for me individually of how I sit and how happy I am to be delving into information, that 'do I have access to, should I have access to?' on a Scale 4 basis. That for me has been an issue from the outset. Q. Is it the confidence or the skills? A. Well skills and confidence, because I'm not an intelligence officer, I've not come from that background either, I know what is important, and I know what information people want to see and don't want to see, I'm not that restricted, but I still have a niggling doubt of 'have I missed something' and if I've missed something that's really important, who's going to protect me, where do I come in that line?"

Administrator, Child Abuse.

PND Business Benefits

When interviewees were asked the question whether there was any evidence of benefits derived from using the PND, responses were varied and some users commented on the time-consuming process of deciphering data held under various parts of the system. However, others identified tangible benefits, which alluded to the importance of police forces sharing information and how this assists individual force investigations. From an intelligence gathering perspective, users described the PND as 'fantastic', which also has the ability to open up new avenues for further research.

"Well, it wouldn't have been on PNC, because that would have been no information. The INI check would have probably done the same, but without going to each individual force, there's no way I would have found out." Operations Dept, CEOP

Users also commented on the value of deciding which data is more pertinent to their search, as opposed to the INI system which placed the responsibility on the responding force to decide what to share to the requesting force. A direct user from the child abuse business area describes the process for preparing a risk assessment in collaboration with a partner agency about an ongoing child abuse investigation and the importance of having the right information at the right time.

"I suppose in fairness to that in times gone by with INI that risk assessment was done before the information came back. At least now, the information, 9 times out of 10 can be there, for them to make that decision on the spot. That is the advantage of PND and will always be the advantage of PND over INI." Child Protection Officer.

Indirect users of the PND were also able to evidence benefits as a result of using the system. In child protection, risk-assessors commented on the importance of having all the necessary information available for when attending a multi-agency case conference and being able to critically decide how to deal with child protection cases; particularly when there may be other concurrent events in relation to domestic abuse for example, and the protection of vulnerable adults, who may have lived in various parts of the UK.

POLICE FORCES

Technology Acceptance: Business Guidance and Communication

During the review process, it was revealed that the acceptance and utilisation of the PND depended on two key factors. First of all, some forces did not have a clear policy or guidance document detailing when a PND search should be conducted in their department i.e. if PND checks should be carried out routinely, and also who was trained to access the system. Secondly, users were also reluctant to use the PND because of the lack of data and up to date data, and some forces continued to contact relevant forces to assist with their cross border enquiries. This demonstrated that although users were sometimes frustrated with the layout and navigation of the system, timeliness and accuracy of data, as well as guidance on system use were considered all important to both direct and indirect users. Users described the PND as an *'under-used tool'* and *'not one that people automatically think about when they're carrying out their investigations'*. In child protection cases, some departments search the PND only for suspects and not for child abuse concerns, whereas other forces said that it was absolutely necessary to incorporate the PND into routine searches. A Child Protection Officer clarifies this point further.

"Absolutely, it really has been incorporated, but that's because INI was incorporated into everything we did, it's absolutely necessary in Child Protection. The intel is probably more important than the convictions or whatever."

In the case of the PND, technology-acceptance also infers business-acceptance of new technology and incorporating its use into business as usual working practices. Therefore, clear local or national guidance on the use of the PND needs to be explicit and available for both direct and indirect users of the PND. This may encourage regular use of the system and the opportunity to locally embed the system in everyday police business. Some interviewees commented on the local delivery of the PND as *'rushed'*, and that a period of *'getting use to the system'* is expected. To assist the process of business change and for the ongoing implementation of the PND, the NPIA is currently in the process of issuing a revised PND Manual of Guidance and a Business Rules Catalogue for forces.

"You've got to take the long-term view, I've taken the 18 month view and I think that's actually spot-on for that, it will be 18 months before things settle down, people get used to it, terminals will work you know, the communication links will work, you know"

- all these things... We've got to get used to it, we've got to find out where the... what the best working practices are, where we'll be looking for the bits of information are, how we find them, how we best use them - we've got a long way to go, users have got a long way to go too, til they are able to do that." Indirect User, Vetting Manager.

Some users felt that the PND was simply an INI replacement; therefore guidance and policy documentation on the INI was now relevant to the PND. This rationale was based on staff resources and workload issues, as well as local departments deciding not to create specific guidance on the use of the PND as it was anticipated that any changes to business processes and procedures would be minimal. This also coincides with the roll-out and allocation of PND licenses to previous INI users that are currently experiencing some difficulty in managing information from the PND. A key lesson to be learnt is that the PND has evoked significant changes in police business processes since the INI, one of which is that the PND stores an unprecedented amount of data from UK police forces and governmental crime agencies and consequently, this requires heightened skills in handling voluminous data, as well as having relevant knowledge in appropriately disseminating data.

The data from the review suggests that the role of communication in promoting the PND and its implementation in forces is important in gathering interest among staff. It would also be beneficial to communicate internal processes that may exist in forces, whereby a request form is required to be completed prior to a PND search being carried out. Some indirect users interviewed lacked an understanding of the system's capability, and what the process was to request a PND search.

Q: What are your feelings about people's knowledge about when they can and can't ask for a PND check? A: I don't think it's very good. I mean, people send the checks in and they think it's just like doing a PNC check and they think if you tap it in, up it comes and you can give them their reply straight away and I don't think there's been enough communication about what PND can do and what it actually entails, you know. I've had people phone up and say 'I've heard this PND is up and running, that sounds really good, could you do a check for me?' and you say 'Well, you have to fill in a form' and they say 'Oh, I didn't realise you had to fill in a form, oh, how long's it going to take?' Direct User, PNC Clerk.

Data Sharing Policy

A frequent theme throughout the review was the issue of information disclosure. Both direct and indirect users, as well as Business Area Managers in Public Protection Units discussed guidance in relation to sharing information with third-party and partner agencies, such as the Social Services in domestic abuse and child protection cases. Others recognised that data sharing protocol did exist, but the question became, as a result of the PND containing a lot of information, how much can we and do we or share?

“The only thing - I think it's a key issue for us in respect of disclosure - is during child abuse investigations, we obviously do the checks, they go onto the records and then we might get asked at a later date or a short time later, to share information that the police hold about that person, now, I know, that one force had a real issue when we did share some information with adult social care, I don't see that that issue couldn't raise its head again”. Business Area Manager, Detective Inspector, PPU.

A police supervisor also highlighted the point that users may ‘inadvertently share something’; from the PND that could technically belong to another force. It was discussed whether existing intelligence handing criteria would generally apply. Overall, these issues could be remedied by forces communicating clear messages about the PND, information on internal processes and guidance on managing data from it.

It seems to me that some more indirect input is needed to understand what you're seeing, what you can do, what you can't. But it's just to make sure that you don't inadvertently drop yourself in the sticky stuff by sharing something that you haven't got the right to do. That would be something that could be done quite easily.

Indirect User, Detective Sergeant, PPU.

It is important that the PND does not become a barrier to sharing information which would defeat its objective; data sharing guidance on the PND may need to be reinforced to ensure there is a common understanding in the policing community of the rules, including guidance on the sharing of data with third party partner agencies.

Force User Groups and Super-users

PND User Groups set-up individually by forces were used as communication forums for force users, to hear about forces' progress on the uploading of their data on to the PND, give new hints and tips on the system, as well as the opportunity to share best practice and success stories. Some forces did not have a PND user group and some of those users considered that it would be useful to have such a group to maintain common standards and working practices.

Q. Well, you think you need a user group? Yeah, I think we do, because I think the way we use PND, and that road to PND needs to be uniform... well, everyone needs to discuss , to make sure we're doing the right thing. Things may change in the future, depending on the information that we capture. Q. I think one of the things that I would look at doing is making sure it's properly structured, the user group, so that everyone knows when you are doing a PND check. Direct User, CEOP.

A general perception was that the role of Superusers was instrumental in supporting users and increasing confidence in using the PND particularly during the early stages of implementation. This was a common view among direct users of the PND who were administrators and new to the system.

I think the only kind of addition we thought of was perhaps mentors within each business area. Perhaps somebody that just had, or was trained maybe before the others, or somebody that they could go to on there, in their unit that could you know... have a look... 'I've got this', almost just a reassurance. PND SPOC, Child Protection.

It is recommended that forces consider the set-up of a PND user group to facilitate the exchange of information. Analysis of the relationships between the data has shown that acceptance of the PND is influenced by the extent of force communication and efforts to embed its use into the working practices of the force, whilst formulating guidance and addressing the various changes to business processes the PND has created as a result.

IMPACT PROGRAMME - PND DELIVERY

The areas of interest pertinent of exploration from a national perspective were in relation to the delivery of the PND project by the IMPACT programme. Interviewees were asked a series of questions ranging from the disbandment of the INI system, PND training and managing business change at a national level. Some business area managers thought that there should have been a greater period of overlap between the two systems until all forces and agencies had completed their data uploads. Conversely, managers did recognise that by switching off the INI this encouraged forces' to tackle their data issues in terms of data quality and data reconciliation. However, it is important to note that the people interviewed were previous users of the INI mainly in the Public Protection area, and therefore represent the views of those who were active and regular users of the INI. Such views may not be necessarily applicable to PND users in other departments such as Major Crime who were not prolific users of the INI system.

In terms of the implementation, some forces felt that the delivery of the PND was 'rushed'. This mainly included training on the PND whereby training dates were untimely received by forces, which created panic for trainers. The training database was generally perceived as inadequate, based on the data contained being unrepresentative of the live system and its environment.

"The only thing probably that I would say is that, from when we had a go-live date, everything seemed to be sort of, rushed, you know. We had all our training rushed and... Not so much with the hardware, the hardware was all put in place and that was ok, but it just seemed... you know 'Oh god, we've got to get the training done' and then, as I say, my first day doing it, there was nobody around. That was quite a sort of a bit of a concern, you know. I think it's a system that takes quite a bit of getting used to". Direct User, Domestic Abuse.

Most forces inferred that the force action plans developed at the beginning of the PND project helped to clarify certain roles and tasks, and assisted the process of organising the technical infrastructure such as the PND's confidential environment. However, most agreed that implementing the technical requirements of the PND system was difficult, and national guidance on this process could have been improved. The view below was commonplace among PND project managers.

“Has the support provided by the IMPACT Programme been sufficient to prepare the force to implement the PND? A: to be honest with you, I'm torn between ‘good’ and ‘very good’. I will say ‘good’ because I don't want to overdo it. On the grounds that... to some things it doesn't matter how good or bad you were, it was desperately needed. My big bugbear was, yes 43 forces could go away and do this, but we need a central control and guidance standards, otherwise we will all do different things and we will get it wrong. So it's absolutely essential that we have central direction”.

Force PND Project Manager.

The general consensus in relation to the national delivery of the PND was that central guidance and direction was important for forces. Reasons given included the sharing of best practice and ideas whereby forces could learn from one another as to what works best and why. In addition, the setting up of the technical infrastructure and the confidential environment of the PND was a competing struggle experienced by some forces, whilst at the same time; working on other project demands and requirements such as preparing for data uploads and data reconciliation.

Managing forces expectations was a critical determinant for the PND in terms of users realising the capability of the new system. Some direct users considered the IMPACT programme's communication on what the PND can deliver as “unrealistic” and users thought the PND product was oversold in Release 1. User confidence in the PND was also affected by the incompleteness of data on the system.

“I just get the feeling that we went live too quickly or maybe if the Forces individually let the system down by failing to pass the information on for uploading. I think it was sold as, here's your all dancing, and that's it and we've gone on and it's like buying a brand new car and there's no engine in it”. Detective Sergeant, Public Protection.

Another critical determinant of the PND is managing organisational change, which is a fundamental aspect of the PND's implementation, which are both mutually entangled. Technology and its users are each constituted by the other – each shaping and being shaped by the other. In the first instance, the design of the PND represents the particular choices that have been made by those involved in the design process, who have assumptions about users and work practices that the PND is designed to support. Once users begin to use the PND, they will be shaped by it, but it will also shape the technology because all technology has interpretive flexibility, that is, it has an open-ended quality. It is because of this mutual entanglement that

cannot be fully predict how the PND will be used in practice and why it may have unintended and unwanted consequences. Defining best practice and departmental guidance from a national perspective may increase the operational use of the system. Organisational change factors are important to recognise in order to encourage people to change their working practices that harness the use of a new policing tool.

Conclusion

It is important to recognise the worthwhile investment of a post-implementation review on new IT projects. It is a significant period in which support for practice-based learning through actual use of the system can be evidenced in an operational setting. There are often opportunities in conducting a post-implementation review to modify or customise the configuration based on users' actual experiences of using the PND, which has been demonstrated during the preparations for PND Release 2. This also assists in the realisation of benefits and increasingly more benefits that were previously unanticipated. Therefore, the 'go-live' date of a new system should also be viewed as an indication of the impact of business change processes and solutions to issues to be addressed particularly in relation to identifying any barriers of use. Attitudes and behaviours toward use of the PND varied considerably during the review, working practices such as PND guidance policies are not found to be in all the forces visited and this may impact on PND acceptance, particularly for departments that were not previous users of the INI. Most forces expressed the desire for commonality in both working practices and guidance for using the PND. However, it was identified that not all departments have the same reliance on the PND, and some departments by the nature of their work will use the system differently. This also extends to information sharing whereby differences in working practices will make the boundaries of sharing information difficult. Attempts to change practices will sometimes meet resistance especially from those who may be adversely affected. Nevertheless, encouraging active feedback in this instance is also useful as a source of new ideas to potentially explore. This review has shown that organisational resistance to change and cultural issues have played a role in the acceptance of the PND and may continue to influence how the PND will be embedded as a business as usual activity.

**National PND Release 1
Post - Implementation Review
Lessons & Considerations
May 2012**



Benefits

The findings from the post-implementation review evidence the general experiences of forces in relation to the implementation and utilisation of PND Release 1. The PIR process was underpinned by gaining an understanding of these experiences and insight into any issues and barriers, so that lessons can be learnt for both the IMPACT programme and for force project delivery teams.

In terms of links to the Benefits Profiles produced as part of the PND Benefits Realisation Plan, the overall quantitative benefit statements in the 'PND Benefits Realisation Plan' are in relation to 'reduced time' to conduct operational processes. The findings following the PIR indicate that this was not a prevalent theme, and conversely forces considered the using the PND as a time-consuming activity, and some were in the process of recruiting additional staff to cope with business demand.

The qualitative benefit statements are less specific and broadly relate to 'improved efficiency and effectiveness'. Some of the indicators are useful and relevant, such as departments evidencing how the PND has been incorporated into their business model and used routinely. Good news stories is another indicator in the current plan, and the PIR found that forces who were active in collecting good news stories said that this positively contributed to raising the profile and credibility of the system to indirect users and managers.

It is recommended that a qualitative approach to benefits realisation be considered based on the successful testing of this approach during the PIR process. This could include the use of force PND user groups as an appropriate forum to assign

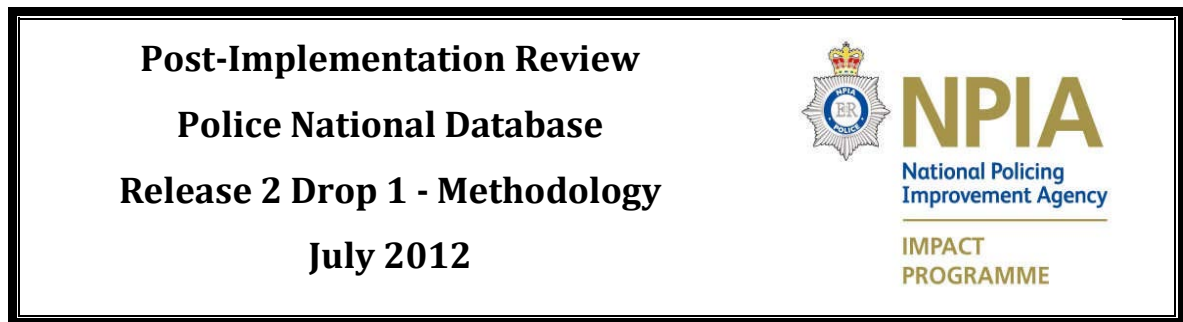
responsibility to people to collect and decipher information. For example, a possible key performance indicator may be: - 'PND Operational Usefulness/Impact on Investigations', which would rely on users of PND information to (subjectively) assess the usefulness of the PND during their investigation. It may be useful to conduct focus groups in forces to monitor progress on the adoption and assimilation of the PND into common working practices. From a strategic perspective, conducting stakeholder analysis may also be worthwhile in canvassing to what extent the PND has contributed to achieving strategic benefits such as overall improvements in data sharing and joint working.

Project Leadership

The findings from the PIR indicate that forces that had a senior or chief officer leading on the delivery and implementation of the PND, had made significant progress on assimilating the PND into common working practices. The PIR also found that the use of the PND was widespread in various business departments. Senior leadership was shown to be effective in project decision-making and an accountability structure was evident in most forces. This proved to be an essential component in overcoming force issues and managing change from a top-down approach, as well as in promoting the PND in force.

Communicating Lessons Learnt

The current mechanisms in place used to communicate to forces project updates such as the National User Group and the Regional User Groups, should continue to be used as forums to share information on the PND. The PIR found that forces that did not have a PND user group were unaware of issues and updates in relation to the project, and this included a lack of knowledge on force business processes concerning the use of the PND. It is recommended that forces without a user group consider setting up a forum such as this, to ensure their involvement in the acceptance and utilisation of a national system, and that business continuity plans are in place to oversee the ongoing implementation of the PND. Those responsible for managing business change processes should also be responsible for communicating lessons learned via PND user groups; this will also assist in achieving a level of national standardisation and specification that will be required so that benchmarks can be set and comparisons can be made on sustaining the ongoing use of the PND.



1. Aim

To explore critically the acceptance of the PND in various business departments in the police organisation, and its integration into working activities.

2. Objectives

- ❖ To 'test' a developed research model based on the findings from the post-implementation review (PIR) for PND Release 1 (page 4)
- ❖ To conduct focus groups with business users of the PND – both direct users and indirect users that have used information obtained from the PND. This is, to ascertain levels of PND adoption, and to examine the implementation of support processes such as business rules to facilitate PND use
- ❖ To conduct focus groups with stakeholders in various business areas, to gauge levels of organisational impact and the change management factors necessary to address in fostering the acceptance and use of the PND
- ❖ To explore benefits realisation in line with the NPIA PND business case

The focus groups will not be separated into people's roles and responsibilities, and could include a mix of direct and indirect users, as well as stakeholder and management representatives. This is to ensure that part of the PIR process involves capturing the views from a variety of participants.

3. Background – Findings from PIR Release 1

The research findings from the post-implementation PND Release 1, revealed several important themes:

1. Implementation process of the PND
 - Communication from the centre about changes to project deliverables
2. Deployment of PND user-licences
 - Users' research and information handling skills

3. System training
 - Quality of training database and users-materials
4. Business rules and processes to support PND use
 - Departmental Guidance, PND is used differently e.g. Vetting Units compared to Force Intelligence Bureaus
5. Managing organisational change
 - Addressing Business and Cultural Change Issues
6. Data Quality and Currency
 - Accurate data that is up to date, strong relevance to the importance for forces to comply with MoPI standards.

4. Review Sample - Participating Forces

It is proposed that the following forces are visited: (see Section 7 for more details)

- ❖ Eastern Region – comprising of representativeness from each force (25/9/12)
- ❖ East Midlands Region – comprising of representativeness from each force (26/9/12)
- ❖ Metropolitan Police – Operation Sapphire and Child Protection Units (27/9/12)

5. Representative Business Areas for Review

The PIR for PND Release 1 concentrated on Public Protection, which includes Child Protection, Domestic Violence, Vulnerable Adults Protection and Vetting - as outlined in the PND Benefits Framework as one of three strategic benefits for the PND. In this review representatives from the intelligence community are also required so that an in-depth understanding of how the PND is used for intelligence gathering purposes can contribute to the review process. This can include Force Intelligence Bureaus, Regional Intelligence Units, Economic Crime Units, Police Online Investigation Teams and Major Crime Units.

6. Benefits for Conducting a Post-Implementation Review for PND Release 2

The post-implementation review that was conducted late 2011 on PND Release 1 provided forces with the opportunity to share their experiences of using the PND, and for indirect users to comment on the value of the information they have obtained indirectly from the PND. Business managers, trainers and project managers were also asked questions in relation to the overall PND implementation process and what they considered should have been done differently or what could be generally improved. This review will also explore local approaches in relation to the use of the PND since Release 2, and will enable insights to be made about levels of PND acceptance and utilisation in the organisation.

The feedback received has so far led to national activity being undertaken to respond to the issues raised. Here are some examples:

- ❖ Release 2 Force Readiness Guidance
- ❖ National and Standardised Business Rules for the PND
- ❖ Setting up of a Data Assurance Group to address data quality issues
- ❖ Local Representation at Regional and National User Groups
- ❖ Release 2 Transition Training Improvements – training database
- ❖ Sharing good news stories to promote use of the PND in forces

The results from the review will enable a critical analysis of the factors which, influence technology acceptance success in the police organisation, and the issues and barriers that may be hindering the sustained use of the PND. The findings will also influence the validation of the proposed use of technology and acceptance model (see page 5), which will be tested during the review. At the end of the review process, a report outlining the findings will be produced and sent to forces.

7. Logistics and Post-Implementation Review Process

- ❖ Review will begin w/c Tuesday 25th September 2012 for 3 days – 1 day per region
- ❖ Each focus group will comprise of 10-12 representatives from each region, forces to decide which business areas to nominate. Suggested start times will be 10am for the Eastern and East Midlands Region. Times to be agreed with the Met.
- ❖ Focus group will last between 2-3 hours – facilitated by the NPIA and the respective Regional Coordinator(s)
- ❖ Met Police - representatives from Operation Sapphire and Child Protection Units, or alternative representation from other business areas that are using the PND
- ❖ Confirmed times, dates and locations to be arranged following information on the number of business area representatives and participating forces
- ❖ Information and notes will be taken during the focus groups for analytical purposes

8. Focus Groups Discussion Areas

Technological Factors

Q1. What are your views in relation to the **system's usability** such as the ease and speed of searching and retrieving information?

Q2. What are your views in relation to the **system's capability** in terms of its features and functionality (such as the filtering of results, ability to cut and paste output into other software etc.)?

Q3. What are your views in relation to the **quality of data** held on the PND?

Q4. Do you think that your force has appropriately **deployed its PND Licenses** to ensure that the **system's potential is fully utilised**? I.e. is it in the appropriate business area, and is the PND **accessible** in your unit?

Implementation Process Factors

Q.5. What do you think were or perhaps still are, the **main stumbling blocks** or challenges in the implementation of the PND?

Q.6. What are your views in relation to the extent of specific **business rules and guidance** in your force/unit to support use of the PND?

Q.7. To what extent has your force **PND User Group** and **Super-users** assisted in raising awareness and acceptance of the PND?

Organisational and People Factors

Q.8. Do you think that forces have a strategy for **managing the necessary process and cultural change** in the organisation?

Q.9. Do you think that the PND has assisted in breaking down **cultural barriers** with regards to **sharing information** and **collaborative working**?

Q.10. What are your **overall perceptions** of the PND and how influential are colleagues in sharing their own experiences of the PND?

Q.11 Has the PND become **adopted** as a system that is **commonly** used in your force/unit?

Prepared by Tessa Lambri - PhD Student, Loughborough University

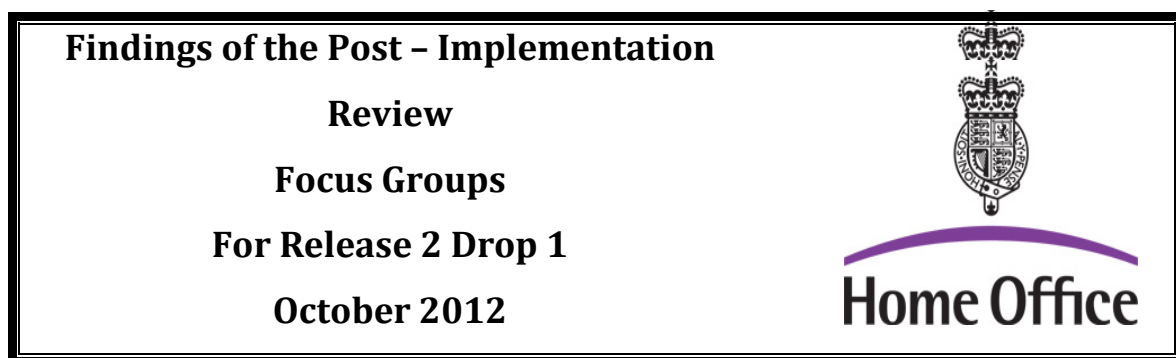
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Any questions on this process can be forwarded to the above or

Martin Hollingsworth

PND Performance and Benefits Lead, NPIA

Email Martin.Hollingsworth@NPIA.pnn.police.uk



Executive Summary

The use and adoption of the PND is gaining momentum, and good news stories continue to grow, but too slowly. Greater awareness of the PND and its capabilities needs to be extended across all ranks and units in police forces.

Users' experiences of the PND varied; those that were using the system frequently commented on how easier it becomes to use, and users' were happy with the speed of returned searches. However, there were a number of issues affecting user confidence in the system (e.g. ambiguous match group returns, wildcard feature not working properly and issues with the navigational layout) – some of these will be addressed by Release 2 Drop 2, but others' will require improved training in how PND operates.

Physical security issues are creating barriers to disseminating information within forces – this is a reflection of the different ways forces have approached the setting up of their RMADS and their confidential PND environment. Best practices and solutions need to be more widely shared.

In terms of business-led issues, forces need to improve data quality and currency, requiring greater adherence to rules set out within MoPI (or a simplified version thereof).

Recommendations

That the NUG commissions advice from the Programme/forces/consultants as necessary to:

- Improve training and communications across forces on the features of the PND;
- Disseminate best practice around RMADs and the setting up of confidential environments;
- Consider how readily a restricted version of PND might become available and what net benefits this might bring;
- How to simplify MOPI (or its replacement under Authorised Professional Practice) and improve greater adherence to standards and best practice.

A timetable should be agreed and regular reporting to the NUG – this requires a specialist secretariat function that is probably best provided by the Programme. Appendix [1] provides a breakdown of these issues and suggested fixes.

1.0 Aim

To assess the acceptance of the PND within business areas and the extent of its use (to what extent is it embedded within standard procedures and business rules);

2.0 Approach

- To conduct focus groups with stakeholders of the PND – both direct users and indirect users that have used information obtained from the PND.
- To explore benefits realisation in line with the NPIA PND business case – in terms of effectiveness gains (thoroughness and speed with which information is obtained and the extent of its use), and efficiency gains in avoiding wasted time searching and compiling information.

3.0 Participating Forces and Business Areas

The Eastern region, the East Midlands region and the Metropolitan Police force took part in the post-implementation review for PND Release 2. In total there were over 40 users of the PND who took part in these focus groups. The units that were represented at the respective focus group were the:

- Public Protection Unit - Child Protection and Domestic Violence
- Vetting and Firearms Licensing
- Area, Central and Regional Intelligence Units
- PND Force SPOCS
- Counter Terrorism
- Serious and Major Crime

4.0 Results

These are the main themes that were identified during the focus groups for the post-implementation review;

4.1 PND DESIGN: PERFORMANCE & CAPABILITY

- Users' were happy with the speed of the PND in returning searches
- Match Groups: this functionality is unreliable and the data records returned do not necessarily correlate with the search criteria entered. This is also causing concern for the users and impacting on their confidence in the system;
- Wildcard function does not work, particularly when searching phone numbers
- Searching POLE in a unified way would reduce the number of searches required to perform. For example, being able to search 'people' and 'object' simultaneously. A user is required to conduct 2 searches for every person; a person search and also an events search. This requires 2 lots of inputting and 2 lots of waiting for the search to come back. If the PND could be improved so that automatically both searches were completed simultaneously on the inputting of 1 set of details there would be a significant timesaving for the user
- Number of records shown on the screen based on the search request, is often incorrect, the navigational bar is also an issue and can cause confusion;
- Some PND users regarded the navigational layout of the PND as difficult and cumbersome and not very user-friendly;
- Navigating and deciphering data records is time-consuming – a simplistic 'Golden Nominal' layout was favoured by the majority to be a more useful representation of data records attached to the individual of interest;
- Printing was considered an arduous process, and it was suggested that a 'print basket' a multiple printing facility be introduced to reduce the time in preparing individual documents for printing
- Converting to PDF format was also a common time-consuming problem; although this seemed to be more of a force issue rather than a PND issue.

- A 'find' button similar to Microsoft Word, whereby you can search for keywords throughout the text on the screen.

4.2 INFORMATION MANAGEMENT

- Data quality, currency and the duplication of records was considered as one of the most important factors that influence the adoption of the PND. The relevance of MoPI and the Retention, Review and Deletion Policy was consistent during this area of discussion;
- Users were also finding it difficult to understand individual forces' abbreviations, and that national standards in abbreviations and pseudonyms would alleviate this issue; a glossary may also help
- Information overload was a reoccurring theme that was expressed by the majority of PND users. Trawling through and deciphering information was described as a lengthy process, and line managers and indirect users requesting PND checks, need to be mindful of this. This is somewhat different to conducting a PNC check for example;
- Issues with data uploading was also an issue for some users, in terms of being able to establish a date for when the record was created, or whether the date on the record depicts when it was uploaded by the force. In some instances, users were unsure as to the date of birth for the individual as this was not easily found or clear on the data record
- Information dissemination – some forces are currently unable to copy and paste data from the PND. This presents problems with disseminating PND information to recipients. It was felt that the confidential environment required for operating the PND contributed to this difficulty;

4.3 BUSINESS DEPLOYMENT

- The PND is regarded as a system that is to be used as a research and intelligence tool, rather than in a live and operational environment;
- Majority of forces that took part had PND user groups and super-users in place to support and address issues mutually and as a collective
- Use of the PND is currently limited in Serious and Major Crime Units; however, this is being addressed by the respective forces It may be of benefit to revisit the allocation of licences to regional and national units with the current collaboration work being undertaken.

4.4 WIDER ORGANISATIONAL FACTORS

- Forces have recognised that marketing and communication about the PND is required to inform police forces of its potential, such as its features and functionality, the business process involved in requesting and conducting a PND search, and general publicity and awareness of the system
- Recent changes and cutbacks have impacted on the adoption of the PND and it is currently difficult to increase PND resources during austere financial measures in place;
- Not all forces that participated in the review had a standard operating procedure document for using the PND; that is specific to business areas;
- Majority of forces regarded the confidential environment set-up for the PND was a barrier to potential users, in terms of additional training, vetting and issues surrounding logging onto the PND and the issuing of IAM cards.

5.0 Business Benefits

Since the national implementation of the PND, its technical capabilities have gradually increased, and the findings from this review indicate that the main business benefit is the access to a centralised pool of national police information. The business case originally produced prior to the roll-out of the PND anticipated certain business benefits to be realised as a result of the PND. At this stage, effectiveness is leading in comparison to efficiency gains, as some users consider the use of the system as a time-consuming exercise. However, in terms of effectiveness, good news stories have evidenced the investigative successes associated with using the PND and as a result; this has had a positive impact on the credibility of the system. There are many examples of the PND assisting in the gathering of intelligence for example, in producing analytical products, in efficiently conducting vetting checks for recruitment purposes and in facilitating the production of up to date risk assessments for multi-agency case-conferences and investigations. Conducting post-implementation reviews has provided insight into a range of issues, including the identification of business benefits steadily emerging. However, to achieve business benefits there are issues to be addressed that directly impact on sustaining the use of the system, which has to be one of the greatest business benefits of all.

6.0 Conclusion

Generally, the PND is being used regularly and is becoming more widely used across business areas, and numerous good news stories emerged during the focus groups. The main concerns relate to the usability of the PND both in terms of navigating through the system and deciphering the information retrieved thereafter. Users' experiences of the PND varied; those that were using the system frequently commented on how easier it becomes to use. Users' were happy with the speed of returned searches; however, records that appeared in the match group results were ambiguous and confusing for users to interpret. One of the main issues was indirect users' and supervisors knowledge and awareness of the PND, and what constitutes a PND search in terms of time and staff resources. However, there were examples given by some forces where this was overcome by the production of an SOP for the PND and a well-publicised internal process for requesting a PND search.

Users expressed how it would be useful to know which force source system the data on the PND originated from. This would be helpful in terms of understanding the context of the information, and possibly allowing further contact with the owning force to be made more easily. Data quality and the currency of information on the PND was one of the main barriers toward the system's use; and whilst it was recognised that for some forces this is work in progress, this subsequently has had an impact on people's general perceptions of the system and its reliability. Overall, the PND was generally regarded as a good system to use but with improvements still to be made. Suggestions included multiple searching capabilities for POLE, consolidated printing and a more efficient process for creating PDF documents.

Appendix 1: Issues and Suggested Actions List

	Issues	Actions
1	Issues raised during Focus Group meetings	Actions Required/currently being undertaken. Views of the IMPACT Programme
2	Match Groups: This functionality is unreliable and the data records returned do not necessarily correlate with the search criteria entered. This is also causing concern for the users and impacting on their confidence of the system	Being addressed by the IMPACT Programme as a matter of urgency
3	Wildcard function does not work, particularly when searching phone numbers	Require specific examples to be reported through to Logica Help Desk to ensure investigation commences.
4	Searching POLE in a unified way would reduce the number of searches required to perform	Requires action to be taken
5	Number of records shown on the screen based on the search request, is often incorrect, the navigational bar is also an issue and can cause confusion	Require specific examples to be reported through to Logica Help Desk to ensure investigation commences.
6	Most PND users regarded the navigational layout of the PND as difficult and cumbersome and not very user-friendly	Training Issue and possibly modification in later releases
7	Navigating and deciphering data records is time-consuming – a simplistic ‘Golden Nominal’ layout was favoured by the majority to be a more useful representation of data records attached to the individual of interest	Potential training issue. Users will get use to this method of using the PND
8	Printing was considered an arduous process, and it was suggested that a ‘print basket’ a multiple printing facility be introduced to reduce the time in preparing individual documents for printing	On occasions local force issue. Printing has develops scheduled to be delivered in R2D2
9	Converting to PDF format was also a common time-consuming problem	Required as a security issue
10	A ‘find’ button similar to Microsoft Word, whereby you can search for keywords throughout the text on the screen.	To be considered during enhancements of PND
11	Data quality, currency and the duplication of records was considered as one of the most important factors that influence the adoption of the PND. The relevance of MoPI and the Retention, Review and Deletion Policy was consistent during this area of discussion;	Data Improvement Group (DIG) has been initiated which will begin to address some of the issues. Forces have a responsibility to ensure data is compliant with Data Protection Act and adheres to the principles

		of MoPI (APP)
12	Users were also finding it difficult to understand individual forces' abbreviations, and that national standards in abbreviations and pseudonyms would alleviate this issue;	For discussion at DIG. Very difficult to achieve as numerous local abbreviations and pseudonyms are used.
13	Information overload was a reoccurring theme that was expressed by the majority of PND users. Trawling through and deciphering information was described as a lengthy process, and line managers and indirect users requesting PND checks, need to be mindful of this;	Marketing and awareness issue.
14	Issues with data uploading was also an issue for some users, in terms of being able to establish a date for when the record was created, or whether the date on the record depicts when it was uploaded by the force. In some instances, users were unsure as to the date of birth for the individual as this was not easily found or clear on the data record	DIG should review this issue

PND Good News Stories Report

January 2013



Key Findings

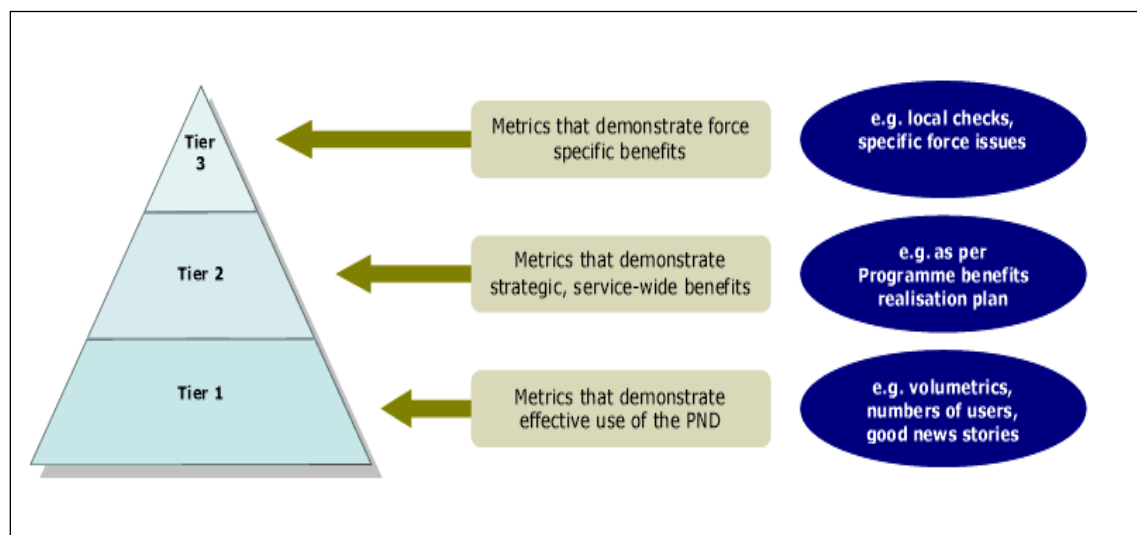
- This report presents an analysis of the good news stories that have emerged during Jun 2011 – Dec 2012. The collation of good news stories features as a metric in Tier 1 of the programme's benefits management strategy
- The report has found that the PND is being utilised across many business areas, and has demonstrated its valuable contribution to a wide range of police activity
- The majority of the stories reported relate to public protection, child protection and serious and organised crime
- The PND has demonstrated its effectiveness in generating risk assessments for missing persons, newly released prisoners; and for putting in place officer safety contingencies
- The PND has supported effective partner agency working with the sharing of information for compiling joint risk assessments with Social Services
- The PND has also proved to be particularly intuitive following the searching of physical characteristics and MO descriptions
- Good news stories reported in child protection have highlighted the importance of sharing information; enabling links to be made with historical police data and current cases

- Good news stories reported in serious and organised crime evidences how the PND has facilitated cross-border operational opportunities with other forces investigating organised crime networks.

Introduction

This report presents an analysis of the good news stories that have emerged as a result of using the Police National Database (PND). The reporting period is from June 2011 when the PND was launched until December 2012, and 60 good news stories have been collated. The IMPACT programme, which is benefits-led and managed the delivery of the PND, produced several documents for forces in relation to the realisation of quantitative and qualitative business benefits. The reporting of good news stories is a metric in Tier 1 of the programme's benefits management approach as shown in Figure 1. From a qualitative perspective metrics relating to Tier 2 also include the collation of good news stories, as well as post-implementation reviews, which has featured as part of the wider force benefits realisation strategy (See Benefits Management Strategy)⁴. The programme encouraged the reporting of good news stories, so that positive messages about the use of the PND can be communicated to forces. Furthermore, the purpose of obtaining good news stories is to demonstrate the effectiveness of the PND, and to understand where PND is making a real difference. They also provide meaningful and tangible evidence in realising business benefits.

Figure 1: NPIA IMPACT Programme's tiered approach to benefits measurement

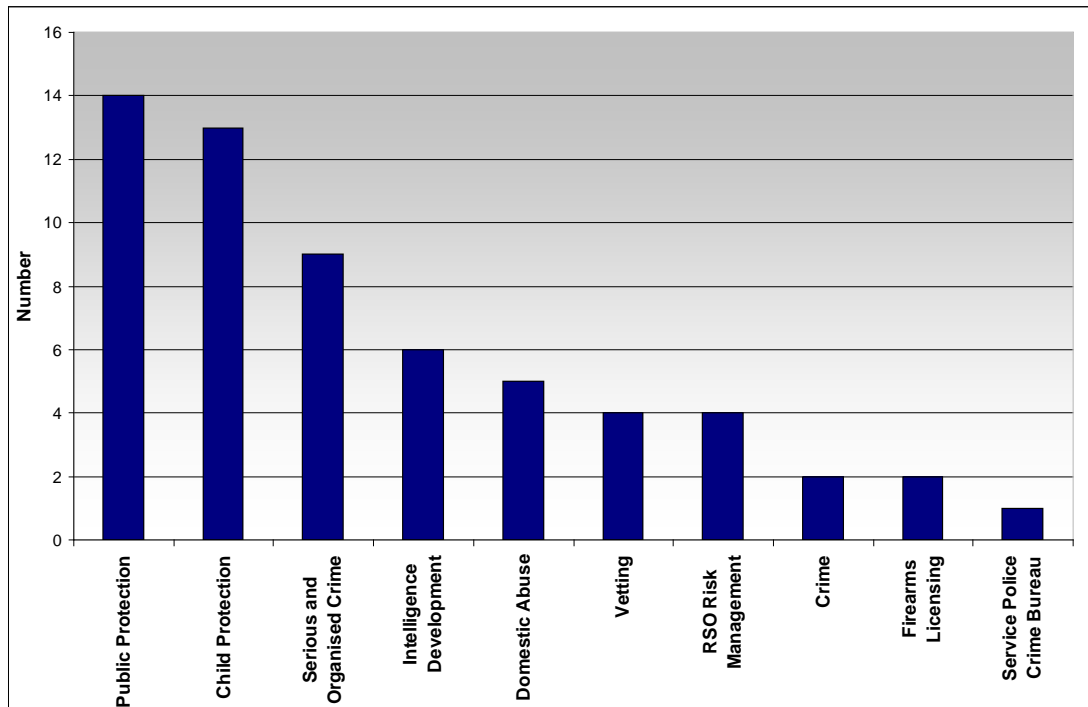


⁴ IMPACT Programme, February 2009

Analytical Findings

One of the advantages for collating good news stories is to demonstrate that the PND is being used cross police business areas. Figure 2 shows the number of good news stories based on their respective business areas; the majority of these stories relate to public protection and child protection matters, however, the graph also shows that the use of the PND is generally wide across most areas of policing.

Figure 2: Good News Stories by Business Area



Public Protection

The PND has positively assisted in the identification of violent individuals known to certain police forces but have also become of interest to other forces. For example, alias names used by offenders can be identified from the PND, and this information can be used to assist in intelligence development and investigation. In this instance, the Police National Computer (PNC) may also provide details of alias names used by nominals, but the PNC will only contain details of offenders post-arrest. This excerpt from a good news story supports the point: *“Checks on the investigating force’s crime system and PNC showed no trace of an individual arrested in connection with violent offences. But checks on PND confirmed that the name checked on the PNC and local force system was actually an alias, allowing further investigations to be conducted against the offender’s real name.”*

The PND has demonstrated its effectiveness in generating risk assessments for missing persons, newly released prisoners; and for putting in place officer safety contingencies. This is primarily based on the advantage of having access to a national police data source, and the need to ensure that the PND is automatically updated is essential for such purposes. The PND has also assisted partner agencies such as the Ministry of Justice and Social Services. A recent good news story relates to the identification of a foreign national seeking employment in the UK whose spouse was a known high-risk offender to children. Another example relates to the temporary placement of a vulnerable adult with a family whose criminal history was traced using the PND. As a result, Social Services changed their course of action.

The PND has also proved to be particularly intuitive following the searching of physical characteristics and MO descriptions, which helped to identify the movement of a suspected offender that was involved in the setting up of a disingenuous Modelling Agency, in order to groom young girls. As a result of the PND, the investigation could be progressed and necessary action was put in place.

Child Protection

The business area of Child Protection represents 21 per cent of the good news stories received during the reporting period. Generally, force child protection units were frequent users of the INI and this may translate to becoming regular users of the PND. Force user statistics for October - December 2012 indicate that child protection represents 20 per cent of the total searches carried out nationally. Good news stories reported in child protection have highlighted the importance of sharing information in enabling links to be made with historical police data and current cases.

The PND has shown in various examples how it has accelerated the investigation process, particularly in relation to preventative action and the re-prioritisation of police activity. CEOP for example, were able to re-assess an investigation based on information held on the PND from a historical crime report. In other good news stories there are several examples that evidence the invaluable difference the PND makes in protecting children from individuals with historical allegations of sexual assault. One example relates to information connectivity with police records and Social Services information for compiling a risk assessment; and as a result of the PND, immediate action was taken toward protecting a child.

Other good news stories evidence the efficiency of the PND in gathering intelligence without delays in identifying the relevant force(s), and the process of requesting the information. For example, a potential child abuse investigation was efficiently managed as a result of finding significant information on the PND. This is an excerpt from a good news story: *“As a result (of the PND), the investigation was quickly resolved. In the past, even with the use of INI, the delay between a request for information and the response could have put the girl at greater risk. In comparison the PND makes relevant information immediately accessible to officers and staff.”*

The PND has demonstrated interoperability in the provision of information from approximately 230 police systems. There are good news stories, which show how PND effectively connects information, and enables undetected and historical crimes of individuals to surface. This has proven to be particularly relevant to child protection and domestic violence cases whereby new partners entering the family pose serious risks to the other partner and their children.

Serious and Organised Crime

According to force PND users' statistics, the business area Serious and Organised crime represents 6 per cent of the total searches carried out nationally between October and December 2012 respectively. Several good news stories have emerged during the reporting period, and these have evidenced how the PND has facilitated cross-border operational opportunities with other forces investigating organised crime networks. For example, as part of an ongoing operation which led to the arrest of an individual in possession of Class A drugs, call data analysis identified an associate with previous convictions for drugs trafficking; this was previously unknown to the investigation, and this information was found as a result of using the PND. The 'Object' searching option on the PND has also helped to identify both historical and current telephone numbers of individuals relevant to the investigation. Vehicle details were also identified which were previously unknown. One of the forces involved commented on the benefit of being able to obtain a 'rich intelligence picture' efficiently, without the delay of obtaining authorised RIPA consent that would have been required in this instance.

Vetting

According to force PND users' statistics, vetting represents 50 per cent of the total searches carried out nationally between October and December 2012 respectively.

The use of the PND in force vetting units slightly differs from its wider use in the police organisation. The PND is more often used as a potential source to generate information and to develop intelligence. The primary purpose for conducting a PND check in vetting is to establish whether an individual and their household, has been or is of interest to the police. Usually, this takes place in the context of staff recruitment and the associated security checks that would need to be carried out. To this end, it would be expected that the vast majority of searches do not result in a positive 'hit'. However, the good news stories that have emerged during the reporting period demonstrate the effectiveness and the efficiency of the PND, both in bringing to attention valuable information about those seeking to work with vulnerable adults and children, and for greatly reducing the time to complete vetting checks. An example of how the PND has prevented the recruitment of potentially dangerous individuals to work with vulnerable adults and children has highlighted the importance of sharing information across the police organisation. This good news story relates to an application for the role of a PCSO working in partnership with local schools. The good news story stated *"...a PND check on the individual revealed a trace in another force, where this individual had been subject of investigation into allegations of sexual assault and had received a caution for gross indecency. Although this matter was historic it was considered particularly pertinent to the nature of the post/role applied for."*

Conclusion

The PND is a direct recommendation from the Bichard Inquiry, which was that a national information technology system to support police intelligence is created. The inquiry also recommended examining the process and effectiveness of intelligence based record keeping, and this relates to maintaining the ongoing use of the PND. If it is to continue to sustain longevity and remain an effective intelligence-gathering tool, it is essential that the PND contains up to date information, and that data are in comprehensible formats. The report has found that the PND is being utilised across many business areas, and has demonstrated its invaluable contribution to a wide range of police activity. The good news stories collated highlight the importance of sharing information on a national scale, and reinforce its potential in increasing investigative opportunities and enforcement action. However, whilst the PND is gaining momentum, its sustained success and evolvment is reliant on several factors; continuing to recognise that the PND is not just about the delivery of IT but about business change enabled by IT, that it is important to ensure that the right IT

capabilities and functionality are delivered, the data it contains are complete, and, the necessary supporting business change elements are in place. This requires commitment and strategic planning if the organisation is to realise the business benefits from the PND.

The Challenges and Complexities of Implementing and Evaluating the Benefits of an IT System: The UK Police National Database

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Abstract

This paper discusses the various challenges and complexities involved in evaluating the benefits of an information system – the Police National Database. The paper begins by outlining background events in UK policing which lead to the Bichard Inquiry in 2004. The PND is a direct recommendation from the Inquiry, and represents one of the most important developments in recent policing history. The organisational context of implementing the PND is examined to inform readers of the various business change issues that are apparent, as well as the cultural changes in policing practices. The national methodology for benefits realisation is discussed, and this alluded to the complex context of evaluating evolutionary information systems such as the PND, and the challenges involved in measuring the system's productivity and performance. Previous research carried out in relation to evaluating information systems, has enabled the development of distinct methodologies, and have assisted in identifying appropriate evaluation metrics for the PND. The paper concludes by summarising the complexities of performance and evaluation in information technology, and how future research planning will determine the development of an appropriate and robust evaluation framework for the PND.

1.0 Introduction

Following the tragic deaths of Holly Wells and Jessica Chapman in Soham, Cambridgeshire in 2002 and the subsequent conviction of Ian Huntley, an inquiry was established under the Chairmanship of Sir Michael Bichard. The Inquiry was set up to examine the process and effectiveness of intelligence based record keeping and

information sharing. Sir Michael made a number of recommendations, one of which was that a national information technology system to support police intelligence should be introduced as a matter of urgency [1].

The Police National Database (PND) has been developed to meet Sir Michael's recommendation. It will, for the first time provide a single view of data held in police intelligence, custody, crime, child and domestic abuse systems across the whole of the UK. It will not replace local police systems but it will allow all forces to see and share information that until now has only been available within individual force boundaries. However, the PND is more than just a powerful research tool, it will facilitate the development of analytical applications that will enable forces to match records and identify new links and patterns in offending at a local, regional and national level.

2.0 Background

Historically, all UK police forces have collected information relating to arrests, incidents, crimes and intelligence and stored this within their own force computer systems. Whilst this has worked well for a number of individual forces, a number of high profile incidents in recent years, have demonstrated that forces not only need to share the information they have collected, but also need to see information collected by other forces. The PND is one of the most important developments in national policing in recent history. For many years, the police service has recognised that it needs to share intelligence and operational information through one system, and the PND provides this opportunity. Tasked by the Home Office, the National Policing Improvement Agency (NPIA) is currently delivering the PND, working with forces in loading their data onto the new system. The overarching benefit of the PND is the capability to electronically share, access and search existing local intelligence and operational information nationally.

3.0 Organisational Context

The PND will be accessed through secure role-based access and will allow sharing, searching, linking and association of information from the 43 forces of England and Wales, 6 Scottish forces and the Police Service of Northern Ireland. This is intended to enable forces across the UK to support public protection and in particular to enhance the safeguarding of children and vulnerable adults, countering terrorism and assisting major crime investigations.

The delivery and implementation of the PND is well documented in the NPIA's Business Plan for 2010-2013 [2]. The project sits under the umbrella of the IMPACT programme, which is about improving police performance within the sphere of information, intelligence and science. The management of police information (MoPI) is a significant component of the IMPACT programme, as its guidance ensures that police information is managed appropriately and consistently in all police forces in the UK. The MoPI Code of Guidance [3], was introduced to forces in 2006, and has subsequently informed PND practices in the recording of police operational information and intelligence. It has also provided forces with guidance as to data quality and data management standards, and has further developed the 5x5x5 intelligence management process, a derivative from the national intelligence model [4].

Delivering the PND is not simply about the delivery of IT. Delivering the PND is about business change enabled by IT and is a complex process, ensuring not just the right IT capabilities and functionality are delivered, but also that the data are prepared and the necessary supporting business change elements are in place. This requires time and careful planning if the Police Service is to realise the benefits from the PND. Consequently, this will be managed in stages. The initial phase began in 2010, and will bring together data from five operational areas of policing – custody, crime, intelligence, child abuse and domestic abuse - into one central system. This will support the following areas of policing [5]:

- Protecting children and vulnerable adults, by being better able to assess risks, and by carrying out more thorough vetting of people in positions of trust and responsibility
- Understanding the threat posed by terrorism of whatever nature, and helping to reduce the risk of terrorist activity
- Disrupting and preventing major, organised and serious crime.

4.0 Proposed Implementation and Evaluation Methodology

The implementation of the PND is currently being delivered by the NPIA as a PRINCE2 managed project. The methodology adopted to measure the subsequent outputs and outcomes is underpinned by the realisation of measurable benefits. The PND is a benefits-led project and metrics have been designed centrally for forces to capture data against, which would then enable them to realise their own local benefits. In collaboration with PricewaterhouseCoopers consultants and the Cranfield School of

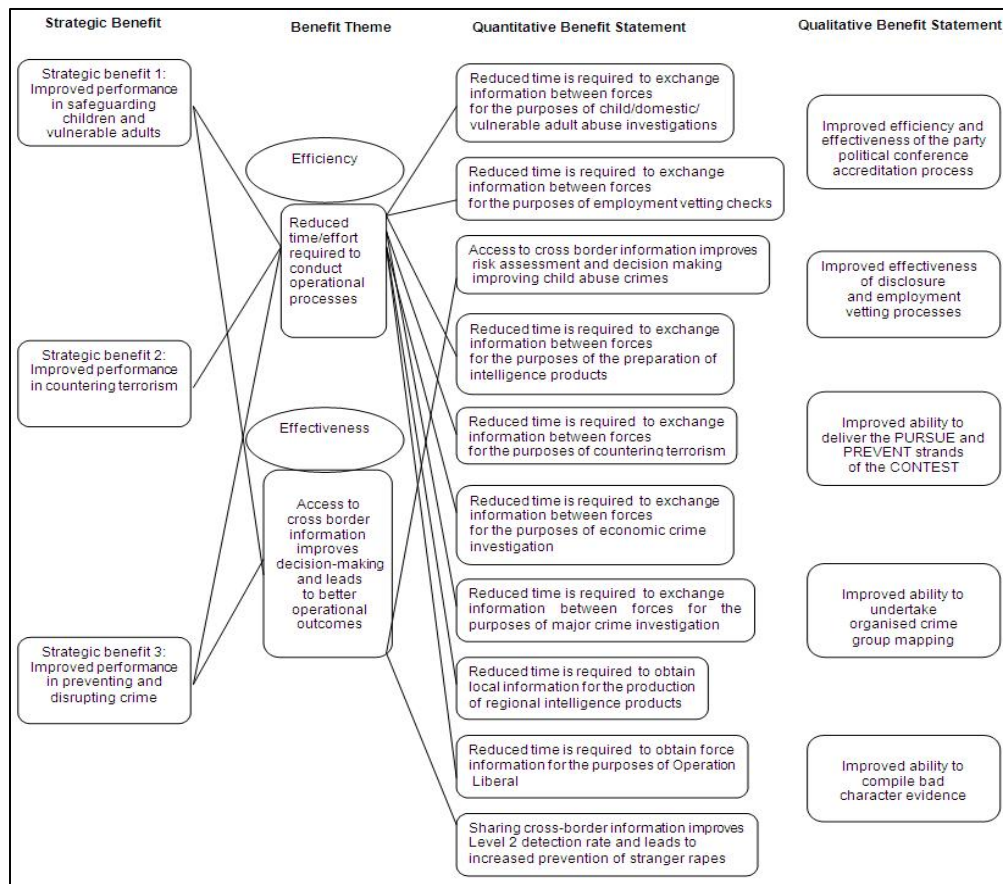
Management, the NPIA formulated a Benefits Management Strategy and a Benefits Realisation Plan to guide forces in developing their own practices for recording data systematically. This has led to the formulation of Force Action Plans and Peer Reviews to assist this ongoing process. Forces are also encouraged to develop their own benefits realisation plans to bring structure and rigour to local benefits management.

4.1 Performance Management

Figure 1 illustrates the strategic benefit areas, the benefit theme that to which it relates, and the quantification of certain benefits and qualitative areas of benefits measurement. Within these three strategic benefit areas, it is hypothesised that two key types of benefits are possible [5]:

- Efficiency: reducing the time and/or effort required to exchange information with other forces; and
- Effectiveness: using information more readily available from other forces to inform decision-making and improve operational outcomes.

Figure 1: PND Benefits Framework [5]



Source: NPIA, 2011.

In planning for benefit realisation, the metrics designed by the NPIA are exclusively underpinned by the theme that the PND will demonstrate effectiveness and efficiency in improving police performance in the policing areas described. The criteria for all metrics designed locally and centrally must be meaningful, attributable to the PND, and practically possible to collect the data within realistic timescales, and at resources cost that is proportionate to the benefit itself. The NPIA is using the concept of a ‘tiered’ approach to measure benefits, including metrics that demonstrate force-specific benefits and service-wide benefits.

5.0 Evaluating Information Systems in a Complex Context

Analysing appropriate methodologies for evaluating the effectiveness and efficiency of a newly designed and implemented national information system for the police service requires consideration of several disciplines and paradigms; for example, information science and information management, criminology, sociology, philosophy and to some

extent anthropology. This is partly due to the various business processes involved in delivering a national information system like the PND, as well as the wider social and environmental mitigating factors associated with implementing new technology in large organisations. It is therefore necessary to explore the role of information technology and information systems in organisations and the reasons why large organisations such as the police service, need to continually adapt and respond to constant change and uncertainty.

Central to the discussion of developing an evaluation framework for the PND is to understand both the business context of the information system, as well as the information technology that is to be used to support and improve new business processes and business change. In the context of policing, the PND has the capability to become an invaluable investigative tool, but the measurement of its 'value', 'performance', 'impact' and 'benefits', are as discussed earlier, dependant upon the creation of appropriate evaluation metrics [6]. The fundamental 'human element' of using and interacting with an information system or database is what can be primarily relied upon to make sense of the data not information technology; and that the technological aspect can only succeed or perform adequately if it is with the combination of their use - "that is the crux of the matter" [7].

This means that without the important tacit knowledge of people and professional judgement and experience, in this case, of police officers and staff, implementing information systems with sophisticated technology, and without measuring the process of engagement between users and technology, would make the development of an appropriate performance evaluation framework difficult. In policing the architectural infrastructure of information management systems are based on specific data handling procedures. Data held on systems is classified information and only becomes intelligence when it has been deciphered, and analysed for either tactical and/or strategic purposes. Knowledge creation is the end result coupled with a high level of interpretation so that it can be used in some form of action [7]. The National Intelligence Model defines intelligence as information that has been subject to a defined evaluation and risk assessment process in order to assist with decision-making. All intelligence should be actionable [8]. This continuum or layered nature of police data is to be recognised, as it further contributes to identifying the challenges and complexities of measuring benefits that are directly or indirectly attributable to the performance of a new information system, such as the PND. The point being made is that a 'knowledge

system' or 'knowledge base' of individual's actions, knowledge, experience and judgement will also be simultaneously created alongside the PND, and it is this knowledge system that will take the captured electronic information and create extensive user knowledge, which could therefore inform the very basis of a sound evaluation framework for realising PND benefits. Developing an information system/information technology strategy for knowledge management, means thinking strategically and planning for the effective long-term application and optimal impact of electronic information to support knowledge management in organisations [7].

Sociological post-modernist theories allude to the importance of understanding personal experience and personal perception, and that one's own interpretation of the world is as valid and realistic as anyone else's. This is particularly relevant in the process of benefits evaluation, in that the evaluation itself is to be thought of as an interpretation of the value of an information system is, to the person or group using it [9]. Using information systems as a determinant of police performance presents challenges, which need to be explored. Gottschalk [10] suggests that by developing a structured approach linking performance to knowledge sharing, occupational culture, leadership roles and the use of information technology, these significant determinants can be identified and applied in improving police investigations by law enforcement agencies. This reinforces the requirement that using information systems as a means of evaluating its performance within a policing context, must also encapsulate contextual determinants such as user requirements and expectations, the operational environment and the overall performance capability of the new system.

Police culture can influence human behaviour and attitude, and ought to be borne in mind when attempting to evaluate the implementation of a new information system requiring new business processes. Professor of Criminology Robert Reiner defines 'cop culture' as a subtle and complex intermingling of police officers' sense of mission, action-orientated behaviour and cynicism where the emphases on danger, suspicion, isolation, solidarity, pragmatism and authority are the core elements [11]. Understanding police organisational culture within the context of implementing a new information system is relevant, because by its very nature police culture could in fact impede the evolutionary development of the PND. The PND will impact upon police culture in terms of challenging its traditional sentiments of exclusivity and by evoking a significant change in the way police do business; which could initially be a potential

barrier of use. Other potential barriers to the successful implementation of the PND are in relation to data quality and data consistency. They are not only important aspects of data privacy, but they are also necessary to ensure that the PND is an effective tool and delivers a system that meets the needs of the Police Service. Data which are incomplete, inconsistent, not meaningful or misinterpreted due to the different ways forces manage their information can lead to poor decisions, wasted time or missed opportunities [12].

Research carried out by South Australia Police by Peter Shanahan [15], conceptualises the police service as a learning organisation that has the ability to adapt to rapidly changing environments. The research describes the element of leadership as being essential for the building of a 'learning' organisation. In this way the leader connects the organisation to the environment, which in turn leads people to being empowered and capable of moving toward a collective and shared vision [13]. Leaders are also required to be able to establish systems to capture and share learning, encourage collaboration and team learning, promote inquiry and dialogue and create continuous learning opportunities. Leadership must be present in order to bring all of the 'learning' organisation elements together into a cohesive whole [13]. These findings support Gottschalk's research results [14], in that leadership is a significant determinant in improving police investigations by law enforcement agencies, and can greatly assist in developing a structured approach towards police performance and promoting organisational learning, by building on the essence of effective leadership and teamwork. This is particularly relevant to discussing both the delivery approach to implementing the PND service-wide, and in relation to the training element and the selection of appropriate training methods for PND users. The research also suggests the importance of open communication between those in leadership roles and operational officers and police staff, to enable a cross-section of the organisation to work together, and to create collective thinking, knowledge and experience. Shanahan [13] states that, "...this gives a sense of the potent energy that could be spread throughout the organisation".

One of the key characteristics of the PND is that an information system that will continue to evolve in the future. PND Release 1 is mainly concerned with data reconciliation whereby forces are loading their data onto the PND (custody, crime, intelligence, child abuse and domestic abuse), and with functionality, which currently matches the existing Impact Nominal Index (INI), which is a national database

containing information on criminals only. For PND Release 2, it is anticipated that there will be enhanced functionality including a much more rigorous and in-depth search facility. All forces would need to have implemented the PND by March 2011, as the Impact Nominal Index (INI) database will be discontinued nationally as of April 2011. Forces will then be able to use the PND to generate lines of enquiry, increase operational effectiveness as a result; decrease operational risk and improve the way police do business. This provides a strong basis to suggest that the PND is an evolutionary information system, which will require evaluation throughout the life of the system, and that the management of benefits, risks and costs are fundamental aspects of the PND's performance and evaluation framework.

Khosrowpour [9] suggests that traditional evaluation methods for information systems may be unsuitable for evolutionary information systems, partly because of the number of multiple variables involved, and the difficulty is quantifying individual and organisational tangible or intangible benefits to information systems. Thus, there is a gap in current research in the evaluation of evolutionary information systems. Khosrowpour [9] suggests the adoption of a much broader, post-modernist view, which encompasses perspectives on recent developments in information technology, as well as considering societal changes and human issues. This view does allude to some of the complexities involved in effectively measuring the performance of a new information system or database. It also reinforces post-modern sociologists in that the modernisation of society and subsequent social anomalies such as rising crime rates, has led to the need for more advanced and industrialised forms of information technology and information systems by law enforcement agencies. In devising an appropriate performance and evaluation framework for the PND, relativism or cultural relativism – an inherent perspective of post-modernism - will be relied upon to gauge individual user's experiences as a central theme in evaluating evolving information systems such as the police national database.

Research carried out by Chen and Chen [15], discusses the importance of evaluating knowledge management systems in organisations. The questions addressed in the research are in relation to organisational investment, measuring the success of the new information or knowledge system and ascertaining whether the system is productive, effective and beneficial. These questions are very similar to the kind of research required to measure PND benefits, where ultimately the focus is not just on the

performance of the system, but also on the design of metrics that can rigorously demonstrate whether the initiative has justified the investment. The research recognises how the technological aspect of implementing new information and/or knowledge systems ought not to be the primary focus, but rather the creation of a robust methodology that can evaluate information systems' performance. A quantitative approach was adopted to carry out the evaluation; this was to enable survey results to be typically quantifiable, and therefore amenable to statistical analysis. Using statistical inference also allowed the results obtained from the sample of respondents to extend to a large population, therefore enabling a wider remit and application [15]. For the PND a similar quantitative approach could be deployed to measure its investment and benefits to UK policing. It is envisaged that when the PND eventually becomes part of 'business as usual' for the police service, approximately 56 forces and agencies will be using the system. Realistically, a quantitative approach to benefits realisation would be the most feasible, valid and reliable. The 'Benefit Profiles' will be invaluable from a qualitative perspective, and would contribute and supplement statistical information as a means of providing meaningful context, for example in the form of case studies, sharing best practice, 'good news stories' and the like.

6.0 Challenges and Complexities in Assessing PND Usage and PND Performance

The Impact Nominal Index (INI) database that is currently being used across the police service in England and Wales produces monthly performance management information for the NPIA. These statistics of INI usage will be used as a baseline of activity, which will then be compared to statistics generated by the PND to measure its usage, although it is recognised that the databases do not contain the same categories of information as INI contains nominals. The comparison of both systems will indicate frequency of access of the national system, the forces that are using the INI, and the strategic business areas that INI is mainly used for, e.g. child protection, major crime, counter-terrorism. As explained briefly, the phasing out of INI is scheduled for April 2011, which means that both the early adopter forces (EAF) Lancashire, Northumbria, Dorset, Gwent and, West Midlands Police, and forces which have progressed well so far with implementing PND locally, such as the Metropolitan Police, and Leicestershire Constabulary, will have the opportunity to access and use the PND for operational and intelligence purposes. The NPIA is currently working towards the aim of simultaneously decreasing INI use and increasing PND use. By communicating the envisaged benefits to forces and by

promoting the added functionality that the PND has, compared to the INI, the NPIA anticipates that the PND will quickly replace the INI system. In order to monitor progress on the switchover from the INI to the PND, EAF PND project managers have been invited to work collaboratively with both their local force and with the NPIA, which includes the authors. This is for the purpose of conducting an initial 'early-review exercise', to gain specific quantitative data, and to also identify key performance and benefits areas that the PND facilitates or enables, which can then be explored further in future data-gathering exercises. It will also identify force progress, in particular the EAF's. The following questions (temporal based to assess efficiency) will form the basis of a questionnaire, which will be sent to all EAF's PND project managers.

1. Time taken to prepare a Request Generator Report for the INI.
2. Time taken to search the PND.
3. Time taken to extract information from the PND and analyse results, to determine which intelligence can be eliminated, and which intelligence is relevant to your enquiry.
4. Time taken for receiving force(s) – namely the INI point of contact, to respond to force request (force(s) receiving the request for information from the originating force to provide response time(s)).
5. Elapsed time between sending the request for INI information and receiving a response(s) from the force(s) owning the data. For example, if more than one force being contacted, response times required for each force contacted.
6. Time taken to review data from the INI and analyse results, to determine which intelligence can be eliminated, and which intelligence is relevant to your enquiry.

Analysis of all the data received will collectively indicate both INI and PND access and usage by the number of searches carried out using both systems during the reporting period. It is anticipated that force users will experience for themselves the wider advantages and functionality of the PND, by jointly comparing its capability to the current features of the INI system. However, it does not assess the benefits of using a shared information system, which can be a complex metric to measure, but ultimately can provide massive benefit as alluded to in the introduction section of this paper.

Some of the challenges and complexities that may arise as a result of forces developing their own Force Action Plans for measuring local benefits are in relation to national data collation and data analysis thereafter. The template designed by the NPIA for forces to capture and record data for realising benefits is thorough and detailed and therefore,

will provide in-depth qualitative information about the benefits the force perceives they have realised. As mentioned earlier in this paper, forces are being encouraged to produce their own benefits realisation plan and to develop these into force action plans, whereby accountability of actions and overall force progress can be regularly monitored. Forces will be populating 'Benefit Profiles' to capture their local PND benefits for each strategic benefit area. The 'Benefit Profiles' will include the detail and description of each benefit, including risks, dependencies, metrics and benefit(s) owners [5]. For forces, completing a benefit profile for each benefit realised will be time-consuming; from an analytical perspective, extrapolating and analysing data derived from the profiles will also be time-consuming, as the profile template has been designed to mainly capture qualitative information, with a quantitative emphasis on reducing time (see PND Benefits Framework p.4). Staffordshire Police has recently produced a 'PND Business Benefits Benchmarking Results Report' for the NPIA. Staffordshire Police devised a series of local workshops, with representatives from each strategic business area to effectively enable the collation of data direct from PND users, project managers and PND regional coordinators. Interestingly, for Staffordshire Police, all of the benefits profiles selected "*effectiveness*" in terms of timesaving as a key PND benefit result, and stated how "*...a national picture could be gained very quickly live-time, particularly intelligence that had not been recorded on the police national computer,*" [16].

Data collection and data analysis from a national perspective may present issues of data quality in terms of non-standardised and inconsistent data gathering methods across forces. It is recommended that the NPIA communicates to forces the importance of developing robust research and analytical methods to achieve a realistic level of data standardisation nationally, and that the benefit of this will be ultimately to assist in developing a full national picture of PND impact and performance. Another recommendation for forces is to deploy staff with research and analysis capability and skills in perhaps organisational performance and intelligence roles. Apart from the EAF reviews, forces will also need to report on other aspects of the PND's performance such as access, usability and functionality issues, which will need capturing to further contribute to the evolving national picture.

There are also challenges involved in assessing the benefits, and whether these have occurred as a direct or indirect result of using the PND albeit tangible or intangible. Policing is a complex environment with a vast array of business processes, business

areas and business priorities. Lessons learnt and best practice evidence are fundamental components of PRINCE2 project management and in particular key reporting elements as outlined in the PND business case [2]. Within the context of PRINCE2, benefits and disadvantages can only be identified if a series of project-led outputs have led to a series of outcomes. In PRINCE2 “a benefit is the measurable improvement resulting from an outcome that is perceived as an advantage by one or more stakeholders” [17]. Case studies will be advantageous for this purpose, as they would provide insight of a force’s operating model for the PND – how it has worked operationally as an investigatory tool, and will also allow exploration of causation in order to find underlying issues. In order to sharpen understanding in a systematic way, case studies would give the opportunity to generate and test hypotheses by looking at events, collecting data, analysing information and reporting the results. It is anticipated that work carried out by forces in developing their own force action plans will be used and shared as best practice and lessons learnt, particularly the EAF’s who have progressed very well in capturing their PND benefits, will be cascaded to other less progressed forces. Some of the complexities discussed in gathering and analysing data to measure PND benefits and performance, echo the views of Khosrowpour [9], where traditional evaluation methods may be unsuitable for evolutionary information systems due to the multiple elements and variables that need to be measured, and the challenges of designing unbiased metrics that can accurately provide causal connections between the independent and dependent variables.

6.1 PND Training

A fundamental requirement for accessing and using the PND is training. As briefly mentioned earlier in this paper, the selection of appropriate training tools and training methodology is crucial in enabling future users to benefit from using the PND as much as possible. The NPIA has chosen computer-based training (CBT) as its method for training force PND users. Centrally, the CBT is designed to give users a brief introduction to the PND prior to either extended briefings delivered by the Regional Coordinators, and/or supplemented with further training via forces locally. The aim of the PND e-learning module is to provide a broad understanding of why the PND has been introduced and how it will benefit its users. It is mandatory that anyone who will directly or indirectly using the PND must complete the module.

The relevance of training is important to the discussion of PND benefits realisation, because training has been identified as a potential barrier of use, which could impact on the successful implementation of the PND. Martin and Jackson [18] recognise the importance of learning and training as key aspects of sustained organisational performance, particularly when introducing new technology to an organisation. Evaluating training and development is crucial in justifying business investment both in time and cost. Unless training activities result in some positive changes in the performance of the organisation, it will be of no relevant value [18]. It will be interesting to ascertain early-users perspectives on the delivery of national PND training, so that feedback can be used to inform future training requirements. The NPIA also facilitated several national PND workshops aimed at senior management and middle management police officers and police staff, to communicate the key PND performance and benefits messages to forces. As discussed by Shanahan [13] and Gottschalk [14], this approach gives emphasis to the element of leadership as being essential for sharing and promoting learning cohesively, for improving police performance and adapting to organisational change.

7.0 Conclusion

In summary, this paper has discussed the delivery of the PND, and the challenges involved in its implementation. Delivering the PND is not simply about the delivery of IT. Delivering the PND is about business change enabled by IT and is a complex process. The realisation of benefits will be a gradual and evolving process, whereby national coordination will play a significant role in collating data and analysing results that will enable a national evaluation of PND impact, performance and justifiable investment. Using a range of research methods including both qualitative and quantitative, will greatly assist in the development of a robust evaluation framework that will measure both the performance of the system, and also its benefits to UK policing. Choosing to adopt quantitative evaluation metrics will permit a wider sample of the population to be researched, and by using statistical significance and statistical inference will further strengthen and legitimise results from an analytical perspective. Qualitative research tools currently in the form of 'Benefit Profiles' will be used to supplement quantitative data, by providing depth, context, and meaning to support statistical results. It is anticipated that by designing an evaluation methodology for the PND, which uses various research methods will add scientific validation and rigour to the research findings, specifically in relation to the realisation of PND benefits in the near future.

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Exploring System Transition in the Police Organisation: The Case of the UK Police National Database

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Abstract

This paper addresses the recent implementation of the Police National Database (PND) and explores the impact of system transition from the Impact Nominal Index system (INI) that was set-up in the interim in 2005. Using a case-study approach, this paper reports on the findings from research undertaken in several police forces in England and Wales; the research aimed to gain understanding of user perceptions and their early experiences of the PND; including the identification of any challenges to business processes and organisational practices as a result. A total of 12 police forces took part and 16 police employees participated in semi-structured interviews. This research has found that there are important change-management issues which require consideration, such as effectively communicating to staff how their roles and responsibilities could be affected following the implementation of the PND. Information sharing is at the heart of the PND; this research has identified mitigating factors which cause difficulty in the dissemination of police information. Maximising the PND's potential in the police organisation requires acknowledgement of the various organisational and cultural changes evoked as a consequence; this will play a role in ensuring that the PND is sustainable, that it has longevity like other core police systems, and that it has the ability to cope with the evolutionary demands of policing.

1.0 Introduction

The National Policing Improvement Agency (NPIA) launched the Police National Database (PND) in June 2011. All 43 police forces in England and Wales, the Child Exploitation Online Protection (CEOP), and the Serious Organised Crime Agency (SOCA) are now connected to the PND. The withdrawal of the Impact Nominal Index (INI) system set up in the interim in 2005 has meant that forces can only seek and acquire national police information on known offenders and individuals of investigative interest from the PND. Media coverage of the PND launch was mostly favourable towards the initiative; however, civil liberties groups and senior MPs expressed concern at the scale of the database and the number of people who will be able to use it. For police forces and agencies, the PND is now at a critical stage – what will users think of the PND? Has it brought about any challenges to business processes and people that were not anticipated? What impact has the transition from the INI to the PND had on users? These research questions will be addressed in this paper.

2.0 Background

The delivery of the PND as a managed project has led to a series of significant change management issues, which include the transition from the INI system to the PND; the sharing of police information across force boundaries; and the challenges associated with implementing a new IT system such as introducing new or altered business processes for the police organisation. Access to police information in traditional communicative forms has been on a strictly need to know basis. Neighbouring police forces were in no more of an advantageous position than forces more geographically dispersed. The point is that physical force boundaries were no more or no less impeding in the sharing of police information [1]. The well known dictum ‘knowledge is power’ is a contributory factor conceptually, in attempting to understand the various elements inherent to ‘organisational culture’; a concept identified in both the Laming Report 2003 and the Bichard Inquiry 2004 as being a crucial factor in recent institutional knowledge failures [2]. Ultimately, there is a greater risk in choosing not to share intelligence than there is to share intelligence in the most basic sense. However, the Bichard Inquiry also found that there were particular recommendations pertaining to the police service’s information handling practices; more specifically clear guidance on record creation, retention, review and deletion and the sharing of information under the Police Reform Act 2006. The remaining recommendations from the Bichard Inquiry were aimed at Social Services and focussed on improvements in employment vetting procedures, new

referral actions for child protection and further training for staff involved in appointing people to work with children [3].

3.0 INI to PND – Information System Transition

First of all, it is important to look at the recent transition from the INI system to the PND. From a business user-acceptance perspective, managing the process of transition from one system to another is significant from both a business and human perspective. Identifying any business benefits directly attributable to using the system greatly depends on people confidently engaging with it, and seeing for themselves that it can do more than the INI, and that ultimately the PND enables the sharing and linking of police information for investigative purposes. It is therefore, important that some initial research is carried out to provide some insight and understanding of how the INI system was used by police forces before the PND, and the expectations of future PND users following its recent implementation. User-acceptance testing is a technical term normally understood to occur before information system software is signed off as fit for purpose, and before a system can go live [4]. From a social and business perspective, this concept has been used for this research to specifically infer understanding of how end-users of the PND will utilise the system contextually, but also how the PND will evoke changes in business processes, and the level of resistance to those changes. Some resistance to change is inevitable, but this is particularly true with the introduction of new systems associated with business process re-engineering (BPR), because of the new ways that work may be performed and possible changes to people's job functions and roles [5]. For definitional purposes, a business process can be described as 'a set of logically related tasks performed to achieve a defined business outcome' [6]. Boddy et al, continue to define 'business process re-engineering' or 'business re-design' as 'an organisational analysis approach to re-designing business processes' [6 p.100]. In essence, it is about identifying new or innovative ways of carrying out work or business as an organisation - sometimes enabled or as a result of newly implemented IT technologies and capabilities. On a national level, police forces have recognised that business process re-engineering is a requirement for the PND, particularly in relation to the sharing and dissemination of police information under the data control measures put in place as part of the security environment. It is therefore, vitally important that the primary objective of the PND, which is the sharing of police information, is not underplayed or negated by too strict security procedures when it comes the dissemination of data.

In order to manage the most critical determinant of technology effectiveness in organisations it is necessary to understand how people use it to get work done. Technology is not valuable, meaningful, or consequential by itself; it only becomes so when people engage with it in practice [7]. Thus, it is important not to neglect technology use, as such neglect may encourage the onset of simplistic assumptions – that if people have technology they will use it, that they will use it as designed, and that such use will produce the expected outcomes. With this in mind, the rationale underpinning this research on system transition from the INI to the PND was based on understanding human experience and perception and exploring people’s interpretations of both current and new business processes, working practices and events surrounding the implementation and use of the PND.

4.0 Research Framework and Methodology

This research is based on a case study approach. Case studies allow in-depth exploration of one particular situation, and facilitate the obtainment of 'rich' data by multiple means [8]. The rationale for adopting a case study approach was that it could provide a preliminary position of acquiring data out of which potential theories can be developed and future research considerations can be identified as a result. It would also enable subsequent decisions to be made about actual research methods to adopt, and validating their appropriateness [8]. Moreover, choosing to conduct small-scale research was based on gaining an in-depth and a holistic view in a natural setting, through exploration of the key issues pertinent to current INI users and future PND operators, and to describe the business processes undertaken during the life of the INI, and the anticipated changes to business processes as a result of the PND. The interview questions focussed on INI usage, the system's advantages and disadvantage, and people's expectations of the PND in terms of users' requirements from both a human and business perspective. Carrying out interviews in qualitative research is particularly useful for small samples [9]. Choosing to conduct semi-structured interviews was a decision based on allowing exploration and flexibility, in how interviewees responded to questions and to give them the opportunity to answer and to elaborate, on the questions asked. The questions were intentionally designed to be 'open-ended', and served the purpose of a checklist - guiding the topics to be covered during the interviews [10]. The crucial point was that whatever the source of influence on what was already known about the topic of research, the concepts used to inform the design of the questions were treated as 'provisional' and open to some alteration in how the questions were answered and in what order [11]. The quest for achieving a representative sample was not definitively required for the purpose of this small-scale case study. Based on the qualitative design of this research, the primary objective was to obtain empirical data using a cumulative sample approach, whereby non-probability sampling is applied namely purposive and snowball sampling to produce an exploratory sample, not a statistical representative one. The sample process for this study was essentially 'discovery lead' and the size and composition of the sample was not predictable from the start. This is a similar method used for theoretical sampling, which is closely aligned to the grounded theory research approach [8]. The main principles of idiographic research are appropriate to understanding with what this research is concerned. Idiographic research positions itself in exploring particular events and providing the richest picture

of what transpires [12]. The aim is contextually to understand phenomenon with emphasis on analysing subjective accounts.

5.0 Research Participants

The forces that contributed to this research were identified through purposive and convenience sampling. All forces in England Wales were invited to participate via their respective Regional PND Co-ordinators, who were asked to nominate key INI and PND users. The forces that responded within the specified timeframe were as a result, the sample population, and arrangements were then made to attend each of these forces to carry out the interviews. Snowball sampling began to emerge; participants suggested other key users to interview, and so the sample began to increase in both size and scope. A mixture of police officers and police staff were interviewed, including office administrators, departmental managers, intelligence researchers, police detectives and uniformed officers. A series of 15 semi-structured interviews were carried out involving primary INI users and future PND users in forces; 12 police forces were visited across England and Wales, these were:

- Bedfordshire
- Cambridgeshire
- Devon and Cornwall
- Dyfed Powys
- Essex
- Gwent
- Hertfordshire
- Leicestershire
- Northamptonshire
- Norfolk
- South Wales
- Wiltshire

Specific Force Departments:

- Force Intelligence Bureau
- Professional Standards – Force Vetting Units
- Police National Computer (PNC) Bureau

- Public Protection Teams - Children and Vulnerable Adults

6.0 Qualitative Data Analysis - A Case Study Approach

The methods used to analyse qualitative data largely differ from the deductive reasoning process often aligned to quantitative methods of data analysis. The fluid and cyclical tendencies in qualitative data collection analysis can generate impressions that qualitative data analysis is rather an *ad hoc* process of data accumulated and transcribed in textual form [13]. However, by and large, interviews of whatever nature will need to be recorded and transcribed whether for qualitative research purposes or for more prescriptive and statistical data analyses [8]. For this research, qualitative data analysis was appropriately used to enable the extraction of meaningful and occurring concepts that are distinct to the social or business setting being investigated. As such, the collection and analysis of data follows an inductive and logical approach, which is 'discovery led', and is concerned with drawing wider inferences and arriving at more generalised statements about the topic [10]. However, this can lead to some degree of crossover, often found in grounded theory approaches. The emergence of 'theory' and 'explanation building' generated from the research data provides some reinforcement of the findings being directly linked to 'real-world facts' as much as possible [11]. Whilst it is appreciated that case studies cannot achieve representativeness, they can however, generate understanding of a 'broader class of things', as well as unveiling the various intricacies and subtleties of complex situations [10]. The limitations or disadvantages of using a case study approach toward research and data analysis thereafter is in relation to the credibility of the generalisations made from its findings. For this research, efforts have been made to minimise this vulnerability by emphasising the need to capture reality and experience with 'unique' and pragmatic evidence that can help to develop and build theory; and as a useful starting point for future research planning and design [9].

7.0 Research Findings

The technique used to analyse the research findings was consistent with the content analysis approach. The reason for choosing to apply this technique was based on systematic analysis of the data to capture the frequency of keywords and to qualitatively enable interpretation of the text in the form of narratives [12]. Furthermore, what were also of interest from a content analysis point of view were the absence of keywords or concepts, which was regarded as just as important; as well as the capturing of 'one-off'

views, which is also important from a phenomenological point of view. Content analysis of all the data was initially carried out in two stages; the first stage involved analysis of the data in relation to questions on the INI system. The second stage analysed the data relating to the PND. The purpose was to compare both systems usability, how the introduction of the new PND system will affect working practices and whether the PND will be able to deliver the features and functions as anticipated.

Stage 1: INI - Analytical Themes and Trends Identified (based on frequency)

5. Business Processes

- d. Request Generator – a time consuming paper exercise, which is used to record the purpose of the INI request to the receiving force(s)
- e. Seeking authority to complete the request generator in the first instance
- f. Delays in receiving intelligence from the forces, particularly large urban forces, which some have a backlog of INI requests to complete

6. System Usability and Capability

- f. Cannot view intelligence available to request from forces
- g. Restrictive searching capability
- h. Data not instantly accessible
- i. Limited technical features and functions
- j. Easy to use/adapt
- k. Unintuitive System
- l. Reputational issues i.e. unreliable and inaccurate information

7. Operational and Intelligence Value

- e. Linking previously unknown intelligence from other forces
- f. Often used for force vetting purposes
- g. Often used for risk assessment purposes
- h. Identifies information not available on PNC
- i. Good navigational tool to seek further information
- j. Mainly used for child protection and vetting purposes

8. Communication and Collaboration

- c. Assists joint-working with other forces/agencies working on similar (or same) enquiries

- d. Aids communication with other forces for preventative policing purposes

The themes emerging from the analysis of interview transcripts contain aspects that require highlighting in terms of the value and benefits of the INI system to end-users, and to policing overall. Although there is usually a time lapse in receiving information from forces, the information derived from the INI is usually not available from other national police systems such as the PNC; the INI facilitates (albeit not instantly), the crucial linking of previously unknown intelligence held by other forces. The data also suggest that generally the INI system is easy to use and easy to adapt to, but it appears that the common issues pertinent to INI users are that the system carries an inherent administrative burden. Technically the INI's searching capability is restrictive and unintuitive to their working processes, and there are reputational issues, which to an extent may have impacted on the limited use of the INI system across all business areas in the police organisation.

In terms of making some recommendation based on this insight, negative perceptions of an IT system, whether as a result of speculation or 'word of mouth' or from real tangible experiences, need to be rapidly identified and ameliorated through training and education in order to minimise the spread of such sentiment becoming a potential barrier of a system's use. Furthermore, organisations implementing new IT systems need to incorporate a significant presence of change-management, communicating not only the envisaged strategic benefits of the system to the organisation in its totality, but also to communicate to staff how they're roles and responsibilities could well be affected [14].

Stage 2: PND - Analytical Themes and Trends Identified (based on frequency)

5. Organisational Factors

- f. Information Technology Strategy for the PND
- g. Re-education on rationale for business process changes
- h. Training on new business processes required by the PND
- i. Confidential environment and strict access security measures
- j. An agreed national data sharing protocol for the PND

6. System Usability and Capability

- f. Easy to use interface

- g. Over complicated system – unintuitive
- h. Better functionality compared to the INI system - wider search criteria includes people, objects, locations and events
- i. No ‘copy and paste’ or printing functionality which impedes the electronic dissemination of data
- j. Automatic updates for forces are essential for business continuity and system credibility/reliability and data integrity reasons

7. Operational and Intelligence Value

- g. Better access to data from a national pool
- h. Benefit risk assessments
- i. Benefit intelligence assessments
- j. Can identify patterns of offending – nationally, regionally, cross-border
- k. Assist decision-making and problem-solving
- l. More emphasis on proactive policing

8. People Impact

- d. Implications for working practices (and on roles and responsibilities, particularly administrative operators who are ‘passive’ users)
- e. Analytical/Intelligence Handling skills required to assess/evaluate information from the PND
- f. Time gained in retrieving data, will be spent deciphering relevant data

9. Information Management Capabilities

- d. Managing information in accordance with guidance and national policy on the ‘Management of Police Information’.
- e. PND gives greater emphasis on assessing the relevance and value of data from the PND – but with information overload concerns
- f. The misuse of information and the potential ramifications –information use and disclosure practices.

In contrast to the views expressed regarding the INI system, which were mainly in relation to delays in receiving data from the requested forces, the system’s lack of technical functionality and the ‘paper burden’ of actually carrying out an INI search request, prospective users of the PND were collectively concerned about the quality and

reliability of the data on the PND, in terms of whether forces on a national scale were regularly updating the system with current and up-to-date information. Furthermore, concerns were raised by police staff working in administrative support roles regarding their new responsibilities of assessing PND records following PND requests from operational police officers in their force. Such 'passive' PND users, who were not previously required to perform the task of assessing a volume of information, are now required to decipher what is significant and relevant in response to the PND request, which could have serious risk implications for policing and safeguarding. Overall, participants recognised that to critically assess and evaluate information from police systems requires the application of specialist skills – skills that not everyone in the police service are necessarily trained or required to have. A force Administrator in the Vetting Unit reinforces this key point:

“The real work begins once you’ve performed a PND search. The onus is put on us to see what might be relevant in response to the request. I can see other administrators and myself seeking reassurance from managers and police officers as to what to choose to pass on - I didn’t need to do this before with the INI system. We need training on how to do this for ourselves.”

Another important issue, which needs addressing, is in relation to how data from the PND is practically disseminated once data records of interest have been located on the system. At the moment the ability to print intelligence records from the PND is very limited, and records cannot be extracted in any electronic form. This could be a potential barrier of use for PND users in that such difficulties could not only dissuade actual use of the system, but could also hinder a force’s ability to easily share vital information from the PND - within their actual force. A police Public Protection Unit supervisor expresses such concern:

“The PND is on a confidential network and this actually makes the sharing of police information quite cumbersome, especially when you have to prepare for Case Reviews with the Social Services or if you’re liaising with another department in your force. You can’t get the information out of the system once you’ve got it, and you can’t print it either. There could be loads of records that I would need to go through and write down – it’s not exactly a good use of my time and energy.”

Davies [6] developed the technology acceptance model and identified the importance of evaluating perceived use and perceived ease of use. Davies [6] suggests that acceptance of new technology in organisations is dependant on people recognising its perceived usefulness and perceived ease of use. The two variables are understood to predict and influence users' attitudes – whether positively or negatively. The empirical study based on a survey questionnaire concluded that perceived usefulness has more effect than perceived ease of use, and that people are more likely to cope with a 'difficult' system if it provides them with valuable information, but unlikely to use one whose only virtue is that it is *just* easy to use [6].

8.0 PND Most Wanted Event – NPIA

Prior to the launch of the PND the NPIA conducted a 2-day event at Bramshill Police College entitled 'PND - Most Wanted'. The purpose of the event was to 'test' the PND in an operational environment by performing real searches on 'wanted' people known or of interest, to the police. It was anticipated that the PND would provide new information that would benefit current investigations, and lead to new lines of enquiry. The aims for the event as outlined by the NPIA in the opening introduction were noted: -

1. Identify good news stories for the launch of the PND
2. Evidence effective operational use of the PND
3. Business assurance to different business areas
4. Encourage increased use of the PND
5. Prove the value of the PND to ACPO leads in order to incorporate the PND into their national portfolios on police guidance and training
6. Learn lessons for PND Release 2
7. Provide evidence to the Home Office and Government Investment Board
8. Validate and prove the PND business case
9. Examine data quality of information held on the PND

As a researcher this was a unique opportunity to conduct participant observation, by contributing to the event as well as observing other forces and agencies taking part. Observing the event was based upon informal observation and conversations with police officers using the PND. The research approach applied during this event largely relates to the study of people in naturally occurring settings in the 'field', which capture their social meanings and ordinary activities, involving the researcher participating

directly in the setting if not also in the activities [10]. The central aspects of ethnography research are concerned with studying people's behaviour in everyday, 'natural' settings whereby the emphasis is more on offering description rather than causation [13]. As participant observer, the intention was to immerse and 'blend in' so that the researcher's presence and participation mirrored the same activities occurring within the 'natural' setting. Primarily, this was a good opportunity to gain 'real' insight of what users' thought of the system, their experiences of using the system and whether it provided them with tangible and useful information that was previously unknown. Overall, the data collected identified several key findings, which were considered as highly important from a users' experience perspective. Users were impressed with the availability and accessibility of police data from forces across England and Wales, but were not so impressed with the navigational layout of the system, particularly when the initial search returned a significant number of records. Also, records that were 'access denied' did not state why the record could not be accessed – the reasons can vary from needing to accept specific intelligence handling conditions, the record(s) not yet been uploaded by the owning force or technical issues that would need to be identified and resolved. On a positive note, the majority of users commented on how the PND demonstrated enormous value to policing by its ability to link intelligence on a national level, and the speed in which searches were returned from millions of data records held on the system. Some of the interesting outcomes from the event are detailed below:

- A **Serious and Organised Crime** group currently under investigation was believed to be active in other parts of the UK. PND searches revealed that one member of the group was the subject of over 100 intelligence entries, which gave details of involvement in other offences
- **Domestic Abuse** - PND identified five forces that held information on a perpetrator with domestic abuse related convictions
- **Public Protection and Risk (Violence)** – An individual acknowledged as being violent. Checks on the force crime system showed no trace. Checks on PND confirmed that the name checked on PNC and local force system was actually an alias

- **Public Disorder** - an 'AWOL' soldier was of interest to three police forces in relation to football violence.

9.0 Discussion and Conclusion

Organisations like the police service need to recognise that new technology is sometimes a convenient scapegoat for workplace dissatisfaction, and it is common to claim that resistance to change is a fundamental human trait [14]. Another perspective would be to focus on the process of making the necessary changes in the police organisation, and the involvement of people in selecting the new technology, or in the way that technology is introduced and used; how the implemented technology is communicated, how much training and support is provided, and how careful the roll-out is planned and executed [5]. Furthermore, in terms of the technology itself, users will be questioning how well suited it is to their work, how easy it is to learn to use, how 'forgiving' the system is of users' errors, and the system's reliability and efficiency [6]. Steps need to be taken by the police organisation towards managing the effective use of new technology, and that resources and efforts are dedicated to developing appropriate users habits, as well as rewarding and recognising the innovative use of technology, rather than just focussing on what the technology is capable of [4]. In the case of the PND, 'teething problems' are clearly apparent but it is vital that early start-up problems are promptly resolved; otherwise issues of such nature could potentially lead to rejection of the new technology. In order to optimise effective use of new technology, it requires users' to have the necessary skills and training to be able to exploit the features and functions available to them. One of the most critical determinants of technology effectiveness is to evaluate how people use it to get work done [6]. User engagement with technology is just one aspect, other aspects relevant to technology usage and acceptance relate to police information behaviour, their information management capabilities and how both tacit ('know-how') and explicit ('know-what') knowledge is captured from police officers and police staff – as this contributes to the intellectual capital of the police organisation.

The amount of information that police officers come into contact is astounding [21]. The police service is a highly information-intensive organisation [1]; it must now work at creating and sustaining an organisational culture that promotes the sharing of information, and knowledge. How people acquire and process information is determined by what their information needs are, their methods of information seeking,

and how the information gathered is being purposefully applied [7]. Knowledge on the other hand in the context of policing refers to individuals' knowledge and that it does not easily transform into organisational knowledge [21]. Empirical studies have shown that the greater the anticipated reciprocal relationships are, the more favourable the attitude toward knowing sharing will be [22].

A fundamental process of policing and law enforcement is investigation. Investigations would grind to a halt if there was scant or limited information to develop or to act upon. The well-known data to knowledge continuum establishes the importance of making distinctions between data, information and knowledge [17]. For policing 'intelligence' is an inherent step in the 'knowledge ladder', and refers to actionable information that has been organised, validated and analysed [2]. Knowledge creation, is therefore, a continuous process of dynamic interactions between capturing the tacit and explicit knowledge of police officers and police staff, and is a nurturing and engaging process, which relies on access to relevant and appropriate information sources and systems [2]. Knowledge management can be defined as a process or method to simplify and improve the process of sharing and understanding knowledge within an organisation, to effectively ensure activities are in place which facilitates the systematic and collective leveraging of knowledge throughout the organisation [18]. From an interdisciplinary perspective, knowledge management can be defined as 'the effective learning process associated with exploration, exploitation and sharing of human knowledge (tacit and explicit) that use appropriate technology and cultural environments to enhance an organisation's intellectual capital and performance' [20 p.14].

In order to maximise the benefits and use of the PND, the police organisation must recognise the profound organisational changes evoked as a result. The changes that require particular attention are in relation to how information is shared, how it is stored, retrieved and utilised; and the application of knowledge management initiatives such as sharing best practice, performance benchmarking, instilling responsibility and accountability for sharing knowledge, and formalising such processes as part of the organisation's core knowledge management values and principles [19]. However, there are many challenges associated with designing and implementing knowledge management tools and initiatives in an organisation. Failing to acknowledge the cultural and change-management dimensions can lead to unsuccessful and futile implementation [20]. Another challenge would be the failure to adopt an appropriate organisational-wide strategy towards integrating knowledge management; police forces will have


different views as to what knowledge management practically means in reality. Forces are aware of the central role of intelligence and knowledge to police work, by identifying what constitutes as knowledge management and where this knowledge exists, can assist in the design of a strategy to facilitate the application of knowledge, which is acquired [21]. Knowledge sharing and exchange is pivotal to successful knowledge management [20]. Research carried out by Seba and Rowley [23] on knowledge management in police forces identified organisational culture as the main barrier to tacit knowledge sharing and exchange of expertise. On the basis of their findings the authors suggest that the police organisation develop further understanding of their organisational culture as part of the process of understanding how to create knowledge exchange cultures [23].

From a strategic and future planning perspective the longevity of the PND should be considered particularly in relation to avoiding system futility. Areas that need to be considered are in relation to the sustainability of the PND in coping with the evolutionary demands of policing. How can continuity and prolonged use of the system be ensured, and to what extent, and what are the critical success factors to indicate how well the PND has become embedded along with the use of other core police systems such as the Police National Computer. Addressing these considerations require further exploratory research to be carried out in the form of a system performance evaluation – to assess the reliability and integrity of the PND within an operational context, and by post-implementation reviews. Post-implementation reviews would be valuable in determining the success of the system in meeting its business requirements and whether it has delivered the anticipated benefits described in the project business case [6]. An additional reason for performing a post-implementation review is so that lessons can be learnt from the project, best practice can be applied to similar projects in the future and attempts made at avoiding the techniques, which failed [4]. Future research can be built on this paper by studying the evolutionary development of the PND in context, its operational usefulness and value as a research tool; and whether the majority of PND users believe as stated by the Deputy Chief Constable of Durham Constabulary Mike Barton - that the system “does what it says on the tin” [24].

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<p>IMPACT PND Post-implementation Review Questionnaires Eastern Region</p>	 <p>NPIA National Policing Improvement Agency</p> <hr/> <p>IMPACT PROGRAMME</p>
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Instructions for completion:

This questionnaire has been carefully designed to assist you in responding easily to the questions. **Please ensure that you respond within the shaded boxes by either typing text or clicking on a box you have selected as your answer.**

To do this:

1. Select the View menu at the top,
2. Go to Toolbars and select the 'Forms' option,
3. Finally protect the form by clicking on the 'padlock'.

Thanking you in advance for your participation.

Information about you:

Job Role/Title:

Length of service in current role:

Department:

Contact details:

Business Area Manager

1. How satisfied are you with the guidance documents produced by the NPIA to support business use of the PND?

Select from list:

2. Has the business area in which you work incorporated PND into routine searches conducted for all activities in which you operate?

Select from list:

3. When is a PND check conducted in your business area?

Insert Text:

4. What savings if any, have been made switching from INI to PND?

Insert Text:

5. Has the PND improved your effectiveness in sharing knowledge with regard to protecting children and vulnerable adults?

Yes No Don't know

Insert Text:

6. Do you have any 'good news' stories resulting from using the PND?

Yes No Don't know

Insert Text:

7. The PND allows you to find information in a way that is understandable and manageable.

Select from list:

8. Based on the search capability of PND Release 1, the information acquired is sufficient enough for my department's needs.

Select from list:

9. What training is required for PND Release 2 following the experience of the training for Release 1?

Insert Text:

10. Has the training/briefing information adequately prepared you/your staff to use PND for your/ their needs?

Yes No Don't know

Insert Text:

11. The PND has positively influenced the decision making process.

Select	business	area:
Child abuse	investigations	<input type="checkbox"/>
Domestic abuse	investigations	<input type="checkbox"/>
Vulnerable adults' investigations		<input type="checkbox"/>

Select from list:

12. The PND has positively assisted and has improved the effectiveness of disclosure and vetting checks (includes firearms licensing).

Insert Text:

Any other comments:

<p>IMPACT</p> <p>PND Post-implementation Review Questionnaire Eastern Region</p>	
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Instructions for completion:

This questionnaire has been carefully designed to assist you in responding easily to the questions. **Please ensure that you respond within the shaded boxes by either typing text or clicking on a box you have selected as your answer.**

To do this:

4. Select the View menu at the top,
5. Go to Toolbars and select the 'Forms' option,
6. Finally protect the form by clicking on the 'padlock'.

Thanking you in advance for your participation.

Information about you:

Job Role/Title:

Length of service in current role:

Department:

Contact details:

Direct PND Users

13. How satisfied are you with the guidance documents produced by the NPIA to support business use of the PND?

Select from list:

14. Has the business area in which you work incorporated PND into routine searches conducted for all activities in which you operate?

Select from list:

15. When is a PND check conducted in your business area?

Insert Text:

16. Do you have any 'good news' stories resulting from using the PND?

Yes No Don't know

Insert Text:

17. The PND allows you to find information in a way that is understandable and manageable.

Select from list:

18. Based on the search capability of PND Release 1, the information acquired is sufficient enough for my department's needs.

Select from list:

19. Have you experienced any problems when using information accessed through the PND?

Yes No Don't know

Insert Text:

20. How satisfied are you with how the PND operates and functions as an information system.

Select from list:

21. Has Match Group data changed or validated your force perception of cross border criminality. Are you finding other forces are dealing with the same person as you but you were unaware?

Insert Text:

22. How could the PND be improved from the user's perspective?

Insert Text:

23. What training has been made available to you in preparation for using the PND?

- NCALT
- NPIA delivered training
- NPIA delivered briefing(s)
- Force training
- Force briefing(s)

24. What training is required for R2 following the experience of the training for R1?

Insert Text:

25. Has the training/briefing information adequately prepared you/your staff to use PND for your/ their needs?

Yes No Don't know

Insert Text:

26. The PND has positively influenced the risk assessment process.

Select	business	area:
Child	abuse investigations	<input type="checkbox"/>
Domestic	abuse investigations	<input type="checkbox"/>
Vulnerable adults' investigations		<input type="checkbox"/>

Select from list:

27. The PND has positively assisted and has improved the effectiveness of disclosure and vetting checks (includes firearms licensing).

Insert Text:

Any other comments:

<p>IMPACT</p> <p>PND Post-implementation Review Questionnaire Eastern Region</p>	
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Instructions for completion:

This questionnaire has been carefully designed to assist you in responding easily to the questions. **Please ensure that you respond within the shaded boxes by either typing text or clicking on a box you have selected as your answer.**

To do this:

7. Select the View menu at the top,
8. Go to Toolbars and select the 'Forms' option,
9. Finally protect the form by clicking on the 'padlock'.

Thanking you in advance for your participation.

Information about you:

Job Role/Title:

Length of service in current role:

Department:

Contact details:

Indirect PND Users

28. How satisfied are you with the guidance documents produced by the NPIA to support business use of the PND?

Select from list:

29. Do you have any 'good news' stories resulting from using the PND?

Yes No Don't know

Insert Text:

30. The PND allows you to find information in a way that is understandable and manageable.

Select from list:

31. Have you experienced any problems when using information accessed through the PND?

Yes No Don't know

Insert Text:

32. The PND has positively influenced the risk assessment process.

Select		business	area:
Child	abuse	investigations	<input type="checkbox"/>
Domestic	abuse	investigations	<input type="checkbox"/>
Vulnerable adults' investigations			<input type="checkbox"/>

Select from list:

33. The PND has positively influenced the decision making process.

Select		business	area:
Child	abuse	investigations	<input type="checkbox"/>

Domestic abuse investigations
Vulnerable adults' investigations

Select from list:

34. The PND has positively assisted and has improved the effectiveness of disclosure and vetting checks (includes firearms licensing).

Insert Text:

Any other comments:

IMPACT

**PND Post-implementation
Review Questionnaire
Eastern Region**



Instructions for completion:

This questionnaire has been carefully designed to assist you in responding easily to the questions. **Please ensure that you respond within the shaded boxes by either typing text or clicking on a box you have selected as your answer.**

To do this:

10. Select the View menu at the top,
11. Go to Toolbars and select the 'Forms' option,
12. Finally protect the form by clicking on the 'padlock'.

Thanking you in advance for your participation.

Information about you:

Job Role/Title:

Length of service in current role:

Department:

Contact details:

PND Lead/Project Manager

35. How satisfied are you with the guidance documents produced by the NPIA to support business use of the PND?

Select from list:

36. Do you feel you have a sufficient number of PND licenses in your department?

Yes No Don't know

37. If not fully rolled out what are the forces plans to roll out PND to other business areas?

Insert Text:

38. What savings if any have been made switching from INI to PND?

Insert Text:

39. Do you have any 'good news' stories resulting from using the PND?

Yes No Don't know

Insert Text:

40. In your opinion, has the support and guidance given by the IMPACT Programme been sufficient to prepare your force to implement the PND?

Insert Text:

41. Learning from the lessons in PND Release 1 - what could the NPIA improve on to help forces with Release 2?

Insert Text:

42. What support are you anticipating from the NPIA for Release 2?

Insert Text:

Any other comments:

<p>IMPACT</p> <p>PND Post-implementation Review Questionnaire Eastern Region</p>	 <p>NPIA National Policing Improvement Agency</p> <hr/> <p>IMPACT PROGRAMME</p>
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Instructions for completion:

This questionnaire has been carefully designed to assist you in responding easily to the questions. **Please ensure that you respond within the shaded boxes by either typing text or clicking on a box you have selected as your answer.**

To do this:

13. Select the View menu at the top,
14. Go to Toolbars and select the 'Forms' option,
15. Finally protect the form by clicking on the 'padlock'.

Thanking you in advance for your participation.

Information about you:

Job Role/Title:

Length of service in current role:

Department:

Contact details:

Trainers/Training Manager

43. What training has been made available to you in preparation for delivering training for the PND?

NCALT				<input type="checkbox"/>
NPIA	delivered		training	<input type="checkbox"/>
NPIA	delivered		briefing(s)	<input type="checkbox"/>
Force			training	<input type="checkbox"/>
Force briefing(s)				<input type="checkbox"/>
Train the Trainer				<input type="checkbox"/>

44. What training do you think is required for PND Release 2 following the experience of the training for Release 1?

Insert Text:

45. Do you think the train the trainer's course has adequately prepared your staff to undertake training in your force?

Yes No Don't know

Insert Text:

Any other comments:



This template will be used during the PND Post-Implementation Review to be conducted in your force. You may wish to use the spaces provided to make notes for use on the day of the review.

Thanking you in advance for your participation.

Information about you:

Job Role/Title:

Length of service in current role:

Department:

Contact Details:

Business Change

1. What are your governance arrangements for PND?

Please consider:

How active is your ACPO lead? Is there an active force user group? Can you provide a copy of your PND Policy?

2. Are you familiar with the guidance and other products that have been produced by the NPIA to support business user of the PND?

Please consider:

Have required subject areas been adequately covered? Which Business Change products are you aware of? (Codes of Practice, User Guide, POLKA, MoG). What are your views on the quality of the products?

3. Has the business area in which you work incorporated PND into routine searches conducted for all activities in which you operate?

Please consider:

Department guidance

4. When is a PND check conducted in your business area?

Please consider:

Department guidance

5. What savings have you made switching from INI to PND?

Please consider:

Staff numbers, time, future savings. Have there been any IAM issues? What have been the costs?

6. On the whole, has PND improved your effectiveness in sharing knowledge with regard to protecting children and vulnerable adults?

Tick as appropriate:

Strongly Agree	
Agree	
Neither Agree or Disagree	
Disagree	
Strongly Disagree	

Business Benefits

7. What improvements to the way your unit/dept operates and outcomes achieved did you expect to realise through the PND?

Please consider:

Efficiencies and effectiveness, any unexpected benefits? Are there any barriers to using PND? If so have you been able to overcome them?

8. Have you seen any evidence of early benefits/improvements/good news stories starting to be delivered?

Please consider:

Examples (performance data if available) from any business area.

9. What do you do with the performance information the NPIA provides?

10. What advice would you give other forces that would help them maximise the benefits they get through the PND?

Please consider:

Try to identify best practice; what works and just as important what doesn't work so other forces can learn from others mistakes.

Using PND / Data

11. Is the information your department accesses through the PND sufficient for their needs? Are there any gaps?

Please consider:

Are you aided in decision making based upon the info on PND? Examples? Any issues

Training

12. Has the training / information adequately prepared your staff to use PND for their needs?

Please consider:

Do you know what interest search is and when to use it? User guide etc.

13. Would you change anything about the training or the way it is delivered?

Please consider:

Length of course, format, delivery etc.

Service Management

14. Have you a process for conducting out of hours PND checks?

Please consider:

Has it been used? Any issues?

Business Area Specific

15. In your experience has PND influenced better risk assessment for the purpose of:

Please select your business area:

- a. Child Abuse Investigations
- b. Domestic Abuse Investigations
- c. Vulnerable Adults Investigations

Tick as appropriate:

Strongly Agree	
Agree	
Neither Agree or Disagree	
Disagree	
Strongly Disagree	

Please consider:


Has it improved the process? Examples?

16. Has the PND affected the decision making process and improved the effectiveness of disclosure and vetting checks (inc firearms licensing)?

Please consider:

Examples?

17. Any other comments?

<p>IMPACT</p> <p>PND Post-implementation</p> <p>Review</p> <p>Direct PND Users</p>	
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This template will be used during the PND Post-Implementation Review to be conducted in your force. You may wish to use the spaces provided to make notes for use on the day of the review.

Thanking you in advance for your participation.

Information about you:

Job Role/Title:

Length of service in current role:

Department:

Contact Details:

Length of time using PND:

Business Change

1. Are you familiar with the guidance and other products that have been produced by the NPIA to support business user of the PND?

Please consider:

Have required subject areas been adequately covered? Which Business Change products are you aware of? (Codes of Practice, User Guide, POLKA, MoG). What are your views on the quality of the products?

2. Has the business area in which you work incorporated PND into routine searches conducted for all activities in which you operate?

Please consider:

Department guidance:

3. When is a PND check conducted in your business area?

Please consider:

Department guidance

Business Benefits

4. Have you seen any evidence of early benefits/improvements/good news stories starting to be delivered?

Please consider:

Examples (performance data if available) from any business area.

5. What advice would you give other forces that would help them maximise the benefits they get through the PND?

Please consider:

Try to identify best practice; what works and just as important what doesn't work so other forces can learn from others mistakes.

Using PND / Data

6. Does the PND allow you to find the information you need and present it in a way that you can understand and is manageable?

Please consider:

Do you understand the POLE concept of how data is structured on PND?

7. Is the information your department accesses through the PND sufficient for their needs? Are there any gaps?

Please consider:

Are you aided in decision making based upon on the information on PND?

Examples? Issues?

8. Have you experienced any problems when using information accessed through the PND?

Please consider:

Examples? How is PND confidential data moved around the force? What barriers exist to speedy communication and how have these been overcome?

9. How do you find the PND operates?

Please consider:

In terms of search? In terms of interpreting results? Timeouts, clarity of screens, search process, results returned, speed etc.

10. What possible additional data would be beneficial to include on the PND and what data isn't necessary?

11. We know that the quality of the data on the PND varies between forces and business areas. Which errors / gaps which affect the results obtained matter to you most?

Please consider:

In your experience, which forces data is good? Which business area's data is good?

12. Has Match Group data changed or validated your force perception of cross border criminality? Are you finding other forces are dealing with the same person as you but you were previously unaware?

Please consider:

Are match groups effective? Have match groups helped you identify cross boarder activity?

13. How could the PND be improved from the user's perspective?

Please consider:

User interface etc.

14. What advice would you give to other PND users to help them get the most out of the PND?

Please consider:

Try to identify best practice. What works and just as important what doesn't work so other forces can learn from others mistakes.

15. What has been your involvement with your force user group?

Assisted Implementation

16. Are there any activities that you feel could have been done better or were absent from the preparations for the implementation of the PND that should have been included?

Please consider:

Type of activity? In what way would it have improved things?

Training

17. What training has been made available to you in preparation for using the PND?

Please consider:

Would e-learning of PND have assisted? Type of training: TTT, Superuser etc.

18. Has the training / information adequately prepared you to use PND for your needs?

Please consider:

Do you know what interest search is and when to use it? User Guide etc.

19. Would you change anything about the training or the way it is delivered?

Please consider:

Length of course, format, delivery etc.

20. What additional training should be in place for existing / new users of the current version of PND?

Please consider:

Floorwalkers, E-learning, Superusers, Mentoring etc.

Service Management

21. Are you aware of the process that you should use to contact another force for follow up information?

Please consider:

POLKA SPOC contacts

22. Have you needed to use the force to force contact process? If so how was your experience?

Please consider:

Why did you have to use the process? What information hasn't PND provided? (Examples of how it has worked in practice good or bad, stats around the frequency of follow up requests, common issues etc.)

23. Have you a process for conducting out of hours PND checks?

Please consider:

Has it been used? Any issues?

Business Area Specific (answer as applicable)

24. In your experience has PND influenced better risk assessment for the purpose of:

Please select your business area:

- a. Child Abuse Investigations
- b. Domestic Abuse Investigations
- c. Vulnerable Adults Investigations

Tick as appropriate:

Strongly Agree	
Agree	
Neither Agree or Disagree	
Disagree	
Strongly Disagree	

Please consider:

Has it improved the process? Examples?


25. Has the PND affected the decision making process and improved the effectiveness of disclosure and vetting checks (inc firearms licensing)?

Please consider:

Examples?

26. Any other comments?

Review Team Members:

<p>IMPACT</p> <p>PND Post-implementation</p> <p>Review</p> <p>Indirect PND Users</p>	
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This template will be used during the PND Post-Implementation Review to be conducted in your force. You may wish to use the spaces provided to make notes for use on the day of the review.

Thanking you in advance for your participation.

Information about you:

Job Role/Title:

Length of service in current role:

Department:

Contact Details:

Length of time using PND:

Business Change

1. Are you familiar with the guidance and other products that have been produced by the NPIA to support business user of the PND?

Please consider:

Have required subject areas been adequately covered? Which Business Change products are you aware of? (Codes of Practice, User Guide, POLKA, MoG). What are your views on the quality of the products?

Business Benefits

2. Have you seen any evidence of early benefits/improvements/good news stories starting to be delivered?

Please consider:

Examples (performance data if available) from any business area.

3. What advice would you give other forces that would help them maximise the benefits they get through the PND?

Please consider:

Try to identify best practice; what works and just as important what doesn't work so other forces can learn from others mistakes.

Using PND / Data

4. Does the PND allow you to find the information you need and present it in a way that you can understand and is manageable?

Please consider:

Do you understand the POLE concept of how data is structured on PND?

5. Is the information your department accesses through the PND sufficient for their needs? Are there any gaps?

Please consider:

Are you aided in decision making based upon on the information on PND?

Examples? Issues?

6. Have you experienced any problems when using information accessed through the PND?

Please consider:

Examples? How is PND confidential data moved around the force? What barriers exist to speedy communication and how have these been overcome?

7. What possible additional data would be beneficial to include on the PND and what data isn't necessary?

Service Management

8. Are you aware of the process that you should use to contact another force for follow up information?

Please consider:

POLKA SPOC contacts

9. Have you needed to use the force to force contact process? If so how was your experience?

Please consider:

Why did you have to use the process? What information hasn't PND provided? (Examples of how it has worked in practice good or bad, stats around the frequency of follow up requests, common issues etc.)

10. Have you a process for conducting out of hours PND checks?

Please consider:

Has it been used? Any issues?

Business Area Specific (answer if applicable)

11. In your experience has PND influenced better risk assessment for the purpose of:

Please select your business area:

- a. Child Abuse Investigations
- b. Domestic Abuse Investigations
- c. Vulnerable Adults Investigations

Tick as appropriate:

Strongly Agree	
Agree	
Neither Agree or Disagree	
Disagree	
Strongly Disagree	

Please consider:

Has it improved the process? Examples?


12. Has the PND affected the decision making process and improved the effectiveness of disclosure and vetting checks (inc firearms licensing)?

Please consider:

Examples?

13. Any other comments?

Review Team:

<p>IMPACT</p> <p>PND Post-implementation Review</p> <p>PND Lead / Project Manager</p>	
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This template will be used during the PND Post-Implementation Review to be conducted in your force. You may wish to use the spaces provided to make notes for use on the day of the review.

Thanking you in advance for your participation.

Information about you:

Job Role/Title:

Length of service in current role:

Department:

Contact Details:

Business Change

1. What are your governance arrangements for PND?

Please consider:

How active is your ACPO lead? Is there an active force user group? Can you provide a copy of your PND Policy?

2. Are you familiar with the guidance and other products that have been produced by the NPIA to support business user of the PND?

Please consider:

Have required subject areas been adequately covered? Which Business Change products are you aware of? (Codes of Practice, User Guide, POLKA, MoG). What are your views on the quality of the products?

3. This review is concentrating on the benefits of strategic benefit 1 as detailed in the Full Business Case. To what extent is PND rolled out into the following business areas?
 - a. Protection of Children & Vulnerable Adults
 - b. Vetting (including Firearms)

Please consider:

Is PND available? Is it being used? How do you know? Do you intend to extend the use of PND further in that Business area?

4. What are you going to do to encourage wider use of PND?

Please consider:

What can be done at a National level? What can the NPIA do? What have you done so far? What have you planned to do?

5. Have you got a sufficient number of licences?

Please consider:

Are any more required? Are licences rolled out to appropriate staff?

6. If not fully rolled out what are the forces plans to roll out PND to other business areas
7. What savings have you made switching from INI to PND?

Please consider:

Staff numbers, time, future savings. Have there been any IAM issues? What have been the costs?

Business Benefits

8. Have you seen any evidence of early benefits/improvements/good news stories starting to be delivered?

Please consider:

Examples (performance data if available) from any business area.

9. What do you do with the performance information the NPIA provides?
10. Have you adopted a benefits management approach similar to that suggested by IMPACT?

Please consider:

If not, what approach are you using? Benefits profile etc.

11. What advice would you give other forces that would help them maximise the benefits they get through the PND?

Please consider:

Try to identify best practice; what works and just as important what doesn't work so other forces can learn from others mistakes.

Using PND / Data

12. Were there any challenges in providing data to the PND that were unexpected?

Please consider:

This question is not intended to be technical, more to draw out issues related to the stages of data provision/business involvement and suggested solutions.

13. Have you any suggestions to improve the processes for data provision?

14. What possible additional data would be beneficial to include on the PND and what data isn't necessary?

15. How could the PND be improved from the user's perspective?

Please consider:

User interface etc

16. What has been your involvement with your force user group?

Assisted Implementation

17. Are there any activities that you feel could have been done better or were absent from the preparations for the implementation of the PND that should have been included?

Please consider:

Type of activity? In what way would it have improved things?

18. Did the Force Action Plan adequately outline all the actions required for implementing the PND?

Tick as appropriate:

Very Good	
Good	
Average	
Poor	
Very Poor	

Please consider:

Any gaps? Further detail required? Too much detail?

19. Did your own and IMPACT's assessment of readiness to implement the PND turn out to be accurate?

Tick as appropriate:

Very Good	
Good	
Average	
Poor	
Very Poor	

Please consider:

Any tips for improving the accuracy of this assessment?

20. Has the support provided by the IMPACT Programme been sufficient to prepare the force to implement the PND?

Tick as appropriate:

Very Good	
Good	
Average	
Poor	
Very Poor	

Please consider:

Can you identify any gaps and suggestions for improvements? Can you identify any suggestions for improvements with regards to what is needed for R2?

Training

21. What additional training should be in place for existing / new users of the current version of PND?

Please consider:

Floorwalkers, E-learning, Superusers, Mentoring etc.

Service Management

22. Can you describe the help desk process that is in place for the PND?

Please consider:

Force help desk, Logica help desk and responsibilities. Responses should be obtained from force helpdesk prior to PIR.

23. Have you needed to use the Logica help desk at all? If so what was your experience?

Please consider:

Examples of how it has worked in practice, good or bad and stats (if available) of the level of demand. Responses should be obtained from force helpdesk prior to PIR.

Release 2

24. How are you planning for Release 2 in your force?

Consider Able to undertake confirmed or unconfirmed matches. Data entry marker, Alerts etc.

25. What training / guidance / information is required for Release 2?

Consider Able to undertake confirmed or unconfirmed matches. Data entry marker, Alerts etc.

26. Learning from the lessons of Release 1, what do you think the NPIA could do better to help forces with Release 2?


Consider: What do you think forces could do better with Release 2?

How can forces support each other for Release2?

27. What support are you expecting from the NPIA for Release 2?

28. Any other Comments

Review Team:

<p>IMPACT</p> <p>PND Post-implementation</p> <p>Review</p> <p>Trainers / Training Managers</p>	
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This template will be used during the PND Post-Implementation Review to be conducted in your force. You may wish to use the spaces provided to make notes for use on the day of the review.

Thanking you in advance for your participation.

Information about you:

Job Role/Title:

Length of service in current role:

Department:

Contact Details:

Assisted Implementation

1. Are there any activities that you feel could have been done better or were absent from the preparations for the implementation of the PND that should have been included?

Please consider:

Type of activity? In what way would it have improved things?

Training

2. What training has been made available to you in preparation for using the PND?

Please consider:

Type of training e.g. TTT, Superuser? Would e-learning of PND have assisted?

3. Would you change anything about the training or the way it is delivered?

Please consider:

Length of course, format, delivery etc.

4. Has the train the trainer's course content adequately prepared your staff to undertake training in your force?

Please consider:

Would you change anything about the training or the way it is delivered? Length of course, format, delivery etc.

5. What additional training should be in place for existing / new users of the current version of PND?

Please consider:

Floorwalkers, E-learning, Superusers, Mentoring etc.

6. What training/guidance / information is required for Release 2?

Consider: Able to undertake confirmed or unconfirmed matches. Data entry marker, Alerts etc.

7. Any other comments

Review Team: