THE UNIVERSITY OF
WARWICK

Professional hybrids and perspectives on electronic health records as boundary objects: The case of the National Programme for IT organising vision

By

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A thesis submitted in partial fulfilment of the requirements for

the degree of Doctor of Philosophy

Warwick Business School

University of Warwick

May 2014

DEDICATION

To my family

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ACKNOWLEDGEMENTS

DECLARATION

This is to declare that

- This thesis has been written by me

- I am responsible for the research work submitted in this thesis

- All verbatim extracts have been distinguished and the sources specifically acknowledged

- This work has not been previously submitted for a degree programme at university or any other institutions of learning

- During the preparation of this thesis the following two papers were presented at conferences.

  - Koshy, M.A., McGivern, G., and Tritter, J. 2013. The clinician-IT hybrid professional. *European Group of Organization Studies 2013, Montreal.*

  - Koshy, M.A., McGivern, G. and Tritter, J. 2013. Organising visions and the dynamics of community stakeholder groups in the NPfIT. *UK Academy of Information Systems 2013, Oxford.*

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Date: 03.05.14

ABSTRACT

This thesis examines the uses of Electronic Health Records (EHRs) and challenges faced in their implementation in the context of England's National Programme for IT (NPfIT), the biggest civil IT programme in the world (Brennan, 2007). Despite the huge investments and high visibility that characterised the NPfIT, its aim of national level EHRs was not achieved and the programme was dismantled after being in operation for nearly a decade. The concepts of 'organising visions' (Swanson and Ramiller, 1997), 'boundary objects' (Star and Griesemer, 1989), 'technology frames' (Orlikowski and Gash, 1994) and 'professional hybridisation' (Noordegraaf, 2007) are employed to explain findings from this research. The study uses qualitative research methods, drawing on documentary sources and 51 semi-structured interviews.

Responding to the limitations of using solely organising visions (Swanson and Ramiller, 1997), this thesis studies the NPfIT using a dual lens combining organising visions and boundary objects to understand the dynamics between stakeholders of the NPfIT organising vision. This thesis presents the EHR itself as a boundary object, and illustrates the knowledge sharing capacity of EHRs across clinical boundaries.

A key emergent finding is the presence of clinician-IT hybrid professionals - a group that has neither been subject to empirical research nor been given sufficient attention in critical projects such as the NPfIT despite their unique position that bridges the clinical and IT domains. This study presents key findings discussing the factors that support and discourage the emergence of clinician-IT professional hybrids.

ABBREVIATIONS

AOMRC – Academy of Medical Royal Colleges

CFH – Connecting for Health

CRDB – Care Records Development Board

DCR – Detailed Care Record

DH – Department of Health

EHR – Electronic Health Record

GP – General Practitioner

GPSoC – GP Systems of Choice

IS – Information Systems

IT – Information Technology

LSP – Local Service Provider

NCAB – National Clinical Advisory Board

NCL – National Clinical Lead

NCRS – NHS Care Records Service

NHS – National Health Service

NHS IA – NHS Information Authority

NAO – National Audit Office

NPFIT – National Programme for IT

PACS – Picture Archival Communication System

RCGP – Royal College of General Practitioners

RCN – Royal College of Nursing

RCP – Royal College of Physicians

SCR – Summary Care Record

CHAPTER 1 INTRODUCTION

1.1   Overview

'The world's most spectacular purchase of "vapourware"[1], perpetrated on behalf of the British taxpayer' (Chelsom, 2011: 6).

'An expensive and problematic solution to a non-existent clinical problem' (Robertson *et al.,* 2010: 6).

'A dismal catalogue of naivety, ambition and spinelessness' (The Times, 2011).

'A fiasco' (Brooks, 2007: 7).

These are not depictions of any ordinary project, but were labels attached to England's National Programme for IT (NPfIT), the world's biggest civil IT programme (Brennan, 2007), also described as 'the project that could make or break' the English NHS (Craig and Brooks, 2006: 182). Launched in 2002 with an initial estimated cost of £6.2 billion (Connecting for Health, 2005b) that spiralled up to £9.8 billion (NAO, 2013), the NPfIT was the flagship programme for the modernisation agenda (Cabinet Office, 1999) within the English NHS. One of its key components, the NHS Care Record Service (NCRS), was intended to provide health professionals and patients easy access to their electronic health records (EHRs) from anywhere and at any time (Connecting for Health, 2005b). Despite the tremendous amount of political support available to the programme, it was subjected to significant criticism from the media and key stakeholders including clinicians (Sauer and Willcocks, 2007) and was finally dismantled in September 2011 (DH, 2011).

The disparity between the NPfIT's promised benefits and the actual outcomes prompts the need to investigate what went wrong, and how the derailment of the programme could have been averted. Nearly midway into the programme, Craig and Brooks (2006:

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[1] Vapourware is a term used to refer to IT products that have been promised but do not actually materialise as they are neither delivered nor officially cancelled

184) had warned that if the NPfIT were to fail, it would cause 'the largest haemorrhage of taxpayers' money from essential front-line services into the pockets of management and IT systems consultants in British history', exemplifying the magnitude of the stakes involved.

This thesis investigates the dynamics between key stakeholder groups including clinicians, the Department of Health, information technology (IT) suppliers, NPfIT management and policymakers in the high profile NPfIT, and demonstrates how dissonance among these players was an impediment to the successful completion of the programme. The lack of clinical engagement was one of the main criticisms of the programme (Coiera, 2007; Cresswell *et al.*, 2011; Hendy *et al.*, 2005), resulting in an absence of efforts to understand the diverse needs of clinicians. This study employs empirical data to illustrate some of the (often conflicting) perspectives of multiple stakeholders regarding EHRs (McGinn *et al.,* 2011), given that the key component of the NPfIT envisioned EHRs at a national level.

Prior to the NPfIT a significant level of computerisation had been reached among general practitioners (GPs) in the UK (Benson 2002a, 2002b). The success of computerisation in primary care was an opportunity for the national programme to employ lessons learned from local EHR implementations to inform policy and practice. However this was not the case, due to a lack of meaningful clinical engagement (Coiera, 2007; Cresswell *et al.*, 2011; Hendy *et al.*, 2005). Much could have been learned from the experiences of primary care physicians who would have provided valuable inputs regarding clinical needs and requirements pertaining to EHRs. The leadership and initiatives taken by GPs who had an interest in computing was one of the reasons for the higher incidence of computerisation in primary care as opposed to secondary care (Benson, 2002a). This is an interesting

contrast to several studies that trumpet the techno-phobic and resistant nature of clinicians (Ford *et al.* 2009; Lapointe and Rivard, 2005; Timmons, 2003b). My empirical data points to the existence of a much overlooked clinical hybrid professional: the clinician-IT hybrid, and this thesis stresses the importance of this role in health IT initiatives such as the NPfIT.

With this brief overview, I identify the importance of this research, and outline the key theoretical underpinnings that inform this study. This is followed by a section presenting my research objectives. The chapter concludes with an outline of the structure of this thesis.

1.2   Why this research?

Lessons learned from past IT projects – both, successes as well as failures (Parliamentary Public Accounts Committee, 2000) did not appear to be drawn on in the case of the NPfIT. Recently voiced hopes of a paperless NHS by 2018 (Whitfield, 2013) seem to indicate an insularity to past failures, resurrecting optimistic ambitions of policymakers who launched the NPfIT with a similar unfeasible timeline of under three years (Brooks, 2007; Greenhalgh and Keen, 2013). While this study does not aim to evaluate a particular aspect of the NPfIT, it illustrates the complex community dynamics which marked the programme using the concepts of organising visions (Swanson and Ramiller, 1997) and boundary objects (Star and Griesemer, 1989), providing useful insights for future research.

In attempting to establish a national level EHR, the NPfIT did not engage with clinicians to understand how they perceived and used EHRs in their clinical practice. The increasingly specialist nature of healthcare implies that the interactions between different clinicians

and EHRs vary. It is important to understand how EHRs interface between multiple users, and how their needs, knowledge and dependencies differ if they are to be deployed effectively. I analyse EHRs as boundary objects (Star and Griesemer, 1989; Carlile 2002, 2004) and highlight their multiple purposes as perceived by their users.

Attempts were made to address the lack of clinical engagement toward the latter half of the national programme by a number of mechanisms including the establishment of National Clinical Leads (Cresswell *et al.*, 2011). This process of involvement is an example of the absorption of clinical professionals into management/leadership and can be viewed as the formation of a distinct professional hybrid, the clinician-manager (Doolin, 2002; Fitzgerald, 1994). The involvement of GPs in the computerisation of primary care in England draws attention to the unique role of clinicians who take an active interest in IT, and who could potentially be regarded as unique hybrid professionals bridging healthcare and technology. Given the potential link between high performing healthcare organisations and their preference for clinician-managers as opposed to managers without a clinical background (Goodall, 2011), there may be similar benefits offered by the increased recognition and involvement of clinician-IT hybrid professionals.

1.3   Key theoretical underpinnings

This section outlines the key theoretical concepts employed in this study. These concepts are revisited in Chapter 2 where I discuss them in further detail.

This study draws on extant literature to understand the challenges, issues and nuances of EHR implementations, and uses this foundation to follow the progress of EHR development and implementation in the context of the NPfIT. Multiple voices, efforts and

ambitions served as inputs to the programme (Sauer and Willcocks, 2007), providing a chain of interwoven debates over the course of the NPfIT.

I employ the concept of organising visions (Swanson and Ramiller, 1997), to analyse the diffusion of IS innovations and the NPfIT. The consideration of 'community discourse' and the emergence and subsidence of 'buzzwords' or dominant rhetoric in organising visions help in understanding the dynamics between the many stakeholders involved in the NPfIT (see Chapters 3 and 5). I also use the concept of boundary objects (Star and Griesemer, 1989; Swan *et al.,* 2007) when discussing the multiple perspectives that contributed to the NPfIT organising vision discourse. Described as 'objects which inhabit multiple worlds simultaneously' (Star and Griesemer, 1989: 408), boundary objects may be physical or abstract, and scholars have studied a range of boundary objects including technology (Gal Lyytinen and Yoo, 2008), texts (Oswick and Robertson, 2009) and timelines (Yakura, 2002).

When discussing clinicians' multiple uses of EHRs, I again return to the concept of boundary objects, highlighting the different types of boundaries (Carlile 2002, 2004) where they may be positioned, to facilitate the flow of knowledge between different EHR users. The different interests of users may hinder effective knowledge flow, due to the challenge of knowledge 'at stake' (Carlile 2004). These tensions highlight the need to take into account users' multiple perspectives and needs for successful EHR implementations.

Underlying the theoretical discussions in Chapter 5 is the idea of technology frames which acknowledges differences in the ways distinct stakeholders perceive and use IT, influencing the way they interact with technology (Orlikowski and Gash, 1994; Davidson, 2002; Davis and Hufnagel, 2007). Conflicts between users result in incongruent

technology frames (Orlikowski and Gash, 1994), and this variation in the interplay between stakeholder groups in different settings accounts for the context dependent nature of technology implementations (Davis and Hufnagel, 2007). Technologies that support multiple incongruent technology frames are likely to have a higher degree of 'interpretive flexibility' (Pinch and Bijker 1984, 1987), defined as the 'capacity of a specific technology (or other knowledge system) to sustain the divergent interpretations of multiple relevant groups' (Sahay and Robey, 1996: 260). This holds true in the case of EHRs given their diverse range of users.

 The latter part of this thesis focuses on the sociology of professions and professional hybrids. Freidson's (1985) theory of restratification proposes that professionals adopt additional roles in response to external threats. This has significance to the emergence of clinical professional hybrids such as clinician-managers (Noordegraaf, 2007; Montgomery, 2001; Ferlie *et al*., 2011), as they attempt to prevent non-professionals from pervading their jurisdiction (Dopson, 2009). Technology too may be regarded as a threat to clinician autonomy as its boundary spanning nature (McLaughlin and Webster, 1998; Tjora, 2000; Barrett *et al*., 2012) facilitates shifts in professional boundaries allowing an increased overlap between different clinical roles (Walter and Lopez, 2008). I draw on these strands of literature to analyse the infiltration of clinicians into the IT domain resulting in a niche group of clinician-IT hybrid professionals.

With this brief overview of the key theoretical concepts which underpin this research, I now outline my research objectives and my anticipated theoretical contributions.

1.4   Research objectives

This research investigates the significance of EHRs as boundary objects subject to multiple interpretations by a diverse range of users. The study is set in the context of England's NPfIT, and studies the key boundary objects that marked the different phases of the national programme. My emergent findings pointed to the existence of a niche group of clinicians involved in IT development, implementation and policy making, and hence this research investigates reasons for the emergence of this new hybrid role and the specific challenges they have to contend with.

This study began with the objective of addressing the following questions:

1. How did the NPfIT organising vision develop under the influence of the discourse prevalent amongst stakeholders during the project?

2. How do different users perceive EHRs, and how do professional roles influence how EHRs are used to mediate interactions and knowledge flow across boundaries?

A key emergent finding from my empirical data was the presence of a significant number of clinicians who have ventured into IT roles. The identification of this often overlooked hybrid led to a subsequent research question:

3. What triggers the formation of the clinician-IT hybrid, and how does this align with Freidson's theory of restratification amongst medical professionals?

With this overview of my research objectives, I now outline the anticipated theoretical contributions from this research.

1.5   Anticipated theoretical contributions

This research offers three main contributions to academic literature, which I shall now detail.

First, the limited success in national health IT systems implementations (Cresswell *et al.*, 2011) and the paucity of literature on large scale EHR initiatives (Takian *et al.*, 2012) highlight the need for research into large scale national EHR initiatives such as the NPfIT's Care Record Service. This study responds to this call, and investigates EHR adoption in the context of England's NPfIT, thus serving as an empirical contribution to literature on large scale EHR projects.

Secondly, scholars have identified the need for more research on the transformation of objects (Engeström and Blackler, 2005; McGivern and Dopson, 2010). During their lifetime, objects may go through phases in which varied levels of value are ascribed to them, and in the process they are transformed and reconceptualised (Engeström and Blackler, 2005). Studying the different phases or 'buzzwords' in the NPfIT organising vision (Swanson and Ramiller, 1997) as abstract epistemic boundary objects, this research traces the development of some key boundary objects contained within the NPfIT. The longitudinal nature of the programme suggests the likelihood of changes in the nature of the programme's boundary objects. By studying the lifetime of these objects in closer detail, this thesis offers insights into the transformation of objects in the context of the NPfIT.

Thirdly, this research investigates the phenomenon of professional hybridisation which is a relatively recent and emerging area of research (Noordegraaf, 2007; Fitzgerald and Ferlie, 2000). Professional hybridisation is an important area of research as it bridges

different domains such as healthcare and management (Noordegraaf, 2007; Montgomery, 2001). This thesis contributes to literature on hybridisation by investigating a niche group of professional hybrids, namely clinician-IT hybrids, which has not seen significant empirical research. Building on empirical data gathered from a range of clinicians involved in IT either in advisory or hand-on development roles, this thesis addresses theoretical as well as empirical gaps in the literature by exploring how and why some clinicians adopt additional IT related roles.

Having outlined my research objectives and anticipated contributions, I now present the structure of the thesis.

1.6   Structure of the thesis

This chapter introduces the reader to this study by presenting an overview of the key drivers and theoretical concepts that underpin this research. I explain the importance of this study, and the relevance of organising visions (Swanson and Ramiller, 1997), boundary objects (Star and Griesemer, 1989), technology frames (Orlikowski and Gash, 1994) and professional hybridisation (Noordegraaf, 2007) to my research focus. I also outline the research objectives and anticipated contributions of this thesis.

Chapter 2 provides a literature review that brings together work from the information systems (IS) field and the sociology of professions, as these strands of literature are particularly relevant to my research focus. Key theoretical concepts, including organising visions, boundary objects and technology frames, employed in the later chapters are elaborated in this literature review.

Chapter 3 provides an overview of 'the NPfIT story' using a combination of documentary sources and reviewed literature. This chapter serves to set the context for the findings and discussion chapters (Chapters 5 to 7) by discussing the key phases that marked the NPfIT during its operation from 2002 to 2011.

In chapter 4 I discuss my research methods by outlining the research paradigm, sampling strategy, data collection phase and data analysis. I go on to consider the process of data gathering and highlight some of the challenges encountered. I also elaborate on the analytical process. The four chapters following this constitute my findings chapters.

Chapter 5 analyses the NPfIT story presented in Chapter 3 using the concepts of organising visions (Swanson and Ramiller, 1997) and boundary objects (Star and Griesemer, 1989; Swan *et al.* 2007). Different phases of the NPfIT such as contracting and the increased efforts toward clinical engagement are studied as abstract boundary objects within the programme. The chapter highlights the different and conflicting views of the stakeholders involved, and how these influenced the NPfIT organising vision.

In chapter 6, the focus is narrowed down to EHRs in particular, using literature on boundary objects (Star and Griesemer, 1989; Swan *et al.,* 2007) to analyse my empirical data and explain how professionals and patients use EHRs to perform tasks and exchange knowledge between boundaries. I discuss the relevance of knowledge differences and dependencies (Carlile and Rebentisch, 2003) between EHR users to explain how the use of EHRs to mediate knowledge boundaries depends on the professional roles and knowledge capabilities of the users.

Chapter 7 shifts the focus to clinical professionals who have adopted additional IT related roles, and who may be categorised as clinician-IT hybrid professionals. This chapter presents empirical data to explain the reasons for the movement of clinicians into these hybrid roles, and highlights the challenges faced by them. I consider Freidson's (1985) theory of restratification and analyse its relevance to the case of clinician-IT hybrids.

Chapter 8 contains my discussion and conclusions. It brings together key points from my findings chapters, and provides an integrated discussion linking these findings, and their relevance to the NPfIT. I then conclude by summarising my key findings and contributions, and outlining the limitations of the study and scope for future research.

With this overview of the thesis, I now proceed to present the key literature that informs this research.

CHAPTER 2 LITERATURE REVIEW

2.1 Introduction

This chapter elaborates on the key literature relevant to my research questions. This study's focus on EHRs in the context of the NPfIT necessitates an understanding of the nuances of IS implementations in a large scale, national, health sector setting. For this reason, I draw on IS literature, steering the discussion toward the healthcare context specifically. Given the complexity of the healthcare setting, I emphasise the need for stakeholder involvement, and bring in the concepts of technology frames (Orlikowski and Gash, 1994), boundary objects (Carlile 2002, 2004) and organising visions (Swanson and Ramiller, 1997) when discussing the IS literature. These concepts acknowledge and accept the tensions and differences present amongst a diverse range of stakeholders and others involved in complex IS projects, but also highlight the need for increased cohesion, and the importance of the commonality between them.

Given the general resistance on the part of clinicians when faced with new technology (Goldschmidt, 2005), it is essential to understand their innate tendency to retain control and independence in their work practices, evocative of the professional autonomy and dominance that they exercise (Freidson, 2007). This requires a comprehension of the sociology of professions (Abbott, 1988; Freidson, 1985), which will also be covered in this chapter.

The next section discusses issues pertinent to IS implementations: challenges, large scale public sector IT, and the contextual nature of IS. This is followed by a discussion on technology frames, boundary objects and organising visions. I provide an overview of the increasing use of IT in the healthcare sector, with a focus on electronic health records

(EHRs). The increasing interest shown by national authorities in such initiatives is also briefly discussed. This discussion on healthcare IT also draws on literature on professional roles, to highlight the added complexity of IT in healthcare due to the independent and dominant nature of the medical profession (Abbott, 1988; Freidson, 2007). With this background on IS implementations in the healthcare context, I highlight the link between professionalism and increased use of technology. The increasing dual roles adopted by health professionals will then be discussed; a phenomenon termed 'professional hybridisation' (Noordegraaf, 2007). I briefly elaborate the reason for such hybrid roles, and why they are crucial to the successful project implementations in the healthcare sector. This is followed by an overview of my research questions, where I reiterate my objectives on the basis of the reviewed literature.

2.2   IT/IS implementations: Progress and challenges

The field of IT has seen exponential growth in the last decade for a range of reasons including: decreasing technology cost, advances in technology, increasing need for faster communication across geographical locations, and increased investment in ICT (Nolan, 1973). The increasing complexity of IT and its management is evident from Nolan's (1973) four stages of data processing growth in organisations, namely, Initiation, Contagion, Control and Integration, that were later extended to *six* stages with the addition of Data Administration and Maturity (Nolan, 1979). As IT innovations are developed, the perceptions attached to them by people depends on the 'talk' or discourses surrounding them, causing some to suggest that they are discursive constructions (Ramiller, 2001a). The initial phases of Nolan's (1979) six stage model were shaped by existing community discourses (Ramiller, 2006; Swanson and Ramiller, 1997) that shaped how they evolved

over time. These discourses do not just differ with time, but between stakeholders, as at any given time conflicting discourses are likely to arise. For instance, IT has been recognised as having benefits as well as negative impacts simultaneously (Paré *et al.*, 2008), and this has sparked debates on whether technology does have the potential to improve work practices.

The decision to adopt new technologies is often clouded by inadequate information and the lofty promises made by vendors (Ramiller 2001a, 2001b). In order to make informed decisions regarding technology adoption, the roles and authority of those advocating it need to be considered, i.e. whether it is authority by expertise, as in the case of IT developers, or authority by the ability to issue orders, as in the case of business executives (Ramiller, 2001b). These roles are of particular importance when discussing large scale IT projects which have a number of key stakeholders including the state, industry and professional groups. With this brief prelude on the evolutionary nature of IT innovations, I will now discuss the case of large scale IT projects which are rife with challenges, and even more so when placed in a public sector setting.

2.2.1   Large scale public sector IT initiatives

New and innovative information and communication technologies (ICT) would at first glance appear to be an unconventional area of interest for the public sector given public servants' general aversion to risk (Ahmad and Broussine, 2003). In the case of health technologies such as EHRs, the challenges of IT implementations (Goldfinch, 2007) combined with the complexity of the healthcare sector (Goldschmidt, 2005) are exemplified when transferred to public sector settings which have their own set of challenges (Jones, 2008; Ahmad and Broussine, 2003). Despite this, the transformational

capabilities of technology have been recognised and governments have seen renewed efforts to incorporate IT for better delivery of services to the public (Silcock, 2001; DH, 2002a). These efforts have resulted in increased public sector investments in ICT, e-government projects and large scale applications to improve efficiency of government procedures.

Despite tremendous progress and increased investments in technology, IT projects are known to be prone to failure (Goldfinch, 2007) and the rate of project failures is reported to be increasing, based on comparative analysis of the 1980s and the 1990s (Ashurst *et al.*, 2008). Large scale IT implementations are subject to even higher risks (Goldfinch, 2007) and have had a track record of frequent failures due to challenges that include resistance, implications of potential power redistribution, evidence of return on investment, and difficulty integrating with already existing fragmented systems (Folkerd and Spinelli, 2008; Fukami and McCubbrey, 2011; Kim and Kankanhalli, 2009; Lapointe and Rivard, 2005). The problem of shifting and expanding project goals and functionalities, also known as 'scope creep' (Kreps and Richardson, 2007), is yet another challenge in large scale IT projects, and results in escalating costs. Public sector projects are no exception, and are known to have particularly low success rates in comparison to other sectors. Some suggest that given the rates of government project failures, public sector IS projects should steer clear of new (innovative) technologies, and be restricted to tried and tested systems (Goldfinch, 2007).

Flyvberg, Holm and Buhl (2007:279) suggest that cost estimations for large scale projects must be regarded with caution as those who promote such projects may 'strategically misrepresent' costs and benefits. Such deliberate cost underestimations may be either to

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promote the interests of stakeholders who would profit from the implementation of such projects, or to support the public interest as lower cost estimates provide an incentive to avoid wasting taxpayers' money. Policymakers responsible for making decisions on the basis of forecasts and estimates are often unaware of the assumptions employed in making these calculations (Wachs, 1990a). Individuals may be under pressure during project planning meetings with superiors, resulting in them providing figures that others want to hear, rather than providing a realistic plan (Flyvberg, Holm and Buhl, 2007). This results in initial project estimates being utilised to merely justify the project rather than to genuinely evaluate it (Wachs, 1990b). Such 'cooked' forecasts (Wachs, 1990b: 144) are deceptive even if they are allegedly for altruistic purposes, and they may result in the rollout projects that are not economically viable in the long term (Flyvberg, Holm and Buhl, 2007).

Hierarchies and bureaucracy may be present in many settings but are particularly pronounced in the public sector and government projects (Ahmad and Broussine, 2003; Bretschneider, 1990; Caudle, Gorr and Newcomer, 1991; Jones, 2008). Public sector IT projects have more inter-dependencies across organisational boundaries, more red tape compared to private sector projects, and are prone to discontinuities in political leadership (Bretschneider, 1990; Cats-Baril and Thompson, 1995).

Public sector initiatives are extremely risk averse (Ahmad and Broussine, 2003) and a lack of political will is one of the reasons why many national public sector programmes fail (Jones, 2008). The other extreme is equally detrimental, where political will mutates into a political agenda that may conflict with the needs and demands of the public. When this occurs, the potential and aims of such initiatives are often tinged with false assumptions,

ulterior motives and ultimately, disillusionment (Ahmad and Broussine, 2003). The high visibility of public sector projects makes them subject to excessive media attention (Cats-Baril and Thompson, 1995), and the drive to maintain legitimacy in the eyes of the wider public (Moore and Hartley, 2005) is a possible reason for their risk aversive nature. This accountability to the public encourages transparency; on the other hand, it may also be the very reason for whitewashing the actual status of various issues.

While some suggest that the very nature of innovative technology implies radical change rather than an incremental approach (Hartley, 2011), the large scale of these government projects, their frequent lack of regard for local standards and the associated difficulties in interoperability and integration call for a need to re-examine the centralised big bang approach adopted by several national authorities (Jensen and Aanestad, 2010). Examples in the UK include the cancellation of the Wessex Health Authority's Regional Information Systems after an expenditure of over £43 million, the abandonment of a benefits payment scheme involving the British Post Office, the Department of Social Security and the computer company, ICL, at a cost of £300 million (Goldfinch, 2007), and more recently, the dismantling of England's NPfIT (DH, 2011) which was the world's largest civil IT project (Brennan, 2007). Britain's 2011 ICT strategy refutes this however, suggesting that its IT failures were not exceptional, and that there is no credible reason to assume that government-led ICT projects are necessarily more prone to failure (Cabinet Office, 2011a). The British government does acknowledge the dependence of IT project success on preparedness, change management and effective process reengineering, and the need to shift its style of ICT implementation away from its typical big bang approach (Cabinet Office, 2011b).

By the early 2000s, the UK public sector experienced a number of IT project failures as highlighted in a report by the Parliamentary Public Accounts Committee (2000). These projects spanned various departments including agriculture, health, the Inland Revenue, defence and education, and it was acknowledged that there was a need to learn from past mistakes. It was in this milieu that the NPfIT was conceived the year following the publication of this report.

At this time there appeared to be a shift from traditional public sector management to new public management (NPM) (Crawford and Helm, 2009), and the NPfIT reflected this in its attempts to engage in consultations with people rather than limit the level of community involvement. While there was an effort to try and learn from successful projects in other countries such as the US (Stevens, 2004), the programme team did not seem to remember lessons from previous IS project implementations in the NHS (Currie, 2008; Maguire, 2007) that were detailed by the Parliamentary Public Accounts Committee (2000).

Several studies of the NPfIT have investigated its challenges and underlying problems (Avison and Young, 2007; Brennan, 2007; Hendy *et al*., 2005; Robertson *et al.,* 2010). Despite the dismantling of the project, it continues to ignite interest from academics as well as practitioners, as a classic case study which represents the challenges to strong governmental and political interest when faced with opposition and disengagement of end-users.

Historically the UK public sector has had a focus on productivity and budgeting measures (Jones, 2008). This holds true in the case of the NHS as well, with its various reforms surrounding purchasing models, performance measures, reorganisation and emergence

of new bodies, fundholding and shifting agendas (Klein, 1995; Morrell, 2006). In the late 1990s, the need for improved service delivery resulted in calls for modernisation, and this included the incorporation of information systems to facilitate this aim (Jones, 2008; NHS, 2000; The NHS Confederation, 2003a).

Given the range of settings and the varied scales in which technology can be implemented, it follows that each implementation scenario is unique and will not necessarily have the same outcomes as implementations in other contexts. This draws attention to the highly contextual nature of IS implementations, and the need to tailor systems to the need at hand.

2.2.2   The contextual nature of IS

Several IS implementations are launched in a bid to be at par with systems in other countries or organisational contexts (Avgerou, 2001; European Commission, 2009; Robertson *et al*., 2010). However, successful IS implementation in other regions, organisations or industries does not necessarily translate into similar outcomes in every case. These variations in IS project outcomes are due to reasons including the diverse stakeholder groups involved, different challenges and requirements of various sectors, and a possible underestimation of the complexity of IS projects in new settings (Avgerou, 2001). There is clearly a need to contextualise and tailor systems to the context in which they are being implemented.

Healthcare in particular has been recognised as a highly challenging environment for the introduction of new technology, given its complexity and institutionalised nature (Chiasson and Davidson, 2004; Fennel and Alexander, 1987). The mutual influence that technology and social context have on each other (Avgerou, 2001) may be seen in the

manner in which health IT introduces changes in clinical work practices, and also has to contend with the workarounds that clinicians attempt in their efforts to resist change (Alshawi *et al.*, 2003; Goldschmidt, 2005). In order to better understand the interplay between technology and its social context, it is necessary to recognise the variations in the way different users perceive and use technology. I will discuss this further, employing literature on 'technology frames' (Orlikowski and Gash, 1994) and 'boundary objects' (Star and Griesemer, 1989).

2.3   Technology frames and boundary objects

The presence of multiple stakeholder groups adds an additional dimension of complexity to the contextual nature of IS implementations, given the diverse perspectives and needs of each user group (Ramiller, 2001b). Orlikowski and Gash (1994) introduce the term 'technology frames' to refer to the varied lenses through which different users perceive technology and its usage.

Technology frames are structured in terms of the various knowledge domains, with the contents of the frame being the knowledge itself (Davidson, 2006). These frames are not rigid, and their structure as well as content may shift and vary with time and context (Davidson, 2006). Given the multiple stakeholders present in a typical IS project, conflicts result in incongruent technology frames. Attempts to resolve these incongruences may result in filtering, negotiation or shifting of technology frames (Ovaska, Rossi and Smolander, 2005). While cognitive diversity is beneficial in early phases of IT development and planning, the later implementation phases require more cohesive and integrated efforts to see fruition (Davidson, 2002). Hence, the tendency for frames to be negotiated

and shifted in order to resolve incongruences between stakeholders may be a step toward a more unified focus in IS implementation.

Some typical technology frames which shape users' understanding of technology include the nature of technology (its features and purpose), technology strategy (on the implementation approach), technology-in-use (ease of use, training, etc.), IT delivery strategies, IT design, the business value of technology, and IT-enabled work practices (on how technology changes or fits in with existing work practices) (Orlikowski and Gash, 1994; Davidson, 2002). The reasons for incongruences in users' technology frames include different requirements and needs of stakeholders. This may in turn be linked to the professional differences amongst various user groups as well, as professionals have specific and specialist requirements and practices which differ or conflict from that of their peers (Aydin and Rice, 1991).

There may be variations in responses to technology even amongst members of a professional group, depending on their departmental or organisational affiliations (Aydin and Rice, 1991). With clinicians often belonging to a combination of organisations and professional bodies, it may be the case that they have to contend with conflicting requirements and expectations from their multiple affiliations.

Technology also has the capacity to change boundary practices, i.e., the way elements on either side of these boundaries interact with each other (Gal, Lyytinen and Yoo, 2008). Technology's boundary spanning capabilities facilitate an increasing overlap of roles and responsibilities (Barrett *et al.*, 2012; McLaughlin and Webster, 1998; Tjora, 2000), also called 'task drift' (Bossen, Jensen and Witt, 2012). This has particular significance to the role of health professionals, as clinicians are gradually able to take on tasks which were

previously outside their jurisdiction, and this means potential changes in the hierarchies inherent amongst clinicians (Nancarrow and Borthwick, 2005). Nurses have begun to execute tasks which were previously the sole responsibility of physicians, resulting in a blurring of professional boundaries. Such shifts in boundaries which enable clinicians to climb up professional hierarchies is termed 'vertical substitution' (Nancarrow and Borthwick, 2005).

The easy access to information made possible by technologies such as the Internet (Henwood *et al.*, 2003) challenge the indeterminate nature of professional knowledge (Boreham, 1983), and this potentially affects the dynamics of patient-doctor interaction as well (Evetts, 2013). The increasing overlap and fusion of roles enabled by technology usage often has to contend with an opposing tendency by clinicians to reinstate boundaries that reassert their professional autonomy and independence (Walter and Lopez, 2008). This aspect of professionalism may be one of the reasons for the emergence of new professional roles by means of hybridisation, which I discuss in section 2.7.

Carlile (2002, 2004) discusses the importance of 'boundary objects' (Star and Griesemer, 1989) in dealing with knowledge boundaries which are present as a consequence of specialist expertise and tasks of professionals (Swan *et al.*, 2007). Boundary objects refer to abstract or physical concepts which are positioned at the interface between different domains, and which are subject to multiple interpretations, perspectives and practices depending on the domain from which they are viewed (Star and Griesemer, 1989; Swan *et al.*, 2007; Nicolini, Mengis and Swan, 2012; Barrett and Oborn, 2010). Boundary objects include technology (Gal, Lyytinen and Yoo, 2008), texts (Oswick and Robertson, 2009),

project contracts (Koskinen and Mäkinen, 2009) and timelines (Yakura, 2002), to name a few. The concept has been applied to a range of domains including software development (Barrett and Oborn, 2010), product development (Carlile, 2002), healthcare (McGivern and Dopson, 2010) and biomedicine (Swan *et al.* 2007).

In referring to the knowledge boundaries which have to be overcome when dealing with a boundary object, Carlile (2002) emphasises that these separate knowledge sources act as both facilitators as well as inhibitors to product development. In the case of IS innovations too, there is a plethora of knowledge sources available as the IS field bridges several domains that have an interest in the innovation being developed (Wang and Ramiller, 2009). The effectiveness of boundary objects do not necessarily depend on their inherent characteristics, but also depends on how stakeholders make sense of them (Fox, 2011). Those objects that gain prominence or encourage communication and adoption across stakeholder groups may be termed 'positive boundary objects', whereas those that inhibit such progress are 'negative boundary objects' (Fox, 2011).

In looking at how technology itself acts as a boundary object between different stakeholders (e.g. different groups of health professionals), Fox (2011) highlights the capabilities of technology to be either facilitative or hindering to cross-boundary collaboration. Artefacts such as engineering drawings are a classic example of how boundary objects can be used for collaboration and communication between different epistemic groups, while simultaneously being used by dominant professionals groups (in this case, engineers) to maintain their expert authority in their jurisdictions (Bechky, 2003).

Unlike boundary objects which may be either physical or abstract, epistemic objects are generally abstract 'objects of inquiry' (Ewenstein and Whyte, 2009: 9) situated within epistemic practices (Cetina, 1997; McGivern and Dopson, 2010). Rheinberger (1992) explains how epistemic objects transform and evolve, and this may be understood through Cetina's (1997) example of computer systems that are modified and improved over the years. Epistemic objects situated between different epistemic practices enable boundary spanning, resulting in the simultaneous existence of epistemic and boundary objects in such cases (Ewenstein and Whyte, 2009; McGivern and Dopson, 2010). Technical objects serve as fixed representations that contain a specific epistemic object (Rheinberger, 1992).

Yakura (2002) introduces the concept of 'temporal' boundary objects and proposes the notion of 'concert in time' wherein clinical professionals in a hospital setting may be able to estimate the time of the day by merely observing the activities which take place at any given time. Similarly, project timelines facilitate a clear distinction between project phases, with each phase viewed differently by stakeholders (Yakura, 2002; Chang, Hatcher and Kim, 2013). By regarding project timelines as 'placeholders' or temporal boundary objects it is possible to distinguish between project phases and how stakeholders perceive and interpret each such phase (Yakura, 2002: 957). For instance, a deadline might signify receipt of payments for those who supply a product or service, while for clients it implies debit and payment of bills. Similarly, working overtime for some would be a cause for resentment, having to work unpaid hours, while for others it provides a way of showing their commitment to their work (Yakura, 2002). Epistemic objects may be contained within temporal boundary objects, as different phases are

subject to multiple interpretations and inputs, and perceptions of each of these phases may vary over time, facilitating the transition to the next phase in the project.

Scholars have also studied contracts as boundary objects (Gal, Lyytinen and Yoo, 2008), as they interface between organisations and stakeholders, enabling collaboration and influencing work practices which are relevant to both parties involved. In their capacity as boundary objects, contracts provide a mechanism to manage risks and uncertainties as they provide all parties involved with a clear statement of expectations, and define common terms which may otherwise be interpreted differently by those involved (Koskinen and Mäkinen, 2009). This means that the planning phase prior to the creation of contracts must involve all stakeholders, and those who have decision making powers should be well informed regarding the nature of the project. However, as elaborated in Section 2.2.1, this is often not the case, as project plans and forecasts are often manipulated or not well informed, due to political reasons as well as a lack of sufficient credible information (Flyvberg, Holm and Buhl, 2007; Wachs 1990a, 1990b). An overview of the different types of objects is provided in Table 2.1 (see page 26).

In their discussion on how objects are 'transformed', Engeström and Blacker (2005) suggest that objects are transient and may get devalued or discarded during their lifetime. Objects may 'die' but do not necessarily 'disappear', as they may be revitalised by 'reconceptualising' the objects, so that they are 'reincarnated' (McGivern and Dopson, 2010) in a different manner from what was originally envisioned. This is dependent on how different stakeholder groups perceive the object and reconceptualise it so that it is used for a different purpose. Carlile and Rebentisch (2003) discuss the need for a shift from *using* boundary objects to *creating* new boundary objects, to represent differences

and dependencies in knowledge that may not have been relevant or known previously, but are of current importance. This is often the case in settings where novelty increases, mandating new or updated knowledge (Carlile and Rebentisch, 2003).

Table 2.1 Key characteristics of epistemic, technical, boundary and temporal objects

Key characteristics of different types of objects	
Epistemic object	- Not fixed; abstract - Characterised by incompleteness; continuously evolves in a series of instantiations - Facilitate knowledge flow within epistemic communities (Cetina, 1997; Ewenstein and Whyte, 2009; McGivern and Dopson, 2010; Rheinberger, 1992)
Technical object	- Static and repeatable - Provide a representation of epistemic objects; (Cetina, 1997; Engeström and Blackler, 2005; Ewenstein and Whyte, 2009; Rheinberger, 1992)
Boundary object	- Concrete, single object, interpreted differently by different groups. - Enables coordination and knowledge flow between domains (Ewenstein and Whyte, 2009; Star and Griesemer, 1989; Swan *et al.*, 2007)
Temporal object	- Interpretations and management of time (and associated tasks) vary between project stakeholders. - Enable temporal coordination (across time). E.g. timelines. (Chang, Hatcher and Kim, 2013; Yakura, 2002)

In understanding the way knowledge is shared across boundaries, of particular importance are 'semantic' and 'pragmatic' boundaries, which go a step beyond the 'transfer' of knowledge which occurs at 'syntactic boundaries' (Carlile, 2004). Carlile's (2004) framework for knowledge flow across these different types of boundaries is depicted in Figure 2.1 (see page 28). Semantic boundaries facilitate the translation of knowledge, taking into account the diverse views and perspectives of different actors, so that there is the creation of shared meaning between these groups. This acts as a precursor to transformation of knowledge at pragmatic boundaries, as engaging in

meaningful dialogue with a clear understanding of how other users perceive an object is essential to reconciling disparities and incongruent technology frames (Carlile, 2004; Orlikowski and Gash, 1994). Stakeholders may have different interests and work practices which shape the way they perceive and use objects such as technology. Efforts to protect their professional interests can conflict with the need to use IT in a collaborative manner, confirming Carlile's (2002) suggestion that knowledge can be 'at stake' and that individuals may often have to make a choice between protecting their interests and using technology in a manner that facilitates knowledge sharing.

The challenges of knowledge sharing across boundaries, or the 'stickiness' of knowledge (von Hippel, 1994), often acts as a barrier to new types and forms of knowledge, and this is a challenge to be contended with when dealing with innovations and hybrid knowledge and professionals (Carlile, 2004). Much of this inertia may also be attributed to the different technology frames with which users perceive, interpret and use technology (Gal and Berente, 2008; Orlikowski and Gash, 1994).

Technology frames provide a shared framework to organisational members or individuals of a particular user group, through which they make sense of the technology (Gal and Berente, 2008). The conflicts and tensions between these different groups implies that there is often an issue of incongruent technology frames (Orlikowski and Gash, 1994), that poses challenges to consistent and successful implementation of technology, due to differences in user perspectives.

Types of boundaries and
boundary capabilities

Increasing
novelty

Increasing
novelty

PRAGMATIC
Transformation

Actor A

SEMANTIC
Translation

Actor B

SYNTACTIC
Transfer

Known   Known
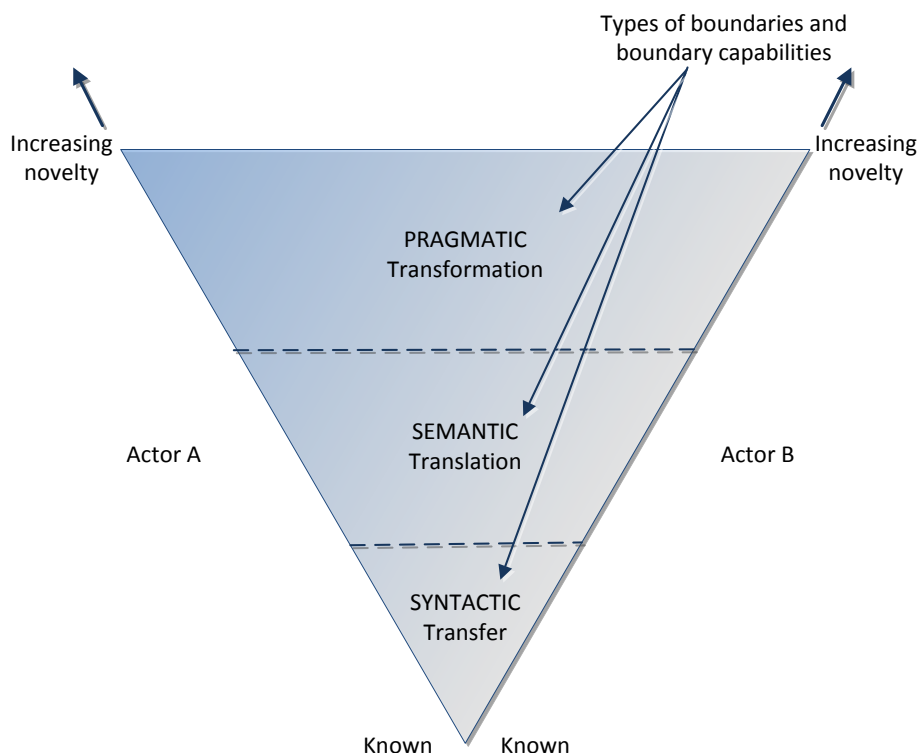
Figure 2.1 Management of knowledge flow across boundaries (Carlile, 2004)

Health technology, with its complex involvement of several user groups and stakeholders presents itself as a suitable example to discuss the many different perspectives shaping the use of specific technologies such as EHRs. When developing health technology, it is not sufficient to try and understand what users (clinicians and patients) want, as different people have their own perceptions of the world. What they say they want and what would actually be beneficial to them in practice often differ (Karsh *et al.,* 2010), adding an additional layer of complexity to understanding the multiple interpretations of an object. Differences in the way users make sense of technology are evident between clinical professionals as well. This draws attention to the existence of different technology frames (Orlikowski and Gash, 1994) with which people view technology as an artefact, and also explains why boundary objects in the technology domain are viewed by stakeholders through different lenses.

The incongruence of technological frames in an inter-organisational setting due to the diverse stakeholder groups involved (Davidson, 2006) points to a need for investigating the dynamics between stakeholder groups, and this is offered by the discourse based approach around which the concept of 'organising visions' (Swanson and Ramiller, 1997) is centred, and which will be elaborated on in the next section. This approach not only allows us to discuss interactions between stakeholder groups and their influence in steering the way technology is adopted, but it also allows us to study the overarching discourses relevant to the vision, in this case being the national implementation of EHRs.

2.4 Organising visions

When implementing new technologies, it is argued that organisations should observe best practices, and learn from the experience of past IT implementations by other players, keeping in mind the need to tailor IT to specific contexts (Avgerou, 2001). However, when the technology in question is relatively new, and there are limited past success stories, the best approach would not be looking back at history, or looking at peers, but looking forward to identify develop a clear vision to steer current efforts towards it (Murphy, 2011). The term 'organising vision' coined by Swanson and Ramiller (1997) refers to the manner in which IS innovations are diffused, and how these technologies are interpreted, legitimised and mobilised in the course of their implementation plan. It acknowledges the heterogeneous nature of the IS field (Avison and Myers, 1995), and the potential existence of conflicts and competing interests due to the multiple actors involved.

Swanson and Ramiller (1997:460) use the term organising visions in the context of new innovative technologies, and define it as 'a focal community idea for the application of

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information technology in organisations'. Dominant discussions or 'buzzwords' provide a glimpse into the 'community discourse' steering the vision (Swanson and Ramiller, 1997; 2003). This also indicates the instability of innovations, as they undergo a process of scrutiny, discussion amongst dominant stakeholders, and further refinement (Ramiller, 2001b). The community discourse of an organising vision is constituted and influenced by a community of stakeholders who have a common interest in the vision (Swanson and Ramiller, 1997).

While other scholars have suggested that the early stages of IS innovation adoption were defined by a rational choice by specific organisations (Tolbert and Zucker, 1983), Swanson and Ramiller suggest that institutional elements are at play right from the beginning, as the perceptions and decisions of specific stakeholders are shaped by the on-going discourses on the innovation. These may take the form of reports, papers, conferences, and activities of other stakeholder groups, and play a role in shaping the concepts underlying the IS innovation. These discourses wherein IT suppliers flaunt the transformative powers of technology and persuade non-IT stakeholders of the need for new innovative technologies, using the rhetoric of 'transformation' or 'novelty' (Ramiller 2001a, 2006) can often be misleading.

The 'interpretive flexibility' of technology (Pinch and Bijker 1984, 1987) is reflected in the multiple perspectives and inputs of stakeholder groups in an organising vision (Swanson and Ramiller, 1997). While there are often conflicting views amongst stakeholder groups in the heterogeneous community, they share a common platform, in that they have a mutual understanding of what the vision represents (Swanson and Ramiller, 1997). This is associated with technology frames (see Section 2.3) which acknowledges the diverse

perspectives of users, lending technology its equivocal nature (Ramiller, 2001b). The concept of epistemic objects is also relevant to this discussion, given that they are subject to different interpretations which may vary with time (Cetina, 1997; Rheinberger, 1992), similar to buzzwords in organising visions (Swanson and Ramiller, 1997) as I shall discuss in Chapter 5.

Organising visions have been employed to study a range of IS innovation technologies including EHRs, telehealth and telecare (Davidson and Reardon, 2005; Greenhalgh *et al.*, 2012, Klecun-Dabrowska and Cornford, 2002). EHRs, given their relatively new and innovative nature, the diverse range of stakeholders (clinicians, technology workers, patients, etc.), the many on-going debates and uncertainties surrounding them, and the increased attention and investment they are receiving, are one of the rapidly evolving organising visions in the area of healthcare IT (Davidson and Reardon, 2005). Greenhalgh *et al.* (2012) study the organising vision of telehealth and telecare technologies, looking at how the very definitions and perceptions of these have developed with time. They also suggest that inconsistency and conflicts within visions may explain why many of them do not see completion.

The distinctive nature of organising visions, as a point of departure or discontinuity from existing practices or technologies may account for the frequent lack of concordance between various stakeholders (Davidson and Chiasson, 2005; Swanson and Ramiller, 1997). This fundamental existence of competing discourses within a community has the potential to shape and *be* shaped by an organising vision (Swanson and Ramiller, 1997). The involvement and inputs of multiple perspectives from a wide range of stakeholders in the creation of an organising vision emphasise the context dependant nature of IS and

the general aspiration to emulate success stories and best practices of industry peers (Avgerou, 2001).

Two preconditions for an agenda to be termed an 'organising vision' are distinctiveness and plausibility (Davidson and Chiasson, 2005; Swanson and Ramiller, 1997). To enable fulfilment of the vision it has to have the added features of being interpretable and important, so that the *value* of the innovation under consideration is recognised, and easily communicated to the community (Davidson and Chiasson, 2005; Swanson and Ramiller, 1997). These are challenging conditions for any IT project, and even more so for one as massive as the NPfIT which was the world's largest civil IT project, and meant for the English NHS which is the largest public sector organisation in Europe (Brennan, 2007).

Organising visions serve three functions, namely 'interpretation', 'legitimation' and 'mobilisation' (Swanson and Ramiller, 1997). Interpretation occurs in the early phases of IS innovation, when exploratory efforts are undertaken to understand the new technology and its implications. An organising vision legitimates an IS innovation by providing rationale for developing a technology through the inputs of multiple stakeholders, and also through the reputation and influence of those who have successfully undertaken implementation of the innovative technology. The third function, mobilisation, refers to the ability of an organising vision to support the progress and realisation of an innovation, as implementers draw on the discourse characterising the organising vision to inform their understanding and to acquire the needed resources and knowledge necessary to implement the technology. A discussion on how the NPfIT may be regarded as the carrier for the organising vision of EHRs in England is found in

Chapters 3 and 5, which provide a more detailed account of the national programme and its care record component.

The drive to use latest innovative technologies is not necessarily linked to a quest towards efficiency, but could be the 'bandwagon effect' – an attempt to be like others in the field, with competing aspirations towards legitimacy or performance (Abrahamson, 1991), as a result of isomorphic institutional tendencies (Abrahamson, 1991; Abrahamson and Rosenkopf, 1993; Kostova and Roth, 2002). Normative influences which cause organisations to adopt technologies because it is the 'done thing' may blind adopters to what is actually in their best interest (Ramiller, 2001a).

The power of texts and talk surrounding innovative technologies is not to be underestimated either, as often, much of what managers know of such applications is from community discourse (Swanson and Ramiller, 1997) and textual information to which they ascribe a high level of authority (Ramiller, 2001a). Attributing a high level of legitimacy to a text, to the extent that it is given more importance than the topic it addresses is termed 'textual attitude' (Ramiller, 2001a) and this could potentially lead to 'mindless' adoption of technology (Swanson and Ramiller, 2004) if IT adoption decisions are clouded by the voice of the crowd as described in supposedly authoritative documents and publications. Such texts provide a valuable insight into the propaganda of key stakeholders in highly visible projects such as the NPfIT, as there is a plethora of documentation, communication and media publicity with which such initiatives may be researched.

With this brief introduction to organising visions, I shall briefly discuss the significance of stakeholder groups and other factors that influence the discourse surrounding an organising vision.

2.4.1 Elements influencing discourse surrounding organising visions

The organising vision discourse depends on multiple factors including the business problematic, community discourse and IS practitioner subcultures (Swanson and Ramiller, 1997), illustrated in Figure 2.2 (see page 35). The interests of technology developers and managers are reflected in the IS practitioner subculture and business problematic respectively, which together form a layer of 'cultural-linguistic resources' that inform the vision. The debates which stakeholders engage in revolve around a commonly recognised subject using mutually understandable language and expressions. However, technology experts often bring their own domain specific terms into a project (Murray, 2001), and this gives rise to jargon or 'legitimated vocabulary' specific to the organising vision itself (Swanson and Ramiller, 1997). These are to be distinguished from buzzwords which emerge and subside during the lifetime of the organising vision, depending on what issues are prioritised at various points of time.

The 'business problematic' emphasises the relevance and need of the organising vision. Available core technologies determine the capabilities of the vision, as they can both facilitate as well as constrain its development. 'Commerce' represents those enterprises with material stakes in the organising vision. The adoption and diffusion of innovative technologies also influence the discourse surrounding the organising vision, as multiple stakeholders including vendors, consultants and business people are involved in the adoption and diffusion processes (Swanson and Ramiller, 1997).

The career path of an organising vision is determined by factors such as the shifting buzzwords, dominant discourses and the general reception of the vision by community stakeholders (Lucas, Swanson and Zmud, 2007; Swanson and Ramiller 1997, 2004). The presence of diverse actors in the community implies that tensions, frictions and disagreements may arise and/or subside during the development of the organising vision (Swanson and Ramiller, 1997), and has parallels to incongruent technological frames (Davidson, 2006; Orlikowski and Gash, 1994).
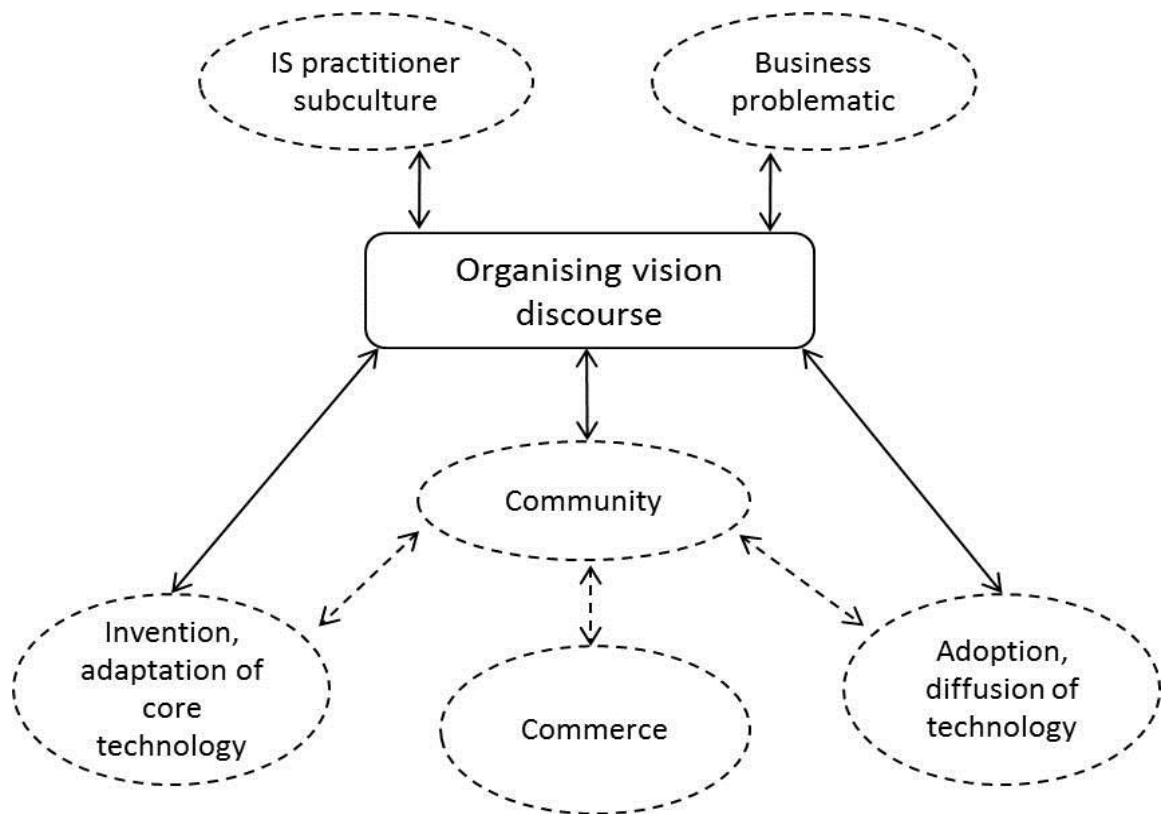
Figure 2.2 Factors influencing the production of organising vision discourse (Swanson and Ramiller, 1997)

The perspectives of these community stakeholder groups not only vary between each other but also vary across time. On-going discourses shape the viewpoints of these different users, and initial conflicts may be appeased by filtering out ideas, or negotiating

or shifting one's frame to be more aligned with others (Ovaska, Rossi and Smolander, 2005).

The complexity of healthcare implementations mandates a large and diverse community of stakeholders involved in the creation and evolution of organising visions in this context (Greenhalgh *et al*., 2012). Sauer and Willcocks (2007) identified three 'Greek choruses' in the NPfIT, drawing an analogy to ancient Greek amphitheatres where crowds raised their voices in efforts to make themselves heard. These choruses in the NPfIT were those of the programme's 'defenders', 'sympathetic critics' (who were actually impacted by the NPfIT systems) and the 'professional critics' (who were more distanced and critiqued the programme as external observers). These will be elaborated on in Chapter 5, drawing on my data sample which has representations from these three groups.

Much of the rhetoric surrounding innovative technologies is characterised by 'exaggeration' or 'communicative distortion', in an effort to persuade people to embrace new technologies (Ramiller, 2006). Some tactics often used include rhetorics of 'urgency' (the need for early adoption of technology), 'novelty' (the radical nature of the innovation), 'transformation' (the value offered by the innovation), 'implementability' (the feasibility of achieving the benefits promised by technology) and 'accomplishment' (the legitimation of the innovation by drawing on previous successful implementations) (Ramiller, 2006). These types of communication mechanisms influence organising vision discourse and buzzwords as stakeholders may be subject to persuasive rhetoric employed by those who promote the innovative technology.

While Swanson and Ramiller's (1997) model depicts the way an organising vision is shaped and influenced by diverse community groups and acknowledges the possible

friction between them, discussion on how these groups interact with *each other* is limited. Studies have demonstrated the tensions as well as complementarities between physicians, nurses, managers, and IT professionals (Hunter, 1992; Marshall, 1998; Robinson, Beaton and White, 1994). The professional differences between these groups are a key determinant in shaping their technology frames. It is also likely that some form of community learning takes place, as actors learn by doing, by drawing from the on-going discourse and from other stakeholders (Wang and Ramiller, 2009). From an organising vision perspective, these inter-group dynamics are likely to have an impact on the path and career of organising visions. The limitations of organising visions in understanding inter-group dynamics and areas of contention between stakeholders can be addressed by employing the concept of boundary objects (see section 2.3), as I illustrate in Chapter 5 where I juxtapose these two concepts to discuss the NPfIT.

Changing needs, expectations and demands of user groups might lead to shifts in their roles and inputs in an organising vision. For example, the role of patients in healthcare is becoming increasingly empowered, to the extent of being viewed as *consumers* and *partners* in healthcare, rather than passive recipients of care from experts (Anderson, Rainey and Eysenbach, 2003; Herzlinger, 2006; Liang, 2007; Newman and Vidler, 2006; Tritter and McCallum, 2006).

With this overview of organising visions and the role of community discourse in steering their path, I now proceed to focus more closely on health IT in particular, and some of the key debates and issues which are relevant to EHR usage.

2.5   IT in health care

Healthcare is generally considered to be slow in incorporating ICT into its work practices (Bates, 2002; Ilie *et al*., 2009). The technology advances seen by the health sector in the past few decades is a relatively recent phenomenon compared to the use of information and communication technologies (ICT) in other areas. Going paperless is an ambition to which many, the healthcare sector included, aspire (Grimson, 2001; Sprague, 2004). Realistically however, elimination of paper cannot be immediate (Sprague, 1995), and would need to be transitional, with the primary role of paper documents changing. Although electronic storage of health records can be traced back to the 1970s (Hersh, 1995), early efforts towards computerised health records were fragmented, and were slow to embrace the need for collaborative, interoperable and seamless communication of health information between providers.

The EHR is regarded as a key instrument for clinical governance today, and is a rapidly expanding area of IT in healthcare, being given increased priority in local, regional and national e-health initiatives (European Commission, 2009; Hassey *et al.,* 2001; Lawler, Hedge and Pavlovaic-Veselinovic, 2011; Robertson *et al*., 2010). These advances have been accompanied by growing public demands and expectations. Given the progressive nature of technology, and people's rising expectations from health service delivery, it would be expected that the implementation of electronic healthcare should present minimal additional challenges. This, however, is not the case. The health sector lags behind others in the adoption of IT, suggesting that in addition to the usual problems faced in IT implementations, there are other challenges unique to healthcare (Cho, Mathiassen and Nilsson, 2008; Chiasson and Davidson, 2004).

The highly institutionalised nature of the health sector poses challenges (Currie and Guah, 2007; Fennel and Alexander, 1987), and there is a need for increased efforts to overcome the resistance against redefining existing boundaries and work practices (Walsh, 2004). The complex and sensitive nature of health information contributes to the many apprehensions and barriers in adopting healthcare information systems (Bates, 2002; Ilie *et al*., 2009; Chiasson and Davidson, 2006). Recently, renewed efforts have been channelled toward the promotion of e-health technologies including EHRs, e-prescriptions and telehealth, to provide seamless healthcare to people (European Commission, 2009). However, these large scale ICT projects in healthcare have often been incomplete and unsuccessful (Brennan, 2007; Cresswell *et al*., 2011; Robertson *et al.*, 2010).

The implementation of any new technology has to contend with the responsiveness and receptiveness of the users, and this is particularly true in healthcare, where clinical professionals take pride in their autonomy and independence (Abbott, 1988; Freidson, 1985). The possibilities of technology acting as a monitoring or controlling mechanism (Timmons, 2003a) contribute to clinical professionals' general wariness in trying out new and innovative technologies.

Professionals leverage on their specialist knowledge to define jurisdictional boundaries (Freidson, 1988). Technology is increasingly acting as a mediator in the determination of these boundaries, as it permits an increasing overlap of tasks between roles such as physicians and nurses (Nancarrow and Borthwick, 2005). Professionals' identities are typically defined by the tasks they undertake (Abbott, 1988) and today, this is increasingly intertwined with the technology available to them (Eriksson-Zetterquist *et al*., 2009; Lamb and Davidson, 2005).

Further, the context dependent nature of technology implementation implies that what works in one setting will not necessarily be as effective in another; the episodic nature of mediation of technology use (Davidson and Chiasson, 2005) determines whether systems are *adopted* or *adapted* by users (Barley, 1986; Orlikowski, 2000). This holds true in the healthcare setting as well, with varied needs and usage between different professional groups and geographical locations, resulting in difficulties with standardisation and interoperability (Jensen and Aanestad, 2010). Consequently, there is often a chasm between national health policy targets and implementation in practice (Mars and Scott, 2009).

2.5.1   The need for ICT in healthcare

The fragmented nature of healthcare services and the mobility of individuals (Wilks, 2010), have triggered efforts towards the provision of integrated e-health services for seamless, efficient and reliable care (European Commission, 2009; Iakovidis, 1998). Increased patient mobility has given rise to demands for cross-border healthcare and transferable patient information using interoperable systems and EHRs (Bates *et al*., 2003; Goldschmidt, 2005; Wilks, 2010). However, difficulties may be encountered due to local and regional units seeking to retain their existing systems (Bates *et al.* 2003; Jensen and Aanestad, 2007b).

The increasingly multi-disciplinary nature of healthcare calls for quick and reliable exchange of up to date data between health professionals (Bates *et al.*, 2003; Galliers *et al.,* 2011; Goldschmidt, 2005). Despite the recognised need for electronic mechanisms in the delivery of healthcare services, barriers exist with regard to their user awareness, acceptance and adoption. These are due to reasons which include institutionalised work

practices, concerns regarding autonomy in work practices, concerns regarding (undesired) blurring of boundaries between clinical roles, security and confidentiality of data, and costs of implementation (Goldschmidt, 2005; Hartswood *et al.*, 2003). While clinical stakeholders may in theory appreciate the benefits of such electronic systems, in practice they often seek alternatives and workarounds to new technology (McGrath *et al.*, 2008) thus mediating the very nature of technology use (Davidson and Chiasson, 2005).

The development of new technologies has resulted in an array of terms related to e-health, which need to be understood before going into further detail regarding their use. EHRs are gaining increasing importance and prominence in the field of healthcare IT, and have also been subject to this use of multiple distinct but often interchangeably used terms.

2.5.2   The constellation of electronic health record terminology

The development and diffusion of IT in healthcare has been accompanied by a proliferation of very similar terminologies for these technologies, which are often not clearly distinguished (Cusack, 2008; Lawler, Hedge and Pavlovaic-Veselinovic, 2011; Thomas, 2006). EHRs are enveloped within the broad spectrum of e-health, and they too are subject to multiple and ambiguous definitions (Greenhalgh *et al.*, 2009). Electronic health records (EHRs), electronic patient records (EPRs), electronic medical records (EMRs), computerised patient records (CPRs) and personal health records (PHRs) are but a handful of the terms which are often interchangeably used by scholars, but regarded as distinct from each other, by some.

This section does not attempt to redefine these different terminologies, but explains the type of records this research explores. For the purpose of this study, I focus on electronic

records in the healthcare sector, and this would include those which facilitate entries pertaining to patients' clinical history, by health professionals as well as patients. The reason for this all inclusive consideration of electronic records, is that while there is a distinction between EHRs which permit entries by staff, and PHRs which are primarily for the use of the patient, in some cases, EHRs do permit (minimal) entries by patients, and to assume that there is no patient involvement in all EHR implementations may be erroneous.

CPRs, EPRs and EMRs may all be regarded as *types* of EHRs (Hayrinen, Saranto and Nykanen, 2008). According to this view, CPRs and EPRs are similar, in containing patients' clinical information from a single hospital (Boaden and Joyce, 2006; Hayrinen *et al.*, 2008), while Electronic Medical Records (EMRs) may be either departmental, inter-departmental, hospital or inter-hospital (Hayrinen *et al*., 2008) and are intended primarily for clinical staff (Whetstone and Goldsmith, 2009).

Personal health records (PHRs) differ from these as they are centred on the patient, may be patient-controlled (Hayrinen, Saranto and Nykanen, 2008), and have all or a part of the information entered by the patients themselves (Hayrinen, Saranto and Nykanen, 2008; Wynia, Torres and Lemieux, 2011). The same, in England, are referred to as Electronic Patient Records (EPRs), with their summary version being labelled as Summary Care Records (SCRs) (Whetstone and Goldsmith, 2009). This alternative definition of EPRs differs from that of Hayrinen *et al.* (2008) who identify the source of the record (in this case being from a single hospital) as the defining characteristic of EPRs.

While Boaden and Joyce (2006) have a similar definition of EPRs as Hayrinen, Saranto and Nykanen (2008), they distinguish their definition of EPRs from EHRs, by attaching a

longitudinal attribute to EHRs, making them 'cradle to grave' records of patient information. There are a plethora of acronyms used for very similar yet different applications, and ambiguity around their actual definitions causes them to be used interchangeably.

Some studies, when using these terms interchangeably, fail to delineate their exact definitions (Hippisley-Cox *et al.*, 2003). Interestingly, the majority of those which fail to explicitly explain their terms tend to refer to electronic records which facilitate clinician recording as opposed to patient recording. This may be because patient empowerment and involvement is a relatively new and emerging concept, and the use of PHRs as defined by Hayrinen, Saranto and Nykanen (2008), is still not widespread (Munir and Boaden, 2001).

McGinn *et al.* (2011) conducted a review of literature on EHRs identifying similarities as well as variations between user groups regarding their perceptions of EHRs. The majority of the studies they reviewed focused more on physicians compared to other healthcare professionals, and this seems to reflect the traditional dominant role played by the medical profession (Freidson 1970, 2007). McGinn *et al.* (2011) also pointed out that some of the common points raised by different user groups were regarded by some as positive, and by others as concerns rather than facilitators to EHR usage. This indicates possible differences in the professional roles and characteristics of the different user groups.

Much of the general literature on e-health and health information systems (HIS) is applicable specifically to EHRs, as EHRs are recognised as one of the key components of electronic healthcare having contentious debates surrounding them. The rhetoric on EHRs

has included conflicting opinions on their impact on quality of health care services, patient-doctor interaction, cost benefits and medical errors (Sidorov, 2006; Ash, Berg and Coiera, 2004). This may account for the resistance often encountered in implementation of these systems. The next sections cover some of the conflicting views regarding EHR use.

2.5.2.1 Impact on medical errors

Whether EHRs actually have a positive impact on healthcare in terms of reducing medical errors, is debatable. Emphasising the need to employ tools such as EHRs to aid clinicians, Weed (1997: 231) cautions against 'misplaced faith in the unaided human mind' and calls for clinical professionals to 'abandon the arrogance of professional "expertise" that shuns such tools'. EHRs have the potential to help reduce medical errors as they provide instant up to date access to patients' clinical information, facilitate better tracking of patient history, assist in decision making and provide reminders or alerts to health professionals (Ilie *et al.,* 2009). Despite these advantages, they also have a tendency to *cause* errors or impede seamless healthcare, often due to issues with their user interface and inappropriate usage (Ash, Berg and Coiera, 2004; Harrington, 2011; Hartswood *et al.*, 2003). This has led to the coinage of the term e-pathogenesis, to refer to any form of patient harm which may be linked to the use of healthcare IT (Weiner *et al*., 2007).

Healthcare professionals have been known to use various abbreviations and symbols in handover documents, and this raises questions regarding the safety of such practices (Galliers *et al.,* 2011). The use of electronic systems for such entries is not a guarantee of error free inputs either, since staff may resort to alternative symbols which resemble their intended notation as some keys for symbols are not easily accessible on a keyboard.

This is potentially unsafe (Galliers *et al.*, 2011). Unless the computer systems provide a list of usable symbols which staff can select from, electronic entry can result in increased ambiguity and medical errors, rather than safe and standardised data entry.

Providing patients with access to their EHRs offers possibilities of reduced medical errors as they can then inform their healthcare providers of possible errors in their records (Boaden and Joyce, 2006). This facilitates a dialogue between health professionals and patients, and also resonates with the increasing focus on patient empowerment through EHRs (Munir and Boaden, 2001; Ueckert *et al.*, 2003). However, this draws attention to debates on the ownership of EHRs, a much contended subject due to parallel concerns related to patient data privacy and confidentiality.

2.5.2.2 Ownership

With the improved exchange of health information through the use of EHRs and other electronic mechanisms, the question arises as to who actually owns the patients' information. It may be argued that prior to the use of electronic records, ownership of patient data was more clearly defined, as there existed only a single (paper) copy of records (Hersh, 1995). The use of integrated EHRs involves multiple providers who can access information entered previously by each other, thus blurring the boundaries of ownership. Increased emphasis on patient empowerment prompts the question of what extent of these records may be viewed, controlled and owned by the patients themselves (Ueckert *et al.*, 2003; Munir and Boaden, 2001*)*.

This issue of patients' access to their own records is a particularly grey area. One of the main fears people have regarding electronic storage and exchange of their personal health information is the issue of confidentiality and security (Miller and Tucker, 2009a;

Kaelber *et al.*, 2008). This has resulted in privacy protection standards, which in themselves create barriers to the use of EHRs, as compliance to these regulations sometimes result in higher costs (Miller and Tucker, 2009a).

Such debates regarding who owns, accesses and modifies the EHR are no doubt concerns for medical professionals, who regard themselves as the authority on their patients' conditions. This then forms an external threat to the independence of healthcare professionals, and may possibly account for the increased interest in technology usage by some professionals (see Chapter 7).

2.5.2.3 Autonomy versus control mechanisms

While medical professionals have traditionally enjoyed a high degree of autonomy and dominance, recent shifts in healthcare have undermined or threatened their position. These include the introduction of new technologies such as EHRs into their work practices, and the increasing trend of patient consumerism (Anderson, Rainey and Eysenbach, 2003; Berwick, 2009; Korica and Molloy, 2010; Newman and Vidler, 2006; Timmons, 2003).

The flexibility allowed by EHRs has been subject to debate. The instant and synchronised access to patient data which EHRs are intended to provide, means that clinicians should no longer have to manually send for test results and patient data from other units, but instead, have it a few clicks away, at their fingertips (Kaelber and Bates, 2007). However, the transparency and exchange of information that is facilitated by EHRs also creates the potential for clinical staff being monitored and audited more easily, causing some to feel controlled and even uncomfortable with their notes being visible to other system users (Jensen and Aanestad, 2007b; Halford, Obstfelder and Lotherington, 2010). The improved

auditing of the clinical electronic trail has been linked to threats of litigation (Miller and Tucker, 2009b), and this may add to the sense of control imposed on clinical staff.

The very nature of data entry required by electronic systems challenges clinicians' autonomy and flexibility. Structured fields and prescribed formats of data entry, though beneficial for the purpose of standardisation between systems, can be yet another cause for feelings of restricted freedom in recording patient information (Ash, Berg and Coiera, 2004). They are often also regarded as being a disruption to professionals' busy schedules and as an interference with time that could be better spent attending to the needs of patients (Ash, Berg and Coiera, 2004).

EHRs may also provide decision support capabilities to staff, making the process of healthcare relatively standardised for certain conditions, allowing for redistribution of tasks across clinical staff roles (Halford, Obstfelder and Lotherington, 2010). The boundary spanning capabilities of technology clearly lead to encroachment of medical jurisdiction by other clinical peers. Consequently, nurses may take over basic care routines and treatments using these support functionalities, helping to alleviate physicians' workloads.

Studies have indicated however, that doctors often tend to draw a line between their duties and those of nurses (Tjora, 2000), and regard boundary dissolving work practices as an invasion into their turf (Waring and Currie, 2009). Such changes disrupt existing practices, and add to the resistance against the adoption of EHRs, making it challenging to integrate them into existing work practices (Lawler, Hedge and Pavlovaic-Veselinovic, 2011). The medical profession's autonomy and dominance in the professional realm (Freidson, 1988) is hence not restricted to maintaining control over external non-clinical

forces, but is also evident in the dynamics between physicians and other healthcare professionals (Coburn, Rappolt and Bourgeault, 1997).

2.5.2.4 Cost effectiveness

The automation of various tasks, facilitated by the use of technology, provides opportunities for cost cutting and resource re-allocation. In healthcare, the possibilities of reduced medical errors, better and quicker decision making, and improved management of clinical resources are some of the benefits offered by the use of EHRs, which in turn could result in reduced costs in the delivery of care. However, these alleged cost-reducing opportunities are refuted by some scholars who suggest that the use of EHRs may increase the risk of medical errors and drive up costs (Sidorov, 2006). The investment required to develop and implement a quality health IT system is significant, despite the long term cost benefits. These are concerns which need to be borne in mind when investing in health IT, given that costs are often underestimated or underplayed at the start of such projects. The NPfIT was one such example, with an initial estimated budget of £6 billion (Sauer and Willcocks, 2007) which spiralled up to nearly £9.8 billion (NAO, 2013).

2.5.2.5 Doctor-patient dynamics

Quality decision making, improved efficiency and quicker access to information are all put forward as attractions of EHRs. On the other hand, it has also been suggested that increased use of computerised records may detract from the quality of doctor-patient interaction, as clinicians' attention is not devoted entirely to their patients. The rise in patient consumerism wherein healthcare is being increasingly regarded as a 'product' that patients want to control and manage on their own, triggers shifts in the traditional

dynamics between them and their healthcare providers (Anderson, Rainey and Eysenbach., 2003; Newman and Vidler, 2006; Herzlinger, 2006; Liang, 2007).

Medical professionals occupy a position of expert authority in their jurisdictions, and their knowledge has been acquired through a combination of prolonged training as well as experience (Abbott, 1988; Freidson, 1985). The concept of the expert patient (Donaldson, 2003; Fox, Ward and O'Rourke, 2005) has implicated a shift from physicians as professional authorities in their domains, to professional guides and advisors to their patients; though some would question this assumption that patients can take sole or increased responsibility for the management of their illness (Greenhalgh, 2009).

The notion of handing over an element of control to their patients, whom they regard as novices in making judgements on healthcare, is one which may not be welcomed by many clinicians (Berwick, 2009). Another school of thought would suggest that patients are the ones in the best position to assess their conditions, and make informed decisions with the guidance of their doctors. Consequently, increased attention has been given to the notion of patient-doctor partnership in healthcare. The use of technologies such as EHRs, which transcend established boundaries and facilitate this provider-patient partnership, would clearly have a direct impact on both the quality of patient-doctor interactions, as well as the level of control afforded to each party.

2.5.3 Government initiatives towards nationalised healthcare ICT usage

The benefits offered by healthcare technologies such as EHRs have spurred several countries to engage in large scale national health IT projects (Robertson *et al*., 2010; European Commission, 2009). The presence of numerous stakeholder groups in health IT projects, each having very different needs and attitudes (Herzlinger, 2006), suggests a

high degree of complexity of such initiatives in the health sector. These dynamics in a public sector IT setting have the added dimension of political influence and government control. Scholars have devoted much effort into investigating the nuances of EHR implementations at various levels including national level projects (Atkinson *et al*., 2002; Ilie *et al*., 2009; Robertson *et al.,* 2010).

The mismatch between government visions and local needs is one of the main hindrances to successful implementation of such large scale implementations. The Nordic countries, considered to be exemplary in their provision of services to the general public, are no exception to large scale project failures. Attempts to implement a national level EPR system in Denmark failed due to challenges related to the geographical area, temporal span and functional scope of the project (Jensen and Aanestad, 2010).

The UK is another recognised e-health forerunner (Dobrev *et al*., 2008) which has faced significant difficulties in its national EHR implementation. Huge investments were made to facilitate integrated healthcare through England's NPfIT, which envisioned interoperable and seamless care for all by means of improved use of ICT. This project, conceived in 2002, identified the implementation of a national electronic care record service as one of its key components. However, a number of challenges including political agenda, overly ambitious targets and lack of clinical engagement were encountered, and national efforts culminated in termination of the project in 2011 (Sauer and Willcocks, 2007; Brennan, 2007; Robertson *et al*., 2010; NAO, 2011). Chapter 3 provides a more detailed discussion of the NPfIT project which serves as the context for this research study.

The tensions between the state and clinical professionals were evident in the national programme. While autonomy is regarded as an integral characteristic of the medical profession (Abbott, 1988; Freidson, 1988), Freidson (2007) distinguishes between economic and political autonomy on the one hand, and technological or scientific autonomy on the other. When physicians do have a level of control over their practice, it is solely due to the legal support afforded to them by the state, as it may provide them with legitimacy, funding, licensing and setting of appropriate regulatory measures (Evetts, 2013; Freidson, 2007). While this aspect of autonomy varies between different regions, the *content* of professional work, i.e. establishment of domain specific guidelines for work practices, inevitably lies in the hands of professionals themselves (Freidson, 2007). Much of this struggle to retain their autonomy is either facilitated or hindered by the use of technology, depending on the manner in which clinicians opt to approach health technology implementations in their practice. While Prasad and Prasad (1994) suggest that computerisation aids or enhances professionalisation, more recent studies however highlight the perception of health IT as a threat to professionals (Walter and Lopez, 2008; Timmons, 2003a). Keeping in mind the challenges of technology in healthcare, including the struggle to retain clinical autonomy in response to threats which arise from technology use, and increasing external control from markets as well as states as a result of new public management (Crawford and Helm, 2009; Timmons, 2003b), I now briefly discuss some of the nuances of professionals' interaction with technology. Following this, I will highlight how these tensions may lead to the phenomenon of professional hybrids.

2.6   Professionalism and technology use in healthcare

Considered the archetype professions medicine offers various approaches to define what constitutes a professional such as internalisation of skills acquired through long intensive training, acquisition of a certain status within society, and autonomy (Abbott, 1988; Freidson, 2007). Professions exist to resolve problems requiring specialist knowledge and expertise, thus making the tasks in their jurisdiction a distinguishing feature of their role. These jurisdictional boundaries are prone to shifts as the nature of certain problems may require the attention of multiple experts, and the professional holding dominant control over the problem determines the subjective qualities of the task at hand (Abbott, 1988).

Further, as already discussed, technology also mediates these professional boundaries by facilitating boundary spanning activities (Lamb and Davidson, 2005; Eriksson-Zetterquist *et al.*, 2009) and enabling people to carry out new tasks that may overlap into other professionals' jurisdictions (Barley, 1986). Nurses are able to take on more responsibilities due to the increased number of duties which they are able to attend to as a result of computerised systems. This may account for the rise in new roles such as the nurse practitioner and the nurse consultant, who are positioned in the spectrum between that of the traditional nurse role on the one hand and the physician on the other (Horrocks, Anderson and Salisbury, 2002; Hewitt, 2001; Robinson, Beaton and White, 1993). Tensions between nurses and their medical counterparts have been recognised by scholars (Stein, 1968). The increased overlap between their jurisdictions (Currie, Finn and Martin, 2010; McMurray, 2010) is then a matter which would be disconcerting to many medical professionals.

The professional status afforded to physicians because of their training and specialist knowledge makes them differ in terms of the adoption and usage of IT (Walter and Lopez, 2008). Clinical resistance to technology has been a chronic challenge in health technology implementation (Jensen and Aanestad, 2007a; Walsh, 2004), with reasons including clinicians' efforts to retain autonomy and control over their clinical jurisdiction (Abbott, 1988; Freidson, 1985) and a general apprehension using new technologies (Alshawi *et al.*, 2003; Goldschmidt, 2005). Their expertise and skill in the medical domain elevates them to a position which necessitates something more than an 'easy to use' system, and must instead, gain their trust. First, it needs to meet their clinical needs, and secondly, it needs to ensure safety at all times to their patients (Walter and Lopez, 2008).

One of the main qualifiers for medical professional dominance is the cultural belief that physicians have the expertise and skills to cure people (Light and Levine, 1988). This belief, say Light and Levine (1988:12), 'is the most fundamental source of professional power; but it is subtle, intangible, and may shift the ground from under the feet of the profession as deference is replaced by wariness'. Today, increased calls for patient empowerment, people being aware of their choices, and having access to more information via technology such as the internet (Henwood *et al.*, 2003), threatens this implicit trust and deference toward physicians. The technology itself is then a threat to physicians' professional autonomy (McGinn *et al.,* 2011).

The increasing knowledge accessible to patients due to computerisation, bridging the knowledge gap between doctors and patients and resulting in diminished trust in doctors, is termed 'deprofessionalisation' (Haug, 1988). The rise in patient consumerism, distrust of so called medical experts, and the trend toward patient-doctor partnership in

healthcare delivery is yet another field of blurred boundaries, as patients seek to become more in control of their health (Hewitt, 2001; Timmermans and Oh, 2010).

Propagation of patient empowerment agendas and patient involvement are coming to the forefront (Newman and Vidler, 2006; Tritter and McCallum, 2006), and medical professionals have to contend with this additional form of accountability and control that is gaining increasing traction. While trust is a crucial component of doctor-patient interactions, Evetts (2013) suggests that this need for trust in professionals triggers increased measures for regulation and surveillance measures that challenge professional autonomy. Freidson (1985) however dismisses the threat of deprofessionalisation due to consumer dominance as being relatively insignificant and over-hyped.

For instance, despite the increased knowledge available to patients, and while clinicians realise the relevance of patient access to their records, this creates challenges and potential burdens for them in dealing with their patients' concerns. Patients may misinterpret their health records using their lay knowledge, and therefore physicians need to take the effort of making sure that the information has been understood correctly by their patients (Fisher and Britten 1993).

Professionals must explain to patients the meaning and implications of the content held in their EHRs, which suggests a gradual erosion of indeterminate knowledge (Boreham, 1983), forcing clinicians to facilitate their patients' clinical understanding of their health conditions albeit at a very basic level. The esoteric nature of their professional knowledge (Reed, 1996) and their position as the main authority over their patients' health information could be challenged by the increased communication and involvement that EHRs offer to patients, and the increased empowerment afforded to patients.

In discussing the construction of illness, Freidson (1970) distinguishes between that constructed by professionals' knowledge, and that constructed by patients' lay knowledge.

> 'Where there is a profession there is by definition a lay population ignorant of at least some of its esoteric body of knowledge and practice, and therefore always in some way responding differently to its ills than would the profession.' (Freidson, 1970: 278)

It is this disparity between the knowledge of medical professionals and that of patients, that enables professionals to not only treat patients' manifested symptoms but to also discern a problem about which the layman is unaware (Freidson, 1970). This then challenges the notion of 'expert patients' who are supposedly those in the best position to understand their own conditions. This is not to undermine the role of patients as they have a pivotal role giving professionals an account of their symptoms, and this is clearly a necessity for their effective treatment (Weed, 1997). However, modern technology offers the possibility to combine medical knowledge as well as patients' inputs through means such as EHRs.

'Proletarianisation', or increased managerial dominance over the medical profession, is yet another impediment to clinical autonomy (Freidson, 1985). However, such threats do not sprout from non-clinical professionals and consumers alone, as the sovereignty of physicians is being increasingly threatened by other externalities which include the market and the state (Starr, 1978; Evetts, 2013). This includes the increasing interest by governments as well as industry players to promote the use of certain technologies (such as EHRs and other auditing tools) at local as well as regional and national levels in healthcare. However, the increased transparency that this facilitates could also be a

source of political control, as outcomes of such audits could be used to trigger changes in clinical work practices and funding, highlighting clinicians' 'reactivity' to transparency mechanisms (McGivern and Fischer, 2012).

In their efforts to retain control over their jurisdictions, professionals employ various tactics in response to external threats to their independence, autonomy and authority (Reed, 1996). Professionals typically assert internal control and self-regulation within their professional community to pre-empt control by the external 'lay society' (Goode, 1952). These include efforts to maintain the indeterminacy of their specialist knowledge (Boreham, 1983), and the deliberate adoption of additional roles to avoid control or 'colonisation' (Waring and Currie, 2009) by non-professionals. This brings me to the subject of professional hybridisation, or the adoption of dual roles by professionals, which I discuss in next section.

2.7   Professional hybridisation

While professionalisation of occupations has facilitated autonomy of workers (Noordegraaf, 2007; Wilensky, 1964), scholars have highlighted the increasing boundary spanning nature and dualism of emergent forms of professionalism, a phenomenon termed hybridised professionalism (Ackroyd and Muzio, 2007; Doolin, 2002; Fitzgerald and Ferlie, 2000; Muzio and Kirkpatrick, 2011; Noordegraaf 2007, 2011; O'Reilly and Reed, 2011; Thomas and Hewitt, 2011). Professional hybridisation is an emerging and important area of research (Noordegraaf, 2007; Spurgeon, Clark and Ham, 2011), and has significant impact on how different domains (e.g. medicine and management) are bridged by integration of their specialist knowledge.

The prevalence of problems spanning multiple domains draws attention to the limitations of expertise limited to specialist knowledge, and emphasises the need for professionals to develop skills to work in such 'multi-professional environments' (Noordegraaf, 2011: 1361). The unique dual roles of hybrid professionals enables them to bridge different domains such as healthcare and management (Fitzgerald and Ferlie, 2000), highlighting the possibility for individuals to act as boundary objects facilitating the transfer, translation and transformation of knowledge across these domains (Carlile and Rebentisch, 2003).

Quinn, Anderson and Finkelstein (1996) highlight the different levels of intellect present amongst professionals, namely cognitive knowledge (acquired through training), advanced skills (the application of their knowledge to practical real world situations), systems understanding (intuitive deep knowledge of the relationships and interactions related to their discipline) and self-motivated creativity (the driver for adaptability to changing external circumstances in order to preserve their knowledge advantage). Creativity not usually being the prime focus of professional work, most professionals concentrate on perfecting the first three levels of intellect to meet the needs of those whom they serve. However, when faced with threats to their jurisdictional autonomy, professionals may leverage on their creativity to retain control over their work, and this may be seen in the case of professional hybrids.

The majority of the studies on professional hybrids concentrate on the managerial functions taken up by professionals, resulting in hybrids such as the clinician manager (Doolin, 2002; Ferlie *et al.*, 2011; Fitzgerald, 1994; Llewellyn, 2001; Montgomery, 2001), despite the often discussed chasm between clinicians and managers (Hunter, 1992;

Fitzgerald, 1994). The position occupied by clinicians is viewed as having shifted from that of dominant professional groups to those that are now exploited or ignored by their increasingly powerful managerial counterparts (Farrell and Morris, 2003; Davies and Harrison, 2003). However, the division between professionals and managers is gradually dissolving, with the former taking up managerial responsibilities, and the latter also often having professional expertise (Farrell and Morris 2003).

Authority over their jurisdictions is one of the defining elements of professional roles (Abbott, 1988) and points to a territorial possessiveness and control exerted by professionals over their domain. The threat of being controlled by external entities has led to a struggle for wider jurisdiction by clinical professionals, as in the case of clinical managers. Whether management itself can be regarded as a profession in its own right has been debated by scholars, as rather than being specialist in a specific task or area, it brings together and coordinates people and tasks of different disciplines (Barker, 2010).

Some scholars suggest that the clinician-manager hybrid is not a *new* phenomenon, but that it has merely become more visible in recent years. Most of the managerial positions occupied by clinicians in the past were on a part-time or voluntary basis (Montgomery, 2001). While managerial responsibilities had been taken up by professionals who previously self-managed their work prior to encroachment of their territory by non-clinical managers, the distinction between their clinical and non-clinical responsibilities would have been made more visible by the consequent shift of control from clinical professionals to non-clinical managers (Bolton, Muzio and Boyd-Quinn, 2011). The subsequent efforts to defend and protect their professional interests by adopting hybrid clinical-manager roles then drew attention to the distinct roles which clinicians are

capable of adopting, resulting in much scholarly attention to the area of professional

hybridisation (Fitzgerald, 1994; Montgomery, 2001; Noordegraaf, 2007).

Prior to the increased prominence of managerialism as a separate role, managerial

functions were implicitly 'fused in the person of the professional' (Bolton, Muzio and

Boyd-Quinn, 2011: 685), as they managed their own work and had undisputed authority

over their tasks. The introduction of new managerial roles however meant that the

source of control was moved away from professionals and placed into the hands of

external people, giving them a point of entry to a work environment which was previously

inhabited solely by professional experts (Bolton, Muzio and Boyd-Quinn, 2011).

Changes in the way healthcare treatment is delivered, with the increasing presence of

external regulatory mechanisms have resulted in the emergence of the 'administrative

elite' amongst clinicians (Montgomery, 2001: 218), or the clinician-manager hybrid

(Doolin, 2002; Fitzgerald, 1994). The rise of the clinician-manager hybrid may be

accounted to the medical profession's efforts to retain autonomy, giving rise to

restratification and professional buffering, wherein new roles or increased efforts to

retain control over their independence are triggered (Freidson, 1985). Other reasons

attributed to the emergence of these hybrids include the threat of external control from

non-clinical individuals that impacts on the professional autonomy of clinicians (Dopson,

2009; Waring and Currie, 2009). The blurred boundaries between clinical professionals as

a consequence of the increasing overlap between different roles has been accompanied

by a transformation in the hierarchies inherent in the medical profession (Currie, Finn and

Martin, 2010; McMurray, 2010), and a tendency for clinicians to take up responsibilities

outside their traditional clinical jurisdictions (Doolin, 2001) in order to retain control over

their work and the indeterminate nature of their professional knowledge (Boreham, 1983).

Despite these changes in professional control, the setting of standards, supervision and review of work is handled by members of the profession, thus enabling them to resist external control to a certain extent. This suggests internal changes amongst clinical professionals themselves, resulting in internal stratification (Freidson, 1985). Coburn, Rappolt and Bourgeault (1997) suggest that restratification of the medical profession indicates increased control exerted by a handful of medical professional elites not only over external (non-clinical) forces, but also over their clinical peers, evocative of the hierarchies present amongst clinicians (Marsden, 1977). The ease of administration offered by computerised systems, and efforts to incorporate clinical tasks and data entry on computer systems, offer yet another possibility for blurred boundaries, and this may also account for the rise of clinical managers, as doctors find it easier to juggle their clinical and administrative duties as a result of technology use.

'Commercialised professionalism' (Hanlon, 1998) suggests that a combination of technical, managerial and entrepreneurial capabilities is necessary for professionals to be successful. This highlights the increasing importance given to managerial abilities, in contrast to the traditional emphasis on professional knowledge alone. Commercialised professionalism also indicates the need for managerial skills to keep clients satisfied as they are increasingly informed and tend to question professional judgement (Hanlon, 1998) – a phenomenon that is reflected in healthcare as well, given the emphasis on patient empowerment and patients' ease of access to online health information (Donaldson, 2003; Fox, Ward and O'Rourke, 2005; Newman and Vidler, 2006).

Both, resistance to imposed control as well as a genuine interest in the managerial aspect of healthcare delivery have served as antecedents to the adoption of such dual roles. This phenomenon of hybrid roles is particularly relevant to the public sector where efforts to monitor performance, modernise services and encourage collaborative working have given rise to new structures and reforms which exploit hybrid forms to meet these aspirations (Kurunmäki and Miller, 2006; Nooredegraaf, 2007). The English NHS is a classic example having seen much reforms and reorganisations in efforts to both monitor healthcare delivery and to place clinicians in positions of leadership (Stevens, 2004).

This emergence of dual roles may be attributed to a need for managers with experience and understanding of the managed professional group, a strategic approach to better work opportunities, or even being a defensive response by professionals who seek to thwart managerial attempts to usurp control over their work practices (Dopson, 2009). Taking up dual roles to protect their professions from external control may be explained in the context of Freidson's (1985) observations on the restratification of the medical profession, and illustrates the phenomenon of 'reverse colonisation' (Waring and Curie, 2009) wherein professionals challenge and resist colonisation of their jurisdictions by external threats such as managerial control.

However, in taking up additional management oriented roles, clinician manager hybrids need to contend with the risk of being regarded as traitors to their profession (Doolin, 2001; Witman *et al.*, 2011) due to the conflicting professional and organisational needs (Kippist and Fitzgerald, 2009). The lack of professional status associated with management (Barker, 2010) may also result in clinical professions having an attitude of condescension or disdain for managerial tasks. This leads me to briefly discuss 'dirty work'

that refers to work that is perceived as being tainted physically (associated with unclean settings), socially (related to stigmatised groups or that entail subservience to others) or morally (involving ethically questionable virtues or methods) (Ashforth and Kreiner, 1999; Hughes, 1958).

Given people's aspiration to establishing positive images and reputations for themselves, those who engage in work that is regarded as tainted often use techniques of 'reframing', 'recalibrating' or 'refocusing' (Ashforth and Kreiner, 1999) their work to retain legitimacy and respect in society. Reframing entails contributing positive value to the work in question, or neutralising the negativity associated with their execution of the task by denying responsibility (due to subordination to superiors) or the negative impacts that ensue. Recalibration involves amplifying the existing positive qualities of the work, while refocusing ignores the stigmatised part of the work to refocus on other aspects such as better pay or flexibility in working hours (Ashforth and Kreiner, 1999). Individuals may also face threats to their identities, requiring them to protect their identities and employ tactics to deal with this challenge (Kreiner, Hollensbe and Sheep, 2006).

The ways in which people negotiate and reconstruct their identities due to conflicting roles, threatened identities and the challenge of being regarded as engaging in dirty work, all serve as antecedents to 'identity work' which entails people 'forming, repairing, maintaining, strengthening or revising the constructions that are productive of a sense of coherence and distinctiveness' (Sveningsson and Alvesson, 2003: 1165).

Much research highlights the tensions between clinicians and both managers as well as IT consultants (Davies and Harrison, 2003), putting the spotlight on clinician resistance in health IT implementations. This is reflected in clinicians' resistance to the state's role in

health IT, as in the case of the NPfIT. Discussing how stakeholders' perceptions of the NHS Care Record Service (NCRS) were influenced by their professional identities, Cresswell *et al*. (2011) highlight data illustrating some clinicians' views that the systems made them feel more IT-oriented, and distracted from their clinical responsibilities. While this may be the case for some, there are a significant number of clinicians who have moved into the IT development arena and adopted dual roles, as I shall discuss further in Chapter 7.

In the case of IT, technology development does require a level of technical knowledge, though this does not necessarily require prolonged and formal training as in the case of professions such as medicine (Abbott, 1988). While some scholars (Denning and Dunham, 2001; Denning, 2001) regard IS or IT as a profession in itself, Orlikowski and Baroudi (1988) advocate that IS cannot be elevated to the status of a profession, but is an occupation which has a presence in multiple disciplines and settings. The suggestion that IT development cannot be regarded as a profession in its own right, but rather, as an occupation (Orlikowski and Baroudi, 1988), is likely to be a concern for clinical professionals as they would object to being controlled or managed by occupational groups that lack the professional status of medicine or nursing, and this may partly account for the increasing tendency for clinicians to take an interest in health IT.

The challenge of incongruent frames (Orlikowski and Gash, 1994) is also faced by professional hybrids, as they must deal with potentially conflicting technology frames, roles and obligations in the different domains in which they operate. However, once this initial barrier is overcome and there is increasing congruence between the users' technology frames, the fusion of roles into a hybrid professional role may be regarded as internalised.

While hybrid roles are gradually formed by the fusion of two different professional or occupational identities, Ibarra (1999) also proposes the concept of 'provisional selves' wherein individuals trial different roles by forming temporary transitional selves when adjusting to new roles and identities. This opportunity to trial new roles offers the possibility of stepping out of the profession that one is entrenched in, to experiment with other interests and 'ephemeral roles' (Kreiner, Hollensbe and Sheep, 2006) which could complement one's accustomed professional role. Professional hybrids may be born out of such circumstances, and reach a point where professional roles become internalised, creating a single hybrid role.

Reed (1996) distinguishes between 'independent', 'organisational', and 'entrepreneurial' professionals or knowledge workers. The medical profession would be categorised as an independent profession given its autonomy, dominance and indeterminate knowledge (Boreham, 1983; Freidson, 1988). Organisational professions (e.g. management) lack the indeterminate knowledge and specialist expertise of their independent counterparts, as their work skills are dependent on the situation at hand (Reed, 1996). Clinical managers may be regarded as hybrid professionals combining characteristics of independent and organisational professions. The likelihood of conflicts between professional and organisational values (Kippist and Fitzgerald, 2009) indicates the potential conflicting roles that these hybrids adopt. Entrepreneurial professionals utilise specialist technical skills to protect their jurisdictions and gain economic benefits, and have a degree of flexibility and autonomy not afforded to independent or organisational professionals (Reed, 1996). Independent professionals (e.g. physicians) are often threatened or controlled by the other organisational and entrepreneurial professionals (Reed, 1996),

and this is seen in the case of the NPfIT (see Chapter 3). These external threats might account for the rise in independent professionals stepping into the shoes of organisational or entrepreneurial professionals to reassert their authority, resulting in professional hybridisation.

Technology too has been recognised as a challenge to clinical professional autonomy (Walter and Lopez, 2008; McLaughlin and Webster, 1998). Scholars have highlighted how technology is often viewed by the established clinical profession with apprehension, suspicion, and in some cases, outright rejection (Heath, Luff and Svensson, 2003; Goldschmidt, 2005; Walsh, 2004). The possibility of codification of their expertise and practices by means of technology (Walter and Lopez, 2008) is also a challenge to their indeterminate knowledge (Boreham, 1983). The ubiquitous use of technology by patients results in rising expectations and better service from their healthcare providers (Kassirer, 2000), providing a reason for clinicians to embrace health technology and cater to their patients' needs. However, technology needs to be designed with the needs of its users in mind, and this is particularly important in a complex healthcare setting. The need for clinical input and appropriate design of EHRs which are sensitive to the reasons why clinicians enter data in a particular way (Heath and Luff, 1996) must not be underestimated. This may account for the increasing presence of clinicians in the IT field (see Chapter 7).

Although the presence of clinicians in the IT domain (Kay and Hayes, 2011; Smith *et al.,* 2011) to resist the potential control mechanisms imposed by technology (Timmons, 2003a) is not new, this professional hybrid role has not been subject to empirical research. Scholars have recognised the importance of involving clinicians in IT

development, but acknowledge the lack of research investigating this unique 'healthcare IT workforce' (Hersh, 2006; Smith *et al.,* 2011).

While professional bodies such as the UK Council for Health Informatics Professionals (UKCHIP), the British Computer Society Health group and the International Medical Informatics Association (IMIA) have been formed (Kay and Hayes, 2011), clinical informatics is a niche area that is very young and is yet to be recognised as a profession in itself (Hersh, 2006). Scholars have suggested that while clinician-manager hybrids also face challenges in being regarded as an independent and distinct professional role, the development of organisations such as the British Association for Medical Managers signal the increased recognition and institutionalisation of these hybrids (Fitzgerald *et al.,* 2006). Though the British Association for Medical Managers was dissolved in 2010, the more recently established Faculty of Medical Leadership and Management continues to promote the importance of clinician-manager hybrids (BMA, 2012). The establishment of similar organisations for clinical informaticians is possibly an indicator of the increasing appreciation of clin-IT hybrids.

Freidson's (1985) theory of restratification suggests that new roles are created in response to threats to professional autonomy. While the clinician-manager hybrid has received significant scholarly interest, findings from this research indicate the emergence of a different hybrid, as clinicians are increasingly engaged in technology development and implementation. Chapter 7 provides a detailed discussion of this key finding, where I investigate the circumstances which trigger the formation of this hybrid role of clinician-IT professionals. Clearly, the use of technology, its mediating role and boundary spanning capabilities, all work together toward redefining traditional professional boundaries and

jurisdictions. Having provided a brief review of the challenges of technology implementation in healthcare and how professional roles are closely related the success of such implementations, I will now highlight the research objectives of this thesis on the basis of reviewed literature.

2.8   Research focus

Studies have investigated EHRs including their benefits (Cusack, 2008; Goldschmidt, 2005), challenges (Boaden and Joyce, 2006; Cusack, 2008), implementation, impacts, cost-benefit value and the parts played by different stakeholders (Aderibigbe *et al.*, 2007; Leicht and Fennel, 2008). Although the importance of involving users from multiple groups - clinical as well as non-clinical - to enable the successful implementation of EHRs and e-health in general, has been recognised (Bates, 2002), there is insufficient research on the role of healthcare technologies from the perspective of diverse user groups (Leicht and Fennel, 2008).

The complex nature of the healthcare field indicates a need to look beyond technology, and to focus more closely on the dynamics between the key stakeholders involved in large scale health IT projects. This requires a deeper understanding of the nature of healthcare professionals, given their longstanding position of autonomy and dominance (Abbott, 1988; Freidson, 2007). It would appear that these traits are at odds with the controlling effect that technology often exerts on individuals. For this reason, this thesis investigates the evolution of a large scale health IT project, namely the NHS Care Record Service component of England's NPfIT, taking into consideration the diverse stakeholders involved in it.

While studies have critically evaluated the NPfIT programme and discussed the challenges of EHRs in England, this research study seeks to go a step further, by tracing the discourses from multiple stakeholder groups which have surfaced, subsided and persisted with regard to the use of EHRs over the course of the NPfIT project. Multiple voices and efforts served as inputs to this massive project, and formed a rich, dense tapestry of interwoven dialogues revolving around various themes and focal points. I identify some of the dominant voices which steered the NPfIT organising vision, and highlight how interests and visions may have shifted over the course of the project.

Literature on technology frames and boundary objects (see section 2.3) brings to light the varied perspectives of different stakeholders. Applying this to the EHR itself, I investigate how this technology may be utilised for different purposes by multiple users, highlighting its role as a boundary object in itself.

Further, given the shifting roles of professionals, resulting in the phenomenon of professional hybrids, I explore the significance of hybrid roles in the context of the national programme. My findings point to the existence of a niche group of clinicians who are involved in IT development, implementation and policy making. This study investigates reasons for the emergence of this new hybrid role and the specific challenges they have to contend with. To date, the literature on clinical professional hybrids has focused on clinician-managers and has not investigated the existence of clinicians who are actively engaged in IT development.

The objectives of this study are to address the following questions:

1. How did the NPfIT organising vision develop under the influence of the discourse prevalent amongst stakeholders during the project?

2. How do different users perceive EHRs, and how do professional roles influence how EHRs are used to mediate interactions and knowledge flow across boundaries?

3. What triggers the formation of the clinician-IT hybrid, and how does this align with Freidson's theory of restratification amongst medical professionals?

Having identified the research focus for this study, I will now proceed to provide an overview of the development of the NPfIT to set the context for the findings and discussion chapters (Chapters 5 to 7).

CHAPTER 3 THE NPFIT STORY

3.1 Introduction

This chapter sets the context for the subsequent findings chapters (Chapters 5 to 7), by elaborating on the national initiative for EHR development in England: the NPfIT. The complexity of the NPfIT is hard to capture within the confines of a chapter – partly due to its vastness, and partly because there is much that is left to be uncovered and which people are unwilling to talk about. These challenges are not easily overcome and explain why there have been numerous attempts to research the programme and to probe its inner workings.

In this chapter I present the NPfIT story, and identify the different phases that marked the programme (see Figure 3.1, page 87). While Chapter 6 illustrates how EHRs can be regarded as boundary objects subject to multiple views and interpretations, Chapter 5 applies the concept of boundary objects to the NPfIT as a whole, considering the different phases it went through (see Figure 3.1, page 87) as boundary objects, and the national programme itself as a temporal boundary object. Before venturing into these details however, an overview of the NPfIT project from its inception is presented in this chapter. A summary of some of the key events in the NPfIT is provided in Appendix D. I begin by tracing some of the main markers in the history of the project to provide the reader with a holistic picture of how the NPfIT progressed from 2002 to 2011.

3.2 The NPfIT NCRS story

This section provides an overview of how the NPfIT unfolded, with a focus on the NHS Care Record Service (NCRS). I highlight some of the main transitions and markers of the programme, using documentary data and reviewed literature. An overview of some of the

key events in the NPfIT is provided in Appendix D. Figure 3.1 (page 87) highlights some of the main phases in the NPfIT NCRS implementation.

3.2.1 The birth of the NPfIT

The increased emphasis on modernisation of the public sector after the Labour government came into power in 1997 (Cabinet Office, 1999) was an antecedent to the 1998 information strategy and the NHS Plan (DH, 2000). These in turn served as the foundation for the NPFIT (The NHS Confederation, 2003a), as it was realised that it was necessary to have an increased investment in health IT (Wanless, 2002) if these aims were to be achieved. The political drive towards modernisation of the public sector was the key trigger for the initiation of the NPfIT which was conceived in a joint meeting between policy makers and industry experts behind the doors of 10 Downing Street on 18th February 2002 (Cross, 2004; Ritter, 2008). This meeting was preceded by a meeting between the then Prime Minister, Tony Blair, and software tycoon Bill Gates, where the latter convinced the Prime Minister of the transformative potential of information technology (Brooks, 2007). The persuasion exercised by such industry players, the increased use of health IT in other countries such as the US, and the under-investment in technology in the NHS (Wanless 2002; Brooks 2007; House of Commons Health Committee, 2007), all acted together to accelerate the launch of the National Programme for IT.

In his letter to the Chancellor of the Exchequer which preceded the report on the future of the NHS, Wanless (2002) advocated 'at least a 10 year programme of change' to see through the modernisation of the NHS. The initial agreed timescale for the NPfIT on the other hand, was two years and nine months after negotiations between attendees of the

previously mentioned meeting (Brooks, 2007). This was a gross underestimation of the project's complexity and scale and indicates that the national programme though launched under the banner of modernisation, appeared to be the brainchild of specific individuals within the upper echelons of policymaking.

3.2.2   Drawing up the specifications

The early phase of the NPfIT saw some level of initial support by clinicians and representative bodies as the 'idea' of the national programme was acknowledged as being a good one, though many respondents indicated that this was accompanied by some apprehension about its implementation. Factors such as doctors' contractual limit on their hours of work mandated the need for suitable mechanisms for information sharing between work shifts, and these were not in place at the time (BMA, 2003). The programme would have offered the possibility of providing the means to meet this need.

The drive for integrated healthcare led to increased talk of a single national health record, and this was the main selling point for the EHR proposed in the 'Delivering 21st Century Support for the NHS: National Strategic Programme' report by the DH (2002a). The idea of 'connectivity' in the initial strategic plan for the NPfIT (DH, 2002a) revolved around the idea of connectivity to a broadband network, rather than actual connectivity and interoperability between systems. The focus at this time was very much on a single integrated system (DH, 2002a; 2002b). It later emerged that the original version of this report (DH, 2002b) indicating a high risk associated with the project was supressed, and the published version had this section and references to it removed (Brooks, 2007). Such lack of transparency is one of the pitfalls in large scale public sector projects (Bruzelius, Flyvberg and Rothengatter, 2002). The NPfIT seemed to have started off on this note,

suggesting the absence of appropriate communication, engagement and buy in for the project from community stakeholders.

The NPfIT held greater promise for secondary care than primary care, given their less established use of computerised systems (Benson 2002a, 2002b). While secondary care respondents criticised GPs' lack of communication regarding their patients' information, the unbalanced nature of communication between primary and secondary care in a pilot project indicated that hospital doctors benefited from increased access to information from primary care, whereas GPs still faced long waits before receiving information from hospitals (NPfIT, 2004c). This was partly attributed to secondary care clinicians' lack of experience using computers (NPfIT, 2004c). The variation in actual benefit afforded to different groups of clinicians, depending on their existing work practices, confirms that perceptions and uses of objects vary for different users at any given point of time (Nicolini, Mengis and Swan, 2012). The NPfIT had very different implications for the many stakeholders and user groups involved or impacted by it. Reconciling the diverse needs of these many groups was a challenge, and significant difficulties were encountered during the project in trying to resolve this.

In March 2003, the Clinical Care Advisory Group and a patient advisory group, two of the initial channels for clinical and patient inputs into the NPfIT (House of Commons Committee of Public Accounts, 2007) prepared a proposal on behalf of the Ministerial Taskforce on Information Technology (2003), where the concept of a 'spine' health record was introduced. This spine was intended to bring together summarised health information from multiple sources for each patient, and would be accessible to the patient who would be the carrier of this information. Healthcare delivery was to use the

combination of information from this spine as well as organisational systems which contained more details (Ministerial Taskforce on Information Technology, 2003). These specifications presented the idea of an individual spine for *each* patient. While this proposal did include the creation of a national system, the conceptualisation of the spine was 'person-based', and revolved around the individual rather than a national level record.

The concept of the person-based spine mutated into the national Spine, which was to act both as a conduit holding all information relevant to a patient at a national level, as well as a messaging system (Connecting For Health, 2005b). The single integrated health record, called the NHS Care Record Service (NCRS) was also to include a Secondary Uses Service (SUS) which utilised anonymised patient data for research and reporting purposes (Connecting for Health, 2005b; The NHS Confederation, 2004). While EHRs have the potential to act as a tool and data source for researchers, there is often much concern regarding the possibility of unauthorised use of patient information for secondary use (Foster and Young, 2012; Safran *et al*., 2007). This use of patient data was a source of apprehension later in the project when issues related to confidentiality and privacy of records were raised.

Alongside the move towards integrated systems, the programme also sought to create a semblance of oneness through the Common User Interface component (NPFIT, 2004c; The NHS Confederation, 2003b) by providing all clinicians with a consistent standard interface to improve patient care and safety and facilitate easier use of different systems by clinicians who shifted locations. This standardised user interface would be particularly

beneficial to individuals who had difficulty adapting to new systems and had to work in multiple locations.

The Summary Care Records (SCRs) and Detailed Care Records (DCRs) were introduced as a part of the NCRS in 2007 (Braunold, 2007). This transition from the idea of a *single* national record to two separate records was questioned by the House of Commons Health Committee (2007), as it reflected a shift in what was originally specified and raised questions as to why two records were being proposed. The perpetual justification for the summary care records, that if a patient lived in one place and fell ill when visiting another location, doctors need to have quick and easy access to the patient's information (NHS Confederation, 2004), is a situation which is relatively uncommon (Craig and Brooks, 2006).

The initial specifications as per the Ministerial Taskforce on Information Technology (2003) report were designed to hold summary health information in the individual person-based spines. The Summary Care Records, introduced in 2007 (Braunold, 2007) were intended to hold this very same information. Evidently, the understanding of what the spine was, changed significantly over the course of the NPfIT. The spine had transformed from the concept of multiple patient-based spines holding summary information of a single patient, to a national Spine which provided access to multiple EHRs, connected local systems and supported a secondary uses service, electronic prescription service as well as a messaging service (Connecting for Health, 2005b; Coiera, 2007). The summary information which was previously understood to be part of the patient-centred spine was now contained within the banner of the 'Summary Care Record'.

The inundation of terminologies and labels in the project led to confusion and ambiguity. The House of Commons Health Committee (2007) report suggests a difference between the Detailed Care Records and the Patient Administrative Systems (PAS) which were being introduced, recognising the latter as supporting systems to the Detailed Care Records.

There was a lack of clear specifications (Coiera, 2007) and this resulted in further divergence between what different users expected, exacerbating the incongruences of the technology frames within which the various stakeholders work (Orlikowski and Gash, 1994).

As a consequence of these vague specifications, the contents of the Summary Care Records and the access and consent mechanism to be adopted for them were areas of contention. The option of 'role-based access' and 'sealed envelopes' (Connecting for Health, 2005b) were raised in response to this, although some questioned the feasibility and security of these mechanisms (Randell, 2007). Further, the implications of patient access to their records have been debated (Ross and Lin, 2003; Ross, 1986; Fisher and Britten 1993), and the possibility of patients restricting access to parts of their records by means of sealed envelopes would have defeated the purpose of the record as a tool around which clinicians plan and coordinate healthcare delivery (Berg, 2002).

Much of the debate regarding the 'opt-in' versus 'opt-out' options for patients was raised because of patients' concerns as to how their data would be used, and the initially planned 'sealed envelopes' were intended to give patients the option to prevent parts of their record being accessed for the purpose of secondary use (Anderson, 2008). The upload of patient data from the Summary Care Records onto the NHS Spine for research purposes using the Secondary Uses Service was a source of concern, as patients could not

opt out of the Secondary Uses Service unless they opted out of the Summary Care Record (Foster and Young, 2012). This approach was described in the media as the Department of Health 'manufacturing consent' (Dunt, 2010). Clearly, the use of EHRs for research purposes is closely linked to discussions on privacy and confidentiality – issues which were given more prominence in the NPfIT toward the latter stages of the programme. While the British Medical Association advocated an *opt-in* approach wherein patients had to deliberately choose to have their details uploaded onto the summary care record, this was contested by the government (Anderson, 2008).

There was much ambiguity and lack of consensus regarding the contents and usage of the Summary Care Records as late as 2007 (House of Commons Health Committee, 2007). The proposal of a hybrid consent system with an opt-out option for the creation of the Summary Care Record, but an opt-in option for inclusion of further information in it (Greenhalgh *et al.*, 2008; House of Commons Health Committee, 2007) indicates some accommodation for patients' preferences. The programme appeared to make efforts toward increased patient empowerment by means of this hybrid consent system, the possibility of sealed envelopes allowing patients to restrict access to their records, and the plans for enabling access to Summary Care Records from homes by means of HealthSpace (House of Commons Health Committee, 2007). The latter two aims did not see fruition due to the complexity of developing sealed envelopes and the low uptake of HealthSpace (Greenhalgh *et al.,* 2010a) to the extent that it was closed down in December 2012 (HealthSpace, 2012).

3.2.3   Procurement of the contracts

While the NPfIT's Local Service Providers (LSPs) were large IT companies with a successful track record in several IT projects, they were blissfully unaware of the complexity and possible unfeasibility of the NPfIT. As with many large projects, there was clearly an expansion of the initially anticipated scope of the project; in this case, this was partly due to insufficient research on the part of the programme regarding what clinicians needed and expected out of the NPfIT.

In September 2003, in an interview with the Director General of the NPfIT and the then Chairman of the Academy of Medical Royal Colleges, the latter emphasised that 'the aim of the NPfIT is to involve all parties to build on existing systems, preserve what is good and avoid the disruption of a "big bang" approach' (The NHS Confederation, 2003b: 2). The programme at this time stated that it did encourage continued investment in local IT (The NHS Confederation, 2003b). GPs however had a general fear that their established and successful computer systems would be ripped and replaced by a monolithic structure that was the NCRS, and this concern would have been exacerbated by the conflicts between the GMS and the LSP contracts.

The NPfIT began with the identification of five geographical clusters catered by the LSPs (see Table 3.1, page 79). With the withdrawal of Accenture in 2006, the two clusters (East and East Midlands cluster and North East cluster) were merged with Computer Science Corporation's North West and West Midlands cluster. In 2008 the contracts with Fujitsu were terminated and BT took over some of the work that was previously to be undertaken by Fujitsu (NAO, 2011).

Table 3.1 NPfIT clusters and Local Service Providers

Clusters	LSP	Sub-contractors for the PAS systems
London	British Telecom	IDX systems initially; Switched to Cerner (Millennium system) in 2006
South	Fujitsu (contract terminated in 2008, taken over by British Telecom)	IDX systems initially; Switched to Cerner (Millennium system) in 2005
East & East Midlands	Accenture (withdrew in September 2006 and was taken over by Computer Sciences Corporation)	iSoft
North East	Accenture (withdrew in September 2006 and was taken over by Computer Sciences Corporation)	iSoft
North West & West Midlands	Computer Sciences Corporation	iSoft (Lorenzo system)

The project was rooted in a setting where there was much negativity and friction between the different groups involved – the clinical users on the one hand, and the technology savvy suppliers and their managers on the other. Ironically, the very people who *did* have proven experience in using IT in their clinical practice, were deliberately ignored, given that GPs in England had a track record of successful use of computers in their practices even prior to the NPfIT (Benson 2002a, 2002b).

3.2.4 Restructuring, engagement and pre-emptive placation

Soon after the signing of the LSP contracts concerns were raised by clinical advisors to the programme, and as a consequence a number of key people either left or were terminated by the NPfIT management. The Clinical Care Advisory Group, the National Clinical Advisory Board (NCAB) and the Patient Advisory Board (PAB) were the engagement mechanisms which the NPfIT began with (eHealth Insider, 2003; NHS NPfIT, 2004). While early reports discussed the valuable and guiding role of groups such as the NCAB and the

NHS IA, some of the individuals from these groups who were identified as having a key role early on in the Programme (NPfIT, 2004a) either resigned of their own volition or were terminated by the programme management (eHealth Insider, 2004a; British Journal of Healthcare Computing, 2005b) for reasons including efforts towards clinical engagement by 'talking to all those doctors' (House of Commons Committee of Public Accounts, 2007: Ev34). This tendency to deliberately distance themselves from clinicians was not conducive to the process of clinical engagement. By describing clinicians as 'those doctors', the NPfIT leadership seemed to have established a gulf between management and clinicians, and did not welcome attempts to bridge this gap. The initial support extended by clinicians toward the programme, as was reported by the programme (NPfIT, 2004a) shifted as these same clinical leaders eventually realised that the consultation was 'a charade' (British Journal of Healthcare Computing, 2005a).

Criticisms of the contracting process, with clinicians not being privy to the final agreed specifications, led to the resignation of the Chair of the NCAB in April 2004 (House of Commons Committee of Public Accounts, 2007). September 2004 saw the departure of the joint Senior Responsible Owner of the programme after a mere six months of holding his position (eHealth Insider, 2004a). Late 2004 saw the establishment of CFH National Clinical Leads (NCLs) to act as representatives of clinical professionals. The closure of NCAB was followed by the entry of a new board, namely the Care Records Development Board (CRDB) (eHealth Insider, 2004b).

There were efforts by the programme to keep the public informed about its progress, through published reports and newsletters. However, as is the case with many other media channels, much of these were masked by what the programme wanted the public

to know and believe. The number of 'regular news updates' through the 'makingITwork' newsletter from the national programme (NPfIT 2004a, 2004b, 2004c; Connecting for Health 2005) dwindled rapidly, suggesting a declining commitment to communication to the public, and the general uncertainty of the programme.

The Director General's vision for the NCRS in 2004 (The NHS Confederation, 2004) included increased patient involvement, increased choice and reduced waiting times; however, not all of these targets could have been achieved from the NCRS alone, and it would appear that potential benefits from other components such as Choose and Book (e.g. increased choice) were made to appear as though they would be boons of the NCRS as well. It seems that there was a struggling effort to justify the needs and the benefits of the NCRS, and often the essence of what was described as hugely beneficial, was that it served as an electronic repository of patient information. This does not appear to be a huge step forward, but with the programme management and the government blowing the trumpet for the NPfIT, there was a clear attempt to sell it as a project with huge potential for the transformation of healthcare.

In 2005 the Care Records Development Board (CRDB) published the Care Record guarantee which was to be subject to six-monthly reviews. The website of the National Information Governance Board for Health and Social Care (2013) indicates that this frequent revision of the guarantee ensured compliance with best practice. While this may be true, Connecting for Health (2005a: 4) explained these periodic reviews of the guarantee to 'update it as the NHS CRS develops'. While the underlying essence of their justification of the reviews of the care record guarantee may be similar, it also has the subtle implication that the NCRS was not geared toward meeting the requirements of the

guarantee, but that rather, the guarantee was likely to change dependent on the progress and capabilities of the Care Record Service.

In April 2005, the NPfIT was renamed Connecting for Health (CFH) and established as an executive agency of the Department of Health (NPfIT, 2004b). The NHS Information Authority (NHS IA) which had been responsible for the approval of NPfIT related functions prior to this was dissolved.

3.2.5 Criticisms and inquiries into the NPfIT

While undergoing significant restructuring and trying to gain clinical support through new engagement mechanisms, the NPfIT began to be subject to increased public scrutiny. By 2004, the BMA raised concerns over the lack of clinical engagement in the programme, and it was clear that the early optimism was gradually transforming into feelings of doubt and neglect (Oates, 2004). The BMA raised concerns over the NCRS and patient privacy in 2005, and following the 2007 Electronic Patient Record inquiry by the Health Select Committee, the BMA reiterated its concern regarding the security, confidentiality and safety of Summary Care Records (BMA, 2007; BJHC, 2005). In April 2006, a group of 23 academics (Anderson *et al*., 2010) put forward a 'dossier of concerns' which continued to be updated until 2010 when the centralised approach of the programme was abandoned. This dossier consolidated several concerns related to the NPfIT collected from multiple sources including published reports and media articles. The NAO (2006) report which was published two months later, although mildly critical of the programme, did not give as negative a review of the programme as anticipated. This NAO (2006) report was delayed to such an extent that it was suspected that there had been much haggling over its contents, before the Department of Health finally consented to its publication (Dunleavy

et al., 2009), and a more realistic review was presented by a later report by the Committee of Public Accounts in 2007.

The government's dogmatic insistence on an unreasonably ambitious timescale was viewed as a precursor to high expectations by the public, leaving many disillusioned (BMA, 2006; BMA, 2008). The vagueness of the NCRS' aims were highlighted by the 2007 Electronic Patient Record inquiry which also indicated that some people felt that original aims may have been abandoned because of the many challenges encountered (House of Commons Health Committee, 2007). Much hype had been made of the Picture Archival and Communications System (PACS) which was not part of the initial core deliverables but was part of a wider phenomenon of scope creep (Kreps and Richardson, 2007) in the project, with other added features including the Quality Management and Analysis System (QMAS) and GP-to-GP systems (House of Commons Health Committee, 2007; Car *et al.*, 2008). While included later as one of the programme's deliverables (Car *et al.,* 2008), PACS was already in use in certain sites.

While imaging systems were mentioned in early plans of the programme (NPfIT 2004a, 2004b), they did not form part of the four core deliverables (The NHS Confederation, 2003d). The programme intended to provide a broader context for the PACS deployment, as opposed to the previous local 'mini PACS' implementations (NPfIT, 2004a).

In a House of Commons Hansard Debate (2009) the then Secretary of State for Health quoted a BMA (2009) statement released that day, to support his view that the programme had clinical support and appreciation for the improved patient safety and reduction in errors that had been enabled by IT. The BMA (2009) statement however read: 'We welcome the commitment that the systems which clinicians find most useful

will not be scrapped. Good IT is central to efficient, effective safe patient care', and this seems to refer to the existing GP systems which had been under the threat of the rip-and-replace approach. This showcased an example of distorted use of media communication, with politicians suggesting that the success of GP systems was a by-product of the programme, and that clinicians were wholly supportive of their approach.

While in 2009 the RCGP indicated its support for the Summary Care Records (Gerada and Field, 2009), the BMA was not convinced and called for a suspension of their rollout until further independent reviews of pilots had been conducted (BMA, 2010). One such review had been conducted earlier by University College London (Greenhalgh *et al.*, 2008), following which the BMA accepted the roll-out of Summary Care Records on a limited capacity subject to further evaluations and acceptance of the recommendations of this initial review. Despite this conditional acceptance of SCRs, there was an accelerated roll-out of SCRs without meeting the terms put forward by the BMA, resulting in amplified calls to bring it to a halt (BMA, 2010).

3.2.6 Disruptions to NPfIT leadership

In 2007, the programme saw the resignation of its Director General, Richard Granger, who had been with the programme since 2002. He was succeeded by Gordon Hextall in January 2008. However, Hextall left the Programme in April 2008, and the programme was taken up jointly by two other individuals in September 2008, one of whom resigned in 2009 (House of Commons Health Committee, 2007; Sauer and Willcocks, 2007; Robertson *et al.*, 2010).

These changes were during and immediately following the multiple inquiries and reviews the NPfIT had been subjected to. The programme management began the process of

trying to undo the mistakes previously committed, by engaging in negotiations with suppliers (Cresswell *et al*., 2010) and collaborating with clinical professional bodies to establish standards for interoperable systems and record keeping (AOMRC, 2008a; RCP, 2009).

While the departure of some of the leadership personnel may have been welcomed by many, the subsequent lack of stability in leadership was unhelpful, given the precarious direction in which the programme was heading.

3.2.7 Attempts to salvage the NCRS

Following much of the criticisms faced in the inquiry by the House of Commons Health Committee (2007), there was an effort to address some of the project lacunae. The Royal Colleges had communicated their dissatisfaction with not being invited to give their inputs on what the NHS Care Record Service was to contain (House of Commons Health Committee, 2007). This may have been one of the reasons for the initiation of a CFH-funded project led by the RCP Health Informatics Unit and approved by the Academy of Medical Royal Colleges (RCP, 2009; AOMRC, 2008a), in recognition of the need for clear-cut standards for medical records. This project was formulated for the purpose of informing and guiding hospital doctors (AOMRC, 2008a, 2008b) – an indicator of primary care physicians' awareness of record standards.

There was also the RCGP's Shared Records Professional Guidance project which was commissioned by Connecting for Health, and which looked at the issues related to shared detailed care records (RCGP, 2009). The absence of record standards has been attributed to the absence of a well-defined structure and the practice of learning to enter data by observing other clinicians' practices rather than consciously abiding by specified

standards (AOMRC, 2008a, 2008b). The RCP's (2010) proposition of 'patient-focused records' emphasised the need for preventive care, as quality care should focus on the patient rather than the disease. It advocated the necessity of a dialogue within the record, driving home the point that patients too should be allowed to edit and access the record, thus empowering them as partners in their own healthcare.

Although increased focus was directed toward establishing record standards, there were those who considered these efforts redundant. An RCP led project advocated the use of 'clinical headings' to standardise health records and mandate the entry of specific clinical data (RCP, 2012).

3.2.8   The closure of the NPfIT

The NPfIT was subjected to significant amounts of publicity, hype, negative coverage and public scrutiny during its period of operation (Coiera, 2007). Given the dominant feeling that it was not fit for purpose or tailored to what people actually wanted, whether it would ever see completion was a question on many people's minds. With the first half of the project marked by centralised top-down leadership, 'ruthless standardisation' (DH, 2002a) and much dissatisfaction amongst clinicians (Coiera, 2007), the latter half of the project following the various reviews and evaluations saw an attempt to rectify some of its failings.

An inkling to its demise may be seen in the Department of Health's announcement in 2010 that the future of the NPfIT would be modular and locally led (Bruce, 2010; DH, 2010). A subsequent review by the Major Projects Authority (2011) concluded that the programme was 'not fit to deliver the modern IT services that the NHS needs', leading to the accelerated dismantling of the NPfIT in September 2011 (DH, 2011).
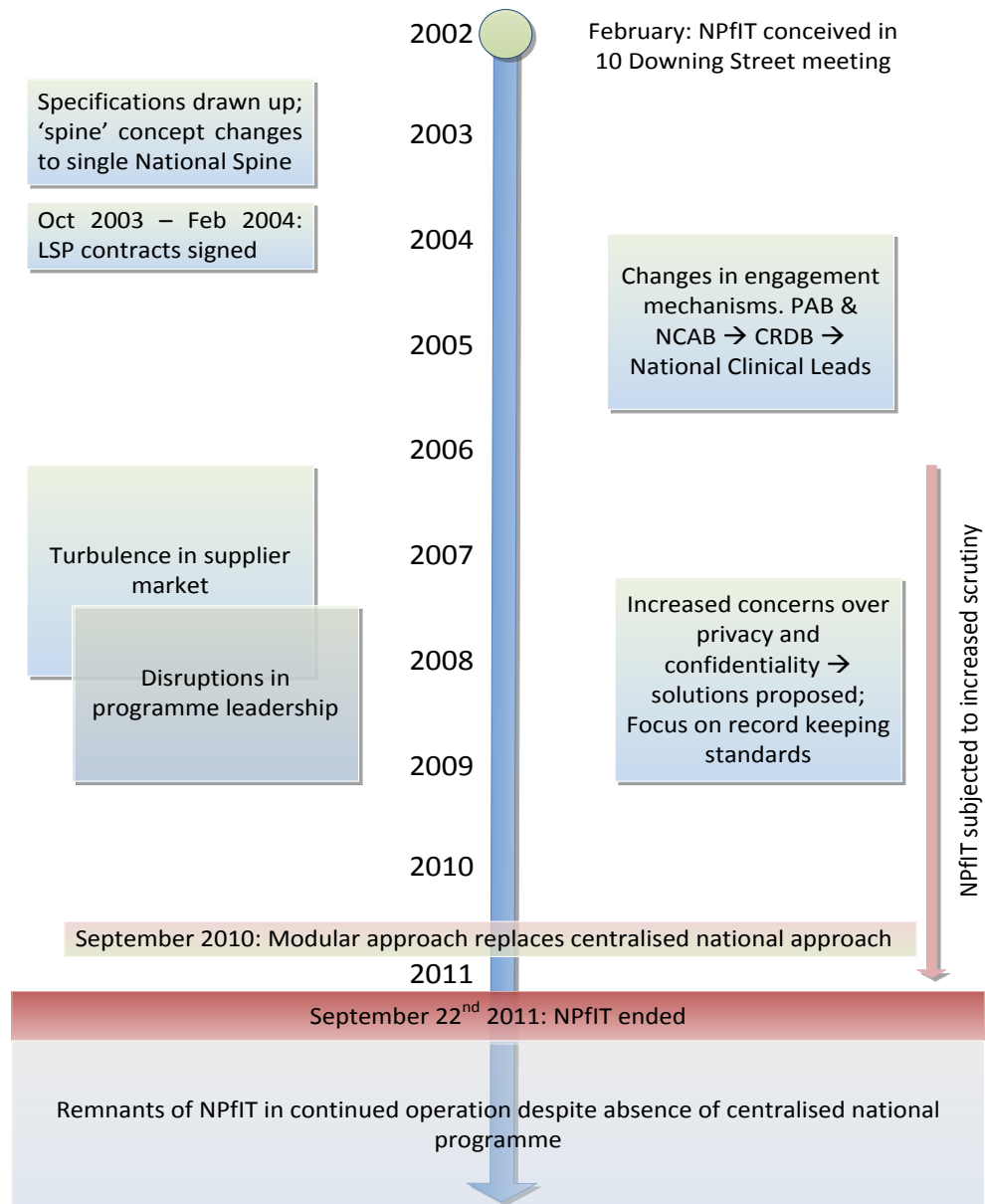
Figure 3.1 Key Phases in the NPfIT

3.3   Summary

This chapter provides an overview of some of the key phases (see Figure 3.1) in England's

NPfIT, a large scale government project that envisioned national level electronic health

records accessible to clinicians and patients through a national Spine (Brennan, 2007;

Connecting For Health, 2005b).

Launched in 2002 with strong political support, the programme began with an ambitious plan and timescale. The contracts were signed relatively quickly between October 2003 and February 2004, resulting in significant dissatisfaction amongst clinicians as they were not consulted nor informed of the details of these contracts.

Early 2004 was the beginning of a period of restructuring and changes in engagement mechanisms. The National Clinical Advisory Board and the Patient Advisory Board that were channels for clinical and patient involvement in the programme, were dissolved and replaced by the Care Records Development Board (eHealth Insider, 2004b) that was led mainly by businesspeople according to my empirical data. National Clinical Leads were appointed to represent clinical groups and to facilitate communication between the NPfIT and clinicians. This was followed by a period of turbulence in the supplier market as some contractors withdrew, leading to changes in the areas covered by the remaining providers as they catered to more clusters. In 2005, there were further changes as the NPfIT was renamed Connecting For Health, subtly highlighting the need for connectivity and interoperability as opposed to the initial monolithic 'one system fits all' (Major Projects Authority, 2011: 12) approach adopted by the NPfIT.

Concerns regarding the feasibility and progress of the NPfIT triggered a number of reviews and evaluations of the programme. The NAO's (2006) review of the programme however was only mildly critical, and evidence points to the high possibility that the contents of the report were subject to haggling between the Department of Health and the NAO. This resulted in a further investigation by the Public Accounts Committee (2007) the following year, and this brought to light several concerns including the delays, the capabilities of the suppliers and the lack of clinical engagement. Alongside this increased

scrutiny of the NPfIT, issues related to patient confidentiality and privacy with regard to the Summary Care Records began to be raised. Mechanisms such as sealed envelopes and patient access to their records were increasingly discussed. In June 2007 the House of Commons Health Select Committee also undertook an investigation into the programme, following heightened concerns on its progress. The same month, the NPfIT's Director General, Richard Granger resigned, and the programme underwent multiple changes in leadership over the next two years.

The latter part of the programme was marked by an increased focus on improved record keeping standards and ways to improve interoperability, rather than integration of systems into a single monolithic national system. This shift to a modular approach (DH, 2010) was a positive step after the 'ruthless standardisation' (DH, 2002a) that marked the early stages of the NPfIT. However the programme continued to face criticisms. The Major Projects Authority (2011) pointed out the lack of a business case for the NPfIT as a whole, despite its individual components having their own distinct business cases. This led to the dismantling of the NPfIT in September 2011 (DH, 2011), with some of its individual components in continued operation though not under the banner of a national programme.

The NPfIT was marked by these key phases that I have briefly elaborated (see Figure 3.1, page 87). The scale of the programme meant that there were numerous stakeholders involved, and that there was a need to take into account the different technology frames (Orlikowski and Gash, 1994) and perspectives employed by them. The innovative nature of the programme makes it comparable to an organising vision (Swanson and Ramiller,

1997) that is characterised by buzzwords that emerge and subside, subject to discourse by stakeholders involved in the vision. This is further discussed in Chapter 5.

Having provided a brief overview of the NPfIT, I will now discuss the research methods in the next chapter.

CHAPTER 4 RESEARCH METHODS

4.1 Introduction

The choice of methodology is crucial to research as the methodology and the nature of the study are mutually shaped by each other. While the methods depend on the issue being researched, the outcomes are influenced by the means in which the study was carried out. This chapter discusses the research paradigm, research design and methods employed in this study.

The term research methodology encompasses both philosophical view points as well as research methods (Finlay and Ballinger, 2006). Some of the traditional well known dichotomous debates on research approaches include quantitative versus qualitative research and realism versus relativism (Fitzgerald and Howcroft, 1998). The need to isolate one's preconceptions and possible biases is another debate amongst scholars. While phenomenologists such as Husserl advocate the separating of one's personal pre-understandings, also known as 'bracketing', later scholars such as Heidegger and Gadamer firmly support the view that consciousness is not distinguishable from the world and that an element of pre-understanding is essential in order to engage in the hermeneutical circle (Laverty, 2003). The very decision as to whether to isolate a single ideology or to develop an approach which includes concepts from multiple research traditions has spurred further discussion as well (Fitzgerald and Howcroft, 1998).

From the onset of my research, I have been aware of the numerous stances which may be taken with regard to any research project, and emphasise that adherence to one ideology does not necessarily exclude the suitability or validity of another approach. I now elaborate on the underlying philosophy and paradigm adopted in this study.

4.2   Research paradigm

Research paradigms are defined by the positioning of three factors in a research study: the ontology (the nature of reality), epistemology (the relationship between the researcher and knowledge) and methodology (the means by which knowledge is attained) (Denzin and Lincoln, 2000).

To address my research objective of tracing the competing discourses surrounding EHRs in the NPfIT, I draw upon the viewpoints of multiple stakeholder groups, and build upon these multiple and varied experiences. This leads me to the ontological question of whether these multiple social constructions are realities in themselves, or if there is a single objective reality which exists apart from the many constructed perspectives which people have. The limitations of data collection and the selective nature of research – whether qualitative or quantitative (Mays and Pope, 1995), indicate that knowledge and findings attained through research are not necessarily representative of the complete truth or reality. My approach acknowledges differences in people's perceptions of realities, but deviates from social constructionism by advocating the presence of an objective reality which exists independent of these individual perceptions. My focus is hence on understanding the subjective perspectives formed by key stakeholders while keeping in mind the existence of a separate reality which is beyond our grasp due to the existence of individual bias and variation in perspectives (Lincoln and Guba, 2000).

With regard to my relationship to my data and knowledge, I concur with the suggestion that most research projects begin with the researcher's interest and some pre-awareness, indicating the inevitable presence of personal bias, no matter how minimal (Steward, 2006). Some scholars emphasise the need to bracket and put aside one's biases and

assumptions in the process of research (Laverty, 2003). Schwandt (2000) recommends that rather than isolating one's personal opinions and biases, one should *engage* them while doing research, and continually refine them in the process of understanding the object under study. To strike a balance, I employed preliminary sensitising interviews (see section 4.4) to help ensure that pre-determined ideas were not skewed towards my personal opinions but took into account the concerns of relevant stakeholder groups as well. I suggest that by attempting to fuse my (informed) preconceived knowledge with the perspectives and experiences of another individual, a more all rounded and holistic understanding of the situation under study was attained.

This research has close links to the IS field which is known to support pluralist methodologies given its multi-disciplinary and heterogeneous nature (Avison and Myers, 1995; Landry and Banville, 1992; Mingers, 2004; Orlikowski and Baroudi, 1991). The field of IS was initially dominated by positivist research (Orlikowski and Baroudi, 1991). However, the multidisciplinary nature of IS (Mingers, 2004) and its close relation to social contexts (Orlikowski and Baroudi, 1991) resulted in a recognition of the lacunae of positivist methods. Some of the reasons for social scientists to deviate from quantitative research towards more qualitative and inductive studies include pluralisation of interpretations and the fast changing nature of the social world (Flick, 2002). This rapidly changing nature of the social environment is highly relevant in the IS field which is continuously developing, and even more so in healthcare IT which is a relatively new area. With this in mind, I chose to adopt a qualitative approach to investigate how individuals view EHRs and relate to their experiences using them.

Qualitative research itself inherently focuses on multiple methods (Flick, 2002) and the changing and blurred boundaries between paradigms (Lincoln and Guba, 2000) often lead to an overlap between different approaches. The highly versatile nature of the human mind and social interaction makes it difficult to theorise and *then* confirm one's hypotheses. As a result, social scientists gravitate towards inductive strategies wherein sensitised concepts are created to explain social phenomena. This is not to say that there is no theoretical knowledge prior to observation or data gathering. On the contrary, an initial understanding of current literature and theory is required, to guide the researcher in the collection and analysis of data (Yin, 2009). As mentioned by Creswell (1994), although more associated with an inductive approach, qualitative research may use existing literature to employ a known theory and contextualise it to suit the phenomenon or context which is being studied. Further, qualitative research is often discounted by scholars who regard it as lacking in objectivity and hard facts, imbibed with researcher bias (Mays and Pope, 1995). However its absence of enumeration has been frequently mistakenly synonymised with an inability to measure or assess, and its capacity to explain social phenomena has been downplayed (Pope and Mays, 2006).

While some element of researcher bias or preconceived ideas is unavoidable in a research study, I wished to minimise uninformed preconceptions in the main data collection phases. For this purpose I engaged in an initial phase of sensitising interviews where I talked to individuals (clinicians as well as non-clinicians) who had used EHRs. This initial data collection phase was informed by my knowledge on EHRs and the wider field of electronic healthcare by means of reviewed literature. This equipped me with an informed understanding of the way individuals used EHRs in practice. The findings from

these interviews and from my initial review of documents were instrumental in helping me identify areas which could be probed further. I employed elements of organising visions in IS (Swanson and Ramiller, 1997), public sector IT management, and EHR usage, combined with informed understanding from my sensitising interviews and documentary data, to guide the final stage of my data collection.

Retrospective studies of change efforts have the likelihood of being biased due to the researcher's awareness of the final outcome of the project (Van de ven, 1992). While this may be true, I am also aware that given the sensitive nature of the NPfIT and the multiple interests which were at stake, the timing of my data collection and consequent findings, i.e., immediately after the dismantling of the project, could have been a factor in encouraging certain key informants to participate in my study.

Interpretation is an inherent part of any research study as one needs to analyse and make sense of one's findings (Silverman, 2005). In order to understand interactions between key stakeholders and systems, and the changing foci of EHR initiatives, stakeholder perspectives need to be interpreted in a manner that can provide an explanation regarding the envisioned as well as the actual adoption of EHRs. When interviewing and listening to people talk about their views and experiences, I sought to probe beneath the face value of statements, knowing that interpreting individuals' accounts required me to question points which might often be taken for granted (Pope and May, 2006). I delineated the research process into distinct stages, employing sensitising concepts from the first phase to inform the documentary analysis, and these findings in turn to identify and interview key informants in the final stage. This facilitates a 'fusion of horizons' (Koch,

1995), so that there is a convergence of perspectives and understanding by this approach of triangulation (Mathison, 1988).

In order to ensure validity and reliability of my data, I employed techniques including data triangulation and respondent validation (Burnard *et al.*, 2008) by sending respondents interview excerpts that I wished to use (see section 4.7.2). I requested these respondents to inform me if there were any errors in the excerpts, or if they wished to be attributed differently given the multiple affiliations of several respondents (see Appendix A). I formulated a sampling strategy (see section 4.5) to include multiple stakeholder groups relevant to the NPfIT to ensure internal validity (Malterud, 2001). The combination of academic theories and the analysis of multiple interpretations and experiences of the care record component of the NPfIT, facilitates a broader application of this research to other public sector projects in IT, particularly in the health care area.

As my research objective is concerned with the study of discourses in the area of EHRs, I will now discuss what is meant by a discourse in the context of this study.

4.3   The study of discourses

In seeking to understand the existing and changing discourses surrounding electronic health records, it is essential to understand and define what is meant by a discourse. Discourses go beyond mere collections of words and language, but represent collective bodies of ideas, texts or behaviours which identify with a specific social issue (Allan, 2007). While these collections may be categorised and distinguished by means of themes, the focal point is not the over-arching themes themselves, but what is contained *within* their expanse, i.e., the 'blank spaces' within the grid, where the grid represents the categorisation of knowledge or discourse (Allan, 2007; Foucault, 1966).

Discourse analysis as a research methodology has numerous strands, and the boundaries between analytical methods such as content analysis, thematic analysis and discourses analysis are often blurred (Braun and Clarke, 2006; Krippendorf, 2004; Phillips and Hardy, 2002). For this reason I shall explain how this study seeks to study the shifting discourses surrounding EHRs in England's NPfIT.

Several content analysis and discourse analysis studies venture into the quantitative domain, using frequency counts and statistical inferences. However, this research seeks to trace the discourses between identified stakeholders in the English health system with regard to the use of electronic records over the past decade. To use the terminology 'discourse analysis' might give rise to expectations such as analysing linguistic details and frequency counts, which does not adhere to the requirements of this research. For the purpose of this study, I regard discourses as domains of statements or practices, reflective of perspectives on various issues, and which may be influenced by individuals' roles and identities. Though this study does seek to understand the current scenario in the NHS with regard to the use of IT with the help of past reports and other documents, it does not seek to probe into the linguistic details of language use, but is concerned with the wider themes and issues of discussion.

Discourses may be manifested publically or privately in the form of documents, conferences and inter-personal interactions (Davidson and Reardon, 2005; Swanson and Ramiller, 1997). To gather data from these multiple strands of possible discourse, I employed multiple methods of data gathering, including interviewing and documentary analysis using a qualitative content analysis approach. Workshops and conferences of a

relevant nature were also attended, to identify and understand the latest contemporary discourse surrounding the research topic.

I now outline the research design, before proceeding to discuss the data collection and analysis phases.

4.4   Research Design

Triangulation builds up the credibility and validity of the study, and this research employs both data triangulation as well as methodological triangulation to collect data from multiple sources using multiple methods (Denzin, 1989; Mathison, 1988). I gathered data through initial sensitising interviews, documentary data, and further interviews with key informants on the basis of findings from the first two stages (see Figure 4.1 below). This incorporation of two key qualitative methods, namely interviewing and document analysis, draws on the strength of concurrent tools to aid triangulation in qualitative research (Hall and Rist, 1999).

1. Sensitising interviews	2. Document analysis	3. Interviews with key informants
• 14 interviews • Informed by literature review	• Reports and publications identified, categorised and analysed	• Guided by findings from previous stages
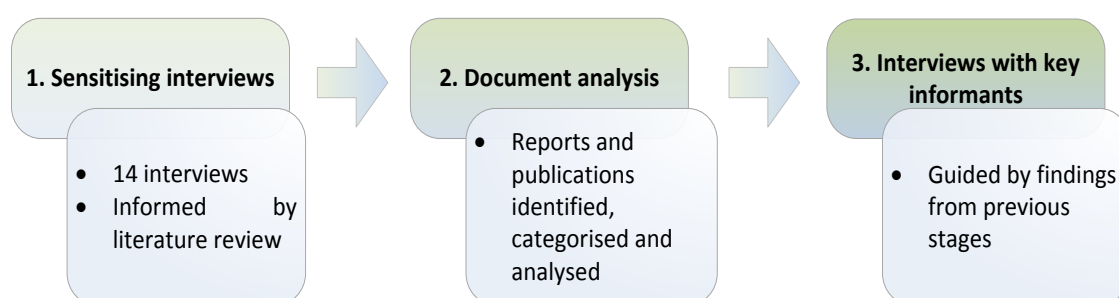
Figure 4.1 Research design

4.4.1   Sensitising interviews

To strike a balance between awareness and sensitivity of the themes to be studied (Kvale, 2007), and the need to be led by the data and the respondents (Silverman, 2006; Kvale, 2007), I conducted 14 semi-structured sensitising interviews to identify the key areas to

be considered. Respondents in clinical roles were identified, and a combination of opportunity sampling and snowball sampling (Noy, 2007; Patton, 2002; Ritchie and Lewis, 2003) was employed to identify and select participants. This allowed the sample to emerge during this phase, and allowed for recruitment of further interviews as it facilitated identification of relevant future interviewees by the respondents themselves, making the sampling process respondent-driven (Dilley, 2000; Noy, 2007; Patton, 2002). Being informed and sensitised to key concepts in the research field is a tool guiding the research process (Flick, 2002; Patton, 2002). The purpose of these interviews was primarily to inform and sensitise me to the issues and challenges encountered by professionals in the area of e-health and EHRs.

4.4.2 Documentary data

Documentary data including reports and publications by the UK government, Department of Health, and professional bodies are valuable unobtrusive instruments providing records of progress and viewpoints at multiple points of time. They can also potentially be used to steer future data gathering from interviews with key informants (Patton, 2002).

I gathered documents published since the year 2000 by various stakeholder groups. These groups include the UK government, Department of Health, NHS and professional bodies such as the Royal College of Physicians (RCP), Royal College of General Practitioners (RCGP), Royal College of Nurses (RCN) and the British Computer Society (BCS). The documents identified are mainly related to England's National Programme for IT (NPfIT), as the implementation of EHRs over the past decade has been envisioned in the context of this national project. Other reports related to the general priorities and concerns

regarding healthcare in the country have also been included, as they form an important part of the context in which the NPfIT was operating.

I then organised the reports chronologically by the publishing body (see Appendix B). These were then sifted and key reports were identified which formed the core thread related directly to the area of EHRs in the NPfIT.

4.4.3   Interviews with key informants

Once a preliminary analysis of the documentary data was completed, I conducted a final phase of interviews with a further 37 key informants, resulting in a total of 51 interviews. These were selected based on the findings from both the initial interviews and the documentary analysis (see section 4.5 for details on the sampling strategy). Prior to interviewing any individuals, I made it a point to read any reports or academic papers published by them, to familiarise myself with their likely position and viewpoint. Appendix C provides the interview agenda I used for this phase of interviews. All interview excerpts in the findings chapters are from key informants from this final phase of interviews unless mentioned otherwise.

4.5   Sampling Strategy

The nature of the sampling approach highlights the manner in which the field is studied and attempted to be understood (Flick, 2002). This research, being exploratory, and investigating the process and underlying tensions at various stages in the NPfIT's EHR implementation, does not begin with a predefined sample, but lets the sample develop by building on the findings from previous phases of the research process. A non-probabilistic, focused and purposive sampling approach was employed at all stages of the research given the qualitative nature of this study (Ritchie and Lewis, 2003), meaning that

the sources used are not necessarily statistically representative but have been selected on the basis of specific characteristics (professional role) and associations with electronic healthcare and EHRs specifically. The sources were not further filtered by other attributes such as location, age, etc., as this was not relevant to my research question.

I adopted a combination of opportunistic sampling and snowball sampling (Noy, 2007; Patton, 2002; Ritchie and Lewis, 2003) during the first phase of my research study. The criterion for respondents in the initial sensitising phase was their familiarity with e-health technologies. Having identified the importance of sensitising myself to the field (Patton, 2002; Flick, 2002), I wished to hear first-hand accounts from professionals regarding their experience with e-health implementations, with a focus on EHRs. Further to identifying personal contacts who worked in the health sector and were familiar with the use of EHRs, I targeted two health technology conferences and used these as opportunities to generate samples by flow populations (Ritchie and Lewis, 2003). These events served as venues to meet relevant people and I requested their future participation as interview respondents for my study. All participants were asked if they could suggest others who would be willing to participate in the study, and this contributed to the sample frame. This allowed the sample to emerge during this stage, enabling recruitment of further interviews as it facilitated identification of relevant future interviewees by the respondents themselves, making the sampling process respondent-driven (Dilley, 2000; Noy, 2007; Patton, 2002). I conducted 14 interviews in this first phase, and respondents included general practitioners, hospital doctors, nurses, nurse practitioners and administrative personnel.

Following the preliminary interview phase, I entered the next stage of my research, which involved the gathering and analysis of documents relevant to EHR implementations in England in the context of the national NPfIT project. Triangulating multiple sources enables a sampling strategy that considers differences in time, place and person, strengthening the research (Flick, 2002; Patton, 2002). This is achieved in this study, by studying documents from different points of time, published by specific relevant professional groups. As the setting of my research is within England, the *place* variable did not play a part in the selection of documentary sources.

The NPfIT project has been the subject of numerous debates, reports and publications over the last 12 years, resulting in a plethora of documentary sources which address various aspects including funding, patient and clinician involvement, privacy and security challenges, and incentives. Consequently, the selection of relevant documentary sources required careful sifting. The document samples were initially selected by searching for publications by the Department of Health, NHS and Connecting for Health, related to electronic healthcare, the NPfIT, and EHRs, in a chronological manner ranging from 2000 to 2011. Findings from the sensitising phase of my research helped highlight some publications or sections within them which contained relevant areas of focus as well. I then identified groups which were representative of the professionals I interviewed in the first phase, and who had an active voice in on-going debates and consultations surrounding the NPfIT. A total of over 150 documents were identified and categorised (see Appendix B). The actual material sample was narrowed down further to those which dealt with EHRs and the NPfIT specifically. These document sources included publications by the Royal College of General Practitioners, the Royal College of Physicians, the Royal College of Nurses and the British Computer Society.

Respondents for the final stage of interviews were identified by searching for relevant persons from the organisations whose publications were analysed in the second phase. While the sample itself is not intended to be statistically representative, respondents from these selected organisations in many cases speak for specific professional populations and are drawn from a range of professional groups such as general practitioners, secondary care physicians and nurses.

Relevant respondents were identified by online searches on the institutions' websites. The presence of health informatics or e-health subgroups within some of the organisations helped identify individuals who were likely to have an interest in EHRs. In cases where names or contact details of people were unavailable from the website, I identified authors of selected publications from these organisations as possible respondents, and approached the media office of the respective organisation for further contact details of these individuals. The media contacts of all these organisations were also asked to forward requests for participation to any other individual whom they consider appropriate to approach for this purpose.

The targeted sample size for this stage was initially 15 to 20 respondents. I identified over 30 potential respondents within this sample frame, making allowance for the eventuality of a low response rate. I asked participants if they could provide further information-rich contacts relevant to the research study at the time of interviews, to facilitate a snowball sampling approach (Patton, 2002; Ritchie and Lewis, 2003). On the completion of 34 interviews in this phase, my findings pointed to the significance of clinicians who were involved in IT design and development. This prompted me to conduct interviews with three more individuals who occupied such roles. The resultant sample size for this phase,

by the end of my data collection, was 37 respondents. For an overview of the distribution of respondents by professional groups, see Appendix A.

4.6   Data Collection

I employed data triangulation using a combination of interviews and document review for my data collection. This section elaborates on the process followed for both these modes of data collection.

4.6.1   Interviews

Semi-structured interviews with open ended questions and themes for discussion (see Appendix C for the topic guide) were employed so that respondents could talk about their experiences without being led by the interviewer (Silverman, 2006; Yin, 2009). In this process, there is an element of 'qualified naïveté' (Kvale, 2007) as well as I needed to be open to new or emergent ideas rather than be influenced solely by pre-supposed assumptions. Kvale (2007) warns against a total lack of awareness of the topic being researched, as the interviewer needs to have a level of sensitivity and discernment to highlight the various nuances of the themes being studied. There is therefore a tension between these two contrasting needs – that of naïveté and that of sensitivity to the research subject (Kvale, 2007), and this needs to be kept in balance. During an interview, respondents themselves may discover new things they were not aware of earlier, and may change their perceptions of a theme, and embark on a process of reflection, making the interview a learning process for both participants of the interview (Kvale, 2007).

Majority of the 51 interviews were conducted as voice calls over the telephone or Skype, due to time and place constraints. 21 interviews were conducted face to face, and 1 interview was a video call via Skype. All interviews with key informants (second phase of

interviews) were recorded using a Livescribe smartpen. Informed consent was obtained and recorded from all interview respondents after providing them with details regarding the purpose of the research. Participants were assured of their confidentiality and privacy, with a clear and mutual understanding of who could access the information they provided (Kvale, 2007).

My first stage of data collection involving sensitising interviews was useful in helping me improve my interviewing technique. As I transcribed these before I embarked onto the main interviews, I was able to see some of my faults such as unconsciously leading questions and interrupting the respondent with a follow-up question. I realised that in instances when I wanted further details on the issue being discussed, it was usually sufficient and less intrusive to use elaboration probes (Patton, 1990) rather than cutting in to verbally raise a question. I kept these points in mind, and made a conscious effort to avoid these pitfalls in the later stages of my data collection.

All the interviews were transcribed completely by me. Though a time consuming process, I chose to do the transcribing manually on my own, using it as an opportunity to familiarise myself with my data, and to use the transcribing process as an interpretive tool in itself (Lapadat, 2000). I had over 48 hours of recorded interview data in total (see Appendix A), and spent approximately 190 hours transcribing them.

As I was predominantly interested in the informational content of the interviews rather than the linguistic details, I employed denaturalised transcription and chose to omit most of the pauses and response tokens (such as 'hmm', 'uhm', etc.) indicating a momentary pause for thought (Lapadat, 2000; Oliver, Serovich and Mason, 2005). In some instances, non-verbal cues can be very important, as in the case of one respondent who was

extremely cautious with what he said, given the sensitive nature of the topic being discussed, and pointed at pictures or documents to indicate who or what he was referring to. Whenever possible I noted down the gesture used and what it was meant to indicate, and used my handwritten notes to link to the right points in the transcript.

I recognised there would be a likelihood of some 'privileged' stakeholders in my sample (Leys, 2002), given the context specific nature of the research question, and the need to address it. As a result, the majority of my respondents were clinicians (see Appendix A). I did find that despite my efforts to form a sampling framework by identifying individuals from specific organisations (see section 4.5), it was hard to pin certain respondents to a single representative body as several of those in the professional bodies also worked with Connecting for Health and other Department of Health units or with academia. Table 4.1 below provides a summary of the distribution of respondents across different categories (bearing in mind that these categories overlap). More details are provided in Appendix A which lists the 37 key respondents, their various affiliations and the organisations which are included in the categories specified in Table 4.1. The affiliations listed for each respondent are not necessarily their current ones, but also include past relevant affiliations which may have caused me to include them in my sample.

Table 4.1 Distribution of respondents across categories

Category	Number of respondents
Clinical professional bodies	12
Non-clinical professional bodies	4
Government/ Department of Health/ NHS bodies	20
Consumer and patient groups	2
Industry	6
Policy advisors / politicians	4
Academia	10
Other health-IT projects and roles	1

4.6.2 Documentary data

Documents provide useful sources for data triangulation, thus improving the validity of research (Patton, 2002; Miller and Alvarado, 2005). In tracing historical events and discourses, documents provide a frozen snapshot of aims, accounts and debates pertaining to the subject being investigated (Miller and Alvarado, 2005). This preserved account of events is invaluable for the purpose of uncovering factual descriptions and both individual as well as collective views of key stakeholders in a project. Their 'inter-textuality' and characteristic of drawing upon other relevant documents in the field may be seen in the example of parliamentary consultations, responses from key stakeholder groups and published reports by government bodies.

Miller and Alvarado (2005) highlight three points to address when using documentary data: the document selection process, the social exchange of documents and source criticism. The first of these has already been discussed (see section 4.5). The social exchange of documents relates to their accessibility and availability. As my document sample was intended to include publications by the UK government, the NHS and professional bodies, these reports were easily accessible online. The sensitive nature of the NPfIT does mean however, that there would have been confidential reports and accounts which were not made available to the public. I did gain access to a few such reports through my interview respondents. One report I received was unlikely to have been a confidential report, but was however unavailable on the Connecting For Health website as it was dated almost ten years previously and did not seem to be available in the online archives. The third point, namely source criticism, requires a critique of the authenticity and accuracy of the source (external critique), and the ability of the source to be a reliable source of information (internal critique). As discussed by Hall and Rist (1999),

document analysis is dependent upon the quality and reliability of the document under study. The documents I shortlisted were published by government bodies, the NHS, or professional bodies, all of whom are either the originator of the topic under discussion, or are reputed and capable of providing an informed and representative account of the discussion at hand. The reports were accessed from the websites of the organisations publishing them, or from the Department of Health website which housed all the responses to consultation documents in a single place.

While the documents selected were from reliable sources, their public nature gives reason to be cautious in accepting them at face value, as they may be polished and strategically written for targeted groups (Miller and Alvarado, 2005). This point surfaced during some of the interviews, when respondents highlighted concerns regarding the lack of transparency and ethical procedures in the publication of certain reports.

4.7   Data analysis

The combination of documentary data as well as interview data facilitated triangulation not only with regard to my sources but in terms of time as well, given the longitudinal nature of the NPfIT (Mathison, 1988). The capability of documents to capture historical events (Miller and Alvarado, 2005) combined with a range of interview respondents who were involved with the NPfIT at different stages, right from its inception, helped me validate my understanding of how it evolved. I shall now briefly elaborate on my data analysis, first discussing the documentary followed by the interview data.

4.7.1   Documentary data analysis

The analysis of documentary data in itself is an act of social construction on the part of the researcher (Flick, 2002), as the data needs to be interpreted and analysed. Hajer's

(2006) ten steps to discourse analysis advocate the starting point being desk research, using 'a first chronology and first reading of events'. In keeping with this, apart from maintaining a systematic list of all reports and documents which contribute not only to the main dialogues to be considered but also to the background context of the NPfIT project, I began a chronological review of relevant reports and publications regarding EHRs and the national programme. Relevant documents can be tracked chronologically and systematically by considering three purposes of content analysis, namely the 'manifest characteristics', the antecedents (the why) and the consequences (the effects) of the documents (Holsti, 1969; Krippendorff, 2004). To manage the documentary data, I organised them by publishing body and chronologically, using a document management table incorporating these three key features (the characteristics, antecedents and consequences) of the manuscripts (see Table 4.2 below). Further details on the documentary sources classified by year and organisation are provided in Appendix B.

Table 4.2 Document tracking template

Year	Stakeholder group	Document details	Key points	Antecedents	Consequences
2001	Government publications				
	Professional groups – reports and responses				
	Corporate groups – reports and responses				
2002	Government publications				
	Professional groups – reports and responses				
	Corporate groups – reports and responses				
… etc.					

The institutionalised nature of documentary data suggests that they can be used to infer the aims and ideologies of their authors or representative organisations (Wolff, 2004). However, Wolff (2004) also highlights the potential for myth and fiction in the creation of these documents, as reports may be published for bureaucratic purposes or to legitimise certain actions or events.

4.7.2 Interview data analysis

Caution needs to be exercised when interpreting qualitative data from interview transcripts due to possible inaccuracies as a result of change in medium (audio to text), and as context may be lost when drilling down to isolated extracts of the interview (Gibbs, 2007). Further, the subtle nuances emphasised by voice modulation in an interview are lost when transferred to a transcript (Gibbs, 2007). Whenever possible, I made brief notes about each interview immediately after it, recording my initial thoughts and what I thought were the key points brought out. These were useful later on as quick reminders of the interview discussion (Burnard, 1991).

I also sent my respondents the interview excerpts that I wished to use, giving them an opportunity to correct any inaccuracies in the transcribed data (Forbat and Henderson, 2005; Mero-Jaffe, 2011; Poland, 1995). Respondents may be asked to validate the analyses of their interview excerpts as well, to ensure appropriate interpretation of the data by the researcher (Krefting, 1991). However, this is a time consuming process. Moreover, the non-academic background of some respondents, and their limitations in understanding the analysis due to their restricted view of my data would have posed challenges (Burnard *et al.*, 2008). For these reasons, I chose to send my respondents only the interview excerpts that were likely to be used, and requested them to inform me if

there were any inaccuracies or if they preferred that the excerpts be attributed differently.
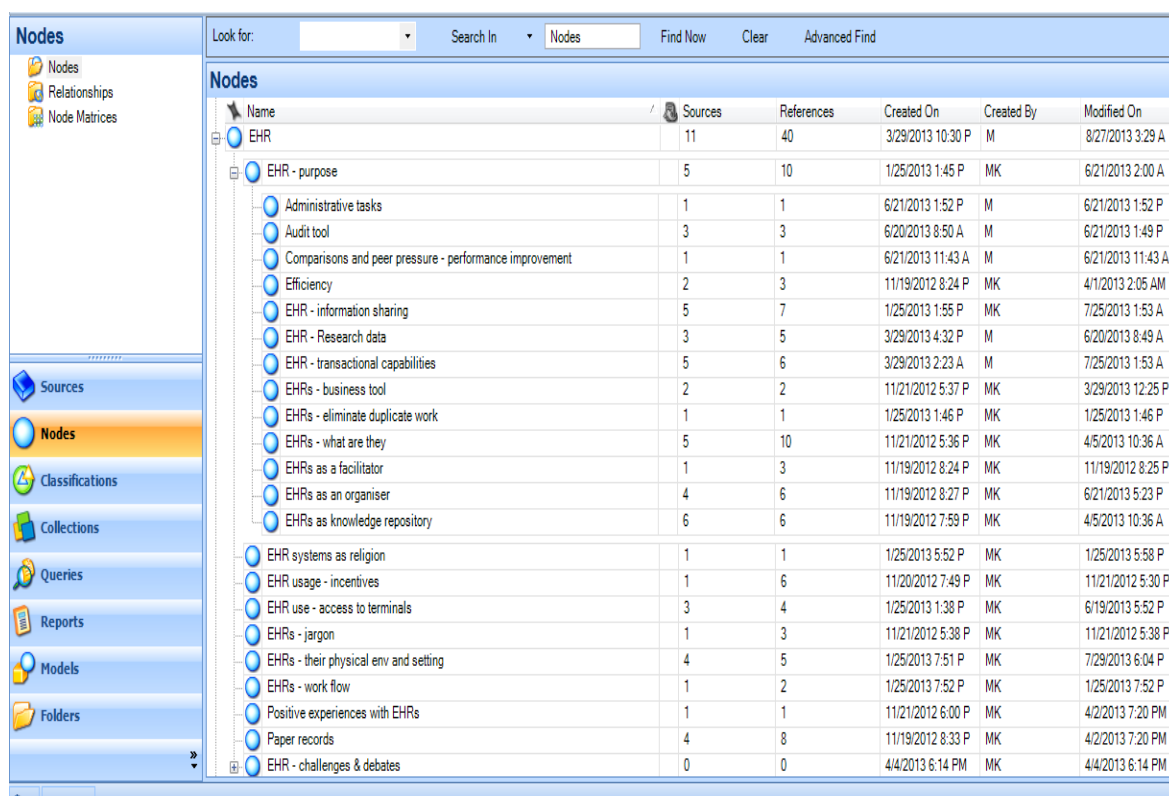
 Out of the thirty-four respondents I emailed for the purpose of validating the excerpts, eighteen responded. Three of these respondents corrected transcription errors, and four respondents edited the excerpts to better express their ideas without changing the original meaning (Poland, 1995). Seven respondents requested that their quotes be attributed in a manner giving them more anonymity due to the sensitive nature of the topics discussed. Three respondents requested certain phrases or quotes to be omitted as they considered them controversial, or not 'socially desirable' (Burnard *et al.*, 2008: 431).

Transcribed interviews were read several times to immerse myself in the data and to better comprehend the interviewees' frames of reference (Burnard, 1991). By identifying latent themes (Braun and Clarke, 2006), I sought to understand the semantic content of my interview data, examining the underlying reasons for respondents' views. Informed by my understanding of academic literature, I began the coding process by identifying initial open codes to organise my data (Braun and Clarke, 2006; Schmidt, 2004) using NVivo 10, a qualitative data analysis software tool. Unlike quantitative data analysis software, qualitative data analysis software do not perform the actual data analysis, but are instrumental in organising and facilitating the process (Weitzman, 2000). This approach mandates a degree of interpretation on the part of the researcher during the coding process.

The interview notes I had written using my Livescribe smartpen were also imported onto my computer. The Livescribe Desktop software synchronises the notes written by hand using the smartpen with the audio recording, and clicking or tapping on the written notes

automatically plays back the corresponding audio recording (Tannen, 2008). This was a useful and time-saving feature of the software, as I was able to quickly and easily listen to specific parts of my interview recordings without having to do a manual search or listen to unnecessary sections of the recording.

Once I had completed open coding for an initial subset of my interviews, I began to cluster these codes (termed as 'nodes' in NVivo 10) into broader analytical categories or themes (Schmidt, 2004). Initially coded as 'free nodes', i.e. without a hierarchical structure, once I clustered the codes into groups, they formed what are termed 'tree nodes' in NVivo 10, due to the hierarchical tree structure created. Figure 4.2 provides a screenshot showing an example of how I clustered these nodes.

Figure 4.2 A snapshot of the coding categories

Transcripts were analysed carefully, keeping in mind that while themes form a pattern within a data set, the extent of their presence and frequency within a data item or across a data set is not necessarily an indicator of their importance (Braun and Clarke, 2006). I used my judgement and knowledge from reviewed literature and documentary data to assess how important a theme was, bringing in a level of interpretation at this stage to the analysis of my data.

The clustering and rearrangement of nodes helped refine my themes and categories, as some codes were merged with other codes, renamed or deleted (Saldana, 2009). While engagement with one's data is important, Gilbert (2002) warns against the dangers of getting 'sucked in' to coding, and emphasises the need to step back, and balance the need for closeness to the data with distance from the data. One suggested strategy to address this is to reflect on the coding tree or hierarchy (Gilbert, 2002), which I found useful as this helped me consider the implications of my codes, and how they could be linked to each other.

The restructured node hierarchy I formed informed the analysis and coding of the remaining interview transcripts, but was subject to modification when I identified new themes in subsequent data (Saldana, 2009). One of the emergent findings, for example, was the involvement of several clinicians in IT design and development, or who served in advisory roles in health IT committees (see Chapter 7). Consequently, I turned back to the literature on professional hybrids to better understand this phenomenon, and I secured interviews with three more respondents who fell into this clinician-IT hybrid category. The analysis phase therefore employed a combination of inductive and deductive code

generation (Hsieh and Shannon, 2005) or iterative theorising (Eisenhardt, 1989; Langley, 1999).

I restructured the nodes into three main hierarchies – the first focused on EHRs in general, the second focused specifically on the NPfIT, and the third on dynamics between clinical and non-clinical stakeholders of EHRs and this included codes related to professional hybrids and their development. A total of 397 codes were generated and categorised within these hierarchical node structures.

The themes which defined my data were informed by the key theoretical concepts I employed, and by clustering my codes under specific broader categories, I was able to link them effectively to my theoretical lens. For example, the different codes related to the use of EHRs were divided under categories related to the use of EHRs, their challenges, and the interactions between professionals in their use of EHRs. This helped identify the different ways in which EHRs occupy a boundary role and act as a boundary object, which forms the basis of my findings in Chapter 6.

4.8   Summary

This chapter outlines the research methods I employed for this study. I discuss the research paradigm and design adopted, and the sampling strategy used to identify my documentary as well as interview sources.

This study triangulates data from multiple sources (Denzin, 1989; Mathison, 1988) and includes 51 semi-structured interviews and documentary data from relevant government and professional organisations. I gathered my data in three phases, beginning with 14 sensitising interviews. Following this I identified over 150 documents from a range of

relevant organisations including the Department of Health, the NHS, Connecting for Health, the Royal College of General Practitioners, the Royal College of Physicians and the Royal College of Nursing (see Appendix B). The first 34 respondents for the final phase of interviews were identified on the basis of their association with these organisations or their involvement or interest in the NPfIT. My emergent findings pointed to the significance of the role played by clinicians who are actively engaged in IT development. This led to the identification of three more interviewees who were in this particular category, resulting in a total of 37 key informants in this stage of interviews.

All 51 interviews were transcribed completely by me, and were analysed using NVivo 10. Iterative theorising (Eisenhardt, 1989; Langley, 1999) was employed and 397 codes were generated and clustered into node hierarchies.

My findings from this data are presented in the next three chapters, and offer insights into the story of the NPfIT (chapter 5), the boundary spanning capacity of EHRs (chapter 6) and a unique professional hybrid, the clinician-IT professional (chapter 7). The next chapter discusses how the NPfIT can be regarded as an organising vision, and uses the concept of boundary objects (Star and Griesemer, 1989) to explain the dynamics between stakeholders and how their interpretations and interests in various aspects of the programme differed.

CHAPTER 5 THE NPFIT AS AN ORGANISING VISION

5.1 Introduction

In this chapter I draw on my interview data, documentary evidence (see Chapter 3) and Swanson and Ramiller's (1997) work to explain how the NPfIT may be viewed as an organising vision. I discuss the roles and dynamics of the stakeholder groups involved using the concepts of technology frames (Davidson, 2002; Orlikowski and Gash, 1994) and boundary objects (Star and Griesemer, 1989).

In tracing the history of the NPfIT, the transformation of the original aims and the complex dynamics between its many stakeholders (including the Department of Health, IT suppliers, NPfIT leadership, clinicians and the general public) showcase how the inputs of specific groups steered the course of the national programme. The innovative nature of the programme and the involvement of numerous stakeholders, make it comparable to an organising vision (Swanson and Ramiller, 1997) that is characterised by buzzwords that emerge and subside, subject to discourse by stakeholders involved in the vision. The perception and requirements of the various groups involved in this high profile health IT project can be compared to the existence of technology frames (Orlikowski and Gash, 1994) which highlight the cognitive structures that determine how groups of individuals use technology. This may in turn be influenced by factors such as their professional training and roles (Berg and Bowker, 1997).

Viewing an EHR as a boundary object (Star and Griesemer, 1989) subject to use, interpretation and information exchange by multiple user groups (Carlile, 2002; Nicolini, Mengis and Swan, 2012; Berg and Bowker, 1997) draws attention to the NPfIT which amplifies this communication and negotiation between different EHR stakeholders as one

of its key components was the NHS Care Record Service. The programme had shifts in priorities and activities over the course of time, drawing parallels to the concept of temporal boundary objects (Chang, Hatcher and Kim, 2013; Yakura, 2002), wherein different phases in a project may be likened to abstract boundary objects. For example, project phases such as requirements specification and contracting are subject to negotiation between multiple groups and are subject to the multiple perceptions and inputs of those parties involved (Koskinen and Mäkinen, 2009). These dynamics were also evident in the NPfIT, with varied inputs and criticisms from those involved in and impacted by the project as I illustrate in this chapter.

Being an ambitious and large scale project which aimed to transform healthcare delivery in the UK, the NPfIT was initially regarded as the answer to innovation and modernisation in the healthcare sector (Mark, 2007). The complex and evolutionary nature of large scale long-term projects and the notion of temporal boundary objects (Chang, Hatcher and Kim, 2013) can be discussed in the context of organising visions which see the diffusion of innovative technologies and the emergence, subsidence and persistence of 'buzzwords' (Swanson and Ramiller, 1997). These buzzwords represent the prevalent thinking and rhetoric surrounding new innovations among diverse stakeholders, and I link them to the different phases of the NPfIT as a temporal boundary object (Yakura, 2002). Given their evolutionary nature and interpretive flexibility (Pinch and Bijker, 1987) subject to the views of multiple stakeholders I suggest that each of these phases can be regarded as inter-epistemic boundary objects (McGivern and Dopson, 2010; Rheinberger, 1992). McGivern and Dopson's (2010) study documenting different phases in the transformation of objects suggests the notion of 're-incarnation' of objects in different forms from what

might have been originally envisioned. This was evident in the NPfIT as well, and I discuss how 'discarded objects' (Engeström and Blackler, 2005) in the NPfIT resurfaced at a later point in the programme.

Various forms of communication including spoken as well as written forms contribute to community discourse (Greenhalgh *et al.*, 2012) in an organising vision, and reflect the different technology frames employed by stakeholders (Davidson, 2002; Orlikowski and Gash, 1994). This is demonstrated in Chapter 3 where I employ documentary sources to provide an overview of the NPfIT story. In this chapter I supplement this account of the NPfIT with key excerpts from my interview data.

In the next section I present findings from my interview data that are of relevance to the story of the NPfIT that was presented in Chapter 3. I use this data to illustrate some of the tensions that were inherent in the national programme, and the differences between the stakeholder groups involved. With this background, I then explain why the NPfIT may be regarded as an organising vision. Following this, I highlight some of the main boundary objects that were present in the NPfIT organising vision, discussing their inter-epistemic nature and how they were transformed (McGivern and Dopson, 2010). I conclude the chapter by summarising my key findings and highlighting the relevance of the concept of boundary objects to organising visions in the NPfIT context.

5.2   Tensions and dynamics inherent in the NPfIT

The account of the NPfIT presented in Chapter 3 drew from documentary sources including government reports and academic literature. From both, documentary sources as well as my interview data, it was evident that there was much conflict and dissatisfaction with the national programme right from its inception. Respondent R17

described a conversation with a person who had been required to present the case for

the national programme at the initial meeting with high level policy makers:

> He showed me a policy guide and his set of slides (…) I said, 'Okay, [Person A], if
> this is purely about persuading [Person B] to raise money or to do something, fine.
> But you do understand that this isn't anything, it doesn't make any sense, it's not
> something you can do'. And he said, 'Oh, no no, I do understand'. So he went in,
> and famously, [Person B] asked how long it would take, and [Person A] said '3
> years', for no reason at all. [Person B] said 'No that's too long, two years'. And
> they settled on 2.5 years. 'How much does it cost?', and he came up with some
> number, and this was based on *nothing!* – R17, Clinical informatician, NHS IA

Those involved in the decision making were clearly aware of the risks and uncertainties

involved, and proceeded with the specifications of the programme in spite of this. The

above quote indicates the limited foundations on which the project was built, and

foreshadows the downward spiral which characterised the later phases of the NPfIT.

The drawing up of the specifications (see Section 3.2.2) was characterised by ambiguity

and miscommunication. The development of the Spine was an example of this, as it was

initially intended to provide an individual spine for every individual, but was transformed

into the National Spine. The reasoning behind the concept of person-based Spines was

that despite multiple providers being involved in the diagnosis and treatment of a

patient's condition, because of the increased specialisation of clinicians and the

fragmented nature of healthcare delivery, the only entity that stayed constant was the

actual patient. Referring to this fictional patient as Mrs. Smith, respondent R17

elaborated on why it was essential to consider the patient as the hub holding together

the different pieces of health information

> You'd be seeing people who may have already had £20,000 of healthcare with
> that problem (…) Expert thought, people thinking about it, and coming to
> conclusions. And we do all that and throw it away! And they show up, standing

with a blank piece of paper. 'Well hello, Mrs Smith! I hear you spent £20,000 on this problem. We've spent some of the finest minds on this problem, and do you know what we've done? We've thrown it away!' (laughs) – R17, Clinical informatician, NHS IA

This issue would have been at least partly resolved with the idea of individual spines, where each person had access to the multiple strands of their records, and could be the carriers of their own health information. This idea however got submerged beneath the plans drawn up by the dominant groups including the programme management and the suppliers. Respondents who had been closely involved with the NPfIT at later stages did not seem to be even aware of the initial conceptualisation of the spine.

> This is a wonderful example of how things metamorphosed without anybody realising what happened. The phrase '*the spine*', was first coined by [person X] (....) And [person X] had drawn a little diagram which said, all sorts of these things happen to Mrs. Smith, but we need something where the key stuff is, so if things happen, this thing was running along in some way, and it's holding key stuff. And [person X] said, 'like a spine'. And so the phrase '*the spine*' became the short hand for this. Now, the change in interpretation that happened, and people didn't even realise they had changed the interpretation, and this reflects how deeply embedded the organisational model of healthcare is. The spine I just described in that picture, was the spine of Mrs. Smith's healthcare (…) I used to say, no we're not creating a national system. We're getting 50 million systems, one for each of us (laughs) (…) This then went into all the stuff I was talking about, the Department of Health, contracts everything else and the people writing the giant thing. And *they* called it the spine. And they called it the *NHS Spine.* It was the spine of the NHS. It was the spine to hold the *NHS* together. It was like they were deaf! – R17, Clinical informatician, NHS IA

The ambiguity surrounding the programme's specifications was accompanied by a plethora of terminologies that were understood differently by those involved. The definitions of these various terms were extremely vague, as seen from the words of a respondent who had a role within CFH:

> 'Detailed care records' was just a term we dreamt up for differentiating between the summary care record and the detailed record that existed in different institutions. - R12, GP, Connecting for Health National Clinical Lead

The above quote by a previous clinical lead in Connecting for Health indicates that much of the jargon and terminology employed lacked clear definition, adding to the ambiguity of the project's aims and general direction. This lack of mutual understanding between the NPfIT stakeholders was reflected in the contracts as well, as explained by Respondent R23:

> The problem was the definition of what was in the contract. When things started falling apart, people then went back to, 'Well the contract says...', and that could be interpreted as something very simple or something very complex. The clinicians obviously want the complex technical solution which is easy for them to use. Whereas people writing the systems were very much 'How can we get away with that, get a tick in the box without doing much work' - R23, Clinical informatician, Clinical Lead for one of the NPfIT regional clusters

Following the lack of clarity on the NPfIT's specifications, there was much concern raised regarding the confidentiality and privacy of patients' information, leading to the proposal of solutions such as sealed envelopes (see Chapter 3). A nurse interviewee suggested that options to control access to their records should be *available* to patients; whether or not they use them, is a different matter. According to her, this facilitates the trust relationship, as patients might feel that they are welcomed as partners in their healthcare.

> I think that if you don't offer it, you won't get by and won't get trust from patients. Probably in reality there will be very few that actually do that (…) but it *has* to be on offer. There is a balance… if you don't offer it, you may not get patients' consent to share *anything.* I think it's just being pragmatic. You might not get the people to share it all. But you might get their approval to share some. - R13*,* Nurse informatician, RCN

HealthWhich? and NPfIT (2003) also highlighted this patients' perspective, that they should be able to view their records if they wish, although most patients admitted that they were unlikely to actually do so. The option of patient access to records then, becomes one which is a virtual engagement mechanism in itself, whether or not the patient chooses to exploit the opportunity. User engagement in this case was enabled by the *possibility* of patient involvement, rather than actual participation of patients in their record access. Enabling patient access to records then offers a pre-emptive measure to ensure users can be more active in the management of their care, and avoids potential criticisms that patients are deliberately barred from being well informed on their health condition. A similar example of technology offerings to provide a semblance of engagement is described by Respondent R32 below with regard to sealed envelopes:

> I don't believe they [sealed envelopes] are going ahead. The sealed envelope was to try to deal with the concerns around information governance. I think it was just too complicated and too complex. It was really a device to placate the very vocal critics who were very concerned about access to personal information on such a large scale. I think it's proved to be unworkable really - R32, RCGP

This account of the sealed envelopes to appease vocal dissenters has parallels to Respondent R13's view (page 121) that certain technologies and options are offered with the purpose of engaging people. The motive behind the offer of sealed envelopes is brought to question, as on the one hand it offered patients a degree of control over their records, and yet their complexity and challenge of implementation causes some to suggest that the sealed envelopes were a mere placation mechanism which could not see fruition within the timeframe of the NPfIT.

My empirical data also pointed to significant dissatisfaction amongst clinicians as they were not consulted or informed of the details of the contracts. In drawing up the

contracts, the national programme was oblivious to the 2003 General Medical Services (GMS) contract which was intended to provide GPs with possibilities of choice (regarding the EHR systems they used), the Quality Management Analysis (QMAS) system, and inter-GP transfer of information (GP2GP). The ignorance of existing contracts may have been due to lack of engagement with clinicians, or due to a disregard for existing arrangements which gave GPs a choice of systems.

> They had two contractual processes going on independently. One was the GP contract, one was the LSPs. And it was only at the last minute they realised the contracts had incompatible clauses (...) The LSP contracts said that you would have exclusive rights to all the NHS systems in that territory; and the GP contracts said the GPs would have choice of systems. And both were signed by the Secretary of State for health. – R6, Health informatician, A national computer organisation

This quote illustrates the incompatibility between the NPfIT's LSP contracts and the GP contracts which were meant to provide GPs with a choice of systems. The GP Systems of Choice (GPSoC) contracts later provided GPs with the option to choose between LSP provided systems or an approved system from an approved supplier (Greenhalgh *et al.*, 2010b; Connecting for Health, 2013).

While the suppliers were large and established companies, their lack of specialisation or experience in large scale health IT implementations was a worry for many stakeholders. Given the general lack of clinical engagement, there was a definite need for suppliers who were able to comprehend clinical needs and requirements.

> *Everything* to [company] looks like a telephone network. Well, God bless them, they *try* hard, but basically everything looks like a telephone network. And I said, 'what about the national thing?' And he said, 'What about it?' 'Well you know, constructing a record...' and he says, 'What? That's a store and forward messaging system, it's a network, a database, we do that all the time in telecoms, and we

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know how to do that. That's not difficult. We don't want any help in that'. And I sat there thinking, Oh my... Because actually, a stupid purchaser can be compensated for by an intelligent supplier. When *both* ends don't know what they are talking about, you have no hope! I just sat there, completely agog! (laughs) – R17, Clinical informatician, NHS IA

This indicates an underestimation of the complexity of the programme on the part of the suppliers. Respondent R17 mentioned that the supplier had a misplaced confidence and assumed an understanding of the requirements and contracts. There were clearly different understandings of the contracts, as both the suppliers as well as the NPfIT leadership had different (and insufficient) understanding of the programme's requirements, as indicated by the above respondent.

Despite this, policy makers and NPfIT management were persuaded by the smooth talk of industry 'experts' who were keen on securing the contracts.

The *reason* national records had not taken off across the world, and they haven't still, and they're still struggling, in the UK, is because, they try and build the record around what the companies can offer. - R5, Hospital doctor, National Clinical Advisory Board

They [the suppliers] had no experience of delivering healthcare. Whereas the people who had experience of delivering healthcare were seen as being awkward buggers… Everything that they are now saying about what failed in the national programme, we would have told them. - R14, GP, BMA-RCGP Joint IT Committee

The specifications were therefore supplier driven rather than user driven. The persuasive and dominant role of industry experts were evident right from the initial meeting with policy makers where they (industry players) put forward the benefits to be gained by launching a national programme. The priority given to these IT experts was continued later in the programme as clinicians were generally ignored. GPs who had successfully implemented computers in their practices would have possibly had a smug reaction when

they saw the programme fail in areas which they had not been consulted about, as suggested by the above respondent's quote.

A respondent who was involved in the Common User Interface of the NPfIT indicated that the importance of this aspect of the IT development seemed to have been undermined by the larger IT suppliers who were delivering the main components of the care record system:

> They regarded what we were doing as a bit of colours and lay out, and we tended to get asked, right at the end, when they had started the first user testing … users said 'This is horrible, I don't like it'… To put some lipstick on a pig, and try and make it better, rather than start from first principles. – R31, GP informatician, Connecting for Health, British Computer Society

This snippet is evocative of a general sense of antipathy between the NPfIT management and suppliers on one side, and clinicians or clinician-led groups on the other, that surfaced frequently during the course of the NPfIT. There was an underestimation on the part of suppliers regarding the importance of an intuitive user interface, and they treated more as an afterthought than as a requirement for their systems. Respondent R31's description of their attitude as putting 'lipstick on a pig' reflects an underlying view that the systems had deficiencies which the suppliers sought to cover up. Rather than tailoring systems to clinicians' requirements, suppliers tried to convince clinicians that the new systems were what they needed, and sought to 'dress' the systems to make them look tailor-made and user-friendly.

Tensions between the suppliers and the clinical users were also evident by the latter regarding the former as materialistic and naïve in their presumptions about the national project. Referring to the first meeting between policy makers and industry experts at 10 Downing Street, a respondent commented:

These two flashy senior execs said 'Give us a few billion, and we will computerise the NHS for you'. These execs, these slick suits… - R14, GP, BMA-RCGP Joint IT Committee

Another point of interest was the discouragement of dialogue and collaboration between the suppliers and the actual end users:

The original plan was to do a classic outsource. So you say to [company] 'I want you to create this capability in this geography and I am going to give you total responsibility for that. So *you* would take over what was already there. And then *you* decide whether you continue to use what is already there, or replace it' (…). It's classic outsourcing (…) They'll go in, they'll take over (…) They'll gently replace that which is mediocre over a time frame. One of the features of outsourcing is that most of the staff working in the existing organisation get transferred to the outsourcing company. (….) But at that time, there was a lot of trade union pressure on the Labour party about the degree of privatisation in the NHS. And the word came from above, 'If your proposals involve a significant amount of transfer of existing NHS staff, then they won't be considered'. So they killed the possibility of a classical outsource. And what it meant was that the LSPs had no responsibility for existing systems, and only made money by replacing them. – R6, Health informatician, A national computer organisation

This would have added to clinicians' anxieties as to whether their existing systems would be replaced, and would have also acted as a threat to the smaller suppliers already on the playing field.

Concerns regarding the lack of engagement with clinicians and other end-users were also evident from my interview data.

There was a massive consultation exercise but it was like a sacrificial anode on a ship. You can't say, (because they are too powerful), to the doctors, 'Go away, let us get on with it'. That's what they wanted to do. 'We'll do a requirements collecting exercise with you and leave us to build it and deliver it. Keep your noses out'. They couldn't say that. So they had a whole structure of pointless consultations which allowed the people who were building the systems to ignore what was going on. – R6, Health informatician, A national computer organisation

Respondent R6's above analogy of a sacrificial anode[2] illustrates the use of consultation

mechanisms as a superficial layer of engagement to preserve the underlying interests and

intentions of NPfIT management. By conducting such consultations, the management

attempted to insulate itself from accusations of not having consulted end-users.

According to respondent R6, the 'engagement' and 'consultation' mechanisms the NPfIT

employed, like a sacrificial anode, came in contact with and were subject to external

elements including clinical stakeholders. However, this 'sacrificial anode' of engagement

was used to shield the underlying layer, namely the plans and intentions of NPfIT

leadership.

The CRDB which replaced the NCAB (see Chapter 3) was also criticised as having limited

clinical representation, as seen in the below quote:

> It [CRDB] had one clinician on it. It was basically a board of six. It was dominated
> by business consultants. – R29, Clinical academic previously with NCAB

The moniker that the same respondent attached to the CRDB reflects the cynicism with

which the board was regarded:

> People in ministerial civil servant offices said, that organisation was bad to us; we
> better have a different one. The business managers who were coming in were
> very keen on a different vehicle that they would control. That's when we got the
> care records development board coming up. They were called Cardboard. – R29,
> Clinical academic, previously with NCAB

The informal play on the name CRDB, calling it 'cardboard', draws out an underlying

attitude toward the board as one which failed to provide concrete guidance and support

to the programme. Its establishment was mainly to replace the NCAB which had been

clinician-led. Unlike its predecessor, the CRDB was dominated by non-clinical individuals,

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[2] A sacrificial anode is a highly reactive metal used to coat a less reactive material surface to prevent it from
corroding. The anode is consumed in place of the object it protects.

and exacerbated the problem of lack of clinical engagement. While concern regarding the lack of clinical input was expressed by several interview respondents, even when consultation exercises *were* conducted there was limited meaningful action in response to inputs received. Work related to confidentiality and patient preferences was done by the NHS IA early in the programme, but the outcomes of these consultations were not acted upon seriously. While there were apparent attempts between stakeholders such as the NHS IA and the Department of Health to talk and listen to each other, there were undercurrents which were aimed at preventing any fruitful dialogue.

> The privacy and confidentiality work which started (….) the proper outcomes were never published; they refused to let them out…. if you're not going to pay any attention to people, you don't want any information out that might create trouble. And this became clear when [person X] said to me, 'Right, I know how to do this (…) have you hired the top twelve barristers in this area? So, queen's council barristers. You only have to hire them for an hour'. 'Sorry, why would you do that?' [Person X] said, 'To deny them to the opposition'. So it's quite a common trick in these sorts of deals, particularly barristers with experience in the area, you might just hire them for a day or something, to advise you. Once they have advised you, they can't in the future advise anybody else on it, because they are conflicted. So [person X] was saying, go out and hire the twelve top people for a day, to deny them to the opposition! And I said, 'The *opposition*? Just remind me, who is the opposition? (laughs) is that the *doctors*? The *people*?' (laughs) and [person X] said, 'the people who try and stop us!' so I'm trying to run this engagement process, and then I'm told to go and block the 'opposition'. – R17, Clinical informatician, NHS IA

The charade of engagement (as indicated by respondent R6's metaphor of 'sacrificial anodes'), combined with the wish to pre-empt any legal action as explained by Respondent R1 above, points to a deliberate effort by the NPfIT to ignore clinicians' needs while continuing to engage in superficial consultations with them. While this plan to block the 'opposition' did not take place finally, it reflects the mind-set of the NPfIT

management. This indicates an absence of collaboration and listening between the community stakeholder groups relevant to the national programme.

Some cynics regarded the NPfIT's shifting engagement tactics as a consequence of being unable to garner support from certain user groups, and being forced to resort to other sources of support. The nursing professionals seemed to have an underlying feeling of being drowned out by the dominant voices of GPs, and when the programme did attempt to engage with them, they attributed it to the lack of support from doctors. Respondent R1 provides an interesting vignette of how interactions between the DH and clinicians shifted as a result of the tense dynamics between certain groups:

> I think the reason why there was a concentrated effort to endorse and embrace the RCN was because the British Medical Association was really adamant that the National Programme for IT is not working, it's not going to work, and they were quite anti the NPfIT – R1, Nurse informatician previously with the RCN

If clinician engagement was limited, patient engagement was even more so. As one respondent said:

> The Department of Health operates in a very simple way. Decide, consult, defend, implement. In other words, involvement is simply a showcase – R20, Co-Director, Patient Concern

The idea that the programme's consultation mechanisms were not genuine efforts to listen to people was evidently shared by respondents from more than one stakeholder group. The above respondent from a patient representative organisation felt that decisions were already made by NPfIT leadership prior to engagement. His opinion that 'consultation' was followed by the DH 'defending' and 'implementing' their approach implies that consultation exercises may have been merely to alert the Department of Health regarding what aspects it needed to be prepared to defend itself about. Therefore,

in addition to being a 'sacrificial anode' and a pre-emptive defence mechanism, engagement exercises also served as a tool to *plan* the NPfIT's defence and retaliation against potential criticisms.

The same respondent, R20, also suggested that the Department of Health considered engagement and consultations as too expensive. Instead, they resorted to implementing the summary care records in a more convenient and cheaper manner, and defended it by trying to convince people of the benefits offered by their approach.

> We fought long and hard for the summary care record to be introduced on the basis of informed consent. In other words, people being told this was going to happen, given a copy of the information that was going to go up on it, they could check it, agree that it was accurate, and then confirm they were willing for this all to happen. That was far too expensive, and too much trouble for the Department of Health. So they instead introduced the system that you did have a right to opt out if you didn't want to be a part of this. You were told that if you did opt out, you must be certifiable, because you would lose all these marvellous benefits, so it wasn't an open choice; it was a deliberate effort to bring them all into line - R20, Co-Director, Patient Concern

Certain respondents (R27, Former academic, health informatician; R8, Clinical academic) believed that the issue of lack of clinical engagement is often over-hyped. Whether this is true is debatable, as involvement of clinical advisory groups did not necessarily equate to their voices being actually listened to.

The frequent restructuring that characterised several phases of the NPfIT was criticised as well. To many, this restructuring was pointless, and was more a demonstration of control on the part of the programme than responding to an actual need for dismantling established units and setting up new ones. Describing the views of some NHS IA staff at the time it was being dissolved, a respondent said:

> 'We'll all just go, do as you will. But actually, what it takes to set up a legal entity to have proper HR, proper finance, proper employment arrangements, a lot of

these people are going to be in the new thing. Why throw everything into turmoil? We'll all go, goodbye, do as you want. But just as a responsible cost effective thing, don't waste money… take it over'. And the message came back, 'No, it has to be seen to be executed'. So, we had a perverse situation in an office in Birmingham, where at one desk was the guy who used to be the secretary, meaning with capital S, of the Information Authority, was completing the final stages of closing down the information authority. It was a legal entity created by Parliament, had a seal and all those things. It was a whole rigmarole to shutting it down and transferring its responsibilities to other things. On the other side of the room was another group of people trying to create a special health authority, going and asking him, 'How do you do it?' And he's in the process of shutting down the very thing that they are trying to create. - R17, Clinical informatician, NHS IA

It appears evident that in pulling down organisations and setting up new ones, the

programme was merely re-inventing the wheel. The functionality of the new units that

were to be set up were similar to that of the NHS IA, and people questioned why there

was the need for this restructuring. Considering the views of the above respondent, it

appears unlikely that the new authority was formed for the primary purpose of

discharging added responsibilities. This points to the possibility of attempts by the NPfIT

management to eliminate certain players, or to have an increased control over particular

functions.

Another explanation for this restructuring may be found in Respondent R34's account of

how government propaganda is generated:

How government propaganda has been organised, is that Downing Street plans out several months in advance which minister is supposed to be on the front pages of the papers on what day. So there's a deliberate strategy that there should be a lead story, a second story, a third story, a fourth story. So if you're the junior minister at the DH responsible for computers, you may be told that the 2nd Tuesday of every month is your slot. And you will come up with an announcement that will take up at least a quarter of a page in the Daily Telegraph. That's one of your primary missions as a minister. It is what you get rated and assessed by, and is critical to your chances of promotion. What this means is that if you get a system which is specified and supposed to be delivered in 2014 and there are 48

ministerial announcements happen in the meantime, that may very well mean 30 or 40 changes to the system, for which the supplier will charge you a million pounds a pop. If a minister is quiet for three years while his system is being built, then the Prime Minister will forget he existed and they will be passed over at the next reshuffle. So there's a constant need for new initiatives - R34, Computer science academic with an interest in the NPfIT

Respondents also highlighted attempts by policymakers and NPfIT management to suppress negative reports surrounding the NPfIT. The delay of the NAO (2006) report and the mild nature of the criticism contained in it (see Chapter 3) caused speculation that the Department of Health had haggled over it. This was confirmed by Respondent R30, who is a member of the Public Accounts Committee:

NAO reports are subjected to what's called a clearance process, (...) to make sure that the report is signed off by the department (...) It enables the audit process to take into account information they were unaware of and make sure the report is as up-to-date as it can be (...) The clearance process normally is a reasonably short process (…) In this particular case it was exploited by the Department of Health, to in effect grind down the National Audit Office and so the report which was published on the 16th of June 2006 was pretty innocuous. - R30, Member of Parliament, Public Accounts Committee

Referring to the NAO's (2006) report, respondent R17 confirmed its inadequacies and the pressures which compelled the NAO to publish a diluted critique of the NPfIT:

That report was a complete misrepresentation, and the National Audit Office knew that. But the forces were so great, that they'd had to. I think maybe they'd played a very clever game, which they knew they were just never going to get that report agreed unless they agreed. But they *knew* that the Public Accounts Committee would in effect reject it and do its own report. And then it asks the same people in the National Audit Office to do that report. And they wrote a highly critical report. I think they wrote the report they wanted to write the first time - R17, Clinical informatician, NHS IA

The use of an x-ray image as the cover page of the NAO's (2006) report was regarded by one respondent as a subtle attempt to steer public opinion in favour of the NPfIT.

> They added the Picture Archive Communication System, PACS, because it was *good*, it *works*. It had *absolutely nothing whatsoever* to do with the central clinical care record. But it worked, it was visible. If you looked at the June 2006 National Audit Office report, they even had on the front of it a photograph of a pair of hands being x-rayed...(…) it had this photograph of the PACS system on the front cover. It gave a misleading impression - R30, Member of Parliament, Public Accounts Committee

The above respondent indicated that the inclusion of PACS as one of the programme's deliverables stemmed from its already proven success, and not the other way round as suggested by the programme (that PACS was one of the successes of the NPfIT).

An RCP led project advocated the use of 'clinical headings' to standardise health records and mandate the entry of specific clinical data (RCP, 2012). While the introduction of minimum standards and structures for EHRs is a progressive step, the usefulness of the headings specified by the RCP project was questioned:

> If you look at the Royal College of Physicians' work on Headings, which has its weaknesses, well it's generally a good thing. It's interesting that we managed to build computerised record systems without any standards for records. And the first thing the RCP did was things like, 'It's a good idea to put the date and the patients' name on the record'. And you're thinking, 'Well wouldn't it! But doesn't this happen?' (laughs) Clearly it doesn't – R6, Health informatician, A national computer organisation

This respondent's views question what purpose special interest groups within bodies such as the RCP served, and if efforts toward engagement could be better channelled elsewhere. The accomplishments of the RCP project seemed to be basic standards that should have been implicitly followed prior to the establishment of a separate project to determine 'clinical headings' for EHRs. However, the clinical headings advocated by the RCP include key fields covering the patient's history, present condition as well as future treatment plan (RCP, 2012). Respondent R6's description of the simplistic standards

proposed by the RCP could be indicative of an underlying feeling by the IT community that clinicians are incapable of knowing what they want and what systems are best for them (Karsh *et al.*, 2010). While entering data such as the patient's name on the health record is obvious and clinicians would not usually have to be explicitly reminded to do so, it is an essential part of the patient's record.

With this overview of my key empirical data, I proceed to discuss how the NPfIT may be regarded as an organising vision, following which I elaborate on the relevance of boundary objects to the national programme.

5.3   The NPfIT as an organising vision for EHRs

Having provided a brief overview of England's NPfIT in Chapter 3, and now having presented my empirical data on the NPfIT, I apply the term organising visions to the project, as it served as the carrier for the EHR vision at a national level from 2002 to 2011. To clarify, an organising vision should not be considered synonymous with a project vision; while it represents a common interest to a heterogeneous community, it may trigger the creation of several projects, all attempting to implement the broader principles and aims of the vision itself. However, in some cases a particular initiative may dominate a setting to the extent that the organising vision is tightly intertwined with it in that particular context.

The NPfIT may be regarded as one such example, wherein the organising vision of EHRs (Davidson and Reardon, 2005) in England has been inextricably linked to the NPfIT during its period of operation. The 'business problematic' (Swanson and Ramiller, 1997) driving the NPfIT vision was a combination of a need for integrated healthcare using technology,

and a political drive to see increased investment in health IT in accordance with the recommendations of the Wanless (2002) review.

The development of the programme resonates strongly with the concept of organising visions. As we have seen in Chapter 2, organising visions explain the manner in which the discourse surrounding innovative IS technologies change, taking into consideration the mutual influence between the technology (which is the organising vision) and the stakeholder groups which are involved in or have an interest in the innovation.

These dynamics are often shaped by rhetorics of 'transformation' or 'novelty' (Ramiller, 2006), as was seen right from the start of the NPfIT, when policy makers were the primary consumers of IT suppliers' hyped promises with regard to a single national EHR. The misrepresentation of time and cost estimates to satisfy higher authorities and to promote the interests of industry players (Flyvberg, Holm and Buhl, 2007; Wachs, 1990b) played a significant role in the sanctioning of the NPfIT, as the decision to launch the national programme was informed by the figures and estimates presented to policy makers at the meeting at Downing Street. These estimates lacked logical calculations, according to respondent R17 (see page 119) as the initial time frame of 2.5 years for the NPfIT was agreed upon without any substantial planning, and was mainly to satisfy the policy-makers present at this initial meeting.

Swanson and Ramiller (1997) term the dominant rhetoric which characterise innovations as 'buzzwords', and these form a significant part of the dialogues which surround the vision. These buzzwords in each phase have parallels to the concept of boundary objects which are positioned at the interface between multiple stakeholder groups (Carlile, 2002), as I shall discuss in section 5.4. Before doing so however, I elaborate how the NPfIT fulfils

Swanson and Ramiller's (1997) three functions of organising visions: 'interpretation', 'legitimation' and 'mobilisation'.

5.3.1.1 Interpretation

Interpretation refers to the way in which a new technology or innovation is explored and understood in its nascent stages (Swanson and Ramiller, 1997). This may be compared to the early efforts to develop EHRs in the primary care sector from the 1970s to 1990s (Benson 2002a, 2002b). The application of electronic health records clearly varied between different clinical groups, resulting in silos of health information. This signalled a need for improved information sharing (Burton *et al*., 2004), triggering the call for integrated healthcare in England. There was also a tendency to compare health IT progress in the UK to that in the US and other European countries such as France (House of Commons Health Committee, 2007).

The NPfIT demonstrated continued differences in interpretation of the EHR vision, as was evident from the different proposed ways of implementing the NCRS. Beginning with clinicians' proposal of a person-centred spine, the very notion of the spine was retranslated into a different form, namely a single national conduit connecting multiple repositories of patient information so that clinicians could easily access their patients' records.

This evolution of the spine concept, the multiple interpretation by community stakeholder groups such as clinical advisory groups and IT suppliers, and its subsequent 'reincarnation' in a different form (McGivern and Dopson, 2010), i.e., as the National Spine and the Summary Care Records, lend it to being termed an inter-epistemic object, which I discuss further in section 5.4.

5.3.1.2 Legitimation

Legitimation questions the need for the technology, and is also influenced by the reputation and authority of those who advocate it (Swanson and Ramiller, 1997). The use of EHRs prior to the NPfIT was predominantly by GPs, many of whom had an active role in the development of the systems (Benson, 2002; de Lusignan and Chan, 2008), and most GP practices in England were computerised by the time the national programme was launched. The reputation of GPs who had reaped the benefits of EHRs, accompanied by the political will and support of the government, provided ample legitimation to initiate a national level integrated care records project. The benefits reaped from computerised practice in the UK, and the success stories of health IT in other countries, provided evidence to serve the persuasive tactics employed by commercial stakeholders, to convince policy makers of the need for a national health IT initiative.

The appropriateness of this source of legitimation is to be questioned however, as the NPfIT was tainted by a political agenda and a façade of engagement with clinicians (see Chapter 3). While the government's drive towards modernisation included aims to increase the use of IT in healthcare (Mark, 2007), the NPfIT itself was launched following decisions taken by policy makers behind the doors of 10 Downing Street (see page 119). This was a direct consequence of the persuasive power of leading IT vendors who convinced the less technology savvy policy makers of the transformative nature of health technologies, and their capabilities to deliver a large scale national project which would provide a single integrated health record for all individuals.

'Hype' and 'exaggeration' are often used to convince users of the urgent need and readiness for implementing new innovative technologies (Ramiller, 2006), and the NPfIT

serves as a classic example of how this came into play. My interview respondents felt that vendors were naïve and underestimated the complexity of the NPfIT. Vendors, in their keenness to gain profits and secure NPfIT contracts exaggerated their capabilities and the potential of the systems they could deliver to transform healthcare delivery in the UK, employing a rhetoric of 'transformation' (Ramiller, 2006).

A rhetoric of 'novelty', characterised by the innovative nature of the project, was accompanied as Ramiller (2006) suggests, by a rhetoric of 'interpretability', as both vendors as well as political players made efforts to convince the public that the project was not only feasible, but of great benefit to the health system. The 2.5 year timescale proposed by them at the initial meeting reflected their optimistic interpretation of the project's feasibility and ease of implementation, which was proved wrong with time.

The previously mentioned comparisons with health systems in other countries also contributed toward legitimising the project, as positive progress in other cases as well as the general trends and 'buzz' constituting community discourse often help justify the feasibility of new innovative projects (Ramiller, 2001a).

Though the potential for transformation through health technology usage is not unattainable, it is extremely challenging and risky given the complex nature of the sector, and these difficulties were underplayed or underestimated by those who were responsible for launching and delivering the project. Ramiller (2001) discusses this prospect of IT projects being undertaken as a result of the persuasive power of those in the technology sector, and the dangers of new technology implementation with inadequate information.

However, another school of thought suggests that IT players leverage on the complexity of the healthcare sector and use it to justify or safeguard their position in the market. Respondent R31, a clinical informatician, quoted Mandle and Kohane (2012: 2241) who suggest that 'EHR vendors propagate the myth that health IT is qualitatively different from industrial and consumer products in order to protect their prices and market share and block new entrants'. This is another example of the use of exaggeration and 'distorted communication' (Ramiller, 2006) in IT implementation, and which likely influenced decisions within the NPfIT organising vision right from its nascent stages, as IT industry players persuaded policymakers of the need for increased investment toward a national health IT system.

5.3.1.3 Mobilisation

Mobilisation refers to the effect of the organising vision on the market (Swanson and Ramiller, 1997). Before the launch of the NPfIT, the EHR market was characterised by several small suppliers and independent efforts by clinicians themselves (Sugden *et al.*, 2006; Benson 2002a, 2002b). The NPfIT changed the scene of the supplier market however, resulting in shifts in the relationships between the NHS, suppliers and clinicians by the establishment of four local service providers (LSPs) for the five clusters identified (Sugden *et al.,* 2006; Connecting for Health, 2005b). This distribution of delivery responsibilities across four providers changed, as two LSPs left and the programme was shouldered entirely by two LSPs toward the latter stages (see Table 3.1, page 79).

The complexity and scale of the NPfIT meant that the chosen suppliers had to be either proven experts in the health technology domain, or novices to the field who did not comprehend the challenges of the programme. That it was the latter that secured the

suppliers their contracts, was the dominant view of my interview respondents. Much concern was raised regarding the capabilities of these LSPs to see the vision to successful completion. Respondent R17's account (see page 123) of the lack of understanding on the part of one of the suppliers reflects the apprehension surrounding the LSPs. Smaller supplier companies, many of which were clinician led, were also affected by the changes imposed by the national programme. As one respondent (R35, see page 232) explained, the only reason they survived was because the NPfIT did not.

The original plan to outsource NPfIT systems did not materialise as the government made efforts to ensure that the positions of existing NHS staff were stable (Respondent R6, page 126). There hence seemed to be efforts by the government to protect the interests of the NHS staff, reflecting the potential conflicting roles governments need to play in large scale public sector projects (Bruzelius, Flyvberg and Rothengatter, 2002).This affected the way the LSPs worked, and may have compromised the way they implemented their systems.

5.3.2   Community discourse and buzzwords

The NPfIT had its share of 'buzzwords' and 'legitimated vocabulary'. The transient nature of buzzwords in the career of organising visions (Swanson and Ramiller, 2003) is evident in the way the focal idea at the start of the programme was integration of healthcare, and how this later shifted to the idea of connected healthcare systems with ensured interoperability *(*NAO*,* 2011). The establishment of an agency named 'Connecting for Health' (Connecting for Health, 2005a) to carry forward the NPfIT echoes this shift. This renaming of the NPfIT may itself may be regarded as a rhetorical mechanism employed to persuade the public of a change in strategy (Ramiller, 2006). The project was also

characterised by vocabulary specific to its implementation, such as sealed envelopes, opt-in/opt-out, Choose and Book, Summary Care Record (SCR), Detailed Care Record (DCR), N3 network, etc., constituting the legitimated vocabulary of the NPfIT NCRS organising vision.

The NPfIT's large scale and public sector setting involved numerous stakeholder groups including clinicians, IT suppliers, the government, the Department of Health and patients, all having varying interests and powers. These community stakeholders all have a role in shaping the discourse surrounding the organising vision (Swanson and Ramiller, 1997).

The existence of different and potentially conflicting perspectives has parallels to pragmatic boundaries where people need to acknowledge differences in order to effectively transform and exchange knowledge across boundaries (Carlile, 2002). The interactions and tensions between the defenders, sympathetic critics and professional critics of the programme negotiated its progress, and formed the community discourse surrounding the NPfIT organising vision. The inconsistencies and disputes between stakeholders does however detract from the coherence of the organising vision, as was illustrated in the case of telehealth by Greenhalgh *et al*. (2012). These disparities may be the reason why technologies that offer big promises often fail to be widely adopted and consequently fail to deliver (Greenhalgh *et al.*, 2012).

Figure 5.1 (page 142) illustrates how these different choruses (Sauer and Willcocks, 2007) constitute the community stakeholder groups in the NPfIT organising vision (Swanson and Ramiller, 1997). Swanson and Ramiller (1997) regarded the IS practitioner subculture as a distinct group which shapes the organising vision. While this is indeed true, as the specifications of the programme may have also depended on what the suppliers had to

offer as suggested by Respondent R5 (page 124), it is also important to recognise that suppliers too may be categorised along with the Department of Health and Connecting for Health as defenders of the NPfIT, as they needed to justify their performance and progress in the delivery of the systems. Further, while Sauer and Willcocks (2007) had a fixed categorisation of these three choruses, I suggest that the stakeholder groups in the NPfIT were not necessarily always contained within the same chorus. The complex dynamics of the NPfIT meant that those who were at one point defenders of the programme could at a later point move to being a critic of the programme due to the lack of engagement and the many other shortcomings of the NPfIT.
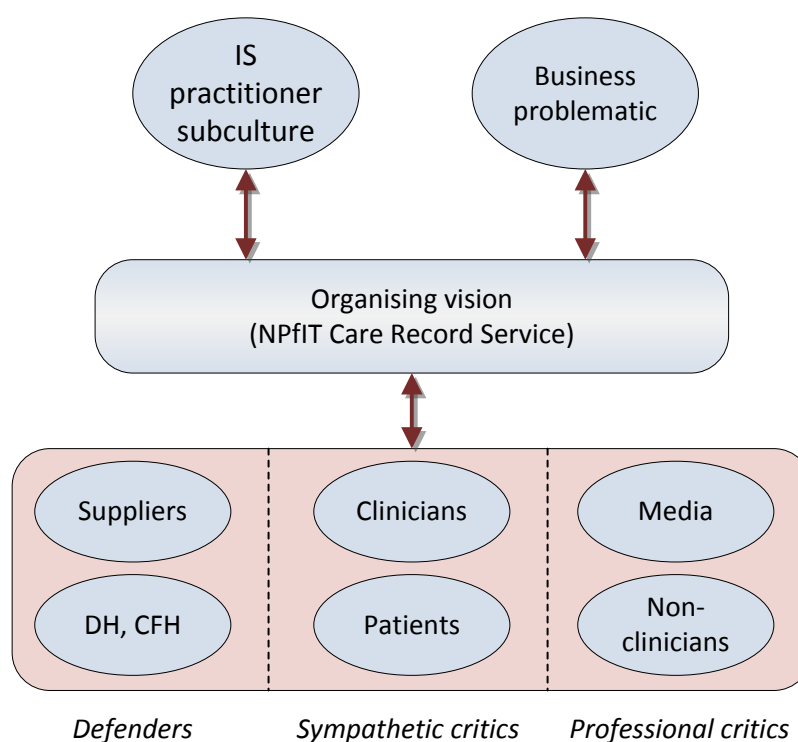
Figure 5.1 Stakeholder groups in the NPfIT organising vision

In retrospect, considering the highly turbulent path of the NPfIT, it is necessary to explore the need and demand for the programme, to understand how the organising vision developed over time. Whether it was a felt need or just 'an expensive and problematic

solution to a non-existent clinical problem', as Robertson *et al.* (2010) inferred from one of their respondents, is a question which begs to be answered. A recurring thought voiced by respondents was that it was a 'good idea'. Ideas however need more than plans, specifications and development to be realised. The key underlying need was informed and contextualised specifications that took into consideration the views of the multiple stakeholder groups concerned.

5.3.3   The manipulations and shifts in vision

The NPfIT adopted a centralised top-down strategy, attempting to roll-out the 'one system fits all' approach (Major Projects Authority, 2011: 12) using 'ruthless standardisation' as stated in its early strategy document (DH, 2002a: 8). Once it was realised by the NPfIT leadership that this was an unworkable approach, the buzzwords changed and the focus shifted to connectivity and interoperability. The change in government in 2010 served as a catalyst for this shift, and by September 2010 the DH announced the abandonment of the centralised approach (DH, 2010; Bruce, 2010). While most respondents conceded that the *idea* of a national care record service was good, the approach taken was unfeasible. This shift may have been due to the significant concerns raised by stakeholders. Negative media publicity would have influenced the dynamics between the professional critics and the defenders (Sauer and Willcocks, 2007) of the programme, and played a role in rethinking the NPfIT strategy.

The NHS CRS was regarded as essential to 'join up' the NHS to provide patient centred care (The NHS Confederation, 2004). While this might connect the different parts of the NHS itself, it didn't seem to accommodate the possibility of connecting the *patient* to the NHS, something which probably needs to be given further consideration with the

increasing involvement of patients as partners in their care (Liang, 2007*)*. This increasingly

involved role of patients is evident from a survey (HealthWhich? and NPfIT, 2003) which

indicated people's wish to have online access to their records from home.

Despite this evidence of patients' interest in gaining better access to their records, and

the initial proposal of a patient-centred spine as indicated by my interview data, the early

strategy adopted by the programme did not give room for such patient involvement.

While medicine is increasingly specialised creating highly fragmented healthcare delivery,

the health needs of patients too are evolving and becoming more complex and difficult to

confine to a single medical specialist (RCP, 2011). This may have been addressed by the

creation of individual spines for each patient, in accordance with the original vision as

expressed by Respondent R17 (see page 120). However, not only was the concept of the

spine manipulated to create a national Spine which was not the initial intention, but

clinicians were deliberately ignored and their dissent was taken as a sign of being

uncooperative and stubborn.

5.3.3.1 A semblance of success

Launched with the NHS Care Record Service (NCRS) being one of the core features, later

progress reports included other components portrayed as successes. The misleading

illustration of an x-ray image on the cover of and NAO (2006) report (see section 3.2.5)

was used to subtly convince people that the national programme was progressing

smoothly. However, the reality that the core component, namely the NHS Care Record

Service, was facing hurdles suggests that this use of an x-ray image on the cover of a

report was a form of distortive communication (Ramiller, 2006). This 'rhetoric of

accomplishment' (Ramiller, 2006) was employed by the NPfIT to justify its progress and as

a legitimising tool to proceed with the project despite a lack of success in other key components such as the NCRS.

The use of the x-ray cover image illustrates how media was exploited to pervert the general awareness of the programme's progress. Alongside this, however, there was a significant amount of negative media coverage as well on the project (Brooks, 2007). Such images and symbols constitute the written community discourse which structures and steers the organising vision (Greenhalgh *et* al., 2012). Interviewees acknowledged that there was much publicity surrounding the NPfIT, and the press coverage also had an influence on the general public perception regarding the national programme. The interplay of these diverse views and media publicity added momentum to the level of dissent, and likely acted as triggers for rethinking the approach adopted to the project.

5.3.3.2 Changing structures

The NPfIT was punctuated by the dismantling of established entities such as the NHS Information Authority, the National Clinical Advisory Board and the Patient Advisory Board, and saw the formation of new structures such as the Care Records Development Board (CRDB), Connecting for Health, and the various new engagement mechanisms such as the national clinical leads (NCLs) (see Section 3.2.4). Interview data pointed to a feeling that these changes were disruptive and served no real purpose, as suggested by Respondent R29's description of the CRDB as 'cardboard' (see page 127). The lack of adequate clinical representation on the CRDB also meant that the engagement mechanisms employed did not draw on the different perspectives of the many stakeholders present in the NPfIT organising vision. Boards need to have a range of people to facilitate debate and the expression of alternative views by dissenters

(Fitzgerald and Ferlie, 2000). The NPfIT management objected to such dissenters however, and when encountered with opposition, opted to eliminate it, as in the case of the NCAB, rather than engage with it.

The NHS Care Records Service was one of the core components of the NPfIT and was described as the 'main plank' of the programme (House of Commons Health Committee, 2007:p3). It comprised of the Summary Care Records (SCRs) at a national level and the Detailed Care Records (DCRs) at a local level. In the case of the NPfIT, 'legitimated vocabulary' did not sprout out of IT professionals' jargon alone (Swanson and Ramiller, 1997), but as a result of clinical and managerial inputs as well. This was evident from respondent R12 (a national clinical lead) who stated that terms such as DCRs were 'dreamt up' merely to distinguish between existing systems rather than necessarily being new systems which were to be implemented. The already existing GP systems were hence the DCRs of the primary care sector; it was the secondary care DCRs which were pending development and which were the focus of the NPfIT.

5.3.4 The NPfIT legacy

At the end of its evolutionary journey, an organising vision could either fade into oblivion, failing to leave a mark, or it could become accepted, institutionalised and camouflaged in its landscape – in either case, ultimately losing its conspicuousness (Swanson and Ramiller, 1997). Though officially dismantled in 2011 (DH, 2011), individual components of the national programme such as Choose and Book have been implemented, widely adopted, and continue to operate. The NHS Care Record Service which was to be connected to a national Spine on the other hand, was not seen through to completion. Neither of these components are entirely out of public discussion however, the former

being a relatively new service, and the latter being one that was and still is subject to various debates. Clearly, though the NPfIT may be officially dismantled, or as some would euphemistically say 'reconfigured', its organising vision has not ended.

With Connecting for Health dissolved in April 2013, the Summary Care Records are now under the responsibility of the Health and Social Care Information Centre (HSCIC), and their implementation appears to be going ahead despite the absence of the NPfIT. The vision for EHRs then, is continuing in a different capacity from what was initially put forward in 2002 when the programme was born. Changes in the defenders (Sauer and Willcocks, 2007), due to new leadership for the Summary Care Records, and the modified scope of the spine from what was originally proposed are some of the reasons for this.

While remnants of the NPfIT such as the Summary Care Records and Choose and Book continue to exist, they are no longer under the banner of a single national project like the NPfIT. The persistence and continued presence of these components can be discussed in terms of boundary objects that get 'transformed' and 'reincarnated' without completely disappearing (McGivern and Dopson, 2010). This is discussed further in Section 5.4.

In order to see success in the implementations of these legacy components, it is useful to identify the barriers that were encountered and not overcome during the course of the national programme. Efforts are now being made to establish clinically approved standards, and these were lacking in the early formative years of the programme. The recognition of clinicians as experts in the needs of their clinical practice is a precursor to meaningful engagement. Further, the tensions which were evident between clinicians and suppliers during the NPfIT need to be ironed out, as it is increasingly evident that clinicians are taking a more active role in IT usage and development (see Chapter 7), and

are often adequately knowledgeable to state their requirements and specifications to providers.

Given the presence of multiple stakeholders each having their own views on the emergent buzzwords in an organising vision, I suggest that the content of these discourses can be explained in terms of boundary objects which are also subject to multiple and evolving interpretations (Star and Griesemer, 1989; Rheinberger, 1992). Having illustrated how the NPfIT can be considered an organising vision, and elaborated on some of the stakeholder dynamics and discourses which were evident during the national programme, I now proceed to discuss how the concept of boundary objects can be applied to the NPfIT organising vision.

5.4 Boundary objects within the NPfIT organising vision

In looking at how technology itself acts as a boundary object between different community members (e.g. different groups of health professionals), Fox (2011) highlights the capabilities of technology to be either facilitative or hindering to cross-boundary collaboration. The multidisciplinary nature of information systems resonates with the idea of objects occupying multiple social worlds (Star and Griesemer, 1989). The NPfIT spanned multiple worlds (political, clinical, technical, commercial and academic) (Greenhalgh *et al.*, 2010b), and is a classic example to discuss the concept of boundary objects.

The flexibility and vagueness of boundary objects allows them to be interpreted differently by various community stakeholder groups (Fox, 2011), while at the same time retaining a structure recognizable and relevant to these different contexts (Pawlowski and Robey, 2004; Swan *et al.*, 2007). This characteristic of boundary objects is particularly

relevant when considering their relevance to organising visions, as the discourses that constitute an organising vision see the emergence and fading away of buzzwords that are viewed with different and potentially conflicting perspectives by those involved (Swanson and Ramiller, 1997). Greenhalgh *et al.* (2012) highlight the different world views held by multiple stakeholders in the field of telehealth, and the conflicts between them meant that there was no clear organising vision in place.

While the existence of boundary objects suggests a common subset of knowledge that overlaps across boundaries and binds different groups together, this same knowledge is used by different users to assess each other (Carlile, 2004). Consequently, knowledge at such boundaries does not always have a binding effect, but could also be a source of contention between various stakeholder groups, resulting in a combination of dialogues as well as tensions between them. This contributes to the stakeholder dynamics which are responsible for shaping organising visions (Swanson and Ramiller, 1997), suggesting that boundary objects occupy a pivotal role in facilitating dialogues and the evolution of dominant buzzwords and rhetoric during the lifespan of an organising vision.

Cetina (1997) and Rheinberger (1992) when discussing the distinction between epistemic and technical objects, emphasise the evolutionary nature of the former versus the fixed and concrete nature of the latter. Just as buzzwords or dominant rhetoric in an organising vision change over time with community stakeholder groups having different perspectives to them (Swanson and Ramiller, 1997), epistemic objects are subject to multiple interpretations by different groups, and their representation (which may be in the form of a technical object) transforms with time, unlike technical objects.

Like organising visions that have a lifespan or career marked by emerging and fading buzzwords (Swanson and Ramiller, 1997), objects too are subject to devaluation or declining importance (Engeström and Blackler, 2005). In discussing the NPfIT as an organising vision, the transient buzzwords and phases through which the programme travelled may be likened to abstract epistemic boundary objects, as the project had an amalgamation of diverse stakeholder groups that had different interests and levels of involvement.

By representing the prevalent thoughts from multiple stakeholders regarding an innovation at any point of time, buzzwords mark the different stages in the career path of an organising vision (Swanson and Ramiller, 1997). Those buzzwords which subside with time have parallels to negative boundary objects (Fox, 2011), as they fail to gain acceptance, and instead give way to other buzzwords which gain prominence and which can be likened to positive boundary objects (Fox, 2011). The concept of sealed envelopes in the NPfIT is an example of a buzzword which subsided, particularly due to the negativity associated with the potential for lapses in patient data confidentiality and security.

There is little evidence of transformation of knowledge at boundaries in the NPfIT, as there was a tendency to resist engaging in meaningful sharing, translation and transformation of knowledge. Instead, my interview data indicated that the expertise acquired by clinicians in the IT domain was dismissed as irrelevant, and IT vendors and managers proceeded with their execution of the project without regard for the valuable knowledge possessed by clinicians who had successfully implemented their own IT

systems (Benson 2002a, 2002b). Chapter 7 elaborates on these technology adept clinicians, and their vital importance to future health IT projects.

I now focus on the abstract form of boundary objects, which in this case is characterised by key phases and issues which marked the NPfIT.

5.4.1   The NPfIT as a temporal boundary object

While the NPfIT lacked a clear projected timeline at the time of its conception, as there was negotiation over the estimated duration of the project right from the meeting at 10 Downing street (see section 3.2.1), it must be remembered that large scale projects often lack a holistic timeline due to the complexities and large number of stakeholders involved, increasing the levels of uncertainty (Chang, Hatcher and Kim, 2013). This implies shifts in priorities and activities over the course of the project, bringing into the picture the concept of temporal boundary objects (Chang, Hatcher and Kim, 2013; Yakura, 2002), where different phases in a project may be likened to boundary objects.

While timelines can be portrayed through graphical representations as in Figure 3.1 (page 87), they also have a narrative element, which is provided by a range of stakeholders having different subcultures, occupations and perspectives (Yakura, 2002). This has similarities to the discourse amongst stakeholders in an organising vision (Swanson and Ramiller, 2006). It is this narrative quality which distinguishes temporal boundary objects from other boundary objects, as it suggests the existence of a beginning, a middle and an end (Yakura, 2002). Analysing the NPfIT as a series of temporal boundary objects that marked the project timeline (see Figure 3.1, page 87), the varied and often conflicting interests of stakeholders are useful in understanding the transitions and shifts in the implementation of the programme. The 'beginning' of the NPfIT narrative was rooted in

the initial meeting between policy makers (see section 3.2.1). Yakura (2002) when discussing project timelines, discusses 'prospective timelines', recognising that the deadlines and milestones which are set are often not met (due to a lack of consideration of the multiple stakeholders having different subcultures), resulting in a gap between the intended and actual schedule. This is seen in the case of the NPfIT as well, where the time frame and schedule outlined when the programme was first conceived were very different from the way the programme was actually implemented.

Prospective timelines are often made without taking into account the influence of multiple stakeholders with different subcultures (Yakura, 2002). It is for this reason that it is essential to distinguish between the phases of projects such as the NPfIT and use the concept of boundary objects to understand the different interpretations of the stakeholders involved. Figure 3.1 (page 87) provides a retrospective timeline of the NPfIT project, using key literature, official publications and interview data to reconstruct the key phases of the NPfIT project as it was implemented. The 'concreteness' of such a timeline combined with the negotiations and flexibility involved in the interpretation of the various phases are key to the role of the timeline as a temporal boundary object (Yakura, 2002).

The 'death' and 'reincarnation' of objects (McGivern and Dopson, 2010) can be observed by the way the spine was transformed, and reincarnated as Summary Care Records. The manner in which the remnants of the NPfIT proceed is also likely to reflect a degree of transformation and reincarnation (McGivern and Dopson, 2010), as initially envisioned aims adapt to the absence of a national programme to carry them through to implementation.

I now proceed to elaborate on the boundary objects which were evident in the NPfIT organising vision and which were part of the on-going community discourse.

5.4.2 The boundary objects surrounded by community discourse

The concept of interpretive flexibility (Pinch and Bijker, 1987) has been viewed as relevant to the NPfIT as there were diverse opinions regarding the implementation of its key components throughout the different project phases (Papazafeiropoulou and Gandecha, 2007). This exposure to multiple interpretations is characteristic of epistemic objects which are subject to change, and unlike 'technological objects', are not fixed (Rheinberger, 1992).

Following the initial contracting process, there were shifts in the engagement mechanisms adopted. While the programme began with the presence of formal clinical advisory groups such as the National Clinical Advisory Board, restructuring and political tensions resulted in a period of superficial engagement mechanisms (see section 3.2.4). Both, the contractual arrangements as well as the engagement mechanisms adopted may be regarded as boundary objects, as the different community stakeholder groups related to these in different ways, and had their own perspectives on the appropriateness of the strategy adopted. With time, the increasing recognition of the importance of patient empowerment and patient needs sensitised the programme to the need to address concerns surrounding patient confidentiality and security. I will now elaborate on these three aspects, namely planning and contracting, engagement, and privacy and confidentiality, regarding each of these as abstract inter-epistemic boundary objects which constituted the NPfIT.

5.4.2.1 Planning and contracting

The conceptualisation and planning of the national programme began in February 2002 at the initial meeting between policy makers and industry experts (see section 3.2.1). This marked the beginning of the planning and contracting phase which is discussed here. However, the very start of this phase evidenced misrepresentation of data and a lack of transparency between policy makers, industry players and the end-users of the programme, similar to that described by Flyvberg, Holm and Buhl (2007).

Respondent R17's account of the initial meeting with policymakers at Downing Street (see page 119) illustrates how costs and benefits were misrepresented (Flyvberg, Holm and Buhl, 2007), as the initial figures regarding the NPfIT's cost and timeline were proposed in an effort to meet the demands of superiors, rather than as a result of logical and systematic calculations. Those present seemed aware of the futility of the national programme, but may have been obliged to comply and consent to it in order to appease their superiors and satisfy their demands – an issue frequently faced in such large-scale projects (Flyvberg, Holm and Buhl, 2007). Such cost estimations manipulated to satisfy higher authorities indicate forecasts geared more toward justifying a project rather than genuinely evaluating its feasibility and benefits (Wachs, 1990b). The decision as to whether to proceed with the project may already have been taken by those who were in a position to do so, and the project estimates were utilised to support their decision, and not to assess it. Respondent R20's description of the Department of Health's strategy to 'decide, consult, defend, implement' (page 129) reflects the dogmatic top-down decision making approach to the NPfIT project, wherein decisions were already made by decision makers even before consultation with the public.

This dominance and manipulation on the part of the NPfIT leadership influenced the nature and speed of securing the contracts, which themselves may be regarded as boundary objects (Gal, Lyytinen and Yoo, 2008; Koskinen and Mäkinen, 2009). The formation of the contract as a boundary object is often triggered by an initial project idea which arises out of a need for expansion or modernisation (Koskinen and Mäkinen, 2009), as in the case of the NPfIT (Cabinet Office, 1999; Wanless, 2002). Contracting and procurement in the NPfIT was carried out over a span of a few months, from late 2003 to early 2004. This was a relatively quick time frame considering the large scale and complexity of the programme.

The signing of the contracts was not only a hasty process, but one which was subject to much secrecy (Brooks, 2007) The choice of suppliers was the outcome of a bidding process, although many respondents suggest that the LSPs were chosen not on the basis of their capabilities in the healthcare domain, but on their *lack* of such experience. Their ignorance meant that they were likely to be unaware of the magnitude of the national programme and the complexities involved, making it easier for the NPfIT management to convince them of the feasibility of the programme. This suggests a reticence on the part of the government and NPfIT management to genuinely welcome solutions that bridged boundaries between different users' needs in favour of the rigid timescale and specifications which the NPfIT laid down.

These dynamics between the suppliers on the one hand, and the government and NPfIT management on the other, also indicate that persuasive mechanisms such as rhetorics of 'transformation' and 'novelty' (Ramiller 2001a, 2006) were employed not only by industry players to convince policy makers of the boons of a national programme, but by the latter

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as well, to concur with IT suppliers and persuade them regarding the feasibility of the NPfIT.

Despite the importance of clear communication and specifications to ensure the contracts were in agreement with what the different stakeholders required, the NPfIT was characterised by manipulation, miscommunication and political power, as is the case in many large scale projects (Flyvberg, Holm and Buhl, 2007; Wachs 1990a, 1990b). This was seen in the way policymakers negotiated the timetable for the NPfIT, beginning with an unrealistic two year timeframe and finally settling on a 2.5 year plan without any real discussion of what this entailed (see section 3.2.1). Not only did policymakers seem oblivious to the assumptions made in arriving at this optimistic time frame, as Wachs (1990a) suggested is often the case, but those who presented the project plans to these policy makers seemed to be obliged to come up with favourable estimates so that the project could proceed. This is in line with Flyvberg, Holm and Buhl's (2007) suggestion that people are often under pressure during project planning meetings with higher authorities.

The combination of overestimated demand and underestimated cost provide an optimal cost-benefit outlook for projects, and once such projects have been sanctioned, they are unlikely to be aborted even when cost overruns are identified. There is a high likelihood of increased efforts to somehow find funds to support a project once it is in progress (Wachs, 1990a). The NPfIT began with an initial cost estimate of £6 billion and this figure spiralled up to £11.4 billion (Sauer and Willcocks, 2007; NAO, 2011). Later the NAO (2013) reduced the estimated cost to £9.8 billion, as the number of systems rolled-out was reduced, and delays and renegotiated contracts with some LSPs made it difficult to

estimate an exact figure for some costs. Concerns were raised as taxpayers' money was channelled toward this national project which had what many people regarded as an infeasible timeline (Randell, 2007).

The contracting process, right from the invitation for bids to the negotiations and potential changes in specifications, is one which entails much interpretation of the contract documents by all parties, and there is a need for a common understanding and consensus to be reached between the different communities involved (Koskinen and Mäkinen, 2009). The inputs of multiple stakeholder groups during this phase was key to determining the finer details of the contracting phase, and had an impact on the overall path of the NPfIT organising vision (Swanson and Ramiller, 1997). As was evident from my data, there were distinctions in the way different parties interpreted the very concept of the spine. The resultant NPfIT contracts conceptualised the spine as a single national Spine.

Not only did the specifications get influenced by the intentions and technology frames of the more influential groups in the NPfIT (Davidson, 2002; Walsh and Fahey, 1986), but their dominant discourse steered different views (Suddaby and Greenwood, 2005) to such an extent that with time, people were unaware of the initial incongruence between the different conceptualisations of the spine. Subsequently, the initial concept of individual spines was not known to most people, as indicated by my interview respondents, illustrating the influence of technology frames of more influential groups in the decision making process of such projects (Davidson, 2002; Walsh and Fahey, 1986).

Contracts are hence critical in formalising and making known the requirements, expectations and schedules for a project, and act as boundary objects between the

different project stakeholders by encapsulating the formal consensus on project specifications. However, they may also obliterate memories of processes and decisions taken *prior* to this phase, as they serve as the primary reference point in the future, regarding the project specifications. The initial concept of multiple 'spines' in the NPfIT for instance was not recollected by most of my respondents who knew the 'spine' as a single national Spine, as the contracts did not document the original idea of multiple people-centric 'spines'.

The lifetime of the spine as an object clearly has parallels to the three stages discussed by McGivern and Dopson (2010), namely vision, transformation and reincarnation. The spine acted as an inter-epistemic object (Cetina, 1997; Rheinberger, 1992), as it was subject to different interpretations by different stakeholder groups, and its conceptualisation changed significantly over the course of time. Initially intended to have multiple patient-centric 'spines', the concept of the spine underwent transformation and was 'reconceptualised' (Engeström and Blackler, 2005) in a different form, i.e., as a single national Spine. The nearest resemblance to the original conceptualisation of the patient-centric spine is held by the Summary Care Record implementation that is meant to hold a summarised overview of patients' health details. Thus the initially envisioned contents of the spine were reincarnated using a different technical object (McGivern and Dopson, 2010), namely, the summary care record.

Further ambiguity was created by the proliferation of NPfIT specific jargon, some of which were 'dreamt up' as explained by Respondent R12 (see page 121) as there was a lack of clear specifications with clinical input. Contracts need to incorporate clearly defined

agreements after consultation with stakeholders so that there is a common understanding on which suppliers can base their work.

Respondent R23's account of the lack of clear definition in the specifications (see page 121) indicates that this 'vagueness' (Rheinberger, 1997) of the contracts lent an element of interpretive flexibility (Pinch and Bijker, 1987) to them as they could be interpreted differently by clinicians and IT suppliers. A similar example is seen in McGivern and Dopson's (2010) study documenting the translation of genetics science into practice in a multi-disciplinary genetics science network, where the indeterminate nature of the contracts provided an opportunity for knowledge experts to take control of the project's jurisdiction.

In the case of the NPfIT, the lack of attention paid to clinicians who had successfully computerised their practices (see Chapter 7) meant that the 'experts' who controlled the contracts were the IT suppliers. Respondent R23's description of the interpretation of the contracts indicates an underlying conflict in the way different stakeholders chose to understand the contracts. As IT development is a profit-making opportunity for IT suppliers, they opt to meet requirements with minimal effort. This suggests that ambiguity in contracts can result in sub-optimal results, as the IT product developed may be designed to meet the financial motives of IT suppliers, rather than the needs of clinical users. The interests of those who develop a system are likely to be reflected in its design (Orlikowski and Gash, 1994) and this was Respondent R23's underlying concern.

The need to take into account different kinds of knowledge when resolving problems is a characteristic of a boundary object (Carlile, 2002). The procurement process is one such example, which should have ideally included providers who had expertise not only in

large scale IT projects, but also in healthcare. The need for not just transferring and translating knowledge, but also transforming knowledge across these boundaries (Carlile, 2004) should have been given priority, in order to build on the experiential knowledge acquired by those involved.

The IT suppliers' limited knowledge of the healthcare sector, as indicated by my interview respondents, may account for their initial optimism surrounding the NPfIT and the consequent cost and time underestimations. This was evident from respondent R17's conversation with one of the IT suppliers who naively regarded the NCRS as a messaging system or a database (see page 123). Flyvberg, Holm and Buhl (2007) emphasise the importance of learning from past failures to help eliminate undue optimism at the start of projects, and this was lacking in the NPfIT.

While many criticised the process for attracting suppliers who had no experience in the healthcare sector, the lack of clinical input and the unfeasible timelines, a minority of respondents viewed the contracting process as well executed, incorporating strategic tactics such as payment of suppliers only on delivery of the systems. Clearly, though there were different opinions surrounding the contracting process as a boundary object, the dominant view was that it was hasty and lacked clinical engagement.

This lack of genuine meaningful engagement was one of key criticisms of the NPfIT (Brennan, 2007). This phase should have seen the consultation and involvement of that niche group of professionals, the clinician-IT hybrids, which will be discussed further in Chapter 7. These professionals who had a valuable combination of clinical as well as technical know-how, would have been critical to facilitating the transformation of knowledge across boundaries, so that the IT systems could be implemented in a manner

which met the specific needs of clinicians. Instead of leveraging their expertise, IT suppliers did not regard the work done by such clinician-IT professionals as important. This was seen by their practice of bringing in clinical programmers from the Common User Interface team relatively late in the development process – a tactic regarded by respondent R31 (page 125) as an attempt to mask the lacunae of the vendor-developed systems.

The lack of clinical engagement intensified the resentment felt by clinicians toward the programme management and suppliers. Interview data presents a picture of suppliers as opportunistic, profit-seeking and too naïve to appreciate the complexities of the project they were getting themselves into. As Respondent R5 highlighted (see page 124), the specifications revolved around what the suppliers offered, rather than what the clinicians *needed*, and this defeated the purpose of the proposed systems which were not geared to meet clinical requirements.

The suppliers' lack of experience in the healthcare domain acted as a further barrier to facilitating knowledge translation and transformation (Carlile 2002, 2004) with regard to the NPfIT, and the programme tended to isolate and distance the technology and clinical domains, rather than seek to bridge the two. Hence, the choice of suppliers was itself a determinant to the nature of community dynamics and knowledge translation and transformation in the NPfIT.

5.4.2.2 Communication and engagement

As explained briefly in the previous section, concerns regarding communication and engagement (or lack of them) were a common denominator for most interview respondents, and were highlighted in the later audits and reports of the NPfIT. Discourse

surrounding an organising vision is prone to points of discord and friction (Swanson and Ramiller, 1997). This drives home the need to engage with these different groups possessing different knowledge sources so that contentious issues that act as boundary objects between stakeholders may be resolved in a manner which takes into account the unique knowledge as well as needs of the diverse stakeholders involved.

Ramiller (2006) discusses the use of 'exaggeration' as a type of rhetoric used to convince and persuade. He suggests that this may sometimes lead to 'communicative distortion' due to the tendency to accentuate the good, and omit the negative. I suggest that this represents two types of communicative distortion: 'positive' and 'negative' distortion. In communicating the progress of the project, the NPfIT engaged in the former, by exaggerating the successes of components such as PACS. The contracting process was exaggerated as one which generated value for money, though later in the project it was evident there were undercurrents that led to providers opting to withdraw from the programme. Negative distortion was also employed by concealing the risks involved in the project and deliberately ignoring the concerns of clinicians. Superficial mechanisms to engage clinicians, compared to a 'sacrificial anode' by respondent R6 (page 126), showcase the limited efforts made by the NPfIT. In short, these consultations with clinicians were a protective mechanism to shield the programme from later accusations regarding lack of clinical engagement, rather than an actual effort to listen to the clinical requirements of those who would be the actual users of the NPfIT systems. The use of superficial consultations thus served the dual purpose of being both a placation mechanism to appease stakeholders, as well as a pre-emptive defence mechanism against future possible accusations of not having engaged with end-users.

External sources, or what Sauer and Willcocks (2007) term professional critics, also played a role in communicative measures, as they accentuated the lacunae of the programme and propagated it to the general public (see section 3.2.5). This then, was a different form of communication distortion (Ramiller, 2006), where the negatives were highlighted, due to the different stakes and interests held by the media. The intentions of policy makers and NPfIT management were at odds with the press, despite their common use of media for communication purposes; the former gravitated toward positive distortion by means of highly optimistic progress reports, while the latter questioned the project due to its drive to produce eye-catching and sensational stories for public interest. In discussing the communication and engagement mechanisms which the NPfIT employed, it is essential to understand the roles of some of the key players such as the policy makers and the media.

5.4.2.2.1 Political backing

The project's political backing (Cross, 2004) was clear, as several respondents pointed out the politically driven nature of the NPfIT. Evidence suggests that attendees at the famous Downing Street meeting at which the NPfIT was conceived (Cross, 2004) were well aware of the risks involved. The omission of the project's risk analysis in an early report was regarded as deceptive (Ritter, 2007) and it is unclear why the risky nature of the programme needed to be concealed. Given that at least some of those who played a key role in the initial meeting deciding on the launch of the NPfIT were aware of the unfeasibility of the project proposal, it would seem that there was a deliberate attempt to camouflage the riskiness of the project in order to provide credence to the political drivers for the programme. The accelerated nature of the programme launch and contracting process resounds with a 'rhetoric of urgency' combined with a 'rhetoric of implementability' (Ramiller, 2006) due to the desire to be at par with other countries who

were ahead in the game, and to rectify the lack of sufficient investment in health IT up till that point (Wanless, 2002). Policy makers and the NPfIT management tried to convince themselves and others of the feasibility of implementing the project within the initially specified timeframe, though it later proved to be grossly underestimated. The 'defenders' of the programme (Sauer and Willcocks, 2007) evidently employed 'distorted communication' (Ramiller, 2006) with the intent to skew public perceptions of the programme.

The dominant and controlling role played by NPfIT management and policymakers overpowered the potential for innovation that is the central focus of an organising vision. Despite the existence of clinician-led system specifications around the time the NPfIT began, these were ignored, misinterpreted and misrepresented to the extent that the very notion of the Spine as we know it today is in reality not what was envisioned by clinicians at the time. This could be due to manipulations by dominating stakeholder groups and their lack of understanding of clinical needs to the extent that they were oblivious to their misinterpretation of the specifications. It would also seem that prevalent institutionalised notions and the power of larger profit-seeking IT suppliers overpower creative and new ideas, thus presenting a conflict between the diffusion of innovative technologies (Christensen *et al.*, 2000), which is what organising visions are centred around, and the views of the dominant community members involved in the organising vision.

The dynamics between the management and the other stakeholders in the NPfIT was tinged with much friction, and though there were apparent attempts to talk and listen to each other, there were undercurrents which were aimed at preventing any fruitful

dialogue. This was seen by the suggestion that legal support be secured to pre-empt any attempts by end-users (regarded as 'the opposition' by a senior NPfIT official, as described by respondent R17, page 128) to question the NPfIT. While frictions are inevitable in the community discourse steering an organising vision (Swanson and Ramiller, 1997), they no doubt help inform and shape the views of the multiple community groups involved. In this case however, there was a wish to eliminate any possibility of dialogue, and to block possible channels of resistance.

5.4.2.2.2 Role of media and communicating to the crowd

The media played an important and dual role in the discourse in which the NPfIT stakeholders engaged. Not only was it a professional critic (Sauer and Willcocks, 2007) of the programme, but it was also a tool exploited by policy makers and the NPfIT to promote a picture and sense of false security, as seen by the use of a misleading cover image on the NAO (2006) report. This use of the media to influence public resulted in very different and conflicting versions of the programme's progress. While management and suppliers portrayed an upbeat picture, this was questioned in light of the NAO (2006) and House of Commons Committee of Public Accounts (2007) reports that pointed out huge delays and the lack of clear quantifiable benefits of the programme. The need to take stock of the project with the help of inputs from multiple sources led to the Electronic Patient Record Inquiry in 2007 (House of Commons Health Committee, 2007).

Much of the media coverage may have been for publicity purposes, rather than out of a genuine concern for the programme. The use of public channels of communication is closely linked with a political agenda, as they are used to propogate intentions that policy

makers have and may form a part of their ministerial duties, as explained by Respondent R34 (see page 131).

Respondent R34's opinion that much of the media publicity related to ministerial announcements is out of obligation and duty rather than actual need, resonates with McGivern and Dopson's (2010) study on how specific community groups use epistemic objects for different purposes including improved credibility. Just as academics rely on publications to build up their portfolio and reputation in the academic community (McGivern and Dopson, 2010), media articles and ministerial announcements can hold similar value for politicians, as suggested by Respondent R34's quote.

Taking this into consideration, there is evidently also a close relation between the use of media for public discourse, political agenda, and the subsequent consequences in procurement costs as a result of these politician driven announcements that implicitly call for modifications to the systems being implemented. Communication of the project's progress was a boundary object itself, as it was done by different stakeholders for different purposes. The defenders, sympathetic critics, and professional critics (Sauer and Willcocks, 2007), all had different reasons for wanting to engage in and receive communication regarding the programme.

The 'defenders', caught up in the hype of the transformative power of technology, were dogmatic in their top-down centralised approach, and disregarded the inputs of the 'sympathetic critics' who comprised the clinicians and other end users who would have experienced the impact of the NPfIT systems first hand. The 'professional critics', who were those in external professional bodies, would have typically been in a position to give an outsider's unbiased opinion on the project. However, the large scale nature of the

NPfIT and the complex nature of health technology projects meant that it included a large number of stakeholders, and even those who were supposedly external to the project had a personal interest in it, as it was to affect the manner in which healthcare was delivered. Those 'professional critics' who were in organisations such as the Royal Colleges and the British Computer Society, and who had no direct role in the project, were able to give an (informed) view of the programme. Despite this, it would be worth noting that the national pride with which the English NHS is generally perceived (Neuberger, 1999), would suggest that even external critics would have a personal stake. This may be one of the reasons why the NPfIT invoked such vehement criticisms and media attention, as it had implications for the general public as well, and was funded by the country's taxpayers.

5.4.2.3 Privacy and confidentiality

The privacy and confidentiality of patient data is highly debated (Foster and Young, 2012; Malin, Karp and Scheuermann, 2010). In the NPfIT, this issue was escalated to a higher level given the large scale and highly visible nature of the project. The prospect of easy access to patient data although of benefit to secondary care clinicians, was problematic for many GPs who regarded themselves as their patients' medical advocate and gatekeeper to patients' clinical information.

Further, the disregard for their success in using computerised records was an insult to GPs' capabilities, and they were reluctant to give up or compromise on what they had already achieved, and share information with secondary care easily, given the amount of effort they had already put into modernising their practices. Safeguarding their patients' data was then not only for the purpose of maintaining the sanctity of the doctor-patient

relationship, but also to protect their own business interests. This argument is elaborated in the next chapter.

While initial consultations on confidentiality issues were conducted by the NHS IA at the outset of the programme (NHS IA, 2002; Health Which? And NPfIT, 2003), according to one interviewee (Respondent R17, Clinical informatician, NHS IA) there was much that was not disclosed or taken into consideration. Instead, the programme reported that patients' overall response to the NCRS was 'extremely positive' (Health Which? and NPfIT, 2003, p3). This again illustrates how technology frames of more powerful and influential groups dominate projects (Davidson, 2002; Walsh and Fahey, 1986), and in this case, concealed or suppressed opposing views that conflicted with the intentions of the NPfIT. Later, issues related to privacy and confidentiality of patient records began to gain prominence, given the large scale of the project, the prospect of easy access to records from any place, and the increasing recognition of the role of patients in their healthcare.

While the programme eventually promised increased patient involvement and access to records in support of patient empowerment, there were concerns regarding the use of patient data for research purposes (Foster and Young, 2012). Debates on who owned these data gave rise to increased efforts to protect patient information by means of access controls and sealed envelopes. While patients could supposedly restrict access to data contained within these sealed envelopes, this could be overridden to extract pseudonymised data for research purposes (Brown, Brown and Korff, 2010). The risk of re-identification of such pseudonymised data was significant, and the conflicting views of patients, clinicians and researchers, on the use of clinical data for research purposes had to be considered (Brown, Brown and Korff, 2010). Finally, due to the complexity of

implementing sealed envelopes, they were never realised, and the concept was eventually abandoned.

With regard to the summary care records, Respondent R20 (see page 130) was clearly of the opinion that the Department of Health considered the *opt-out* option more convenient, and did not wish to take the extra effort of getting patients to make a deliberate choice. The Department of Health's approach of highlighting the disadvantages of opting out of the summary care records was a persuasive tactic to convince the public that it would be in their best interests to consent to having their health information in a summary care record.

Amongst clinicians too there were disparities, with secondary care doctors expecting the programme to facilitate an increased flow of information from primary care to secondary care. GPs on the other hand regarded their professional interests and the patient-doctor relationship as their first priority, and had concerns regarding the transfer of their information across the primary-secondary care boundary. The concerns raised by patients, the quest to gain access to clinical data by researchers and the business interests of primary care physicians, all constituted the community discourse which surrounded the subject of privacy and confidentiality of patient records. Some of these conflicting views may be linked to professional differences that I elaborate in more detail in the next chapter.

5.5   Conclusion

The complex and large-scale nature of England's NPfIT, and the dismantling of the programme in 2011 after several years of investment, make it an object of research for several scholars (Brennan, 2007; Car *et al.*, 2008; Coiera, 2007; Cresswell *et al.*, 2011;

Currie and Guah, 2007; Greenhalgh *et al.*, 2010b; Sauer and Willcocks, 2007). By analysing

phases in the NPfIT organising vision as boundary objects which evolve and shift in

priorities, this chapter addresses two needs: the need for research on how objects are

transformed (Engeström and Blackler, 2005; McGivern and Dopson, 2010) and for studies

investigating large scale EHR programmes (Takian *et al.*, 2012). Using the concepts of

boundary objects (Star and Griesemer, 1989) and organising visions (Swanson and

Ramiller, 1997), I present and analyse a brief narrative of the key phases in the NPfIT,

illustrating how the programme evolved and was subject to multiple stakeholder inputs

and perspectives as a part of the community discourse.

While organising visions (Swanson and Ramiller, 1997) are useful to study the discourse

that characterises organising visions for IS innovations, they do not pay adequate

attention to the interactions between the stakeholders who provide inputs to this

discourse. This limitation is addressed by using the concept of boundary objects (Star and

Griesemer, 1989) that interface between different epistemic groups and are subject to

multiple interpretations as a consequence of incongruent technology frames (Orlikowski

and Gash, 1994). This dual lens employing organising visions (Swanson and Ramiller,

1997) and boundary objects (Star and Griesemer, 1989) is a valuable tool as it helps

understand not only the emergent buzzwords which constitute discourse in an organising

vision, but also the dynamics between stakeholders for whom these buzzwords serve as

boundary objects.

The complex and evolutionary nature of large scale long-term projects and the notion of

temporal boundary objects (Chang, Hatcher and Kim, 2013) can be discussed in the

context of organising visions which see the emergence, subsiding and persistence of

buzzwords (Swanson and Ramiller, 1997) representing the prevalent thinking and rhetoric surrounding new innovations in a community of diverse stakeholders. As buzzwords in organising visions are subject to multiple interpretations due to the presence of diverse community stakeholder groups, they can be regarded as epistemic objects which undergo transformation, are perceived differently by various groups and subject to change as interpretations change over time (Rheinberger, 1992). The large scale of the NPfIT and the multiple stakeholders involved suggested that it was rife with ambiguity and could be likened to a temporal boundary object (Chang, Hatcher and Kim, 2013; Yakura, 2002) as it saw the emergence and fading away of various phases and priorities (Brennan, 2007; Sauer and Willcocks, 2007). These key phases (see Figure 3.1, page 87) were subject to different interpretations by stakeholders. Each phase (contracting, engagement, etc.) has parallels to Swanson and Ramiller's (1997) notion of buzzwords in an organising vision. This chapter focuses on specific phases and issues of the project which were also subject to contention and the different views of those involved.

Discourse involving various stakeholder groups shapes an organising vision, as buzzwords arise or subside at various points during the career path of the vision (Swanson and Ramiller, 1997). The dominant buzzwords of the NPfIT varied over time, and moved from integration to interoperability, and from the notion of multiple individual spines for patients to a single large national Spine holding all patients' health information. This illustrates the changing nature of the programme and relevance of boundary objects in this context, as the vision and constituent buzzwords were subject to different views and interpretations of the community stakeholders.

However, it is this very involvement of multiple groups having different professional and cultural perspectives that can potentially stifle the progress of innovation (McGivern and Dopson, 2010). The conflicts and tensions between the various epistemic and organisational groups involved in the NPfIT confirms recent research (McGivern and Dopson, 2010) on how such structures influence how objects are transformed.

The contracts and components of the NPfIT did not have clear specifications, making them epistemic objects (Rheinberger, 1997) with much ambiguity and interpretive flexibility (Pinch and Bijker, 1987). Initial requirements put forward by customers may be weakly structured as there may be a misunderstanding of the underlying needs and problems, resulting in a boundary object which is likely to be subjected to much negotiation and change (Koskinen and Mäkinen, 2009). These negotiations play a critical role in forming a stronger structured boundary object in the form of contracts, and the absence of such dialogue was one of the lacunae of the national programme.

In characterising the different technology frames of IT developers and users, Orlikowski and Gash (1994) highlight variations in the way these different groups regard the implementation strategy as well as the use of technology. The views of technologists and IT users are often in conflict with each other, and it is not uncommon for technology design to reflect the decisions of the former group who are responsible for its development (Davidson, 2002; Markus and Bjorn-Andersen, 1987), or the interests of management rather than clinical users (Berg, 2002). This too was evident in the NPfIT contracting process, given the lack of clinical input into the programme in the early stages.

Given the complex nature of this large scale health IT project and the many stakeholders involved (Brennan, 2007; Sauer and Willcocks, 2007), it was critical that the skills, requirements and perspectives of the multiple community stakeholder groups involved were taken into consideration so that there would be better utilisation as well as assessment of knowledge surrounding boundary objects (Carlile, 2004). In this context, the boundary objects include key issues such as technology procurement, patient data confidentiality, and communication and user engagement in the NPfIT. Inconsistencies and disparities between stakeholder groups often results in lack of coherency in an organising vision (Greenhalgh *et al.*, 2012), and in order to bridge the difference between such groups, the need for translation and transformation of knowledge at boundary points is emphasised. However, rather than regarding them as disruptions to be eliminated, Walsh and Fahey (1986) suggest that the resolution of such conflicts can be leveraged to contribute positively to a project.

Decisions made in a project are often dominated by the technology frames of more influential or powerful groups (Davidson, 2002; Walsh and Fahey, 1986). The NPfIT was initiated under the direction of high-level policy makers, and the IT suppliers and NPfIT management had greater leverage over the programme than the clinicians who were to be the actual end-users of the proposed systems. Markus and Bjorn-Andersen (1987: 500) suggest that IT designs that do not entirely meet with users' expectations may be regarded as a 'technical exercise of power' by information systems professionals over users. This confirms the view that technologists and other influential stakeholders dominate technology development and implementation decisions when compared to technology users (Orlikowski and Gash, 1994). The limited powers of those clinicians who

did occupy lead roles is evocative of the diminished authority of those in managerial roles in the public sector due to the coercive powers of those in more influential positions (Caudle, Gorr and Newcomer, 1991).

Given that technology embodies the objectives of its developers and key proponents (Orlikowski and Gash 1994), the transformation of the Spine from a patient-centric concept to a national Spine reflects a lack of patient focus or empowerment during the early phases of the NPfIT organising vision. The tendency for policy-makers to have a 'monument complex' (Flyvberg, Holm and Buhl, 2007) wherein they envision large-scale projects with high aspirations represents a different technology frame when compared to end-users of clinical systems who may be more interested in local tailored systems. The monolithic 'big bang' approach is often employed to meet politicians' 'need to show things are happening' (Craig and Brooks, 2006: 206). The technology frames of influential and powerful policy-makers as well as IT players redefined and 'reconceptualised' (Engeström and Blackler, 2005) the Spine, illustrating how technology frames of dominant groups influence the frames of other stakeholders and steer the development of IT (Davidson, 2002; Walsh and Fahey, 1986). The 'reincarnation' of the patient-centric 'spine' as a technical object, namely the Summary Care Record, is in agreement with studies that highlight the transient nature of objects, and the possibility of discarded objects resurfacing in different and more utilitarian forms (McGivern and Dopson, 2010; Engeström and Blackler, 2005).

There are disputes as to whether incongruent technology frames disrupt technology development, or facilitate better technology solutions due to the possibility of taking into account diverse perspectives (Davidson, 2002; Orlikowski and Gash, 1994). I suggest that

the possibility of improved interpretation of ambiguity by considering multiple technology frames (Orlikowski and Gash, 1994) has parallels to the interpretation of boundary objects which are positioned at the locus of incongruent technology frames as they interface between different domains. While boundary objects allow for interpretive flexibility, they also have a level of structure which provides some commonality by which multiple user groups can recognise the object (Sapsed and Salter, 2004; Star and Griesemer, 1989). This presence of flexibility as well as commonality in boundary objects is similar to shared frames (Orlikowski and Gash, 1994) which recognise the existence of a set of common core beliefs despite variations in interpretations between different individuals.

The high visibility of public sector projects (Bretschneider, 1990) such as the NPfIT and the likelihood that the preferences and opinions that stakeholders form during the nascent stages of a project are unlikely to change significantly at a later point (Bruzelius, Flyvberg and Rothengatter, 2002), emphasise the need for projects to be evaluated from their formative stages (Coiera, 2007). However, policymakers responsible for making decisions on the basis of forecasts and estimates are usually unaware of the assumptions employed in making these calculations (Wachs, 1990a), as in the case of the NPfIT. There was a deliberate act of misinforming policy makers and underplaying time and cost estimates, which may be regarded as ethically and legally unacceptable irrespective of the reasons behind such underestimations (Flyvberg, Holm and Buhl, 2007).

In discussing the inter-stakeholder dynamics and discourse which prevailed during the NPfIT, Ramiller's (2006) work on exaggeration as a form of communicative distortion is relevant to highlight the types of engagement and persuasion mechanisms employed. The

NPfIT was characterised by a significant amount of media discourse which was used to both praise its progress as well as to discredit its supposed achievements.

Building on Ramiller's (2006) discussion on exaggeration resulting in communicative distortion, I suggest a distinction between positive distortions and negative distortions, highlighting how these were evident in community discourse of the NPfIT organising vision. The high levels of scrutiny and evaluation typical in public sector projects (Bretschneider, 1990) was seen clearly in the NPfIT with multiple reviews by the NAO (2006; 2011), Committee of Public Accounts (2007) and the House of Commons Health Committee (2007). The media itself was used for both positive as well as negative distortion by the different 'choruses' of the programme, i.e. the defenders, sympathetic critics and professional critics (Sauer and Willcocks, 2007). While the defenders used media for positive distortion to exaggerate the successes of the NPfIT, the press and auditing bodies such as the Committee of Public Accounts utilised it to expose the faults and shortcomings of the programme, thus illustrating how media communication itself was used for very different purposes by the NPfIT organising vision's stakeholders.

The use of rhetoric as a strategy of legitimacy, employing persuasive language to either legitimate or oppose innovations (Suddaby and Greenwood, 2005) has relevance to organising visions, where diverse community stakeholder groups coexist and may be oriented to different technology frames (Orlikowkski and Gash, 1994). The dominant discourse or rhetoric very much shapes and steers their views, and can potentially facilitate congruency of their different standpoints toward the innovation (Suddaby and Greenwood, 2005). This was evident in the NPfIT in the way the different technology frames which shaped people's perceptions of the spine were influenced by the dominant

groups, namely the NPfIT management and the suppliers, and with time these views converged to the point that most respondents were unaware of how the concept of the spine originated.

The tensions between NPfIT management and suppliers, and clinicians, may have been aggravated by the latter who would not have relished the prospect of being subject to the control of managerial and IT groups who did not have the same professional status and reputation traditionally possessed by clinical professionals (Fitzgerald and Ferlie, 2000; Orlikowski and Baroudi, 1988). The resistance of clinicians to such manipulations further facilitates the phenomenon of restratification of the profession, which I elaborate in Chapter 7.

Looking at the NCRS component of the NPfIT using the dual lens of organising visions and boundary objects to investigate key issues including procurement, engagement and privacy and confidentiality has set the context for the next two chapters in which I narrow my focus to two areas. First, the EHR itself as a boundary object, and subsequently (in chapter 7), I look at the significance of a niche group of hybrid professionals who play a vital role in bridging clinical and non-clinical domains. I now proceed to present my findings on the multiple perspectives and uses of the EHR as perceived by its various users.

CHAPTER 6 EHRS AS BOUNDARY OBJECTS BETWEEN USERS

6.1 Introduction

Having discussed the NPfIT organising vision and the boundary objects contained within it, in this chapter I shift the focus to EHRs specifically and how they too may be regarded as boundary objects with multiple functionalities, used by a diverse range of stakeholders including physicians, nurses and patients. EHRs were central to the NPfIT, which had the NHS Care Record Service as its primary component, and which was integrated by means of the 'Spine' (Brennan, 2007).

The very concept of the EHR varies across contexts (Greenhalgh *et al.,* 2009) making it comparable to a boundary object which is interpreted differently with time and context (Rheinberger, 1992). I therefore discuss these divergent views and uses of EHRs using the concept of boundary objects (Star and Griesemer, 1989), as EHRs may be regarded as inter-epistemic objects (McGivern and Dopson, 2010) situated at syntactic, semantic and pragmatic boundaries (Carlile, 2002, 2004) between different clinical professionals as well as patients.

A key determinant shaping people's attitudes toward technology is their professional role (Aydin and Rice, 1991). Views of health IT as a control mechanism (Timmons, 2003) and the imposed changes in work practices (Ford, Menachemi and Phillips, 2006) are some of the concerns that are in conflict with the professional autonomy of health professionals. For instance, Walter and Lopez' (2008) study highlights the distinct way in which physicians perceive health IT including EHRs. Physicians' professional role entails a high degree of autonomy, and the prospect of challenges to their autonomy and the possible erosion of the indeterminate nature of their knowledge due to the codification possible

through EHRs is likely to hinder their acceptance of the technology (Walter and Lopez, 2008). Bechky (2003) provides a similar example of engineering professionals who avoid clear and complete codification of their knowledge in engineering drawings, instead using these drawings as epistemic tools to reinforce boundaries and maintain the indeterminate nature of their knowledge. In addition to clinical data entry, EHRs have also been employed to meet administrative and business needs particularly in the primary care sector (Berner, Detmer and Simborg, 2005), demonstrating variation in their uses across different settings. There are clearly differences in the way clinical groups use EHRs, and this has parallels to the multiple and on-going interpretations that epistemic objects are subjected to (McGivern and Dopson, 2010).

The concept of technology frames (Orlikowski and Gash, 1994) is also relevant to this discussion, as the very design of a system is dependent on the views of those who develop it (Davidson, 2002). The different epistemic communities between which EHRs are positioned have different technology frames that determine how they perceive EHRs, in terms of their purpose and actual use in practice. The tendency for technologies to reflect the interests of those who develop them (Davidson, 2002; Orlikowski and Gash, 1994) makes the EHR symbolic of tensions and power struggles between its multiple users including primary care physicians, secondary care physicians, nurses and patients, as they serve different functions in healthcare delivery (Greenhalgh, 2009).

I draw from my empirical findings to illustrate some of the competing discourses surrounding EHRs' purpose and use. This chapter draws on reviewed literature on EHRs, professional roles and boundary objects (Chapter 2), as I discuss how different

professional groups relate to EHRs differently depending on their self-perceived roles as well as the way they regard their professional colleagues and counterparts.

I now present my empirical data on the way individuals use and perceive EHRs. I first outline their relevance to clinicians, followed by the way in which EHRs influence clinician-patient interactions. This is followed by a brief discussion of the knowledge differences as well as dependencies (Carlile and Rebentisch, 2003) between clinicians and patients, to highlight the importance of EHRs as boundary objects which interface between these differences and as platforms on which these dependencies may be fulfilled. Following this, I highlight some of the main uses and functionalities attributed to EHRs, and this is in keeping with the notion of EHRs as boundary objects that serve different purposes for different stakeholder groups. I go on to discuss these different uses of EHRs using the concept of boundary objects in greater depth, and this is followed by a brief summary of the chapter.

6.2   EHRs: What do they mean to their users?

My data indicates that not only do users' attitudes towards EHRs vary, but their perceptions of its purpose also differ. Inter-professional dynamics were also evident, reflecting some innate differences between particular healthcare professionals. That professionals regard themselves in on the light of their professional roles has been discussed (Chapter 2), and will be further discussed in Chapter 7 which investigates the blurring boundaries between professionals and the emergence of new professional roles.

I now present my empirical data highlighting the significance of EHRs to clinical users, and the diverse needs and requirements of different clinical groups.

6.2.1 The diverse needs of EHR users

This section explores some of the different viewpoints towards EHRs, depending on professional roles and responsibilities. I first present data that contrasts the perspectives of primary and secondary care physicians. I also explain how this differs from those of nurses, who have different clinical responsibilities compared to their physician counterparts. The views of patients is also presented, and I elaborate on how EHRs play a role in mediating the clinician-patient boundary.

My interview data indicated clear tensions between primary and secondary care physicians, and their use of EHRs. The role of the GP as the first point of contact for the patient as the facilitator for continuity of care causes them to identify themselves as the primary user of the EHR, as opposed to their specialist colleagues. The friction between primary and secondary care physicians with regard to EHR usage is reflected in the following quote:

> Most secondary care doctors can't understand why they don't just share it. And part of that I think is a fundamental cultural difference. General practitioners record information for themselves to see it later - R3, National Clinical Lead, Connecting for Health

Secondary care physicians believe that the motives for EHR data entry by GPs are very different from theirs. While the former claim to be supportive of sharing information, they are convinced that their primary care colleagues' reasons for clinical data entry are driven by self-interest and a desire to record information for their own benefit.

The nature of the nursing role however, is very different. Respondent R15 explains how the 'caring' nature of nurses' responsibilities makes it challenging for nurses to employ standardised data entry practices:

> You're doing lots of stuff that isn't quite so concrete. You're sussing out how much the person knows, what they are feeling, what their anxieties are, it's a much broader sort of softer, much more difficult to structure, and nursing hasn't been good at structured record keeping. So their notes tend to be prose - R15, Nurse informatician, RCN

The typical structure of the EHR is often geared more toward the needs of physicians, rather than nurses. This was evident from one respondent who sympathised with the challenges nurses face in using EHRs to meet their clinical requirements: ,

> My observation would be that many of the traditional GP record systems are not as good at meeting the core aims for some of our nursing colleagues. There are many similarities as we tend to benefit from sharing much of the key underlying information. Some of the nursing requirements are more descriptive and narrative, whereas many of the medical things are more based on disease and intervention encoding, results and investigations. So I think in many respects there is a challenge to meet subtly different needs. – R28, GP, Connecting for Health National Clinical lead

The contents of EHRs are also contentious, and this is evident by the differences between the needs of clinical professionals. The quote below captures some of these differences, and illustrates how a single EHR can be viewed and utilised differently:

> If you go and ask a psychiatrist to show you his records, he will show you pages and pages of narratives handwritten text. If you go and ask an endoscopist to show you his record, he will show you a combination of lots of pictures, and operation reports. And if you ask a radiographer to show you his records, he will show you loads of images and scans. We all have very different requirements from our record systems. And the concept of a single care record whether it is a summary care or not, is that you can put all of that into one big bucket, and you can automatically or intelligently only show the records that are of interest to the person. – R14, GP, BMA-RCGP Joint IT Committee

In addition to the utilisation of EHRs by clinicians to enter and interpret clinical data, EHRs can also be a valuable tool to mediate the dynamics between clinicians and their patients. With the increasing prominence of shared decision making, the very idea that clinicians

are not automatically able to see all their clinical information is inconceivable to some patients.

> It's [improved and easy access to patients' records by clinicians] obviously desirable, and people really take it for granted that it happens now. Without any reference to electronics or the... patients I would think, would assume that if they go to see a doctor, he probably is informed on every aspect of their health that he needs to be, in order to care for them - R20, Co-Director, Patient Concern

To the above respondent, the need for clinicians to see all the information pertaining to a patient was so important, that it seemed unthinkable that this might not be the case. Patients' access to their own records is being given increasing importance today, as described in Chapter 2. Some IT suppliers have gone a step beyond patient access to records, and provide patients with the capability to use secure messaging mechanisms to communicate with their providers. While the technology to facilitate this functionality is clearly available, not all practices enable it, even if their systems have this capacity. Respondent R10, a clinician who runs a clinical software company explained this:

> The system that [Supplier] offers does include secure messaging but I don't think any practice has actually offered it to patients because they are terrified of having an avalanche of messages from patients – R10, GP, A health software supplier company (Interview phase 1)

Clearly, this indicates a reluctance on the part of clinicians to deal with the large volume of queries that would be facilitated by the use of certain technologies.

In addition to the variations between clinical and non-clinical stakeholders' use of EHRs, and their different requirements, EHRs have been generally used to meet a number of functionalities outside clinical practice. I now briefly present empirical data to highlight some of these functionalities, before proceeding to the discussion of my findings.

6.2.2 The different functionalities of EHRs as perceived by their users

Apart from the variations in the way different clinicians use EHRs and their contents depending on their clinical needs, there are also other variations in how the uses of EHRs are perceived and applied. This ranges from administrative functionalities, to clinical purposes, to business tools, as I shall illustrate with my data.

One of the basic functionalities of EHRs is to meet administrative needs. Respondent R28 explained that this was how his practice began, with more advanced clinical functionalities being incorporated into the IT system only much later.

> Initially it was to support some of the management and essential core business processes such as managing the patient list efficiently. Then over the years we started to use it increasingly for disease registers. And then we took the decision to start to use it interactively as a clinical record system, but only after a number of years of gaining confidence with using some of the background functionality. So initially it was in effect our patient administrative system. Then we added on repeat prescribing, which significantly automated a very tedious manual job and kept much better and safer records. - R28, GP, Connecting for Health National Clinical lead

In the above case, the utilisation of EHRs for other clinical purposes expanded once clinicians gained a level of confidence with the administrative system. Once these tasks were mastered, the elimination of duplicate tasks and improved record keeping was achieved, and this helped improve the performance of the practice by better utilisation of resources.

Another application of administrative functionalities in EHRs deals with finances and reimbursement. Describing the way the nursing staff in her hospital were required to enter patient information, the respondent below explains how EHR data was used for fiscal purposes.

> You need to write everything that happens to the patient... even though you couldn't see the reasoning, or you couldn't see why things have been done, or how the patient was doing or anything like that. You could only see exactly what had been done to the patient... it's more like a bank account, with things that have been done. So then the Trust would be paid according to what we've done to the patient. - R1, Nurse (Interview phase 1)

At a certain point, the EHR transitions from being a static collection of data, and if used appropriately, may be used to compare health information not only within a patient's own record, but between different patients as well.

> You got a computer, right click, show me all the episodes of cystitis. And it all goes in the record, and tracks all the entries coded cystitis, and displays on the screen. And so that means on my system, I can right click, I can select blood pressure, and I can see a graph of the patient's blood pressures were going back as far as, you know, that's a fantastically useful clinical tool. - R14, GP, BMA-RCGP Joint IT Committee

This quote by Respondent R14 illustrates how clinical care can use the EHR not just as a database of patient information, but as a tool to make a meaningful diagnosis based on content other clinicians have collected.

However, there is a limit to how useful a static repository of information can be. Respondent R14, talking about the proposed Summary Care Record component of the NPfIT says:

> If the patient is unconscious, it sounds like a very sensible idea that you should have a record. But the problem is, if it's a multi-contributor record, are you going to base your decisions on what you see on that record, or are you going to base it on the information you can gain in an A&E department? Basically, no emergency doctor is going to ignore what he can access in his department, in preference to summary care records. - R14, GP, BMA-RCGP Joint IT Committee

Although Respondent R14 acknowledged the potential benefits of the SCR, the issue of multiple contributors was raised, giving rise to the question of whose account (in the SCR)

of the patient's condition was to be most relied upon. The respondent went on to highlight that in an A&E context, clinicians are most likely to act on the symptoms and problems they see immediately, relying on results from tests conducted at the scene, rather than on historic data recorded in the SCR. This draws attention to the intuitive nature of medical care, where clinicians rely on knowledge and expertise gained from experience, rather than solely on documented details of a patient's health.

One of the main purposes of the Summary Care Record was to provide a summary of patients' information accessible to anyone, anywhere, and at any time. The case of medical emergencies away from home was a commonly quoted benefit of the Summary Care Record, although several respondents questioned the need for a separate record which contained a mere skeleton of one's health information, and which was not likely to be used frequently except in cases of emergency such as in an A&E unit. The NPfIT justification for the summary care record was based on a situation which was relatively uncommon, and to IT suppliers and consultants it was 'mouth-wateringly profitable, yet usually quite unnecessary' (Craig and Brooks, 2006: 208).

Continuing the discussion of EHRs as more than static collections of data, as voiced by respondent R27 (Former academic, health informatician), there is a need for 'a shift from looking at informatics as being records, something which is there for posterity, to being communication, something which is passed as information from one person to another'. This possibility of information sharing triggers further debates on the security, confidentiality and ownership of EHRs. Before venturing into these issues, I consider how professionals themselves view the possibility of improved communication afforded to them by EHR technology.

Taking this a step further, some clinicians use EHRs for purposes that transcend mere static data storage, and utilise them to manage their practices and make profits. This often results in them having a significant degree of possessiveness over their records. This is particularly true in the case of GPs, as seen by the below quote by Respondent R14.

> Our records, to be honest, are our business tool. If we don't have our records, we can't run our practices and we can't make money. Also, we can't cater for patients (…) we must control our records, in order to run our businesses. So we are naturally very possessive - R14, GP, BMA-RCGP Joint IT Committee

This utilisation of the EHR as a business tool causes ambiguity as to what actually constitutes the EHR, and whom it is meant for. Referring to the much discussed subject of patient access to their records, the above respondent continued:

> Access to their medical information is distinct from what you would describe as their record. I also log other things, I log the sort of reports I send out on patients. I also log whether I send the bills for travel vaccinations. I also log the fact that sometimes they're a bit awkward to my staff. You know, there are lots of things that we record on our systems which I don't believe are patients' medical records. So I think there's a distinction between the business tool that I use, and the patient's record. - R14, GP, BMA-RCGP Joint IT Committee

This interview excerpt highlights the ambiguity surrounding what actually constitutes the EHR. While some might suggest it refers to the clinical information related to a patient's condition, others believe it is a more encompassing object which includes administrative data, payment details, and general notes and reminders by clinicians, in addition to the patients' clinical information. It is clearly in the interests of business-oriented physicians to clearly demarcate the administrative and business functions of their EHR systems from the components which focus solely on clinical data.

Having said this, there remains the question of who should be responsible for entering data into the EHR repository, and whether the user group responsible for the task of data

entry has exclusive rights over access to the data. The tensions between primary and secondary care clinicians was evident from my data, with the latter expressing the opinion that GPs did not share information with their secondary care counterparts. However, the implications of the proposed Summary Care Records in the NPfIT meant that much of the data that GPs entered would be easily accessible to secondary care. While this had potential benefits in terms of uniform access to patients' basic details in times of emergency, it was in conflict with the business interests of GPs.

> A lot of GPs felt that by offering up the data they had collected, it's certainly *their* data, raised concerns for the future of their practices… I would basically put the patients first and argue that patients' safety is more important but it is a very basic argument that actually giving away their crown jewels was not in their interest (…) Secondary care is very eager for GPs to share their records, but they don't have a record to share with the GPs. So the GPs felt paranoid that they were working for the entire health system, and nobody else is putting their weight (…) that's not easy, they have to work hard to do it, they have to sweat over their records, and then people come along, and just *nick* them. – R10, GP, Connecting for Health National Clinical Lead

> The people who have the pain of making the record exist, are not the ones who get the final utility out of the product. That's really difficult, because if you are going to do something where you know ultimately it will be beneficial to you, you will do it. If you're asking GPs to do something above and beyond what they already do, which is to a point, I don't think it's a massive amount of work, but it *is* work. But they are never going to see any benefits from that. I think that's a harder sell to make – R25, Nurse informatician, Connecting for Health

GPs' reticence (Respondent R10) to share information with secondary care can be linked to their reluctance to shoulder the 'pain of making the record exist' (Respondent R25, Nurse informatician), and having to share it with other clinicians who have not put in as much effort into it, as seen by the above quotes. Their entrepreneurial efforts to computerise their practices (Benson, 2002a, 2002b) have resulted in them prizing their patient records as their 'crown jewels', as expressed by Respondent R10.

In the case of the NPfIT, the proposed systems were of more benefit to secondary care than to primary care, and consequently, many GPs did not welcome the prospect of having their patients' summary data uploaded onto the summary care records for the benefit of other clinical specialties. This is illustrated in the above quote by Respondent R25, who explained why the summary care record was viewed with apprehension by several clinicians.

In addition to these functionalities of EHRs for administrative, clinical and business purposes, respondents also elaborated on how EHRs are useful for performance measurement and learning purposes. Respondent R29 explained how comparison of EHR data between different providers could act as a motivator for clinicians to be at par with their peers in other organisations.

> If you feed the data back to people, they compare themselves with the hospital down the road, and nothing drives people more than knowing your competitor is doing better – R29, Clinical academic previously with NCAB

As seen by this respondent's quote, using EHRs for this form of research encourages healthy competition between care providers. Respondent R29 explains how providers use their peers' performance data as a yardstick, and strive to perform as well as, if not better than, their competitors. This is further elaborated on by another respondent who explained how EHRs can be used to document and evidence best practice in quality healthcare delivery:

> People actually capture data to provide evidence that what they're doing is working or not working, so that we can all learn. Otherwise what's going on in small pockets everywhere is just going to remain there and nobody is going to learn from it. – R12, Nurse practitioner (Interview phase 1)

Further, if this data is made available to the general public, patients too may be made aware of the strengths and weaknesses of the various healthcare providers available to them, enabling them to make more informed decisions regarding their care. However, the likelihood of EHRs being visible to others (such as patients or regulatory bodies) makes it likely that clinicians may resort to different data entry practices. This was evident from Respondent R14's explanation of why patients are allowed access to GP records that are only recorded after a particular date.

> The information strategy has accepted that some GPs may say you can see your records, but only after a certain date, because the ones before that date weren't created with in mind that you may be looking at them. Now the problem with that is, what that implies is an implicit acknowledgement that GPs will modify the way they create their records. - R14, GP, BMA-RCGP Joint IT Committee

This modification of clinical data entry is a challenge to be taken into consideration when enabling easy accessibility to EHRs. However efforts are now being made to standardise the way clinicians make data entries, as is evident by initiatives such as the RCP's work on record standards (see Chapter 3).

I now proceed to discuss the empirical data presented in this chapter. I first discuss the knowledge differences and dependences that are present between EHR users, and how they are resolved by means of EHRs. This is followed by a discussion on the different uses of EHRs, and how they act as boundary objects subject to interpretation by their multiple users.

6.3   Knowledge differences and dependencies surrounding EHRs

As seen from my interview data in the previous section, there are not only differences in the reasons why clinicians use EHRs, but there are differences in the contents of EHRs as well, depending on who uses them. Medical problems often transcend the manmade boundaries between medical specialties, and this could result in errors when medical professionals make diagnoses within the confines of their specialist knowledge or guided by their intuition (Weed, 1997). EHRs act as a bridge across such professional boundaries and enable clinicians to step beyond the bounded rationality of their particular domain of knowledge (Weed, 1997) and make informed decisions using information which has been shared via the EHR by their clinical colleagues.

The tensions between primary and secondary care have been studied by scholars (Berendsen *et al.*, 2006; Marshall, 1999; Marshall and Phillips, 1999; Westerman *et al.,* 1990), and interview respondents highlighted the cultural difference between the two as one of the reasons for this conflict. With the increasing specialisation as well as fragmentation of healthcare delivery (Guthrie *et al.*, 2008; Nettleton, 2004), collaboration between primary and secondary care physicians is essential to provide patients with safe and high quality healthcare (Branger *et al.*, 1992). Scholars have questioned whether such niche knowledge tends to narrow specialists' expertise, rather than making them better equipped to handle the unexpected when treating patients, and it is for this reason that it is crucial that patients' information be stored in a record which all clinicians treating the patient can access (Weed, 1997).

The lack of sufficient information sharing is a complaint voiced by both GPs and hospital physicians against each other (Marshall and Phillips, 1999). Respondent R3 (see page 181) voiced this complaint as well, and explained that the very purpose of recording patient

data differed between secondary and primary care doctors. While the former do so for the purpose of sharing their findings with their clinical colleagues, GPs create EHRs for their own practices and their own reference. This is confirmed by scholars as well, who highlight the differences between primary and secondary care use of clinical reports and records, as secondary care may archive patient data due to the episodic nature of care, whereas for GPs this information is crucial to follow-up care and treatment of the patient (Berendsen *et al.*, 2006) and not usually for the purpose of sharing with other clinicians (Booth, 2003).

The nursing profession on the other hand, is regarded as having a more supporting care role that focuses on the continued care of the patient (Abbott and Meerabeau, 1998). As Respondent R15 (see page 182) put it, part of nurses' responsibilities deal with patients' feelings, fears and anxieties. Consequently, their EHR data entries are often more verbose and descriptive, as explained by Respondent R28 (see page 182). Traditionally considered to be dominated by their medical counterparts (Freidson, 1970), the role of nurses increasingly overlaps with that of physicians as they are more involved in decision-making and take on more responsibilities (Hughes, 1988; Currie, Finn and Martin, 2010; McMurray, 2010). EHRs act as a facilitator for this, as they are capable of providing nursing professionals improved access to patient information.

The 'prose' and unstructured nature of data entry by nurses indicated by Respondent R15 as well as Respondent R28 (see page 182) either points to an increasingly elevated position of nurses in the clinical hierarchy, or contests Berg and Bowker's (1997) suggestion that the more wordy or unstructured EHR data is, the higher the position of the data inputter in the clinical hierarchy. The duties which accompany professional roles

therefore play a role in determining how EHRs are used, and how patient data is entered. This poses a challenge for the standardisation of records that is one of the most pressing needs for improved interoperability of systems, as highlighted by scholars (Carpenter *et al.,* 2007) as well as my interview respondents.

Nurse Respondent R15's description of the use of EHRs for functions that are not 'concrete' points to their interpretive flexibility (Pinch and Bijker 1984, 1987). Their capacity to cater to multiple and varied requirements of clinicians, combined with the subjectivity with which their contents are interpreted, render EHRs as classic examples of interpretive flexibility (Pinch and Bijker 1984, 1987).

As seen from my empirical data, the content of EHRs is contested, as is their accessibility and visibility to different users. Once there is agreement on what information is held in an EHR, the challenge remains as to how this can be effectively shared with appropriate individuals. The traditional gatekeeper role of the general practitioner has been appreciated as well as criticised. Recent research has indicated patients' wish that GPs act as *gateways* to specialist care (Bechtel and Ness, 2010), as opposed to *gatekeepers*, acting to limit their health information. The importance of 'shared care' (Hampson *et al.*, 1996) as well as continuity of care (Guthrie *et al.*, 2008) is clearly felt by the patient population, so much so that patients find it inconceivable that this is not necessarily the case (see page 183). I now briefly turn to the boundary between professionals and patients, and discuss the relevance and challenges of EHRs in this context.

The assumption that doctors are aware of their patients' clinical histories to give them appropriate treatment and care (Respondent R20, see page 183), is reminiscent of times when patients had implicit trust in their physicians and relied on their expert knowledge

(Freidson, 1988; 1985). Physicians do not always have full information on a patient's health condition and this is at odds with patients' trust in their doctors. An increasing realisation of the deficiency of information available to clinicians from their patients records is a possible catalyst to the increased focus on patient empowerment, self-management of healthcare and patient access to records (Anderson, Rainey and Eysenbach, 2003; Newman and Vidler, 2006).

Increased accessibility of patients' records and increased patient choice suggest changes to the established roles and powers available to health professionals. These include the possibility of changes to the gatekeeper role that GPs traditionally discharge so that they are on an equal footing with other healthcare professionals, as seen by the shifting rhetoric from 'doctor-patient' relationships to 'patient-professional' relationships (Shaw and Hegedus, 2005).

The potential for EHRs to present a combination of data entered by professionals as well as patients indicate the capabilities of EHRs to bridge the gap between professional medical knowledge and patients' understandings of their own health conditions. Such coupling of medical knowledge and patient inputs (Weed, 1997) is particularly important given the increasing attention given to patient-centred healthcare and shared decision-making. By providing a platform on which to record patients' accounts as well as physicians' notes and diagnosis, EHRs provide a mechanism to bring together both the expert knowledge of professionals as well as the relevant lay knowledge of patients. The discussed differences in the type of knowledge held by clinical as well as non-clinical users of EHRs, and the dependencies between them, emphasise the importance of EHRs as boundary objects that aid the transfer, translation and transformation of knowledge

(Carlile, 2004; Carlile and Rebentisch, 2003) between these different groups (see section 6.5 for a more detailed discussion of EHRs as boundary objects). It could also be part of the basis for EHR content contestation, as what is essential for one clinical specialist may be perceived as superfluous by another. This contestation of what an EHR should contain was evident in the case of the Summary Care Record, as there was much debate over what information it held, and several clinical respondents were of the opinion that its contents were too superficial and scanty to be of real benefit to clinicians.

Table 6.1 (page 196) summarises the main knowledge differences and dependencies (Carlile and Rebentisch, 2003) between the key stakeholders of EHRs. The knowledge differences between clinicians and patients are reflected by the professional expertise that clinical professionals have acquired through prolonged training as opposed to the lay knowledge of patients (Freidson, 1970). This poses a challenge to patients' interpretation of the content within their EHRs, as discussed in section 6.2.2.

Among clinicians too there are differences in the types of knowledge possessed. Physicians may possess expert knowledge in a niche area, as in the case of consultants, or they could have a holistic and broad spectrum of medical knowledge for instance, as GPs. These knowledge differences suggest a degree of knowledge dependencies (Carlile and Rebentisch, 2003) between clinicians, as they may have to consult with each other to gain a clearer understanding of patients' conditions (Weed, 1997).

Differences in the role played by various clinicians in healthcare delivery also point to knowledge differences between physicians and nurses. Physicians' employ scientific or 'case' knowledge that is 'independent of any particular patient' enabling them to make medical diagnoses and decisions regarding treatment (Stein-Parbury and Liaschenko,

2007: 472). The caring role of nurses however requires 'patient knowledge' which involves an understanding of people's experience of an illness (Stein-Parbury and Liaschenko, 2007: 472).

Table 6.1 Knowledge differences and dependencies between EHR users

		Knowledge differences			
		Physicians		Nurses	Patients
		Primary care	Secondary care		
Knowledge dependencies	Physicians — Primary care	n/a	Different types of specialist knowledge versus holistic general knowledge of GPs (Weed, 1997)	Nurses' caring role ('patient knowledge') vs. physicians' diagnosis and treatment of patients ('case knowledge') (Stein-Parbury and Liaschenko, 2007)	Expert professional knowledge (physicians) vs. layman knowledge of patients (Freidson, 1970)
	Physicians — Secondary care	Communication and collaboration to make informed medical decisions (Weed, 1997)	n/a		
	Nurses	Caring role of nurses subject to instructions and decisions of physicians (Berg & Bowker, 1997)		n/a	Professional knowledge of nurses vs. layman knowledge of patients (Freidson, 1975)
	Patients	Patients dependent on physicians for medical diagnosis and treatment		Patients dependent on nurses' knowledge on caring and treatment	n/a

Further to these different views of EHRs dependent on professional roles, EHRs are attributed different functionalities and purposes. These too may be determined by the professional role of the stakeholder groups involved. Following a brief discussion on some of the functionalities of EHRs as evidenced by my interview data, I will go on to consider them in the context of boundary objects, and how the EHR boundary object acts as a bridge as well as a potential barrier between professional groups.

6.4   The multiple uses of EHRs

In this section I discuss the multiple uses and functionalities of EHRs using interview data presented in section 6.2.2. Respondents highlighted EHRs met multiple functions ranging from administrative tasks to clinical and research purposes. I elaborate on these different functionalities and briefly discuss the significance and challenges of the same, with the help of reviewed literature.

6.4.1   EHRS for administrative and fiscal purposes

Early use of EHRs was focussed on administrative tasks such as data entry and payment processing (Berner, Detmer and Simborg, 2005). While these functionalities are the basics with which most EHR systems may have started with, they are pivotal to the continued growth and success of clinical practices. Respondent R28's account (see page 184) confirms this, as he explained how his practice began using the technology for basic administrative purposes, but later progressed to more clinical functionalities. Further, documentation of the details of a patient's conditions and treatments are often essential for clinicians to be reimbursed and funded (Hersh, 1995), as explained by Respondent R1 (see page 185) as well as several GP respondents. Nurse Respondent R1's description of EHR data entry indicated that the data was entered objectively without the 'care' details which are an implicit part of the nursing role (Fagermoen, 1997), and with the primary purpose being for funding and reimbursement purposes.

Recording such details is also required for clinical audits, which in turn provide a measure of performance and efficiency (Roland, 2004). Not only is this linked to increased funding, but it also provides yardsticks by which practices are measured, and acts as a trigger for clinicians to improve the quality of care they provide.

Respondent R1's account of EHRs as a record of 'what happens to the patient', comparing it to a bank account, illustrates how EHRs can serve as task organisers, as they provides clinicians with an overview of what has been given to the patient and what treatment is still pending (Berg and Bowker, 1997). Berg and Bowker (1997) suggest that the EHR itself embodies the hierarchies amongst clinical professionals, as it separates sections depending on who is allowed to access and modify parts of the record. The more unstructured a form in the EHR is, the higher in the clinical hierarchy the data inputter is likely to be (Berg and Bowker, 1997). However, the nature of the entries is not necessarily linked to hierarchy, but could reflect the differences in the type of content that various clinical professional deal with, as evident from the quote by Respondent R14 (see page 182) who elaborated on the variations in the type of data used by different clinical professionals.

6.4.2 EHRs as repositories

The use of EHRs to enable financial payments (see section 6.4.1) is facilitated by their capabilities to act as repositories to document details regarding laboratory tests and treatment details (Hersh, 1995). This capability of EHRs is particularly important, given the increasingly fragmented nature of healthcare delivery as a consequence of the proliferation of health specialists and isolated systems for recording patient data. One of the key functions of an EHR is therefore, to act as a static repository of clinical observations, diagnoses, treatment details and progress notes (Hersh, 1995), being a syntactic boundary object which enables the transfer of knowledge across boundaries (Carlile, 2004). This in itself is not a huge challenge and GP practices in England have been successfully doing this for a number of years (Benson 2002a, 2002b). The bigger challenge

comes as a result of the increasing need for continuity of care, collaboration between different health professionals, and the blurring boundaries between them (Bates *et al.*, 2003; Galliers *et al.,* 2011; Goldschmidt, 2005; Hartswood *et al*., 2003). This implies transitioning from being a syntactic boundary object to a semantic or pragmatic boundary object in order to facilitate meaningful translation or transformation of EHR data (Carlile, 2004) to meet patients' needs.

The historic clinical data from test results and x-rays in a patient's record are often isolated, and summaries of a patient's condition are continuously reconstructed by linking back to these details. Respondent R14 (see page 185) explained how historic data can be immensely useful in order to analyse variations of medical information such as blood pressure over a period of time. While the historic data provides a linear history, the summary and progress notes provide non-linear histories by linking back to the historic data and using the relevant details to rationalise the medical diagnoses and treatment (Berg and Bowker, 1997). The medical data in the EHR is thus subject to constant interpretation (until the data is considered old and irrelevant to the patient's present state), and may be utilised differently by different clinical professionals at different times.

6.4.3   Moving beyond the static: EHRs as transactional tools

The word 'record' in the term 'electronic health record', can lead to conceptualising an EHR as a mere static collection of information or as a repository. However, EHRs have tremendous potential to facilitate not only knowledge transfer, but also knowledge translation and transformation across semantic and pragmatic boundaries (Carlile 2002, 2004). There may be a cost associated with the sharing of information across boundaries, as the knowledge possessed by professionals is 'at stake' (Carlile, 2004: 556). This may be

linked to the previously discussed tensions between primary and secondary care clinicians (see section 6.3), with GPs regarded as being protective of their patients' data and unwilling to share their carefully recorded information with secondary care clinicians.

I now proceed to discuss the use of EHRs for purposes beyond the static storage of information, using interview data presented earlier in this chapter..

6.4.4 EHRs as a business tool

While the term EHR brings to mind an electronic record for the purpose of recording health data, one of the early uses of computerised systems in healthcare was for billing and administration (Hersh, 1995). Such functionalities are more relevant to those who are interested in the costs, profits and efficient processing of routine tasks involved in running a business or practice of their own. In the UK, GPs work either as independent contractors or as salaried GPs employed by independent contractors. For this reason, most GPs are driven by the aim to improve the efficiency and performance of their individual practices, viewing them as businesses that provide them with profits (Cohen and Musson, 2000). This was seen by Respondent R14's admission of EHRs as GPs' business tools (see page 187). Consequently, GPs tend to be extremely possessive about their EHRs, as explained by Respondent R14 and Respondent R10 (see pages 187-188).

 Hence, while professionals' specialist knowledge equips them to provide their services and fulfil certain roles, they can also use this knowledge as a tool for their own self-interests which could include monetary profits and retention of control over their work (Freidson, 1970; Bolton, Muzio and Boyd-Quinn, 2011). The notion of commercialised professionalism (Hanlon, 1998) encourages managerial as well as entrepreneurial traits in professionals, as the gulf between professionals and managers is being dissolved (Dent,

2003). This is evident in the case of GPs as they actively employ their computerised records to record their performance indicators and gain profits (Roland, 2004).

From Respondent R14's account (see page 187), it is evident that primary care physicians' perceptions of EHRs as their business tools can be at odds with the view that EHRs are repositories that can be accessed for the benefit of those involved in healthcare delivery, including the patients themselves. There is an apparent conflict between the business interests of GPs, and a drive for patient empowerment through access to their records.

Both, Respondent R10 as well as Respondent R25 (see page 188), explained how GPs often cling on to their EHRs as they do not wish to share their records which they have painstakingly maintained, with other clinicians. In the case of the NPfIT, they were expected to share their patient data with secondary care by means of the Summary Care Records, and this was not welcomed either. These illustrations of GPs' possessiveness of their records and their reticence to share their data is an example of knowledge being 'at stake' (Carlile, 2002), as there is a cost involved if they share their computerised records. This potentially acts as a barrier to the effective of EHRs as boundary objects that mediate knowledge differences and dependencies.

6.4.5 EHRs for research and learning purposes

The use of clinical data for research purposes illustrates how the use of EHR content differs not only between users but across time as well; for instance, data entered for clinical purposes can be later used for research purposes (Foster and Young, 2012). In the case of the NPfIT, the use of EHRs for research purposes is closely linked to discussions on privacy and confidentiality – issues which were given more toward the latter stages of the programme (see Chapters 3 and 5).

Apart from using data entered in EHRs for the purpose of clinical research, performance of practices may be gauged by means of mechanisms such as the Quality and Outcomes Framework (Roland, 2004). This information may be shared with the public in an effort to help people make informed choices regarding where they get treated, and is useful for research related to healthcare delivery. This is seen from Respondent R29's account (see page 189) of how feeding healthcare performance data back to people has a positive impact on the nature of healthcare delivery.

However, this could also result in 'reactivity' on the part of clinicians to these transparency mechanisms (McGivern and Fischer, 2012). Consequently, clinicians often exercise caution when entering information in EHRs, and feel compelled to withhold notes that could be problematic for them at a later point (McGivern and Fischer, 2012). The very prospect of patients being able to view their medical records causes physicians to modify their EHR data entry behaviour (Berg, 2002), as indicated by Respondent R14 (see page 190).

However, using EHR information for research and learning purposes can also have the great benefit of supporting evidence based medicine and adoption of best practices amongst providers. Respondent R12 highlighted the dangers of not sharing such data, as it could lead to 'pockets' and silos due to the lack of information sharing. The utilisation of EHRs as administrative and performance measurement tools (see section 6.4.1) combined with the potential of sharing this data with peers, researchers and the public hence provides an excellent incentive for care providers to ensure and document the quality and efficiency of the care they provide to their patients.

Having discussed the knowledge differences and dependencies amongst EHR users as well as some of the uses of EHRs as perceived by their users, I now proceed to discuss how EHRs themselves may be regarded as boundary objects.

6.5   The role of EHRs as boundary objects

Objects may be conceptualised as 'objectives of inquiry' that adopt characteristics of agency (Engeström and Blackler, 2005; Star and Griesemer, 1989). The quest toward modernisation and computerisation of services includes the provision of functionalities electronically as opposed to traditional modes that require interaction between individuals. EHRs have helped automate processes within healthcare delivery, and have facilitated an increased overlap between the roles of different clinical professionals such as doctors and nurses (McLaughlin and Webster, 1998; Tjora, 2000). EHRs can therefore be regarded as boundary objects that not only act as an interface between different roles, but that negotiate the boundaries marking the distinction between these roles.

Variations in the perceived use and purpose of EHRs (as administrative tools, repositories, transaction tools, research tools, etc.) illustrate the different technology frames present with regard to the 'nature of technology' and 'technology in use' (Orlikowski and Gash, 1994), i.e., people's understanding of the functionality as well as the use of a technology. EHRs may be deemed boundary objects by virtue of their capacity to transcend boundaries and the variations in the way different epistemic groups perceive and use them (Fox, 2011; Star and Griesemer, 1989; Carlile, 2002; Nicolini, Mengis and Swan, 2012). This is seen from the previous discussion on the multiple uses of EHRs, and the knowledge differences and dependencies that surround them (see sections 6.3 and 6.4).

Fox (2011) and Bechky (2003) described how technologies and artefacts such as engineering drawings can be either facilitative or hindering in their roles as boundary objects. EHRs too demonstrate such variations, as they can facilitate communication and collaboration between different clinical professionals (McGinn *et al.*, 2012), and could also potentially have negative effects, acting as inhibitors to change (Fox, 2011; Carlile, 2002; Oswick and Robertson, 2009). Respondents' accounts of the tensions between GPs and secondary care doctors with regard to information sharing via EHRs is an example of how what could potentially be used to enhance clinical communication has instead resulted in resentment amongst clinical professionals.

Respondent R14's description of the different types of data that an EHR can potential hold (see page 182) also captures the potential of an EHR to act as a boundary object. This is because it holds information of pertinence to multiple care providers, in different formats, and depending on how the information is accessed, the relevant details are provided to the person who accesses it. Carlile (2004) discusses semantic boundaries that enable interpretation and translation of knowledge. In this context, EHRs offer a range of information in different formats, with care providers able to utilise that which is relevant to them, and if required, refer to those entries by other professionals as well. This entails a process of interpreting results, and translating information entered by other clinicians in a manner which is relevant to the patients' condition, and to equip them to make an informed and intelligent diagnosis.

The increased focus on patient empowerment and patient access to health records by means of EHRs (Pyper *et al.*, 2004; Ross and Lin, 2003) draws attention to the clinician-patient boundary where EHRs are positioned. Health IT has been described as a 'loom'

that can weave together two different types of knowledge: knowledge about the patient's condition and clinical professional knowledge (Weed, 1997: 231). By facilitating this combinatorial knowledge, the boundary object capabilities of EHRs are again illustrated.

Boundary objects need to be maintained, or as Bossen *et al.* (2012) suggest, they need to be 'trimmed' in order to support continued usefulness as boundary objects. The recognition of the role of non-clinical personnel in performing this task highlights the differences in the way different professionals use the clinical record. Further, Bossen *et al*. (2012) suggest that the EHR is not the primary work object of clinicians, as their primary duties and interests lie with the patient. However, with increasing capabilities for tele-consultations and the need for second opinions with fellow medical colleagues, there is potentially an increased reliance on the EHR as the first point of reference with regard to a patient. For this reason, the EHR may gradually become a step toward the social construction of the patient.

Respondent R10 explained how IT can potentially be used to for communication between patients and doctors (see page 183). This highlights the potential for EHRs as boundary objects, to bridge the communication gap between patients and their physicians. However, as Respondent R10 elaborated, this capability is hindered not by failings of the technology, but by physicians themselves due to their reluctance to facilitate easier patient-doctor interactions because of the additional work it could entail (Ross and Lin, 2003). The positive and facilitating capabilities of boundary objects are clearly negotiated and determined by the stakeholders on either side of the boundaries where they are situated.

6.5.1 EHRs at syntactic, semantic and pragmatic knowledge boundaries

Regarding the EHR as a boundary object, GPs, secondary care physicians and nurses are three key clinical user groups that communicate and interact via their mutual boundaries. EHRs are positioned at the interface between these groups, and between them and patients as well, facilitating the movement of knowledge across different types of boundaries. Table 6.2 (see page 208) gives an overview of some of the different perspectives of EHRs held by various user groups, and the type of knowledge boundaries for which they employ EHRs as boundary objects.

When regarding EHRs as static repositories (see section 6.4.2), the content and format of the records may be contested. As Respondent R14 (see page 182) noted, amongst doctors too, the very nature of data they record and access is different, depending on their specialty. EHRs hold information of interest to many different types of stakeholders including clinicians, patients, researchers, insurance companies and government bodies (Berg and Bowker, 1997). Efforts to integrate patient data from various sources into a single record, as was the vision of the NPfIT, suggest that a single EHR should meet the needs of multiple professionals by giving access to relevant data, and withholding unnecessary information. This move towards integrated health records recognises the EHR as an object positioned at the boundary between different clinical professional groups, reinforcing its inter-epistemic nature (McGivern and Dopson, 2010).

In addressing the diverse practices and understandings of the different fields between which boundary objects are situated, the concept of standardisation becomes highly relevant as this establishes an underlying framework which provides a common structure across different social worlds (Lee, 2005), facilitating knowledge transfer across syntactic

boundaries (Carlile, 2002). Considering the case of EHRs in the NPfIT, the emphasis on standardisation was one that gained prominence only later in the programme. The role of EHRs as boundary objects which are perceived and used very differently amongst clinical professionals was one that was evidently not taken into consideration from the start of the NPfIT. Later efforts such as the RCP's project to standardise records using clinical headings (see section 3.2.7) were instrumental in facilitating improved standardisation of the EHR as a boundary object spanning multiple professional groups. In the absence of such efforts to make the boundary object more understandable to those who use it, it then becomes a rigid structure which offers limited means of knowledge flow between various users due to their different views and technology frames (Lee, 2005; Orlikowski and Gash, 1994).

Respondent R28 (see page 182) suggested that most EHRs do not meet the needs of nursing professionals, as nurses' inputs tend to be more descriptive. This highlights a deficiency in the structure of EHRs at syntactic boundaries (Carlile, 2004) when the requirements of different clinical professionals are not taken into account right from the creation of the boundary object when data is entered into the EHR. The need for collaboration between clinical professionals when treating a patient highlights the knowledge differences as well as dependencies (Carlile and Rebentisch, 2003) inherent in healthcare delivery (see Table 6.1, page 196).

Table 6.2 The EHR boundary object: views of different users

	GPs	Hospital doctors	Nurses	Patients
Purpose of EHR	Repository; Business tool; Patient's data, but GP's record; Patient's data different from GPs business tool; Not constructed with a view that they will be seen by patients (R14, GP)	Information Sharing; Administrative and fiscal purposes (R3, National Clinical Lead)	Facilitate continuity of care; Entry of 'Soft data' (R15, Nurse informatician)	Access to own records; Increased control over own healthcare (R20, Patient Concern)
Actual use	Advanced; facilitated by incentives provided by government/companies (Roland, 2004; Benson 2002a, 2002b)	Lags behind primary care; More complex environment for EHR usage (Benson 2002b; R31, GP informatician)	More receptive to new technologies, but EHRs are not well designed to meet nurses' needs (R15, Nurse informatician)	Patient access to records is being increasingly emphasised, but needs more buy in from clinicians (R10, GP, Interview phase 1; Ross and Lin, 2003)
Perceptions of (other) professionals' and their use of EHRs	Dispute secondary care physicians' complaint about GPS' not sharing information	GPs record info for themselves and regard the EHR as special, sacred, protected (R3, National Clinical Lead)	Medical systems: more administrative; whereas nursing requirements are more 'joined up'	n/a
Type of knowledge boundary	*Pragmatic* Interpret data for patient diagnosis; Utilisation of EHR for multiple clinical and non-clinical purposes); Power tool (R9, GP)	*Pragmatic* Interpret data for patient diagnosis	*Semantic* Interpret data for patient care and treatment	*Syntactic/ Semantic* (Self-entry of data; Use lay understanding to interpret clinical entries)

While EHRs may serve as knowledge repositories providing details of a patient's medical history, the nature of clinical care means that clinicians are expected to update the EHR boundary object, often using the information already present in it to inform their clinical decisions This resonates with Carlile and Rebentisch's (2003) discussion on the need to

create new boundary objects due to the acquisition of new knowledge which renders the old boundary object incomplete or deficient in some way. Records of historical medical data such as blood pressure, for instance, can help clinicians determine trends in a patient's health, and thus assist in making a more informed diagnosis (Respondent R14, see page 185). The need for on-going inputs and transformation of the knowledge present in EHRs then highlights the novel and dynamic nature of healthcare, and the need to constantly 're-create' EHRs with each episode of care.

This re-creation of EHRs as boundary objects means that clinicians engage in a process of interpreting the existing contents of the health record, illustrating the semantic nature of the knowledge boundary in this case. By providing a repository of information (see section 6.4.2), EHRs present clinical specialists with opportunities to draw conclusions regarding a patient's treatment, and to use the records as boundary objects around which medical opinions can seek to reach a common and meaningful understanding of a patient's condition and needs.

However, in order to reach a consensus, the syntax and structure used in the EHR have to be understood in the same way by those clinicians involved. The EHR mediates relationships between different professionals, and some of the coded entries are dependent on who enters the data; clinicians may interpret a condition differently and consequently the standardised codes clinicians use to describe a patient case may vary (Berg and Bowker, 1997). The differences and ambiguities inherent in the way clinical professionals interpret clinical data mandates the need to use the EHR as a *semantic* boundary object (Carlile, 2004) so that there is a shared understanding of what EHR

contents mean. This is essential to ensure safe and effective treatment, especially when multiple clinicians are involved in delivering care to a patient.

Their re-creation of the EHR to reflect their interpretation of the existing record in combination with their diagnosis of patients' problems by observing new symptoms, points to the potential altering of current knowledge and creation of new knowledge which is characteristic of pragmatic knowledge boundaries (Carlile, 2002) (see Table 6.2, page 208).

As seen from my interview data, nurses' responsibilities and roles are very different from those of doctors. Though they interpret EHR data to treat and care for their patients, they have limited decision making powers and would normally defer to the diagnosis and decisions made by physicians (Berg & Bowker, 1997). For this reason, the nature of the knowledge boundary where EHRs are positioned is semantic (see Table 6.2, page 208), as they interpret existing data, but unlike their medical counterparts, are not responsible for creating new knowledge in the form of diagnoses.

The use of EHRs as business tools and for research purposes (sections 6.4.4 and 6.4.5) highlights the way that EHR data can be used beyond the mere transfer or translation of knowledge across syntactic or semantic boundaries (Carlile 2002, 2004). The view of EHRs as a business tool is held mainly by primary care physicians, (GPs), as their practices are operated as independent businesses (Cohen and Musson, 2000). Many GPs use the data contained in EHRs for the improved performance and profits of their practices, as evidenced by my data. This reflects a transformation of EHR contents by leveraging it to generate performance related data for mechanisms such as the Quality and Outcomes Framework (Roland, 2004). This utilisation of EHRs for what some would consider

potentially conflicting purposes – quality of care, and improved profits, demonstrates how primary care physicians employ EHRs as pragmatic boundary objects (Carlile 2002, 2004) by transforming static information into transactional and profitable data.

The utilisation of patient records for purposes beyond clinical care (e.g. research) without consent, could possibly jeopardise the patient-doctor relationship due to violation of trust and confidentiality (Foster and Young, 2012). Unless a level of trust is established between the patient and the clinician, there is likely to be contestation over the ownership of the EHR and its contents. However, the idea that the EHR boundary object is owned by one particular group potentially violates the innate character of a boundary object: its characteristic of occupying a position between domains and between different stakeholders, each having their own views and perceptions regarding the object (Star and Griesemer, 1989).

EHRs also offer possibilities for patients to view their record, and in some cases input basic data. In the latter case, patients merely transfer information into the EHR, using it as a syntactic knowledge boundary (Carlile 2002, 2004). Patients' access to their records for the purpose of viewing their health data involves a process of interpreting the information they see. However, given their lack of professional medical knowledge, their attempts to 'translate' (Carlile, 2004) their medical information to lay terms may be limited and often erroneous, which is a concern for physicians (Fisher and Britten 1993). Scholars have also suggested that the increasing knowledge accessible to patients due to computerisation can potentially bridge the knowledge gap between doctors and patients, resulting in diminished trust in doctors and the subsequent deprofessionalisation of the medical profession (Haug, 1988). However, Freidson (1985) argues that the exponential

increase in medical knowledge and expertise means that the gulf between professional

medical knowledge and that of laypeople will only increase, as computerisation does not

necessarily enhance people's understanding of the information they access. This then

limits patients' capabilities to use the EHR as a pragmatic knowledge boundary as they

usually lack the specialist cognitive knowledge required to interpret the entire contents of

their health records accurately and meaningfully. For this reason, the knowledge

boundary with regard to patients' use of EHRs is usually syntactic, as knowledge flow is

usually limited to transfer rather than translation of knowledge. However, if patients have

increased access to health information, and are well informed on their own health

conditions, they may be able to meaningfully translate the information contained in their

EHRs. Therefore, the knowledge boundaries mediated by the EHR object in the case of

patients varies, and may be either syntactic or semantic (see Table 6.2, page 208).

6.6   Summary

The position of EHRs between different epistemic practices highlights their role as

boundary objects (Star and Griesemer, 1989), situated at the interface between different

stakeholders including GPs, hospital doctors, nurses and patients. The manner in which

the different clinical groups perceive and use EHRs may be linked to their professional

roles and differences.

Increased specialisation and fragmentation in the clinical field (Guthrie *et al*., 2008;

Nettleton, 2004; RCP, 2011) has resulted in increased knowledge dependencies and

differences (Carlile and Rebentisch, 2003) between various clinical professionals. These

interdependencies mandate the need for EHRs to interface between healthcare

professionals as well as between professionals and their patients, as I outlined in Table

6.1 (page 196). By acting as boundary objects between different clinical specialties, EHRs provide a 'shared context' (Carlile and Rebentisch, 2003) to facilitate the sharing of health information in a mutually understandably and useful format between clinical professionals.

Just as boundary objects can have bridging or hindering effects, EHRs too have been recognised to have positive as well as negative effects on healthcare and the way health professionals communicate and collaborate (McGinn *et al.*, 2012). The variations in user requirements, expectations and use of EHRs, justify the perception of the EHR as a boundary object.

Incongruences between the technology frames (Orlikowski and Gash, 1994) with which users view and use EHRs could be due to factors such as political, professional or cultural differences. This was evident from the very different requirements of nurses, compared to physicians, as indicated by my empirical data. The traditional caring role of nurses (Abbott and Meerabau, 1998) requires them to enter data describing a patient's condition, unlike the relatively objective data entered by physicians. EHRs also act as potential symbols of professional boundaries and hierarchies, due to variations in access based on roles. This too was reflected in my interview data, and illustrates the political, professional and cultural differences which potentially affect the role of EHRs as boundary objects.

While EHRs are *capable* of providing a pragmatic boundary across which knowledge can be transformed (Carlile 2002, 2004), I argue that that they are not exploited to this level by all users. This is due to reasons including the nature of their work, and their knowledge limitations (in the case of laypeople). A summary of how various users employ EHRs as

boundaries to meet knowledge differences and dependencies is provided in Table 6.2 (page 208).

Lee (2007) and Bossen, Jensen and Witt (2012) suggest that not all objects are boundary objects, as some artefacts negotiate and redefine boundaries rather than just acting as an interface between them. While EHRs can potentially redefine boundaries, they also serve as a bridging mechanism between different clinical professionals. They therefore have a dual role of *interfacing* across boundaries (by providing a record of patient information subject to clinicians' interpretations) and *pushing* boundaries (by enabling clinicians to adopt tasks previously beyond their jurisdictions).

Bal *et al*. (2007) in their study on referral letters between GPs and hospital doctors explain how such communication enhances seamless care while at the same time reinforces the different tasks and responsibilities which are taken up by medical professionals in different clinical domains. The possibility of both bridging as well as dividing primary and secondary care by means of electronic referral letters (Bal *et al.,* 2007) confirms the capability of technology to have a dual effect on professional boundaries (Bechky, 2003). Extending this to the case of EHRs, this chapter illustrates the role of EHRs as boundary objects interfacing between different EHR users, as well as its capability to shift boundaries by facilitating task drift and thus enabling vertical substitution (Nancarrow and Borthwick, 2005) wherein changes in boundaries enable professionals to climb up professional hierarchies.

In order to use EHRs as boundary objects to transfer, translate or transform knowledge (Carlile, 2004), clinical professionals must be willing to share information. However, the problem of conflicting interests and the issue of 'knowledge at stake' (Carlile, 2004: 556),

can hinder the effective use of EHRs as boundary objects between clinical professionals. This was evident particularly between primary and secondary care physicians. Efforts to protect the indeterminate nature of clinical knowledge in order to retain professional autonomy thus affect the extent to which EHRs can serve as effective boundary objects.

The influence of professional roles, clinical autonomy and jurisdictional boundaries (Freidson, 1988) are clearly relevant to the discussion on EHRs as boundary objects. I now proceed to the next chapter where I discuss how clinicians can attempt to assert their professional dominance by actively engaging with and developing technology, partly as a response to the potential threat imposed by technology itself (Walter and Lopez, 2008; McLaughlin and Webster, 1998).

CHAPTER 7 CLINICIAN-IT HYBRID PROFESSIONALS

7.1   Introduction

This chapter draws on the sociology of professions (Abbott, 1988; Freidson 1985, 1988) and professional hybridisation (Llewellyn, 2001; Montgomery, 2001; Noordegraaf 2007, 2011; Thomas and Hewitt, 2011), to highlight the presence of a group of hybrid professionals that has not been subject to empirical research: 'clinician-IT hybrids' (Koshy, McGivern and Tritter, 2013). Extant research on hybrid professionals has focused predominantly on professionals who adopt additional managerial roles to bridge professional and managerial domains (Doolin 2001, 2002; Farrell and Morris, 2003; Fitzgerald and Ferlie, 2000; Llewellyn, 2001; Muzio and Kirkpatrick, 2011).

Clinician-IT hybrids, or 'clin-ITs', although present in the UK for over two decades, constitute a relatively small percentage of clinicians, and may not be as established as in countries such as the US. This is reflected in my data, as evidence of this dual role emerged from just a handful of respondents, who I focus on in this chapter. My data indicates the prevalence of this hybrid role amongst GPs, and much of the evidence is from this category of clin-ITs, whom I term GP-IT professional hybrids. Drawing on Freidson's (1985; 1988) work on restratification and buffering in the medical profession, I illustrate how external threats account for the formation of these hybrid professionals in some cases. However, using my findings, I elaborate Freidson's theory, and discuss other possible factors that facilitate the formation of clin-ITs.

This chapter focuses on the emergence and drivers of the clinician-IT hybrid role by drawing on my empirical data, but also briefly discusses clinical leaders as hybrids in the context of the NPfIT. The increasing use of health IT by clinicians is accompanied by

patients having an interest in technology and its use for monitoring their own healthcare (Anderson, Rainey and Eysenbach, 2003; Newman and Vidler, 2006). Debates regarding who accesses and modifies the EHR are often concerns for doctors, who regard themselves as the authority on their patients' conditions. This may be one explanation for the increased interest shown by clinicians in the use of EHRs. Tensions between clinicians and their system suppliers (see Chapter 5) and resistance against colonisation (Waring and Currie, 2009) by the IT industry are other possible reasons why some clinicians have stepped foot into the informatics field.

I first present my empirical data illustrating how clinical hybrid professionals have interests that overlap between different domains including medicine, management and technology. My data highlights the increasingly blurred boundaries amongst professionals and some antecedents to their increasing amalgamation with non-clinical roles. This is followed by a discussion of clinical professional hybrids using my empirical data as well as reviewed literature. I discuss the presence of clinical leaders and their role in the NPfIT. I then elaborate on clinicians' interest in IT development, highlighting the clinician-IT professional as an emerging hybrid role. I present some of the key factors that facilitate the development of clin-IT hybrids, following which I discuss why GP-ITs are the more prevalent amongst these hybrid professionals. I then discuss the challenges faced by clin-ITs as evidenced by my data, and finally provide a summary of the chapter.

7.2   Professionals and the struggle to adhere to boundaries

Recent years have seen the increasing control exerted by external groups such as managers, and imposed mechanisms such as technology, over clinical professions. To be controlled or managed by occupational groups that lack the professional status of

medicine and nursing, and that challenge the jurisdictions of clinical professionals, is likely

to be a concern for clinicians, and may account for the rise of professional hybrids such as

clinician-managers and clin-ITs.

Clinical professional hybrids were present in the NPfIT as well. The roles of the National

Clinical Leads may be likened to those of clinician-managers, as their dual role

incorporated clinical as well as advisory responsibilities. Their bridging role between the

NPfIT management and clinicians required good communication skills and an

understanding of both managerial as well as clinical domains, especially considering

issues such as lack of transparency and the tendency for exaggerations and

miscommunications in the programme (see Chapter 5). Respondent R12 who had been

involved in such a boundary spanning role elaborated on the need for clinical hybrid

professionals to gain the support of people from both the domains in which they worked:

> You have to learn to work with Chinese walls, and you have to get both sides to
> trust you. And so that's why you had to have people appointed who were trusted
> from those roles, who had that kind of skill set. – R12, GP, Connecting for Health
> National Clinical Lead

Despite their prominent position and their prescribed duties of facilitating engagement

with their clinical peers, respondents questioned the actual power afforded to these

National Clinical Leads. Further, the calibre and the influence of these Leads were

questioned by some, as seen from Respondent R24's quote:

> I wouldn't say it [involvement of the National Clinical Leads] didn't have any
> influence. It had some. But I think the calibre of the clinical leads they introduced
> didn't reflect the challenge that was at the heart of what was happening – R24,
> Former Joint Senior Responsible Officer of the NPfIT

While Respondent R24 acknowledged that the National Clinical Leads did have some

influence in the programme, he suggested that these engagement mechanisms were not

adequate to meet the needs of the NPfIT. Scholars have identified the lack of credibility afforded to the National Clinical Leads as some of them were no longer actively engaged in clinical practice (Cresswell *et al.*, 2011). This apprehension of hybrids' capabilities due to their disengagement with clinical practice is true of clin-ITs as well, and I discuss this further in section 7.5.3. One of the clinical leads acknowledged a sense of being incapacitated within Connecting for Health, with limited capacity in the organisation to trigger change:

> I don't think we realised it at the time, but the job we'd been given, lacked the responsibility inside the organisation that it needed to make the programme more successful than it was (…) They had us as an overarching theme, and some of them had lots of clinicians dotted about here (…) The role of the clinicians within the thing as a whole has gone *down* the hierarchy rather than up. – R3, National Clinical Lead, Connecting for Health

This suggests that the National Clinical Leads may have served as figureheads put in place to provide a façade of clinical engagement. Rather than serving as a communication channel between clinicians and the NPfIT management, the movement of the clinical leads '*down* the hierarchy' suggests that they were deliberately controlled by senior management, and may have been expected to comply to the programme's aims irrespective of the clinical voice that they represented.

The National Clinical Leads' roles entailed much time and commitment their parts. However, their impact was constrained because of the need to juggle their clinical jobs with this role, and often dedicate not more than a day a week to their secondary role. Respondent R15, a nurse informatician, elaborates the time constraints faced by clinician-manager hybrids in balancing their clinical and managerial responsibilities:

[In] the Department of Health quite often appointments are there to give advice, but they don't really impact on anything. It was realised that we couldn't do this role on half a day a week and a lot of willingness (laughs). – R15, Nurse informatician, Royal College of Nursing

As explained by Respondent R15, the limited time that some clinician-managers spend on their managerial roles is perhaps another reason why the National Clinical Leads were not able to have sufficient influence and inputs into the NPfIT.

Moving on to the significance of clin-ITs at the time the NPfIT was launched, the lack of clinical engagement and consultations before the contracts were secured, was a source of concern to clinical professionals, as they believed that the NPfIT was not fit for purpose (see Chapters 3 and 5). Despite the established use of computers in primary care in England, the programme management failed to consult with GPs who had developed their own systems and who had a better understanding of clinicians' needs and requirements. The nature of the dual clin-IT role is an extremely sophisticated one which has perhaps been underestimated by many, including those involved in the NPfIT. Respondent R6 highlights this complexity of the clin-IT role:

The failure to recognise that you needed a level of domain expertise, that you could only get if you engaged effectively with the clinical and the existing clinical informatics community… because it takes years, not months, to have an understanding. A doctor can't do it; an IT person can't do it. It's that breed of people who have learnt a bit about each of them. And to reach that level of expertise, takes (…) years. The domain is so complex. – R6, Health informatician, A national computer organisation

As seen from the Respondent R6's comment, the clin-IT hybrid role is one that takes a significant amount of time to develop. Once clinicians have reached the point where they have adequate experience and knowledge in both domains to be classified a clin-IT

hybrid, there is perhaps the question regarding where their professional identities and priorities lie. Referring to the NPfIT, Respondent R6 commented:

> There were relatively few clinicians that were engaged. Most of them were the sort of people who had got to that stage where they were neither a doctor nor an IT person. They had become that merged entity. – R6, Health informatician, A national computer organisation

The ability of clin-ITs to combine a comprehension of clinical professional tasks with technical expertise, puts them in a unique position where they can tailor systems to the actual functions that clinicians *do*, rather than what IT developers or even clinicians themselves think they want. As Respondent R31, a GP-IT noted:

> We had enough money to actually for the first time in health anywhere, to do user-centered design, which was sitting lots of clinicians down and instead of saying 'Tell me what you'd like', we said, 'Tell me what you do, and we'll try and show you how you can do it better'. – R31, GP informatician, Connecting for Health, British Computer Society

Another respondent who fell into the clin-IT category echoed these thoughts, and in describing his role as a professional hybrid, explained his ability to interface between the clinical and IT cultures:

> I'd see myself as bridging that gap, because I understand right down to the programming level what can be done and what can't be done. I can use that to inform GPs, don't listen to what they think they want, but think in terms of what's actually possible – R36, GP, IT programmer

Both the above clin-ITs recognised the futility of merely asking clinicians what sort of computer systems they want. The combination of their IT skills and clinical backgrounds equipped both respondents to distinguish between the 'wants' and 'needs' of their clinical colleagues, and to know how best to meet these needs using technology.

The recognition of the value that clinicians can provide in the development of their systems is seen in their representation amongst clinical software companies. Their partnership with doctors may be regarded as a selling point for these companies. Respondent R9, a senior GP comments:

> One of the major suppliers had a famous advert which said 'Designed by doctors for doctors', in illegible handwriting like you would see in a prescription in the old days (laughs) – R9, senior GP involved with EHRs

The use of the slogan 'by doctors for doctors' is evocative of the democratic slant employed by IT suppliers' marketing campaigns, in a bid to persuade clinicians to use their IT systems.

I now proceed to present further empirical data illustrating why different clinicians adopt the hybrid clin-IT role. As mentioned earlier, much of this evidence is from the primary care sector, and there appears to be a prevalence of the clin-IT hybrid amongst GPs. This is not to say that other clinicians are exempt from the clin-IT category, as some non-medical respondents did show a strong inclination to IT development and formulation of guidelines. However, there is clearly a higher incidence of clin-ITs amongst GPs, and I will discuss why this might be so, following my general findings and discussions on the antecedents and formative factors in the development of clin-ITs.

Prior to the launch of the NPfIT, there were incentives in place for GPs to use computerised systems, and several companies offered primary care practices free or subsidised systems (Heath and Luff, 1996; Jha *et al., 2008).* The subsidised use of IT offered primary care an opportunity to discover the advantages offered by such systems, and the potential they had to improve the performance of their practices. Respondent R9, a senior GP elaborates on these incentives:

> There was a scheme called the free GP scheme (…) One was run by AAH Meditel, which is a computer software company, and the other was VAMP, another computer software company. And they did deals with the pharmaceutical industry to collect data from GP systems and prescribing data and with the proceeds that they got from the pharmaceutical industry, they gave us free networked computers. So from 1987 until about 1989, we used a computer system which is pretty good actually, to change the working practices in our practice. So we used it as a tool to transform the business processes in our practice. – R9, senior GP involved with EHRs

Clearly, these incentives offered to primary care physicians worked to the benefit of both the medical professionals as well as to market players. While it opened GPs' eyes to the possibility of improved performance as well as profit, it offered industry players the opportunity to obtain information from primary care practices and make money by utilising it for research purposes.

IT in the clinical setting seemed to have been also driven by GPs' wishes to enable clearer division of tasks, reinforcing the boundary between medical and nursing responsibilities. Respondent R31's words below demonstrate how IT may be developed for this purpose of establishing boundaries between clinical professionals:

> Back in the early 80s it was still a very paternalistic model of healthcare. And the nurses were not the independent prescribing practitioners that they are these days. It was much more doctor's handmaiden stuff. So, that was how I got into designing systems. Because I actually wrote some screens for the nurses to do basic screening for us. Height, weight, blood pressure, BMI, that sort of stuff – R31, GP informatician, Connecting for Health, British Computer Society

While the role of technology has changed over time, and has shifted from being a divisive tool to one which encourages increased overlap between the nursing and medical role, it can also be used by doctors to clearly define *what* tasks they would permit nurses to undertake.

Differences in the way health professionals work also result in variations in the take up of technology between primary and secondary care. In Chapter 6 I briefly discussed GPs' possessiveness of EHRs and how they utilise technology to the benefit of their practices, unlike secondary care clinicians who are comparatively unwelcoming to new technology. This is further illustrated in Respondent R9's words:

> If you talk even now to doctors in the acute sector, they are not convinced that IT systems in general are going to deliver them benefits. They are more like tools for the management to find out information about the way they practice and constrain them. As a GP, it was my tool. I booked it. I could find information about care, and actually use the information that it contained. As a power tool to include the profitability of the practice and improve the way that we could get more money to do good patient care for our patients. So it was always my tool, or *our* tool, and it was really helpful. – R9, senior GP involved with EHRs

The description of computer systems as 'my tool, or *our* tool' by Respondent R9 captures the possessiveness and close association of GPs with their systems, both individually as well as collectively. Their use of their systems as a 'power tool' reflects their autonomous style of working as opposed to their secondary care colleagues who are monitored and constrained via technology by their managers. The below quote by a health informatics consultant further illustrates this point:

> GP clinical systems were designed and developed by the GPs themselves. They had great ownership into it and they took great pride in developing systems that did exactly what they wanted them to do. The problem with secondary care is that a manager has dumped a PC on a consultant's desk and he just looks at it and says to his secretary, 'I don't use these things'. – R7, Health informatics consultant, a national computer organisation

As indicated by respondent R7, the very act of developing their own IT systems gave GPs a sense of pride, achievement and independence, as they were able to create finely honed systems tailored to their specific needs.

The tensions between primary and secondary care physicians, with the latter regarding the former as highly possessive of the information they possess was further elaborated by Respondent R3, a secondary care physician:

> The longitudinal record for individual practitioner use is regarded as very special, sacred, and it must be protected. Hospital practitioners record information for *others*. That's why we write it down. So other people can read it and understand what's wrong with the patients. (…) When a patient leaves, either the hospital for an in-patient stay or an outpatient episode, they are given a copy of the communication to their GP (…) So we're used to sharing information, and sharing information with the patient. GP's aren't. – R3, National Clinical Lead, Connecting for Health

This drive to record information for themselves may be one explanation for GPs' interest in venturing into the IT domain alongside their clinical practice. From my data it was evident that a number of clinicians, GPs in particular, take the initiative to pioneer ideas and improved software in their practices, by either engaging in the technology development themselves, or establishing clinical software companies dedicated to creating clinician-friendly systems for this purpose. As Respondent R35 comments:

> I'm someone who saw IT as a way of enhancing the clinical practice. That's completely where I come from. How can IT improve the quality of the care I offer as a doctor to patients, and how can it improve the quality of care that others can offer - R35, GP involved with a software company

The above quote captures the service oriented nature of the medical profession. However, as GP practices in England are independent businesses that gain profits from improved performance (Roland, 2004), some respondents suggested that the need to measure outcomes through mechanisms such as the Quality and Outcomes Framework could be a reason for clinicians to use computerised records. This does not mean that personal profit necessarily replaces their obligation to provide quality care to their

patients, but is one which goes hand in hand with improved care and outcomes. The need to necessarily measure outcomes within GP practices using the Quality and Outcomes Framework mandated the implementation of systems to record patient data. As explained by Respondent R6:

> The way GPs were paid, changed (…) you couldn't think about the Quality and Outcomes Framework without computerised records – R6, Health informatician, A national computer organisation

There was also clearly a sense of ownership of the primary care systems, as GPs appreciated the value it brought to their practice. As Respondent R9 (see page 224) highlights, the identification of the system as their own tool is felt by the GP community collectively, and is not limited to a handful of isolated GP practices. This would have provided the few (but successful) existent GP-IT hybrids continued support from their professional community.

Apart from reasons such as the need to measure performance outcomes and to improve the quality of care delivered, some respondents suggested that a genuine interest in IT development motivates clinicians to venture into IT development. Often, this is triggered by the feeling that they can improvise on the work of their non-clinical counterparts. This was expressed by Respondents R36 and R37:

> It's always been of interest doing computers and things related to computers, right from childhood. And I learnt obviously some basic programming when I was a child, and then went off to medical school, qualified a doctor, and then a few years ago, I started to get interested in programming again, more as a hobby than anything else. And part of my practice where I work, I could see there was a need to develop an intranet for our practice. So I learnt to programme on the basis of that. I basically taught myself to programme just from books and online. – R36, GP, IT programmer

I was quite frustrated with some of the existing solutions and thought we could probably do a better and easier one to use. - R37, GP, IT programmer, formerly involved with a local medical committee

Both these respondents expressed their recognition of the need for better IT systems due to the deficiencies of those already in place. The difficulties in adopting systems that are insensitive to the complex nature of healthcare provide clinicians an impetus to be actively involved in clinical systems design and development, as indicated by Respondent R37.

When asked how they identified themselves professionally, most clin-IT respondents regarded themselves primarily as clinicians, emphasising their stronger identification with their clinical professional role despite the increasing overlap of their work with the IT domain. Many clin-ITs consider their programming as a hobby rather than as an occupation or profession. They do not necessarily adopt this dual role in an explicit effort to exert control over their work, but engage in IT development out of genuine interest. Respondent R36 (GP, IT programmer) described himself as 'mostly GP'. Another respondent explained that the purpose of his IT company was purely to meet clinical needs:

The company came out of interests I had as a GP in primary care. The company was never intended as something to make money. It was purely a means of disseminating a product that was going to improve general practice, and that still is the case. – R35, GP involved with a software company.

My empirical data indicated a higher prevalence of clin-ITs amongst primary care physicians. Reasons respondents offered for the comparatively quicker and widespread use of IT in primary care included the easier implementation environment in primary care, given that it is an office environment where a stationary desktop is practical to use,

unlike a hospital setting where people are more mobile and have to transition between different departments and locations. Respondent R31 noted:

> The patient comes into the GP surgery, sits down, and you don't have to have anything complex about mobility. Whereas in the acute sector, you've only got that luxury sort of in out-patients. Because of the multi-disciplinarity of most outpatient departments you can't guarantee there'll be a desk and computer on it from one clinic to the next. – R31, GP informatician, Connecting for Health, British Computer Society

The comparatively basic and simple nature of this consultation setting implies that GP systems are not as complex as those required in a secondary care setting, making it easier for GPs to apply themselves to the development of their systems, as it is a skill relatively easily learnt and not requiring exorbitant resources. Respondent R6's quote below illustrates this further:

> They [IT systems] were typically built by people in garages. Because you could do that - you could build a PC of your own, you write your own operating system. And all of the early systems have that sort of root, starting from a PC… So general practice I think is an easier environment, you get your head around it, and you can do it with low cost hardware. - R6, Health informatician, A national computer organisation

Another possible reason for this as pointed out by the same respondent, was the highly structured nature of primary care records themselves:

> A lot of time and effort has been spent on trying to make records computable. And I think some of the thought comes from primary care, because primary care records are highly computable, highly coded and highly structured. - R6, Health informatician, A national computer organisation

My interview data also highlighted several challenges faced by clin-IT hybrids. Despite their understanding of both the clinical as well as technological domains, clin-ITs seemed to have their skills and capabilities questioned. Respondent R31 commented:

> Clinicians, if you ask them, 'What's the problem?', they will tell you that it looks like the paper equivalent, because clinicians are not software architects, neither are they designers, neither are they process mappers. And so, inevitably, they design something which is a form which inevitably doesn't deliver what they want. Because it's a paper form with less functionality than the paper. – R31, GP informatician, Connecting for Health, British Computer Society

Respondent R31 was himself a GP-IT hybrid, but acknowledged the shortcomings of the work of some of his clin-IT peers. His description of EHR systems developed by clin-ITs as 'a paper form with less functionality than the paper' reflects a step backward, rather than forward, in terms of utility. Comparing these EHRs to paper forms also suggests challenges clin-ITs might have in designing a user-friendly interface for their systems, as the technology they develop may at face value appear to be very similar to already existing systems. However, while the user interface of GP systems may lack in some aspects, the specific needs and specifications of GP practices are best understood by those who have been in that work environment themselves. Respondent R9 comments:

> The systems were designed by doctors for doctors and they were treated therefore by the large scale IT industry people who came in, with some suspicion, because these were amateurish systems. They looked amateurish to their eyes. They weren't based around Windows, and state of the art…But their functionality was exquisite. Their functionality is finely honed to the requirements of the GP, and very difficult to emulate. – R9, senior GP involved with EHRs

This empathy with clinical IT needs gives clin-ITs an edge over standard IT suppliers. However, to successfully develop clinical software, or to start a company which does so, is only half the story. Another challenge faced by clinicians is convincing larger suppliers of the need for specific components which have been developed by independent clinicians or smaller companies started by them, as indicated by this GP respondent:

> One of the difficulties we find is that producers of the GP systems or hospital systems haven't had a commercial imperative to embed [IT systems] from outside into their products – R35, GP involved with a software company.

This was one of the main problems of the NPfIT, wherein the proven success of GP systems was ignored. This may have been due to the lack of credibility of clinicians as IT developers, as I shall shortly discuss. Though a previous quote mentioned the difficulty for clinicians to develop systems that were entirely user friendly because of their non-technical background, it has also been evident that functionality and not user-friendliness is the prime concern for most clinicians. Having said this however, there have been initiatives by more technically inclined clinicians to undertake development of more refined user interfaces. However, gaining recognition amongst the IT crowd as competent technology developers is a challenge for clin-ITs.

Even in the case where clinicians had technical know-how and had taken up dual roles, there were occasional instances where they felt challenged with regard to the way people perceived them professionally, as they did not have formal IT training. Referring to a system being developed, one respondent says:

> I did wonder at one point whether I could commercialise that and sell it to other practices. I did talk to other practices, and they didn't show much interest around it. That felt at the time to be likely because it was just me as an individual, rather than me as a part of a company, or part of a software company which had a name and brand, or a professional IT person. I felt that was maybe in the way. I thought if I'd gone to practices as a part of a software company or even as a self-employed software person, then I'd probably have a bit more credibility. - R36, GP, IT programmer

Respondent R31's account (see page 125) explains how clin-ITs' work on the NPfIT's Common User Interface was not incorporated right from the early phases of systems design, and how they were instead approached only toward the end of the systems

development phase, reflecting the lack of importance given to the user interface by the suppliers. Clearly, their seeming involvement in the development of the system was not sufficient, as *timely* inclusion of these clin-IT hybrid professionals is required for the successful design and implementation of technology. They were brought in at the very last stage to tweak the user interface more as an afterthought than as an essential part of the system design. This superficial involvement of clin-ITs seems to have parallels to the establishment of the National Clinical Leads whom many regarded as mere figureheads used to appease the general public, rather than to actually engage with users and make an impact on the way the NPfIT systems were being implemented.

In the NPfIT, GPs in particular were not given the importance that was due to them as experienced users as well as developers of IT in primary care. As Respondent R9 notes:

> GP computing was thought to be a cottage industry which was irrelevant in terms of mainstream IT as used by banks, the oil industry, insurance companies, and the next place to go with that expansion of this commoditised IT industry, was health. – R9, senior GP involved with EHRs

Respondent R31 adds:

> At the time, I was regarded as a bit of a propeller head. Because you know, I'd written medical systems, and I did the IT bit of the National Programme. And so I was viewed as not really a proper doctor. I was quite amusing and did good presentations. But you know, I wasn't someone to be carefully followed – R31, GP informatician, Connecting for Health, British Computer Society

The above quotes by Respondents R9 and R31 point to significant challenges faced by clin-ITs as they are not taken seriously by others. In the bigger picture, this lack of credibility and importance given to clin-ITs was a threat to the existing small health software companies which had been started up by clinicians, as their efforts were shadowed by the large scale NPfIT project. GP R35 notes:

> Being part of a very small company, this [NPfIT] was a massive threat to us. And virtually, it drove us out of business, because at that time, the only IT that was being purchased in the NHS was IT that was part of the NPFIT (…) the companies that were a part of the national programme were very big companies. There was little space for small companies… it did affect us badly. But it could have affected us worse. The only reason it didn't affect us worse was because of the slippage and failure of the NPFIT (laughs) - R35, GP involved with a software company

Clin-ITs thus had to contend not only with non-clinical peers who questioned their capabilities and expertise in the technical sphere, but also the competition imposed by strong market players who had government support. The NPfIT's challenging atmosphere as smaller IT suppliers were threatened by the larger Local Service Providers (LSPs) aggravated clinicians' resentment and resistance, and contributed toward the increased chasm between clinician-led software companies and larger industry players.

Several respondents mentioned the lack of commercial incentives and the absence of a clear cut career path for those professionals who wished to travel down the road of clinical IT development while at the same time retaining their clinical responsibilities. This vagueness and lack of recognition of the clin-IT as an independent professional role in itself causes these hybrids to prioritise one role over the other.

In discussing the career challenges of being clin-ITs, physicians elaborated on their ability to alternate between their clinical and IT interests as they could always return to the former if their IT career interests did not prove fruitful. This ability to experiment with options due to their ability to return to medical practice, offers clinicians a unique opportunity to 'try on' other roles.

> Doctors, they can always go back to their day job, so they are not that easy to manipulate. – R6, Health informatician, A national computer organisation

> When I joined the LMC, that was obviously a huge step, that was going from full time general practice, and working 3 days a week for the LMC, sorry. It was such a steep learning curve that I began to get a bit frustrated with my clinical time. So I thought, 'when I'm doing this, I want to give it six months of just trying this and see how I feel and reassess after that' – R37, GP, IT programmer, formerly involved with a local medical committee

Respondent R37's temporary shift in career path may have been facilitated by the knowledge of the ease of returning to clinical work, as highlighted by Respondent R6. He faced challenges in balancing his clinical responsibilities with his technology related role within a local medical committee. His decision to temporarily withdraw from clinical practice to pursue his IT programming interests is also evocative of the entrepreneurial trait of many GPs.

Given the large scale of the NPfIT and the many stakeholders involved, conflicts and tensions were inevitable. However, such conflicts were not restricted to the project alone, but surfaced in the general differences between the interests of clin-ITs and those of IT suppliers. Respondent R36 notes:

> I did try to get permission as well to make it work for us as a practice. But I wouldn't then be allowed to use that if I sold it elsewhere; so I couldn't then commercialise it. And what's the point of putting extra stress into it, if it wasn't going to be commercial. It's going to be quite a lot of work, to actually get it integrated (…) In terms of developing shared records and things like that, it would be so much easier if we weren't held to what the companies that wanted. The companies really want to kind of control it all themselves, to control the data. If you want to develop something, they want to develop it and build their system better, rather than integrate with someone else who might be better. – R36, GP, IT programmer

Clearly then, despite what might be said by clinicians, profit making too is a key driver in their interest in developing IT for their practices. As expressed by respondent R36, commercialisation of developed software motivates clin-ITs to further develop and refine

their developed technology for the wider benefit of the health sector. However, the presence of an underlying power struggle between clinicians and IT suppliers, as the clinical data serves as a source of authority and as a power tool (Respondent R9, page 224), means that both parties strive to develop IT systems suited to their own interests. GPs for instance regard themselves as the gatekeeper to their patients' information, and their records serve as a business tool for their practices (see Chapter 6). IT vendors on the other hand seek ways to make data available to other user groups such as clinical researchers, and create another channel of profit making for themselves. As evident from the above quote, IT vendors are also reluctant to liaise with other developers or clin-ITs, preferring to develop their products independently rather than help small scale developers integrate their IT components into systems developed by larger industry players.

I also observed resentment from secondary care colleagues who felt that GPs in particular did not serve any useful purpose in their IT development roles. Respondent R16 comments:

> Clinical input in Connecting for Health was provided by, from what I could see…the core advice was given by a bunch of GPs who didn't actually do general practice because they turned themselves into IT consultants – R16, A medical director, previously involved with Connecting for Health

On being asked what he thought of those GPs who had stepped into IT roles, the same respondent voiced his 'completely negative' opinion of such clin-ITs:

> They know nothing about secondary care. A lot of GPs don't know anything about a modern hospital. (…) A lot of dissatisfied GPs, which pretty much by definition they are, because GPs who enjoy being GPs would still be GPs, not working for CFH. They're all freelancing on a £1000 a day contract, roaming around the place… – R16, A medical director, previously involved with Connecting for Health

Respondent R16's opinion on the lack of capabilities of clinicians who were on-board the NPfIT was supported by another interviewee:

> Even the clinical people who were on it [NPfIT], were more technical than clinical.
> - R24, Former Joint Senior Responsible Officer of the NPfIT

The clinicians that Respondent R24 referred to evidently distanced themselves from their clinical practice. Consequently, their clinical colleagues voiced their dissatisfaction and apprehension regarding the capabilities of these professionals to relate to their clinical requirements. Clearly, clin-ITs face significant challenges from both non-clinicians as well as clinical peers who question their credibility.

I discuss these findings related to clin-ITs in greater detail in Sections 7.4 and 7.5. Before that however, I will briefly consider the clinician-manager hybrid and its presence in the NPfIT project, using the empirical data presented in this section. Much research has been done on clinician-managers, so I limit my discussion on this hybrid role, and devote majority of this chapter to the clin-IT hybrid role which has not been studied in great detail.

7.3 Clinicians as managers in the NPfIT

Although having shifted from being dominant professional groups to those that are increasingly controlled by management (Farrel and Morris, 2003; Davies and Harrison, 2003), clinical professionals are adopting managerial roles, thus dissolving the boundaries between the clinical and management domains. The rise of the clinician-manager has been an area of avid interest to scholars (Kitchener, 2000; Fitzgerald and Ferlie, 2000) as Reed (1996: 592) predicted the 'warring' of professional and managerial groups and the potential merger of the two to form a hybrid role.

While some scholars have warned of the risk of deprofessionalisation as a result of restratification and new roles, Kitchener (2000) suggests that this need not be the case, as clinician-managers often utilise their position to safeguard their clinical interests and maintain professional closure. Rather than the clinical field being colonised by managers, the emergence of clinical managers could be understood as an application of management techniques in the clinical domain, illustrating the phenomenon of reverse colonisation wherein 'the tools of colonisation are used by the colonised to challenge the authority and gain independence from colonisers' (Waring and Currie, 2009: 774). This is also illustrated in McGivern and Ferlie's (2007) study where clinicians regarded externally imposed control measures as unnecessary bureaucratic mechanisms that did not benefit clinical practice. This prompted them to play 'tickbox games' to create the impression that they conformed to the requirements of various appraisal mechanisms while continuing their accustomed clinical work practices.

Different stakeholder groups are likely to have conflicting interests or incongruent technology frames (Orlikowski and Gash, 1994), thus building walls to protect their interests. In the case of clinicians, resistance is often wielded against external control mechanisms that challenge their professional autonomy. Respondent R12's (see page 218) reference to 'Chinese walls' indicates the obstacles that hybrid professionals have to contend with, as they deal with stakeholder groups having different needs. However, hybrid professionals' 'dual commitment' to different roles enables them to consider the needs of different domains, making them more 'cosmopolitan' than their comparatively 'parochial' purely clinical colleagues (Coburn, Rappolt and Bourgeault, 1997). This is particularly important given the increased focus on consumer-driven healthcare and

managed care (Hoff, 2001) that requires sensitivity to yet another group, i.e. patients. By seeking the trust from both parties, hybrids form a conduit connecting two very different groups of people, thus enacting a boundary role (Doolin, 2001). In the case of the NPfIT however, clinician managers, i.e., the National Clinical Leads, had limitations to performing this boundary role effectively. Respondents reported that clinicians' roles had gone 'down the hierarchy' and that the very calibre of the chosen Clinical Leads was to be questioned (see page 219). Despite their position as National Clinical Leads, these clinician managers were given limited powers within the programme. This is an example of clinical professionals being used or 'co-opted' by external forces to control or regulate the profession, resulting in erosion of clinical autonomy rather than its preservation through restratification (Coburn, Rappolt and Bourgeault, 1997; McDonald, 2012). Despite the potential for clinical hybrids to exercise reverse colonisation measures (Waring and Currie, 2009), in this case hybrid roles seemed to be exploited by the programme management to exert increased control over clinical professionals under the banner of clinical engagement.

Respondent R15 (see page 220) highlighted the challenges faced by clinician managers in 'balancing between the two worlds' of clinical practice and management (Witman *et al.,* 2011), and this too may have accounted for the National Clinical Leads' limited influence over the NPfIT. On the other hand, Fitzgerald and Ferlie (2000) advocate that hybrids such as clinician-managers need to retain a strong link to their professional practice and take up managerial responsibilities on a part-time basis, in order to avoid being isolated, rejected or regarded as lacking credibility, by their clinical peers. A balance then needs to be struck between dedicating a sufficient amount of time to the managerial and

leadership duties involved in the National Clinical Lead roles, while at the same time continuing with professional practice alongside.

Given the lack of power of clinical leads in the programme, clinicians needed another mechanism through which to input into the IT systems they were to use. This then leads me to the concept of the clin-IT hybrid that enables clinicians to bridge their clinical knowledge with the IT. Despite the existence of GPs who had successfully computerised their practices (Benson, 2002a), the NPfIT did not give sufficient importance to this important group of hybrids, and instead, the 'ruthless standardisation' (DH, 2002a) approach of the programme stifled and constrained local innovation by smaller entrepreneurial groups (see section 7.5.1). Despite these challenges, many clinicians had a sustained interest in IT development and possessed a valuable combination of clinical and IT knowledge. The need to avoid the mistakes committed in the NPfIT makes it important to understand and appreciate the significance of clin-ITs and the pivotal boundary spanning position that they occupy.

7.4   Clinical informatics: Home to an emerging clinical hybrid

In recent years there has been a rise in the number of clinicians having an active interest in health technologies. Clin-IT hybrid professionals include clinicians who have an interest in technology in either an advisory, entrepreneurial or development capacity. This then includes clinical informaticians who seek to transform healthcare by means of information and communication technology (ICT), and who are positioned at the intersection between the clinical and ICT fields (Gardner *et al.*, 2009). Drawing on Reed's (1996) categorisation of professionals as independent, organisational or entrepreneurial, clin-ITs are hybrid professionals with characteristics of independent and entrepreneurial

professionals, given their utilisation of technical skill (IT development) to defend their jurisdiction and autonomy.

When faced by external changes and threats professionals often hone their creative skills to preserve their authority in their respective jurisdictions. The clin-IT hybrid meets this need by leveraging a combination of professional intellect and creativity (Quinn, Anderson and Finkelstein, 1996), to develop systems tailored to clinicians' unique needs. Likewise, clinician-managers need to form adaptive strategies that enable clinical professionals to fulfil their clinical roles while simultaneously meeting performance and efficiency targets. Self-motivated creativity (Quinn, Anderson and Finkelstein, 1996) is therefore an inherent quality of hybrid professional roles in the clinical setting.

Amongst the different clinical groups, my interview data suggests a higher concentration of these clin-IT hybrids amongst primary care physicians. This is not to say that nurses or secondary care physicians had no interest in clinical informatics; all five respondents from the nursing category regarded themselves as informaticians to different degrees, although not all were actively engaged in the actual development of systems. However these nurses constituted a relatively small percentage of the data sample (see Appendix A).

Out of the thirteen GPs interviewed in my final phase of interviews, seven were GP-ITs, four of whom were actively engaged in IT development. The remaining three GP-ITs either held IT advisory roles or had started independent clinical software companies with the intention to provide fellow-clinicians IT systems that were informed by clinical inputs and therefore tailored to their needs. Amongst the ten secondary care physicians interviewed in the final phase, only five were clin-ITs. Two out of these five clin-ITs held IT

advisory roles to guide the formulation of best-practice guidelines for health IT use, and only three secondary care clin-ITs did hands-on IT development.

GPs seemed to have a stronger and more active presence in the clinical informatics field compared to their other clinical colleagues, perhaps due to their entrepreneurial track record combined with their drive to improve performance of their practice (Cohen and Musson, 2000). I discuss this prevalence of clin-ITs amongst GPs in more detail in section 7.4.2. Doolin (2002) discusses how clinicians' entrepreneurial and business oriented nature can be context dependent, as evidenced by his study where clinicians in a public health system operated in line with the traditional service oriented nature of the medical profession, whereas these same clinicians adopted an entrepreneurial and commercially driven approach within their own private practices. This is evocative of a potential conflict of interests when clinicians work across multiple domains, and I discuss this further in section 7.5.3.

Professions exist in order to resolve problems that require specialist knowledge and expertise, thus making the tasks in their jurisdiction a key distinguishing feature of their role (Freidson, 1988). These jurisdictional boundaries are prone to shifts as the nature of certain problems may require the attention of multiple experts, and the professional holding dominant control over the problem determines the subjective qualities of the task at hand (Abbott, 1988). This suggests that the treatment of these problems depends on the concerns and position of the professional group addressing them. Respondents R31 and R36 (see page 221) explained how their unique dual roles enabled them to understand the needs of their clinical peers and meet their requirements with the help of IT.

Karsh *et al.* (2010) emphasise that designing health technology involves more than merely asking users what they want as each user group has its own perceptions. As seen by respondent R31's quote (see page 221), clinicians' wants often differ from what would actually be beneficial to their practice, as their technical understanding is limited (Karsh *et al.*, 2010). Clin-ITs occupy a unique position where they can balance clinicians' wants with an awareness of clinicians' actual work practices, as expressed by respondents R31 and R36, thus having a clear understanding of the complexities of clinical work and how best to leverage technology to meet clinical needs. Their hybrid knowledge helps them distinguish between clinical wants, requirements, and what is technically feasible. Despite their clinical knowledge, clin-ITs too need to listen to the specific requirements of their clinical colleagues, just as respondent R31 asked clinicians to *tell* him what they *did*. This also highlights clinicians' different work practices and requirements from their clinical records (Berg and Bowker, 1997; McGinn *et al*., 2011), and a clinical background in one area does not qualify a person to design systems for professional colleagues without receiving their input. However, the common ethos of serving patients and promoting quality of care, may enable clin-ITs to empathise with what other clinicians want from their IT systems.

With this brief overview of the clin-IT hybrid, I now turn to my empirical data to analyse the factors that facilitate the emergence of this clinical hybrid.

7.4.1   Drivers for the emergence of the clin-IT hybrid

In this section, I turn to my empirical data to discuss some of the drivers for the formation of clin-IT hybrids. Freidson's (1985) theory of restratification suggests that new roles are created in response to threats to professional autonomy. Clinicians often adopt

managerial roles alongside their clinical work, to prevent control by those outside their profession (Ferlie *et al*., 2011; Montgomery, 2001). It is likely that there are similar antecedents that facilitate the development of clin-ITs, as I shall illustrate. In addition to these, I elaborate Freidson's (1985) framework, and also propose other possible reasons for the emergence of the clin-IT hybrid.

As indicated by my interview data, the significance of involving clinicians in IT development is being recognised by IT suppliers as well (see page 222). The attempt by suppliers to sell themselves by highlighting active clinical involvement in the design and development of their systems shows their recognition of the need for IT to be tailored to the unique requirements of clinical professionals. This need for clinical input in IT design may be one of the reasons why a significant number of clinicians have shown an interest in developing their own IT systems (Benson 2002a, 2002b). The question regarding what clinicians *need* from a computerised system needs to be asked, and clearly, no one would be in a better position to answer this than clinicians themselves (Smith, 1996).

'Illegible handwriting' referred to in Respondent R9's account of a company highlighting how it engaged with clinicians, is a frequently cited criticism of clinical data entry into paper records (Volpp and Grande, 2003). IT developers may also be of the opinion that data entered in clinical records are not organised and are reflective of bad data entry practices. However, Heath and Luff (1996) suggest that what appears to be unorganised data in a health record might be the result of complex clinical thought processes that inform decision-making. EHRs are embodiments of tacit clinical practices that 'inform both the writing of the record and their reading by "any" general practitioner' (Heath and Luff, 1996:355). In the mentioned quote, the 'Designed by doctors for doctors' slogan in

illegible handwriting may have been a tactic employed by the company to demonstrate its identification and understanding of how and why clinicians enter data the way they do. The company's apparent empathy with clinical work practices combined with its involvement of doctors for systems' design was used to legitimise their IT offerings, reflecting their underlying recognition of the benefits of clinical involvement in IT development and design.

With this brief discussion on how IT companies themselves are beginning to encourage the involvement of clinicians in their design process, I now proceed to discuss some of the factors that trigger the emergence of clin-IT hybrids.

7.4.1.1 External threats from the state and market

In addition to managerial control by non-clinicians, other externalities including the market and the state (Doolin, 2002; Evetts, 2013; Marsden, 1977), also pose threats to the autonomy and sovereignty of medical professionals (Starr, 1978). This has led to the 'progressive subordination of professionals' (Muzio and Kirkpatrick, 2011: 394). Scholars have debated this subordination of professionals in the face of regulations and bureaucracy (Reed, 2007) given their capability to adapt and develop new strategies when they encounter such challenges (Muzio and Kirkpatrick, 2011). Restratification as a response to threats from the market and state (Freidson, 1985) reflects the latter approach, and was seen in the NPfIT.

The NPfIT provides a classic example of a national level health IT project that was centrally controlled and that proposed the introduction of new systems without adequate consultations with the actual end-users, i.e. clinicians (see Chapters 3 and 5). This led to the increased prominence of resisting clin-ITs, particularly GP-ITs. 'Cognitive dissonance'

(Respondent R14, GP, BMA-RCGP Joint IT Committee) between IT suppliers and clinicians who had experience in using computerised systems gave added impetus to clin-ITs who were convinced that they could develop better software solutions than those being offered (Respondent R37, GP, IT programmer). The friction between these different groups (clinicians, IT suppliers and policy makers) can be attributed to their incongruent technology frames (Orlikowski and Gash, 1994) given their different views on the need and use of technology. The bridging role of clin-IT hybrid professionals can potentially alleviate this incongruence, as they are equipped with an understanding of both the clinical as well as technology domains.

The IT suppliers responsible for delivering the NPfIT systems were regarded by some of my clinical respondents as materialistic and incompetent (see pages 124 and 126). The prospect of having to comply and make do with what the IT suppliers provided would not have been taken well by the medical profession, as IT developers cannot claim the professional status and reputation possessed by physicians (Orlikowski and Baroudi, 1988).

Respondent R14's (GP, BMA-RCGP Joint IT Committee) description of the NPfIT's IT suppliers as 'flashy' 'slick suits' who had 'no experience of delivering healthcare' (see pages 124 and 126) captures the antagonistic attitudes of many clinicians toward IT industry players. He described this situation as one of 'cognitive dissonance', and this resonates with Orlikowski and Gash's (1994) theory of incongruent technology frames where the interests and perspectives of different user groups regarding technology are very different and often conflicting.

A similar resentment to control by managers, whom clinicians regard as non-professional, is highlighted by Fitzgerald and Ferlie (2000). This dissatisfaction at having to be subordinate to occupations that did not possess the professional status of medicine, combined with the lack of clinical engagement within the NPfIT may have spurred clinicians to continue with their independent ventures in an attempt to retain some autonomy over their practices. However, as one respondent pointed out, it was a highly challenging atmosphere as smaller IT suppliers were threatened by the larger Local Service Providers contracted by the NPfIT. These frictions aggravated clinicians' resentment and resistance, and contributed toward the increased chasm between clinicians and the IT suppliers, resulting in renewed efforts by a small niche group of clin-ITs, particularly GP-ITs, to exercise their autonomy in the face of state and market pressure. Such ventures reflect a deliberate move to protect their clinical practice from external authority and interference (Montgomery, 2001), and relates to Freidson's (1985) notion of restratification, as professionals employ technical skills to maintain independence from external IT suppliers and government imposed control.

7.4.1.2 Incentives

The use of computers by GPs in UK has been far ahead of their secondary care counterparts (Benson 2002a, 2002b). This may in part be attributed to the incentives in place for GPs to use computerised systems. Respondent R9 (see page 223) elaborated on these schemes and explained how this enabled GPs to improve their working practices by means of computers. Incentives such as these free computer schemes (Heath and Luff, 1996; Jha *et al.*, 2008) and the need for measurement of quality as required by the

Quality And Outcomes Framework which was established in 2004 (Roland, 2004) acted as motivators to implement computer systems in GP practices in England.

Initiatives by market players such as VAMP, where the systems were financed by selling GPs' data to pharmaceutical companies (Heath and Luff, 1996) contributed to the spurt in computerised GP practices. Given that technology reflects the purposes of those who design or pay for the systems (Davidson, 2002; Walsh and Fahey, 1986; Anderson, 2008), the systems offered to GP practices may not have been conducive to the established practices of primary care. Data entry pertaining to patient diagnosis and treatment had to be inputted in formalised and specific formats, as they were to be used by pharmaceutical companies (Heath and Luff, 1996). This use of anonymised or pseudo-anonymised clinical information for research purposes has been debated (Foster and Young, 2012; Malin, Karp and Scheuermann, 2010) and is often the cause of much concern on the part of patients who may regard themselves the sole owners of their personal health information.

The structured nature of EHRs and prescribed data entry formats may also be regarded by clinicians as disruptions or control mechanisms (Ash, Berg and Coiera, 2004). While standardised records and data entry standards are important for interoperability, collaborative healthcare, performance measurement, secondary use of data and patient safety (Wallis, 2007), in this case the standards would have been imposed by market players (AAH Meditel and VAMP) for their benefit and not necessarily with the interests of clinicians or patients in mind. The design of health records needs to be tailored to users' needs (Wallis, 2007) and take into account the way clinicians interrogate their records when searching for data (Wyatt and Wright, 1998). As discussed in Chapter 6, the

needs of users vary between clinical specialties, posing further challenges to the design of EHRs. This emphasises the need for clinical input in the design of EHRs, to ensure that systems meet the needs of their diverse range of users.

The Quality And Outcomes Framework, while encouraging the use of computers to record the performance of GP practices and consequently reward best practice (McDonald, 2012; Roland, 2004), could be regarded as yet another platform from which the state exerts indirect control over the clinical profession. It can also be considered a form of 'enforced self-regulation' (Dent, 2005) as GP practices that perform well are rewarded accordingly, thus encouraging clinicians to meet the measures of the framework. Representing state-driven priorities and indicators rather than recognising the intangible and often unquantifiable nature of quality of care, the Quality and Outcomes Framework with its incentives has been described by some as 'deeply corrosive to the ethical practice of medicine' (Mangin and Toop, 2007: 435).

Although autonomy is considered an integral characteristic of the medical profession (Abbott, 1988; Freidson, 1988), much of the autonomy and control physicians exert is with the support given to them by the state (Freidson, 2007). The support from the state could be extended in the form of funding and incentives to computerise practices as I have discussed. Whether the incentives provided by the British state and market players encouraged clinicians to embrace technology by providing them subsidised IT systems (Jha *et al.,* 2008), or bred an environment where clinicians felt increasingly controlled and monitored by measures such as the Quality and Outcomes Framework (Mangin and Toop, 2007), is a moot point. In either case they facilitated an interest in technology amongst clinicians, served the purpose of encouraging the increased use of computers in clinical

practice, and acted as a catalyst to the already existing GP efforts to develop tailored systems for their use.

While economic and political autonomy varies between different regions, the *content* of professional work, i.e. establishment of domain specific guidelines for work practices, lies in the hands of professionals themselves (Freidson, 2007). Consequently, some clinicians adopt IT roles to retain the inherent professional boundaries and hierarchies amongst themselves (Coburn, Rappolt and Bourgeault, 1997; Marsden, 1977), resulting in internal stratification (Freidson, 1985).

7.4.1.3 Delegation and division of work: reinforcing boundaries

In Chapter 6 I highlighted the capacity of EHRs to shift and redefine professional boundaries due to the increased overlap of professional roles (Bossen, Jensen and Witt, 2012), illustrating the potential for technology to 'combine jurisdictions' (Abbot, 1988: 239). This too is a threat to medicine's autonomy and distinct jurisdiction, as professional power, status and hierarchies are mediated by technology use (Barley, 1986; Tjora, 2000). The tensions between specific clinical groups such as primary care physicians, secondary care physicians and nurses, that I discussed briefly in Chapter 6, surfaced in my interviews with clin-ITs as well.

Respondent R31 (see page 223) described how in the early 1980s he developed systems that had specific interfaces for nurses to enter basic data for physicians. Medical professionals delegate less important or mundane tasks to those whom they consider occupying lower ranks in the clinical hierarchy (McMurray, 2010; Nancarrow and Borthwick, 2005; Allen, 1998), and as indicated by respondent R31 nurses often serve as 'handmaidens' to the medical profession (Currie, Finn and Martin, 2008). In this case, this

demarcation and delegation of tasks is done by clin-ITs right from the design phase of the system, thus attempting to embed professional boundaries and hierarchies within the system itself. Clearly, the development of health IT is often reflective of the hierarchies and jurisdictional boundaries that are characteristic of healthcare (Marsden, 1977; Nancarrow and Borthwick, 2005).

However, this traditional perception of nurses as subservient to the medical profession (Horrocks, Anderson and Salisbury, 2002), is one which has been changing, as seen by the establishment of new 'less-bounded' nursing roles such as nurse practitioners and nurse consultants (Currie, Finn and Martin, 2010). This is partly facilitated by technology, which enables re-negotiation of the doctor-nurse boundary (Tjora, 2000).

The differences between technology use by primary care and secondary care were also evident from my findings. Respondent R9's (see page 224) reference to GPs' possessiveness over their systems as their tool illustrates the ownership of systems in primary care, enabling GPs to utilise computers for their own benefit, as they are remunerated on the basis of the recorded performance of their practices (Cohen and Musson, 2000; Doolin, 2002; Roland, 2004). While GPs might not deliberately adopt clin-IT hybrid roles to reinforce the boundaries between primary and secondary care, their clear possessiveness of their IT system as their tools suggests an element of exclusivity in the way GPs use their systems. This might explain the 'enthusiastic adoption of computing by general practitioners but widespread alienation of hospital doctors' in this regard (Benson, 2002a: 1086). The next section discusses clinicians' use of IT for improved performance and profitability in further detail.

7.4.1.4 Quality of care, improved performance and profits

One of the traits commonly attributed to the medical profession is its traditional commitment to serve people (Freidson, 1988). Today, this takes the form of improving quality and efficiency of healthcare delivery, so that patients receive the best treatment possible. In the case of clin-ITs, this is seen in their interest to develop IT for the purpose of improved healthcare delivery, as was seen from Respondent R35's quote (see page 225). This showcases the service oriented nature of the medical profession (Abbott, 1988) as well as the self-motivated creativity (Quinn, Anderson and Finkelstein, 1996) of such clin-ITs as they endeavour to adapt their practices and the technologies used, to better serve their professional roles and responsibilities.

While improved healthcare delivery is often the cited reason for embarking into the clinical informatics domain, and may well be the case, GP practices in the UK operate as businesses that profit from improved performance outcomes (Roland, 2004). This then questions the underlying reasons behind the increased use of IT by physicians, and the consequent phenomenon of the emergence of clin-IT hybrid professionals. While professionals' specialist knowledge equips them to provide their services and fulfil certain roles, they can also use it as a tool for their own self-interests which could include monetary profits and retention of control over their work (Freidson, 1970; Bolton, Muzio and Boyd-Quinn, 2011). The introduction of the Quality and Outcomes Framework made it essential for primary care to record their performance details if they were to be paid (Roland, 2004). This was voiced by my respondents as well, and acted as an additional incentive for GPs to implement computerised records in their practices (Roland, 2004), as I discussed in the previous section.

The notion of 'commercialised professionalism' (Hanlon, 1998) is of relevance here, as it encourages managerial as well as entrepreneurial traits in professionals, as the gulf between professionals and managers is being dissolved (Dent, 2003). This is evident in the case of clin-IT hybrids as well, as they engage in independent and entrepreneurial initiatives such as setting up clinical software companies, to further the profits of their practices and also to commercialise the products they develop.

7.4.1.5 Interest in IT as a hobby

A general interest in IT programming is what often prompts clinicians to venture into the development arena. Some feel a sense of frustration with existing systems, and endeavour to take matters into their own hands, as they feel they may be able to address their needs and requirements in a better manner than external IT suppliers, as was evident from two interview respondents. This chasm between the types of systems IT suppliers provide and those that are developed by clinicians reflects the different technology frames (Orlikowski and Gash, 1994) within which these different groups function. These respondents' emphasis on the positive contribution that their clin-IT roles could make can be compared to Ashforth and Kreiner's (1999) description of how individuals handle identity conflicts and challenges to their roles by means of reframing their work. They do this by highlighting how their IT programming role infuses value to clinical practice, and is not a threat or impediment to clinicians' work practices which is how IT systems are often viewed (Timmons, 2003).

Elaborating on this example of clin-ITs wanting to design their own systems, it is clear that unless there is clinical input, or an understanding of clinicians' work processes, technology is unlikely to serve the needs of clinical practice. Computerised records promise clinicians

benefits including quicker and easier access to patient data. They may re-organise the structure of the patient record to make it clearer and tidier than traditional handwritten records (Heath and Luff, 1996). However, in doing so, Heath and Luff (1996) suggest that the EHR developers may undermine or be oblivious to clinical practices which account for the seemingly unorganised nature of physical records:

> By ignoring why the record is as it is, the design fails to recognise that the very consistencies which have been identified are themselves the products of systematic and socially organised practices. (Heath and Luff, 1996: 360)

My empirical data suggests that most clin-IT respondents identify themselves primarily as clinicians, and several do IT programming as a hobby rather than for commercial or business purposes. As hobbyist programmers work with IT mainly as a hobby, they enjoy more flexibility and freedom in choosing what they work on (Shah, 2006). While this poses challenges to completion of programming projects due to lack of formal monitoring, these IT developers play an important role in developing creative and innovative technologies as they are driven by an interest to do and learn, rather than by a mandatory requirement to complete a task by a given time (Shah, 2006).

Extending this to the concept of clin-IT hybrids who engage in IT development as a hobby, clearly they are driven by their self-motivated creativity (Quinn, Anderson and Finkelstein, 1996) which is vital to responding to external changes and threats to work practices. The pivotal boundary position occupied by these hybrid professionals at the interface between the clinical and technology fields, combined with their self-motivation and interest in IT programming, provide an excellent opportunity for the development of innovative technologies in the health sector, tailored to the needs of clinicians. The clin-ITs amongst my respondents, particularly the GPs, also explained that some of the IT

development work they did was a result of observing their practices and addressing their obvious needs. In her discussion on hobbyist programmers, Shah (2006) mentions this tendency for hobbyists to respond to the needs of their surroundings, and this perhaps adds an element of agility and responsiveness to the nature of the GP-IT hybrid.

7.4.2 Prevalence of clin-ITs amongst primary care physicians: GP-ITs

While my empirical data included the accounts of nurses as well as doctors who had a strong interest in the development or formulation of guidelines related to health IT, evidence indicated a prevalence of the clin-IT hybrid amongst primary care physicians. The higher incidence of clin-ITs amongst GPs may be attributed to factors including the independent and business oriented nature of their practice (Cohen and Musson, 2000).

The physical setting in which GPs work is also very different from that of secondary care physicians. As described by Respondent R31, the very nature of the GP setting where consultations are held within a single room makes the use of IT easier, thus facilitating an interest in its development (Benson, 2002b).

The relative complexity of record keeping in secondary care has been discussed by Benson (2002b) who highlights the voluminous nature of hospital records and the complex workflow patterns inherent in secondary care, mandating higher security mechanisms. As suggested by Respondent R6, GP records on the other hand are not as complex and are comparatively more structured, making it easier to develop EHRs in the primary care setting.

Despite scholars suggesting that GPs occupy the 'bottom rung of the ladder' in the hierarchies of healthcare (Coburn, Rappolt and Bourgeault, 1997), GPs possess a degree

of independence which is difficult for their secondary care counterparts to attain. Given their independent practices, GPs regard themselves as entrepreneurial businessmen, with their individual practices operating as businesses (see section 6.4.4). In the UK, this business oriented disposition was encouraged right from the 1990s when GPs were required to use IT to record data for the purpose of remuneration, thus triggering an interest among GPs to optimise their practice and to use technology towards this end (Cohen and Musson, 2000; Benson 2002a). Respondents highlighted this by citing the examples of GPs given subsidies for IT systems in the 1980s, and that of measures such as the Quality and Outcomes Framework which requires GPs to record their performance data in order to be rewarded for best practices.

GPs' aim of protecting their business interests (Cohen and Musson, 2000) causes them to restrict access to their data. This wish to retain control over their records was one of the reasons the Summary Care Record was opposed by many GPs (see Chapters 3 and 5). The content of the summary care records was to be derived from GPs' records (Greenhalgh *et al.,* 2010b), and there was a reluctance on the part of GPs to share the fruit of their labour, or the 'crown jewels of general practice' as described by Respondent R10 (see page 188).

My interview data also showcased the sense of pride that GPs take in developing their own systems, unlike their secondary care counterparts who usually work under non-clinical managers who impose control mechanisms on them by means of IT systems. GPs' direct involvement in the design and development of their clinical systems made their relationship with their systems 'mutually constitutive' (Korica and Molloy, 2010). This also accounts for GPs' sense of ownership of their systems as expressed by Respondent R9's

description of GPs' systems as 'my tool, or *our* tool' (see page 224). In contrast, secondary care consultants resent to having IT systems imposed by their managers, and are likely to express their dissatisfaction to their peers and non-clinical subordinates, as expressed by Respondent R7 (see page 224). This might result in the delegation of tasks to those whom they regard lower in the clinical hierarchy (McMurray, 2010; Nancarrow and Borthwick, 2005; Allen, 1998) to relieve themselves of the responsibility of clinical data entry, since their minds may be resolved in their determination that they 'don't use these things' (R7, Page 224).

Given that professional knowledge and the information they hold acts as professionals' source of power and authority (Quinn, Anderson and Finkelstein, 1996), it then follows that strong incentives are needed if GPs are to share information. Respondent R3's views (see page 225) on information sharing practices among primary and secondary care clinicians highlight GPs' apparent reticence to share their records. This however may be explained by the hard work that GPs have put into the computerisation of their practices, and their dissatisfaction at having to let others reap the benefits of their efforts. As Respondent R10 explained (see page 188), secondary care clinicians do not *have* established record systems like primary care practices, and GPs feel 'they have to sweat over their records, and then people come along, and just *nick* them'. This is a classic example of knowledge 'at stake' (Carlile, 2002) as GPs do not wish to lose possession of their hard earned records and data by sharing them with secondary care.

The complexity of the clinical domain (Bates, 2002; Ilie *et al.*, 2009; Chiasson and Davidson, 2006) contributes to the indeterminate nature of medical knowledge (Boreham, 1983). The need for professionals who are not situated at extreme ends of the

clinician-IT spectrum, but who have a combination of clinical expertise as well as IT skills, was voiced by several respondents. The acquisition of specialist knowledge which spans different areas combined with the track record of successful computerisation of GP practices, places GP-ITs in a pivotal position with the capability to facilitate communication and collaboration in large scale health-IT projects such as the NPfIT.

7.5 Challenges faced by clinician-IT hybrids

Despite the benefits of having individuals with both clinical as well as IT know-how developing clinical systems, there is the barrier of legitimisation of their expertise and work. The seeming incompatibility of user-friendly versus clinically useful systems is an issue which often arises when clinicians develop IT themselves, as seen from my interview data. Two respondents (see page 229) highlighted the possible deficiencies of systems that are developed by clinicians. Despite perhaps knowing what they want in a system, clinicians are not always as adept as their IT counterparts in the actual development of an appropriate system.

However, what GP systems might lack in user interface is compensated for by their 'exquisite' functionality that is 'finely honed' to clinicians' needs (Respondent R9, page 229). Physicians prize the functionality of their systems over their ease of use (Walter and Lopez, 2008), and GP-ITs have an edge over IT suppliers as they have a clear understanding of clinical needs because of their own clinical knowledge and experience. This preference of functionality over user-friendliness of their systems may be linked to clinicians' need to be able to trust their systems (Walter and Lopez, 2008), in order to provide their patients with the best quality care possible.

7.5.1 Attaining credibility in the shadow of IT giants

The boundary role of professional hybrids means that they have to be fully engaged in both domains at the interface of their hybrid role, in order to retain their credibility to both parties. While insufficient time commitments to managerial or technical duties may result in questions regarding their suitability for the role, another factor which affects their credibility is their experience and expertise in both domains (Witman *et al.*, 2011). Several interview respondents discussed challenges faced in earning the respect of non-clinical groups such as IT suppliers. Some clinical respondents themselves voiced their apprehensions regarding their clin-IT colleagues, and were of the opinion that some clin-ITs were not capable of fulfilling their responsibilities in either the clinical or IT domain.

Medical professionals have undergone prolonged and extensive training to attain their independent professional status. However, not the same can be said about secondary roles such as management and technology development amongst professionals (Orlikowski and Baroudi, 1988). Scholars have suggested that management and IT lack the 'professional' nature of more established professions such as medicine (Barker, 2010; Orlikowski and Baroudi, 1988). This then means that those clinical professionals who have moved into a hybrid role, face significant challenges in terms of establishing their reputation and gaining trust in their new combined role.

Although most of my clin-IT respondents did not encounter challenges to their credibility from their clinical peers, Respondent R36 (see page 230) suggested that his lack of formal qualifications or affiliation to an IT company could have deterred other clinicians from showing interest in a particular system he had developed. The NPfIT demonstrated a similar dismissal of GP-ITs as a collective group, and GPs themselves were aware of the

lack of seriousness with which they were taken, and considered that their unique dual role was perhaps regarded as unconventional or unprofessional by IT suppliers as well as the NPfIT management, raising questions regarding their perceived legitimacy as medical professionals.

Clin-ITs clearly face a struggle in maintaining their esteemed professional position, as their new hybrid role might dilute their privileged reputation as authorities in the clinical domain (Freidson, 2007). This diminished respect for clinicians once they move into clin-IT roles may explain their general tendency to identify more strongly with their professional role such as medicine or nursing (Smith *et al.*, 2011). Studies have shown that this stronger identification with their professional roles is true in the case of clinician-manager hybrids as well (Llewellyn, 2001).

Clin-ITs who had started small scale health IT companies were also faced by threats in the market. Large scale national EHR projects are often tinged with political drivers (Takian *et al.*, 2012) such as policymakers' 'monument complex' (Flyvberg, Holm and Buhl, 2007), and the NPfIT was no exception. Smaller companies and start-ups by clinicians who were keen on developing tailored and useful systems for their practice were dwarfed by the magnitude of the national programme, and the big IT players who had been contracted.

7.5.2 Career prospects and balancing of roles

In their study which is in an Australian context, Smith *et al.* (2011: 132) suggest that clinical informaticians' 'lack of self-identification of the group' causes them to identify more strongly with their professional roles. This might explain the absence of a well-defined career structure for clin-IT hybrids, as they themselves do not always explicitly associate their role with that of a hybrid professional. Respondent R6 (see page 221)

explained that clin-ITs in the NPfIT were neither clinicians nor technologists, and instead, had become a 'merged entity'. This would have also been felt by the clinicians themselves, as their dual capabilities may have diluted people's regard for them as clinical professionals, as they occupied an 'in between' state (Llewellyn, 2001) between clinical practice and IT. However, most clin-IT hybrids I interviewed identified more with their clinical role, and regarded themselves first as clinicians, with their IT interest being a secondary role. This is similar to past research findings that clinician-manager hybrids consider their managerial roles as supplementary to their clinical functions (Doolin, 2001; Llewellyn, 2001).

In balancing their dual roles, hybrids are often challenged by time constraints as well as conflicting interests of the different domains within which they operate (Fitzgerald and Ferlie, 2000; Kippist and Fitzgerald, 2009). This may cause some to switch between these roles and experiment with 'provisional selves' (Ibarra, 1999) to balance their clinical and non-clinical responsibilities. Kreiner, Hollensbe and Sheep (2006: 1045) regard these provisional selves as ephemeral roles that involve 'temporarily escaping one's predominant role set and stepping into an entirely different role', and that entail identity work (Sveningsson and Alvesson, 2003) as individuals deal with the challenges of their multiple roles. By exploring and trialling different roles, professionals can negotiate between their existing roles and those that they aspire to (Ibarra, 1999).

This notion of 'provisional selves' (Ibarra, 1999) was reflected in one case where a GP respondent had moved away from clinical work in order to explore the possibility of starting an independent clinical software company (see page 233). Challenges in balancing time between clinical and non-clinical responsibilities often deters clinicians

from taking up dual roles, as they prefer to focus on their clinical work for which they have undergone prolonged training (Doolin, 2001), as in the case of Respondent R37. However, this respondent opted to step aside from his clinical role and focus on his IT interests, trialling this secondary role for a few months. While Kreiner, Hollensbe and Sheep (2006) used examples of participation in recreational activities and groups such as sports to discuss ephemeral roles, this can be extended to alternate work roles, particularly in the case of IT related roles as many clinical professionals engage in IT development as a hobby rather than out of commercial interest (see section 7.4.1.5).

In section 7.3 I discussed the need for hybrid professionals to engage in their secondary roles on a part-time basis, to retain credibility in the eyes of their professional peers (Fitzgerald and Ferlie, 2000). In the case of hybrids such as respondent R37 who opt to shed their primary professional responsibilities to trial a new role, they may have to contend with issues regarding the trust and reliability afforded to them by fellow clinicians.

Respondent R37's decision to trial an IT oriented role by starting up a clinical software company showcases initiative and self-reliance – characteristics typical of entrepreneurship (Doolin, 2002). This feeds back into the discussion on the prominence of GP-ITs due to their independent and entrepreneurial nature compared to their secondary care colleagues (section 7.4.2). Respondent R37's experience echoes the view that hybrid roles often result in internal conflicts due to the challenges of balancing time between two different and potentially conflicting roles (Kippist and Fitzgerald, 2009). He opted to trial (Ibarra, 1999) a purely IT role in response to the difficulties of juggling

clinical and IT tasks. However, although he put a temporary halt to his clinical practice, this does not indicate an abandonment of identification with his medical role.

One respondent (R16, A medical director previously involved with Connecting for Health) expressed a negative opinion of GPs who had an IT role within Connecting for Health (see page 234), suggesting that they had turned away from their clinical responsibilities and did not contribute positively to IT development either due to their lack of understanding of the secondary care setting. In the case of respondent R37 however, there was a potential interest in returning to clinical practice, and his hiatus from clinical practice was partly due to his wish to cope with the initial steep learning curve which accompanied his IT role.

Respondent R6 (see page 232) mentioned the advantage that medical professionals have in being able to always return to their clinical practice even if their other secondary roles did not prove successful. Not only does this again reflect the tendency of clinical professionals to identify themselves primarily with their clinical role (Smith *et al.,* 2011), but it also reflects the unique position afforded to medical professionals in society (Abbott, 1988). Acknowledged as a profession which enjoys a preeminent position with a significant amount of autonomy and dominance, medicine, it has been suggested persuades people to 'medicalise' their problems and be convinced of their *need* for the services of the medical profession (Freidson, 1988; 1985). This then makes it less problematic for medical professionals to 'trial' other roles (Ibarra, 1999), and either balance their clinical and non-clinical tasks (Witman *et al.*, 2011), or revert to their primary professional identity when they need to. However, this ease of switching roles (Ibarra, 1999) is a double-edged sword, as it could potentially be regarded as a lack of

professional commitment by peers (Witman *et al*. 2011), as I will discuss in the next section. Scholars have cautioned against such discontinuity and disruption to clinical practice due to the challenges of securing credibility in the eyes of professional colleagues who could regard hybrids as traitors to the profession (Farrel and Morris, 2003; Witman *et al.*, 2011).

7.5.3 Conflicts of interest

Professional hybrids such as clinician-managers encounter conflicts between their professional and organisational roles. Identity work (Sveningsson and Alvesson, 2003), the way in which professionals deal with these differences and construct their identities is relevant to how hybrids balance their seemingly contradictory roles and responsibilities. The 'constant struggle bringing about temporary views of the self, where certain identity versions dominate over the others, depending on the context' (Sveningsson and Alvesson, 2003) is operational in the concept of provisional selves (Ibarra, 1999), as individuals trial roles, and alternate between different contexts and work responsibilities (Kreiner, Hollensbe and Sheep, 2006). These conflicts between roles is present among clin-IT hybrids as well, as they may be perceived as having commercial interests in promoting IT systems as opposed to clinical professionals' traditional purely service-oriented ethos (Hanlon, 1998).

Efforts to balance multiple conflicting roles can cause people to create a hierarchy to distinguish the importance of their different roles and identities with higher ranked roles being the ones more likely to be enacted (Kreiner, Hollensbe and Sheep, 2006). This is another explanation for most clin-ITs' primary identification with their clinical role as evident from my empirical data.

Respondent R35, a GP involved in a software company, explained that his primary aim was to improve the quality of clinical practice by means of the software developed by his company, and that it was not intended for profit making (see page 227). This respondent felt the need to clarify the motivation for setting up his IT company, possibly to refute any suggestion that this aspect of his work was morally 'tainted' (Ashforth and Kreiner, 1999) by commercial drivers. His rationale also reflects his primary identification with his clinical role as a GP, and his aim to improve clinical practice rather than make profits alone.

To Respondent R36 on the other hand, commercialisation of software developed by clin-ITs was important, as it seemed futile to spend so much effort into IT development without being able to make any profits from it. Commercial incentives are then one of the drivers for the sustained development of the clin-IT role – be it profit out of marketing their developed software as expressed by Respondent R36, or through increased profit for their practice due to more efficient work practices facilitated by the implemented technology.

Apart from conflicts and challenges from non-clinical elements, clinical hybrids often have to contend with their peers who may regard them as traitors or anomalies to the profession (Witman *et al.,* 2011). The lack of professional prestige associated with managerial and IT oriented roles may cause clinical professionals to look down on hybrid professions who take up the 'dirty work' (Ashforth and Kreiner, 1999) of controlling professionals via managerial or IT mechanisms. My empirical data did not suggest that clin-ITs themselves feel that their roles and work are regarded as 'dirty work' (Ashforth and Kreiner, 1999) that was viewed with condescension by their clinical colleagues.

However there were clinical respondents who did have extremely negative opinions of their clin-IT peers. Respondent R16's condescending view of GP-ITs in the national programme (see page 234) reflects an underlying opinion that they were traitors or anomalies to the profession, and a similar perception is often associated with clinician-manager hybrids (Witman *et al.*, 2011). His negative attitude towards these GP-ITs was aggravated by the way they distanced themselves from their GP roles to 'turn themselves into IT consultants', and suggests that he regarded their IT responsibilities as 'dirty work' (Ashforth and Kreiner, 1999) that lacked the prestige, status and prolonged training that is characteristic of the medical profession (Abbott, 1988). His description of these GPs prompts the question, what constitutes a clin-IT? Clearly, the clinicians that Respondent R16 referred to had abandoned their clinical roles and no longer identified themselves as GPs. It is therefore essential to emphasise that the clin-IT role requires active involvement with both the clinical as well as IT domains, or an on-going interest and empathy with both areas.

This respondent felt that those GPs who ventured into the technology arena did so for financial reasons and out of dissatisfaction with their clinical work. This is similar to Llewellyn's (2001) findings that clinician-manager hybrids sometimes have to contend with others' opinions that they move to managerial roles due to their lack of clinical skills. Respondent R16's description of these GPs as 'roaming around the place' captures a picture of these clinicians not utilising their time and resources to any meaningful end, apart from their own personal profit, suggesting that he regarded their role as morally tainted (Ashforth and Kreiner, 1999). The view that these GPs did not gain satisfaction from their medical work and preferred to identify themselves as 'IT consultants' fuelled

respondent R16's antagonistic opinions of them, emphasising the need for clinical hybrids to maintain continuity with their medical practice to retain credibility and respect amongst their clinical colleagues (Witman *et al*. 2011). Therefore, to qualify as meaningful boundary spanning professionals, clin-ITs need to maintain their association with their clinical practice, or be able to retain their ability to understand their fellow clinicians' needs, rather than crossing over entirely into the technical domain. Commitment to continued medical practice has been recognised to help preserve professional identity and facilitate a reputation of professional commitment (O'Connor *et al*., 2002), and this holds true in the case of clin-IT hybrids as well.

7.6 Summary

Despite the challenges of convincing clinicians of the benefits to be gained by the appropriate use of EHRs, there is already a small but enthusiastic group of clinicians whose professional interests have persuaded them to take part actively in health IT development and usage. While technology may diminish professional status or boundaries due to its ability to enable boundary spanning (McLaughlin and Webster, 1998; Tjora, 2000), the recognition of the value of computerised systems, combined with the tendency for professionals to resist control by extraneous factors (including technology), result in hybrid roles that merge professional occupations with the technology development domain. This chapter makes a contribution towards the existing literature on hybridisation (Noordegraaf, 2007; Fitzgerald and Ferlie, 2000; Waring and Currie, 2009; Thomas and Hewitt, 2011; Doolin, 2002) by highlighting the existence of the clin-IT hybrid professional that has not been subject to significant empirical research.

The rise of the clin-IT hybrid reflects the need felt by healthcare professionals, particularly GPs, to retain control not only over their clinical processes and monitoring mechanisms, but the tools and technologies used for these purposes. This relates to Freidson's (1985) restratification principle that stipulates the assumption of specific (additional) roles by professionals as a means of preserving their professional group from external control.

Although these perceived threats from the state and market as a consequence of the NPfIT were felt by clinicians, there were more subtle encroachments into their work practices by means of state and market provided incentives such as subsidised computer systems. While these incentives motivated GPs to computerise practices, and did not appear to threaten clinical autonomy, technologies are often designed to meet the interests of those who develop or sponsor them (Davidson, 2002; Walsh and Fahey, 1986). The 'shelter' provided by the state to professions (Johnson, 1995:10; Freidson, 1988), although not constraining their technical work, limits their absolute autonomy as they need to comply with certain requirements of the state as their protective custodian (Freidson, 1988). While the technology incentives offered to clinicians by the state would at first glance appear to support the medical profession, it is likely that these incentives were intended to meet specific aims of market and state players, as was evident by the utilisation of data generated by GP practices for market research purposes. However, despite this ulterior motive, the incentives also had a catalytic effect on GP practices' use of computerised systems. This sparked an interest in GPs who were keen to develop better solutions, as was the attitude of one clin-IT respondent

Elaborating Freidson's (1985) theory of restratification as a consequence of threats to professional autonomy, the formation of these professional elites or hybrids are not

necessarily a response to extraneous factors alone, but could also be due to internal threats amongst the professions (Coburn, Rappolt and Bourgeault, 1997). This effort to prevent colonisation (Waring and Currie, 2009) by clinical colleagues is directed towards preserving the traditional hierarchies present amongst clinicians (Marsden, 1977).

In the case of clin-IT hybrid professionals, technology may be used to reinforce these hierarchies and further the degree of internal stratification. Clin-ITs who design health IT systems can determine how technology can be used to delegate tasks to specific clinicians, as opposed to the use of technology to facilitate task drift (Bossen, Jensen and Witt, 2012). For example, by delineating the responsibilities of physicians and nurses by means of technology, clin-ITs reinforce the traditional physician-nurse boundary and reduce the possibility of vertical substitution (Nancarrow and Borthwick, 2005) wherein professionals move up hierarchies due to shifts in role boundaries.

Also, tensions between primary care physicians and secondary care specialists may exist due to the latter regarding GPs as lacking in specialist knowledge (Marshall, 1999) and feeling that they do not need to learn from their primary care colleagues (Berendsen *et al*., 2006). Such conflicts between medical professionals accentuate the divisions and boundaries between primary and secondary care. Whether GPs' use of technology to manage their patient records as their 'crown jewels', as Respondent R10 described (see page 188), is a strategic move to assert themselves and cause other clinical professionals to depend on their primary care data, is an interesting possibility.

While the discussion up to this point on why clinicians may take up dual clin-IT roles may be linked to the theory of restratification in response to threats to professional

autonomy, the latter two factors which I highlight, present two different characteristics that may be associated with clin-ITs. Freidson's study does not account for the presence of other factors such as personal interests and entrepreneurial aspirations that also contribute to the restratification phenomenon. My findings indicate that in addition to possibly being a form of resistance to state and market imposed control, clin-ITs may emerge as a consequence of IT programming as a hobby amongst these professionals, and also as a result of the entrepreneurial nature of some physicians, particularly those in primary care.

The entrepreneurial nature of clinicians, GPs in particular, prompts them to seek means by which they can improve the performance and profits of their practice, particularly due to the mechanisms in place to remunerate GP practices on the basis of their recorded performance (Cohen and Musson, 2000; Doolin, 2002). This breed of clin-ITs can be regarded as a fusion of independent and entrepreneurial professions (Reed, 1996), as they leverage their technical knowledge to facilitate and further their professional interests, while at the same time gain profits from their hybrid work. The concept of commercialised professionalism (Hanlon, 1998) is relevant to clin-ITs in such cases, as they combine their professional roles with entrepreneurial efforts to bridge the gaps between their clinical work and their IT needs.

A general interest in IT development as a hobby was highlighted by most clin-ITs. Although scholars have suggested that the IS development cannot be regarded as a profession (Orlikowski and Baroudi, 1988), technology development needs a certain amount of technical knowledge and interest, albeit not necessarily with formal training or qualifications (Abbott, 1988). Considering this point, it would seem that in the face of

threats by the market, state or other professionals, those clinicians who take up IT related roles as a defence strategy would not be completely new to the technology field. Instead, they would most likely be those who already regard IT as a hobby, or who have demonstrated entrepreneurial initiatives in designing technology for the commercial as well as clinical benefit of their practices.

While external threats such as state and market control can result in restratification (Freidson, 1988) by prompting clinicians to take up dual clin-IT roles, these are not the primary reasons why clinicians engage in these roles. Instead, entrepreneurial interests in IT for commercial self-interest or as a hobby are the main underlying factors for the increasing prevalence of clinicians in IT development. However, this is not to deny the role of external threats in facilitating the phenomenon of clin-IT hybrids. I argue that these two factors, i.e., an interest in IT for commercial purposes or as a hobby, are pre-requisites for the emergence of clin-ITs in response to market and state threats. Without this inherent interest and active engagement with IT, the expected outcome of imposed control by external threats would be either subordination (Reed, 2007) or heightened clinical resistance to technology, which have been the subject of numerous studies (Ford *et al.*, 2009; Walsh, 2004).

I have also discussed the key challenges faced by clin-IT hybrid professionals, including their need to retain credibility in the eyes of their peers, the competition and pressure they face from other IT players, and the many conflicts of interest which are inherent in the healthcare field. Efforts to deal with these external challenges and the conflicts between their multiple responsibilities might prompt clin-IT hybrids to engage in 'identity work' (Sveningsson and Alvesson, 2003). Clinicians' possession of highly specialised

medical knowledge and expertise provides them with a stable foundation on which to fall back on, should their interests in technology development not prove successful. This anchors them firmly so that they are more confident to venture into non-clinical domains such as management and IT development, drawing parallels to Ibarra's (1999) discussion on provisional selves and trialling of alternate 'ephemeral' (Kreiner, Hollensbe and Sheep, 2006) roles.

While most respondents agreed with the need for increased recognition of clinicians who have IT skills, a minority expressed dissatisfaction and resentment regarding the clinicians who were involved with the NPfIT in an IT oriented role. They regarded these clinicians as having transitioned into technology development out of dissatisfaction with their clinical roles, or due to monetary incentives, and were of the opinion that they had lost touch with their clinical side. This then emphasises the need for sustained involvement or at least interest in clinical practice, for clin-ITs to be effective. The general tendency of industry players to look down upon, or to ignore clinicians, may also trigger a need for clin-ITs to prove themselves capable of developing products which are as good as, if not better than those developed by their IT counterparts. These challenges suggest that clin-ITs potentially engage in identity work (Sveningsson and Alvesson, 2003) to deal with conflicts between their multiple roles, difficulties in balancing their time between these, and the possible disparagement encountered from IT players as well as clinical peers.

The important role of clin-IT hybrid professionals is one which needs to investigated in greater depth, given the tremendous potential offered by these hybrids to act as translators and intermediates between the clinical and IT domains. This chapter is a response to this need, and presents empirical evidence to stress the pivotal position

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occupied by clin-ITs and the challenges they are typically faced with. Having presented my

key findings and discussions, I now proceed to the last chapter where I provide a brief

integrated discussion linking my three findings chapters, and my conclusions.

CHAPTER 8 DISCUSSION AND CONCLUSION

8.1   Introduction

In this chapter, I provide a brief integrated discussion which links the key points from my findings in a cohesive manner, and my conclusions from this study. The intention is not to elaborate on the discussions already provided in chapters 5 to 7, but instead to explain how these three separate strands of thought fit together in a broader way.

The previous three chapters provided an overview of my main findings and discussions. I first presented the NPfIT story and used the concepts of organising visions (Swanson and Ramiller, 1997) and boundary objects (Star and Griesemer, 1989) to analyse some of the main phases that marked the programme. I then narrowed my discussion specifically to EHRs, illustrating their capacity to act as boundary objects interfacing between different users, facilitating knowledge flow across boundaries (Carlile 2002, 2004) and also potentially shifting these boundaries. Continuing on the theme of shifting and bridging boundaries, Chapter 7 put forward the concept of a unique professional hybrid, the clin-IT, showing how such hybrid professionals step beyond the confines of their traditional professional jurisdictions by adopting new IT related roles in addition to their primary clinical role.

In the next section I encapsulate the significance of my findings chapters in relation to each other. The key concepts of organising visions, boundary objects and professional hybrids are interwoven to explain the use of EHRs by different professionals and the boundary spanning capabilities of both EHRs as well as clin-ITs in the context of the NPfIT. This is followed by the presentation of my conclusions. I highlight my key findings and contributions, explaining how these meet the research objectives of this thesis. I then

briefly discuss the implications for practice, limitations of my study and scope for future research.

8.2 Discussion

Swanson and Ramiller's (1997) account of discourse within organising visions recognises the multiple and conflicting inputs from a range of stakeholders. However, the interaction between these groups is not highlighted in their work. The three 'choruses', namely the defenders, the sympathetic critics and the professional critics in the NPfIT (Sauer and Willcocks, 2007) had distinct interests and influenced the programme in different ways. The failure in attempts to engage with stakeholders during the different phases of the NPfIT led to a lack of consideration of the incongruent technology frames (Orlikowski and Gash, 1994) and the inter-epistemic nature (McGivern and Dopson, 2010) of its key component, the NHS Care Record Service.

The use of boundary objects proves useful to investigate the on-going dynamics between stakeholder groups within organising visions.. By analysing the buzzwords in the NPfIT organising vision (Swanson and Ramiller, 1997) as different phases or boundary objects (Star and Griesemer, 1989) contained within a larger overarching temporal boundary object (Chang, Hatcher and Kim, 2013) that was the NPfIT, Chapter 5 highlighted tensions, misinterpretations, re-interpretations and the changing nature of discourse in the organising vision.

Figure 8.1 (see page 275) attempts to depict the relevance of boundary objects to the NPfIT organising vision as well as to the use of EHRs by clinicians and patients. However, it needs to be borne in mind that the complexity and murkiness of the NPfIT makes it difficult to represent these concepts within the confines of a diagram. Figure 8.1 merely

seeks to provide a basic representation of how the different strands of theory which have been discussed in previous chapters may be brought together in order to better understand some aspects of the national programme.

While Sauer and Willcocks' identification of the three choruses in the NPfIT enable the convenient representation of some of the key stakeholder groups in the programme in view of the theoretical underpinnings of this study, it has its limitations as well. Though Figure 8.1 categorises various stakeholders (such as IT suppliers, the Department of Health and clinicians) into these three choruses, my empirical data points to a high level of fluidity between these three categories (represented by the bi-directional arrows between them in the figure). The volatile nature of the NPfIT led to much dissatisfaction amongst many, including some key clinical leads within the programme. My respondents included individuals who had held high level positions within the NPfIT, but were later eliminated from the programme due to differences between their interests that were driven by quality healthcare delivery, and that of the NPfIT management which was more interested in the speedy roll-out of the programme (see Chapters 3 and 5). People who at one time were 'defenders' of the programme thus later moved to the other end of the spectrum, becoming vocal critics of the NPfIT.

Many of the 'defenders' who were Clinical Leads, would also fall under the category of the 'sympathetic critics' as they were clinicians whose practices would have been affected by the progress and outcomes of the NPfIT. Clearly, as mentioned earlier, the complexity of the programme is difficult to represent in a single diagram. However, Figure 8.1 meets the purpose of bringing together the key theoretical concepts of boundary objects, organising visions and professional hybrids, to illustrate them in the context of the NPfIT.
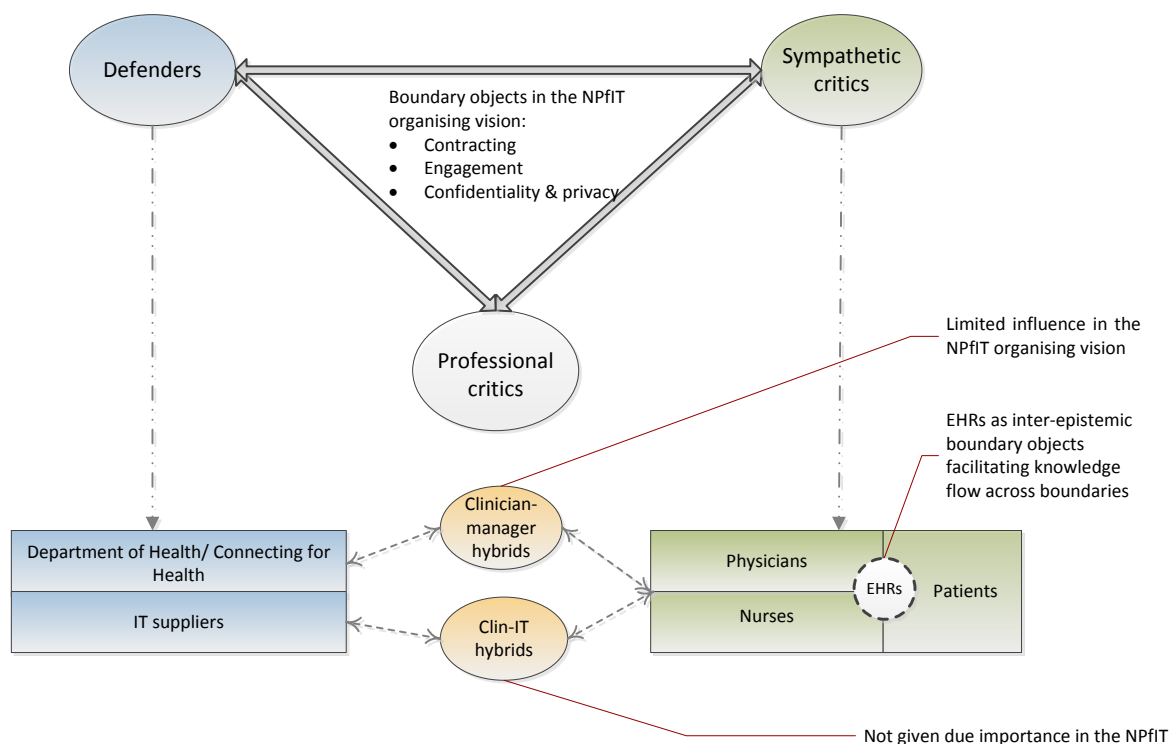
Figure 8.1 Encapsulation of key concepts: The significance of professional and boundary objects among the three 'choruses' in the NPfIT organising vision

Scholars have highlighted the multidisciplinary nature of innovations in a biomedical context, and the importance of boundary objects in enabling knowledge sharing between different specialist groups involved (Swan *et al.*, 2007). The NPfIT provides a similar example of multidisciplinary innovation because of the novelty of the proposed IT systems and the multiple worlds (political, clinical, technical, commercial and academic) that they spanned (Greenhalgh *et al*., 2010b: 15-16). These multiple worlds are included in Sauer and Willcocks' (2007) categorisation of the three 'choruses' that are depicted in Figure 8.1.

The NHS Care Record Service was essentially a glorified EHR, meant to enable storage of patients' EHRs on a national Spine. In order to understand the complexities of EHRs at a national level, and the diverse needs of its users, the programme should have considered what the very notion of an EHR meant to its multiple clinical users. It is for this reason

that it is relevant to analyse EHRs separately, as boundary objects in their own right (Chapter 6).

The different uses that stakeholders 'inscribe' onto a technology result in it serving multiple purposes, highlighting the ambiguity of technology (Spicer, 2005) and its capacity for interpretive flexibility (Pinch and Bijker, 1987) as an inter-epistemic boundary object (McGivern and Dopson, 2010). EHRs serve an array of purposes including being static repositories of data, financial and administrative tools, sources for data for secondary use, and business tools to improve healthcare delivery and boost profits of practices (Chapter 6). In discussing these different uses, the notion of knowledge differences and dependencies (Carlile and Rebentisch, 2003) becomes relevant as the different types of data used by users, and their different needs for data from other users, can be provided via EHRs. Figure 8.1 (page 275) illustrates the pivotal position occupied by EHRs as they facilitate knowledge flow across boundaries amongst clinicians and also between clinicians and patients.

In their discussion on organising visions, Swanson and Ramiller (1997) also acknowledge the formation of new roles and the shifts in hierarchies that occur as a consequence of IS innovations. This was evident in the NPfIT with the incorporation of National Clinical Leads, who can be categorised as clinician-manager hybrid professionals (Montgomery, 2001). The NPfIT however did not take into consideration the presence of yet another emerging role, the clin-IT hybrid.

While EHRs have the potential to blur professional boundaries by enabling users to assume tasks previously beyond their jurisdictions (Bossen, Jensen and Witt, 2012), they are also capable of reinforcing existing boundaries (Bloomfield and Hayes, 2009). For

instance, when clin-ITs design systems to clearly demarcate the tasks done by physicians from those done by nurses (Chapter 7) this reinforces the control over these jurisdictions. Studies have also shown how medical physicians delegate less important or mundane tasks to those whom they consider to occupy lower ranks in the clinical hierarchy (McMurray, 2010; Nancarrow and Borthwick, 2005; Allen, 1998). This highlights the capacity of clin-ITs to exploit EHRs to reproduce traditional clinical hierarchies by the way they delegate tasks through the technology.

Clinicians who are actively and directly involved in the development and implementation of health IT have an increased sense of ownership of their systems, and their identities and the technology are likely to be more 'mutually constitutive' (Korica and Molloy, 2010). Their use as well as non-use of technology influences the way they are regarded as professionals, as this could determine whether patients approach them for a particular problem (Korica and Molloy, 2010). The uses that they 'inscribe' onto a system could be reflective of efforts to exercise power and dominance over other groups (Spicer, 2005). Given the view that GPs do not occupy a high rank in the medical hierarchy compared to their secondary care colleagues (Coburn, Rappolt and Bourgeault, 1997), the enthusiasm for computerised records demonstrated by most GPs and the rise of GP-IT hybrids is possibly an indicator of GPs' efforts to establish their status and independence by becoming 'insiders' (Korica and Molloy, 2010) to the development and implementation of computerised systems.

However, clin-IT hybrid professionals play a crucial boundary spanning role as well, by bridging the two very different domains of healthcare and IT. While boundaries separate knowledge from different domains, acknowledging knowledge which is situated at these

boundaries and that overlaps multiple fields is important for cross-disciplinary efforts as it links groups that are typically isolated from each other in terms of their skills, capacities and knowledge (Carlile, 2004).

In the case of the NPfIT, clin-ITs could have contributed significantly to the programme because of their hybrid knowledge and boundary spanning capabilities. However, their expertise and success in the use of health IT was not acknowledged, and the NPfIT did not make use of the opportunity to draw on their experiences. Despite the NPfIT's lack of engagement with clin-ITs, this breed of professionals had a sustained interest in the development of IT.

Although state support often facilitates clinical (economic and political) autonomy (Freidson, 2007), there may be a shift in dynamics when state interests are at odds with those of clinicians (Thomas and Hewitt, 2011). The NPfIT as the flagship government programme for health IT in the English NHS, had strong political backing to promote increased investment in health IT as recommended by the Wanless (2002) report. Most clinicians on the other hand, found the project questionable in terms of its feasibility and value for money, and felt that it was meant to serve political interests rather than clinical needs. In Chapter 7 I discussed how state and market threats may have a catalytic effect on clin-ITs as they leverage their technology interests and drive for improved performance to counteract challenges posed to their autonomy. Clearly, in the NPfIT clin-ITs were compelled to distance themselves from the programme, rather than exploit their capacity as boundary spanners, as the programme's aims did not align with their clinical aims and interests.

Disparities in the technology frames within which the different stakeholders were embedded were very clear, and the role of health professional hybrids, both clinical managers as well as clin-ITs was critical for successful rollout of a project as ambitious as the NPfIT. However, the involvement of these groups of hybrid professionals was either limited (in the case of the National Clinical Leads) or conspicuously absent (the clin-IT hybrids). Though the clinician-manager hybrid was present in the operation of NPfIT in the form of the National Clinical Leads, several respondents suggested that these clinical leads had limited influence and credibility in practice. Those clinicians who had IT related roles within the NPfIT were either not appropriately involved in the development process (for instance, involvement of the Common User Interface team at a relatively late stage) or were viewed by their clinical colleagues as neither satisfied with their clinical roles nor capable and efficient in their IT roles (see Chapter 7).

The clinical-manager and the clin-IT hybrid professionals had the capacity to act as bridges between the defenders and sympathetic critics (Sauer and Willcocks, 2007) in the NPfIT (see Figure 8.1, page 275). The limited recognition given to these hybrids, particularly the clin-ITs, was an unfortunate shortcoming of the programme and contributed to the key criticism of the NPfIT, namely the lack of meaningful engagement mechanisms (Coiera, 2007; Cresswell *et al.*, 2011; Hendy *et al.*, 2005).

Having summarised the discussions from my findings chapter and illustrated how they relate to each other, I shall now present my conclusions and their implications for practice.

8.3   Conclusion

In this section I return to the research questions that drove this thesis, and outline the key findings and contributions derived from this research.

The study began with the aim to investigate the progress of EHR implementation in England in the context of the recently dismantled NPfIT. The large scale of the programme and its high visibility made it subject to much media publicity as well as criticism. I employed the theoretical concepts of organising visions (Swanson and Ramiller, 1997), boundary objects (Star and Griesemer, 1989) to inform the research process. My research was initiated with the following research questions:

1. How did the NPfIT organising vision develop under the influence of the discourse prevalent among stakeholders during the project?

2. How do different users perceive EHRs, and how do professional roles influence how EHRs are used to mediate interactions and knowledge flow across boundaries?

Emergent findings from the data collection and analysis phase prompted me to expand my research focus to investigate the significant presence of clinicians in advisory as well as design and development roles in health IT. This finding was of relevance to recent scholarly interest in the rise of hybrid professionals (Noordegraaf, 2007) such as clinician-managers (Doolin, 2004; Fitzgerald, 1994; Fitzgerald and Ferlie, 2000; Montgomery, 2001). The clin-IT however, is a distinct hybrid role that has not been researched in detail despite its importance to health IT implementations where it is critical to understand the complexity of the healthcare sector in order to develop useful health IT. Consequently, this thesis addresses the following additional research question:

3. What triggers the formation of the clinician-IT hybrid, and how does this align with Freidson's theory of restratification amongst medical professionals?

With this outline of what this research set out to address, I now elaborate my key findings.

8.3.1 Key findings

Although it was hoped that the NHS Care Record Service would *provide* continuity of care (Parliamentary Office of Science and Technology, 2003), instead it proved to be one of the more radical parts of the NPfIT, marked by points of discontinuity and shifts in focus during the course of the programme.

Combining the concept of organising visions (Swanson and Ramiller, 1999) and boundary objects (Star and Griesemer, 1989), I demonstrate how some of the key phases and buzzwords in the NPfIT organising vision can be regarded as boundary objects. The main boundary objects that marked the timeline of the NPfIT organising vision included the LSP contracts, , increased and varied engagement mechanisms, and later on, more patient-focused debates that revolved around issues of confidentiality of data in the NPfIT's NHS Care Record Service.

While Swanson and Ramiller (1997) suggest that an organising vision either fades away or gets accepted and institutionalised, I argue that there is an alternate possibility. The transformation and re-incarnation of objects (McGivern and Dopson, 2010) can be extended to the case of organising visions given the multiple and often conflicting perspectives of stakeholder groups that characterise the buzzwords that emerge during different stages of the vision. The incongruent technology frames (Orlikowski and Gash,

1994) of these groups account for some of these inter-group tensions. I use the example of the transformation of the patient-centric notion of the individual's electronic spine into a National Spine, and the subsequent reincarnation of the original spine concept in the form of the Summary Care Records.

My findings on the multiple perspectives that EHRs are subjected to as boundary objects (Chapter 6) address my second research question. I link the knowledge differences and dependencies (Carlile and Rebentisch, 2003) inherent amongst clinical professionals and patients to the way they interface with each other using EHRs. Of particular significance is the way that professional roles and their associated jurisdictions and responsibilities influence how clinicians and patients can use EHRs to make use of knowledge held at the boundary where the EHRs are positioned.

Scholars suggest that EHRs embody clinical hierarchies (Berg and Bowker, 1997) as well as tacit clinical practices (Heath and Luff, 1996). This stresses the significance of professional roles in the way EHRs are used, since clinical needs and requirements vary among clinicians (Berg and Bowker, 1997) as shown by my empirical data. Hierarchies inherent among clinicians (e.g. the traditional subordination of nurses to the medical profession) (Freidson, 1970) and the increasingly specialist nature of medical knowledge (Guthrie *et al.*, 2008; Nettleton, 2004; RCP, 2011) indicate the need for clinical professionals to consult the knowledge and expertise of their clinical colleagues or superiors. The utilisation of the EHR to facilitate knowledge flow across syntactic, semantic or pragmatic boundary is therefore dependent on the roles, knowledge differences, and knowledge dependencies (Carlile and Rebentisch, 2003) among its users.

Drawing on users' different perspectives on the purpose of EHRs, I elaborate how EHRs enable knowledge flow across syntactic, semantic and pragmatic boundaries, and how the nature of knowledge flow, i.e. transfer, translation or transformation (Carlile 2002, 2004), varies between different clinicians as well as patients (see Table 6.2, page 208). The professional dominance and autonomy of the medical profession (Freidson, 2007) was reflected in my finding that the use of EHRs to transform knowledge across pragmatic boundaries is mainly among physicians.

Physicians' professional knowledge and their jurisdictional authority (Abbott, 1988; Freidson, 1985) enables them to make independent decisions based on patients' symptoms and the information present in EHRs, following which they update or 'transform' the contents of the record to reflect their findings. My findings also illustrate that primary care physicians go a step further by using EHRs as business tools, thus extending the utility of the record for non-clinical purposes as well. This also reflects the entrepreneurial traits of many GPs (Doolin, 2002), as they explore ways to improve the performance of their practices for remuneration purposes as discussed in Chapter 7, in the context of GP-ITs.

Nurses on the other hand, have to defer to physicians' decisions and knowledge (Berg and Bowker, 1997), and as a result are constrained to 'translate' or interpret EHR contents across semantic boundaries (Carlile 2002, 2004). Patients too are limited to this level of knowledge flow depending on the level of access they have to their own records. Their interpretations of their EHRs are constrained by their lay knowledge (Fisher and Britten, 1993), imposing challenges to their capacity to use EHRs for knowledge 'translation' and 'transformation' (Carlile, 2004).

Analysis of clinicians who adopt hybrid clin-IT roles was outlined in Chapter 7. In probing the reasons that prompt clinicians to move into such dual roles, my findings support Freidson's (1985) principle of restratification within the medical profession, wherein professionals adopt additional roles as a response to external threats such as the market or the state. However, my analysis also provides evidence of other factors that facilitate the emergence of clin-ITs (particularly GP-ITs), including their personal interest in IT as a hobby, and their efforts to improve the performance and profits of their practices, reflecting their entrepreneurial nature (Cohen and Musson, 2000; Doolin, 2002; Llewellyn, 2001).

I suggest that rather than external threats being the primary driver for the formation of clin-IT hybrids, the main pre-requisite for restratification in this case is an inherent interest in technology as a hobby or as a performance management tool. Given the need for a minimal amount of technical knowledge to develop IT (Denning, 2001) the acquisition of this knowledge is required before clinical professionals can meaningfully adopt additional technology related roles in response to external threats to their autonomy. Thus, while the presence of state and market threats facilitates the emergence of the clin-IT hybrid, resulting in restratification as proposed by Freidson (1985), it is technical knowledge or an understanding of IT design at the very least, that enables the actual formation of the clin-IT.

In analysing the challenges faced by clin-ITs, my findings indicate that to a certain extent these hybrids engage in identity work (Sveningsson and Alvesson, 2003) to retain credibility and to balance the demands of their multiple roles. This includes trialling roles (Ibarra, 1999) and maintaining that the sole purpose of their entrepreneurial efforts at

developing IT are for improved quality of care as opposed to financial benefits alone. Like clinician-managers who are often regarded by their peers as traitors to the profession (Witman *et al.*, 2011), clin-ITs too are subject to criticism from their clinical colleagues. My findings illustrate how clinicians opined that GP-ITs in the NPfIT had lost touch with their clinical side, and had transitioned to IT roles due to dissatisfaction and discontentment with their clinical roles. This points to the need for clin-ITs to maintain and balance dual (clinical and IT) interests to qualify as hybrids, lest they inadvertently disengage completely with their clinical side.

Having provided an overview of my key findings, I shall outline the key contributions of this thesis.

8.3.2 Contributions

This research contributes to academic theory in the following ways.

First, it responds to calls for studies on large scale EHR implementations (Takian *et al.,* 2012) given the higher concentration of research on EHRs at a more local level. The scale, complexity and huge investments involved in the NPfIT (Brennan, 2007; Coiera, 2007; Hendy *et al.* 2005) make it an ideal case to research, and I employ the concept of organising visions (Swanson and Ramiller, 1997) to guide the analysis of my empirical data.

Second, recognising the limitations of organising visions (Swanson and Ramiller, 1997) to explain tensions and interactions between stakeholders, I complement my theoretical framework by using the concept of boundary objects (Star and Griesemer, 1989). As organising visions are sustained by discourse between multiple stakeholders, Swanson

and Ramiller (1997) focus predominantly on the 'establishment and maintenance' of the discourse with limited consideration of the reasons behind possible conflicts between stakeholders perspectives that influence it. This shortcoming is overcome by utilising the concept of boundary objects (Star and Griesemer, 1989) that are positioned between different epistemic groups (McGivern and Dopson, 2010) and their capacity to mediate different types of knowledge boundaries (Swan *et al.*, 2007; Carlile 2002, 2004).

Conversely, the concept of boundary objects (Star and Griesemer, 1989) alone is inadequate to investigate the development of projects such as the NPfIT. While boundary objects are useful to understand the dynamics and knowledge sharing between stakeholders, there is a need to understand how these boundary objects may be reconceptualised and transformed (Engeström and Blackler, 2005; McGivern and Dopson, 2010) over time in the broader context of a project such as the NPfIT. This is similar to the way buzzwords in organising visions emerge and subside, and the 'image of the future' (Swanson and Ramiller, 1997: 460) towards which the organising vision aspires can influence what Engeström and Blacker (2005) term 'the life of the object'.

The juxtaposition of these two theoretical concepts as a dual lens is therefore a valuable contribution to theory, as it enables the analysis of inter-group dynamics that influence the discourse within organising visions, and also allows us to better understand the epistemic nature of the objects interpreted by these different groups.

Third, by considering the buzzwords within the NPfIT organising vision as abstract inter-epistemic boundary objects mediated by the multiple stakeholder groups involved, and how these changed over time, this study addresses the call for further studies investigating the transformation of objects (Engeström and Blackler, 2005; McGivern and

Dopson, 2010). Using my empirical data, I demonstrate the transformation (Engeström and Blackler, 2005) as well as re-incarnation (McGivern and Dopson, 2010) of specific aspects of the NPfIT.

Fourth, this research contributes to literature on the nature of knowledge transfer, translation and transformation at boundaries (Carlile 2002, 2004) by identifying how professional roles, knowledge differences and dependencies can determine whether a syntactic, semantic or pragmatic approach is adopted to facilitate knowledge flow across boundaries. The dominance of the medical profession (Freidson, 2007) combined with its specialist knowledge enable physicians to 're-create' the EHR by interpreting its existing contents as well as the current condition of the patient. GPs' entrepreneurial traits and aims to improve their performance can cause them to leverage data contained in the EHR to generate performance related data for their practices, illustrating yet another example of transformation of knowledge. Nurses however, given their traditional subordination to the medical profession, need to defer to the decisions made by physicians, and are in most cases limited to using EHRs as semantic boundaries wherein they interpret EHR data to fulfil their caring role toward patients (Abbott and Meerabeau, 1998).

Fifth, this study addresses the paucity of research on the importance of clinician-IT hybrid professionals. Professional hybridisation is an emerging and important area of research (Noordegraaf, 2007), and has significant impact on how different domains (e.g. medicine and management) are bridged by integration of their specialist knowledge. The high incidence of GP-ITs among these clin-IT hybrids may be explained by their drive to improve the performance of their independent practices for remuneration purposes (Cohen and Musson, 2000). Tensions between GPs and their secondary care colleagues

may also act as a motivation for GPs to assert their status in the clinical hierarchy considering the better status and resources traditionally afforded to the latter (Horder, 1977). This could prompt GPs to emphasise their independence and ownership of their systems by actively engaging in the computerisation of their practices.

While the clinician-manager hybrid form was gradually incorporated into the NPfIT, existing successful IT systems implemented by other clinicians and notably entrepreneurial general practitioners was ignored (Benson, 2002a). This suggests that the efforts to engage clinicians in the NPfIT did not take into consideration the expertise of clinicians with a strong interest in technology, and that this group constitutes a less researched hybrid role. I elaborate on Freidson's (1985) restratification principle to discuss alternative explanations for the adoption of additional roles by clinicians, and in the case of clin-ITs, would argue that it is these alternative factors (i.e. interest in technology as a hobby, and an interest in leveraging IT to improve their profits and performance) that equip them to respond to external threats which arise in the form of market and state control mechanisms.

8.3.3   Implications for practice

Findings from this research are useful to guide future health IT efforts, as there is a clear need for improved and increased engagement not only with clinicians, but with clinician-IT hybrids as well. This study addresses calls for research into large scale EHR implementations (Takian *et al.*, 2012) by investigating England's NPfIT. However, given the limited success in national health IT systems (Cresswell *et al.*, 2011), EHR implementations need to draw from lessons learnt at regional and local levels as well.

The experience of GPs in England is one such valuable source of guidance that was not given adequate attention, as indicated by my empirical data. A pivotal role was played by the GP-IT professionals in this case, as they form a vital bridge between the complex healthcare domain and the technology development arena. The capacity of these professionals to bridge different domains (Llewellyn, 2001; Montgomery, 2001; Witman *et al.*, 2011) and facilitate a convergence between incongruent technology frames (Orlikowski and Gash, 1994) is extremely useful in health-IT initiatives. Future initiatives in the health IT sector could learn from the failings of past projects such as the NPfIT, and appreciate the critical importance of exploiting the skills, knowledge and boundary spanning position of clin-IT professional hybrids.

The complexity and variance of EHR use across different clinical groups (Chapter 6) suggests that engagement with clinical users is essential despite the clinical knowledge possessed by clin-ITs. The diverse needs of clinicians (Berg and Bowker, 1997) emphasises that clinical expertise in one area is not a sufficient qualifier for clin-ITs to engage in IT development without consultations with their clinical colleagues. This was a problem in NPfIT, as a secondary care respondent explained that GPs who were involved in IT roles in the national programme had no understanding of the needs of secondary care. Therefore, while clin-ITs act as a bridge between the IT and clinical domains, they themselves should not be regarded as representative of clinicians as a whole when they interact with IT players. However, their clinical background enables them to empathise with the needs of clinicians to a better extent compared to pure IT developers, and it is this hybrid knowledge that makes them pivotal to the successful implementation of health IT.

8.4 Limitations

The timing of my empirical data collection was opportune, in that it was immediately after the dismantling of the NPfIT and this may have allowed some respondents to be more open and free in discussing their involvement with the programme. However, I still discerned traces of concern and a general air of cautiousness on the part of a few respondents, given the politicised and sensitive nature of the programme. I was refused an interview with one of the key individuals involved with the programme who gave the reason of 'not wanting to talk about the National Programme at this point'. I attribute that to the prominent and visible role played by this individual in the NPfIT, and the person's reluctance to resurrect the highly sensitive discussions that characterised the programme.

While the aura of secrecy left behind by the NPfIT may have influenced how much some of my respondents disclosed, my diverse range of respondents who had been involved with or had a close interest in the NPfIT during its different stages, helped with the triangulation of retrospective data from different points in time (Mathison, 1988) and facilitated a holistic understanding of how the programme evolved.

The high visibility of a few key respondents made them initially wary about saying too much regarding the NPfIT. This is a common challenge with interviewing 'elites' (Mikecz, 2012), and I found that in some cases I had to be extremely observant to note down verbal and physical cues (see Chapter 4). I was able to gradually establish a rapport with some of these respondents, and one such interview went on for well over two hours.

It is possible that some of my respondents would have painted overly positive or negative pictures of the NPfIT due to their particular interests or roles in the programme. A few of

my respondents had held high level positions in the NPfIT and were the Leads or Senior Responsible Owners for specific components of the programme. I also interviewed one respondent who at the time of the interview was a key person in one of the continuing components of the NPfIT. This respondent openly admitted that it would be advisable to talk to other respondents as well regarding this particular area of the NPfIT as he had a vested invest in it. I therefore had to rely on my interpretive skills to read between the lines. As I had a wide range of interviewees - from those who had been actually involved in the NPfIT to those who were informed clinicians who could give me their outsider perspective on the programme, I was able to collect a significant amount of data with a reduced risk of a biased sample.

When recruiting interview respondents from professional bodies via the media contacts available on the respective websites, I had to assume that all relevant people within the organisation had been contacted on my behalf. It is therefore difficult to give an estimate of the actual response rate of sample, as I was not given information on the number of people contacted within these professional bodies.

Another possible limitation was the time constraints of some key respondents. Scheduling interviews with individuals was a long process as I had to liaise with their assistants and secretaries. I requested a minimum of 30 minutes with most respondents for the purpose of interviewing them. However one respondent whom I would have particularly liked to have interviewed for longer, gave me less than 30 minutes as he was in-between meetings despite my having scheduled an appointment with him. Clearly he had assumed that I was not expecting a longer interview. This may have been due to

miscommunication, as I had to liaise with his secretary to schedule the interview, and my respondent may not have been aware of my initial request of a 30 minute interview.

In the initial interviews, one of the limitations was myself, as a researcher. As I discussed in Chapter 4, being new to qualitative research interviews, I committed mistakes typical of most novice researchers such as using leading questions and interrupting respondents. However with time and experience, this changed, and the second phase of interviews was much easier and proved to be extremely useful due to my improved interviewing skills.

8.5   Scope for future work

There are a number of avenues for future work based on this research. Of interest would be further studies to investigate what characterises the clin-IT hybrid. While my findings provide an account of *why* clinicians sometimes move into dual clin-IT roles, more detailed study is required to determine what distinguishes them from purely clinical colleagues, and at what point their interest in technology positions them at the boundary bridging the clinical and IT domains.

Amongst clin-IT hybrids there appears to be different types of clin-ITs. Rather than a single categorisation of 'the clin-IT hybrid', it is likely that there are different layers of clin-ITs having different degrees of involvement in IT. IT development need not be the key criteria to be characterised in the clin-IT category, as some clin-IT respondents did not engage in IT programming, but rather, were extremely knowledgeable about the capabilities of IT for clinical purposes, and therefore served in advisory roles. Further research could be carried out to sift through these layers of clin-ITs, and to identify clearer distinctions and characteristics of this unique hybrid group. The existence of a

more complex hybrid professional merging the clinical-manager with the clinical-IT professional is a possibility which could be investigated.

Given the prevalence of GP-ITs amongst clin-ITs, it would be useful to conduct further research into this particular group of hybrids. The current study is restricted to data from a single country. Investigating the emergence of GP-ITs in other countries would enable a comparative study of the factors which facilitate the formation of GP-ITs. It would also be beneficial to extend the research focus to other clinical professionals such as secondary care physicians and nurses. The professional differences involved would play a role in steering the development of the different types of clin-ITs.

It would also be useful to conduct research to investigate the presence of this breed of hybrids in other professions. Scholars have studied professional managerial hybrids in other professions including law and education (Whitchurch, 2006; Faulconbridge and Muzio, 2008; O'Connor and Smallman, 1995). It would be useful to investigate the presence of similar professional-IT hybrids in non-clinical contexts, and to compare these hybrids in different professional domains.

Whether the factors which encourage clinicians to step into IT roles are evident in other professional domains is also an area of possible research. The dominance of the medical profession affords it a high degree of respectability in society. Future research could study whether this dominance of the medical profession influences the reputation and credibility of clin-ITs compared to other professional-IT hybrids.

The juxtaposition of the theories of organising visions and boundary objects is one of the key contributions of this study. A future avenue for research involves a more detailed

study of the different types of objects and how an organising vision may be constituted of these. Given the diverse stakeholders present in an organising vision, this is a suitable theoretical lens with which to study the dynamics between different groups who use or perceive a boundary object.

Returning to the central object of interest in this research, the EHR, further work could be done on investigating the nature of knowledge flow facilitated by the EHR between professional boundaries. Given the increasing responsibilities shouldered by nurses and other paraprofessionals who have traditionally been regarded as subordinate to the medical profession (Currie, Finn and Martin, 2010; McMurray, 2010), of particular interest would be if and to what extent such clinicians can leverage EHRs as pragmatic boundaries by transforming and creating new knowledge within the record.

The increasing volume of rhetoric on patient empowerment, patient-centred healthcare delivery and patients as partners in their healthcare (Newman and Vidler, 2006), prompts questions about the capacity of EHRs to facilitate knowledge transformation at pragmatic boundaries (Carlile, 2004) for patients as well in the near future. Regarding knowledge differences between clinicians and patients as complementary, where patients' experiential knowledge can support medical professional knowledge (Tritter and McCallum, 2006), rather than as lay versus professional knowledge, can potentially enable patients to employ EHRs using a pragmatic approach rather than their traditional syntactic or semantic approach.

8.6 Summary

> 'The end of the paper chase is going to cost each of us £1 per year, which seems a fair deal to me' (Granger, 2003).

Thus ran The Times' quote of the day on Christmas Eve 2003. These words of the Director General of the NPfIT, the world's largest civil IT programme (Brennan, 2007), offered the hope of fully computerised health records at an extremely affordable cost. More than ten years since the programme was launched, the 'paper chase' is still on, and taxpayers' pockets have suffered the haemorrhage predicted by Craig and Brooks (2006:184), as the estimated costs escalated to £9.8 billion excluding future costs with the LSP systems (NAO, 2013).

This thesis investigates the perspectives and uses of EHRs in the context of the NPfIT which had ambitious targets, high costs and an initial challenging timeframe of less than three years (Brooks, 2007) by drawing on multiple strands of literature. Compounding the theoretical concepts of organising visions (Swanson and Ramiller, 1997) and boundary objects (Star and Griesemer, 1989), I discuss not only the emergent 'buzzwords' (Swanson and Ramiller, 1997) in the NPfIT organising vision, but also how these buzzwords act as inter-epistemic boundary objects (McGivern and Dopson, 2010) between the range of stakeholder groups involved. This dual lens is a useful tool which takes into consideration the different and often incongruent technology frames (Orlikowski and Gash, 1997) of those involved, and how these influence the organising vision discourse.

Although a detailed and comprehensive study of the entire NPfIT is beyond the scope of this thesis, this research offers valuable insights into the complexity of EHRs in terms of use amongst clinicians as well as in the context of large scale implementations. While the management of the NPfIT has been criticised extensively by the media, clinicians and

external bodies such as the Public Accounts Committee, it is easier to look back and identify lacunae in such initiatives, than it is to foresee challenges which can arise given the complexity of the health sector and the numerous number of stakeholders involved. As one respondent (R27, Former academic, Health informatician) put it, 'Hindsight is 20/20. Or as doctors would say, a "retrospect-oscope" is a very powerful diagnostic instrument'.

This thesis also highlights the boundary spanning capacities of EHRs as they address knowledge dependencies and differences (Carlile and Rebentisch, 2003) between EHR users by enabling knowledge transfer, translation and transformation across boundaries (Carlile 2002, 2004). The nature of this knowledge flow (i.e., transfer, translation or transformation) is dependent on professional roles and responsibilities, since boundaries that mark professional jurisdictions may limit the way some clinicians (e.g. nurses) and patients can use EHRs.

The recognition that the NPfIT components spanned multiple worlds suggested that the most important individuals or groups within the programme were those that occupied boundary roles bridging different sectors (Greenhalgh *et al.,* 2010b: 15-16). However, the focus was predominantly on clinician-manager hybrids (Montgomery, 2001) who in this case were national clinical directors, leads or implementation managers (Greenhalgh *et al.*, 2010b) and these roles too had limited influence as indicated by academic studies (Cresswell *et al.,* 2011) and my empirical data. The importance of boundary roles was realised relatively late in the programme, and the lack of importance given to clinician-IT hybrid roles was an unfortunate mistake by NPfIT management. This study contributes to extant research on professional hybrids (Doolin 2001, 2002; Llewellyn, 2001;

Montgomery, 2001; Noordegraaf 2007, 2011) by highlighting the importance of clin-IT hybrid professionals, particularly GP-ITs.

The insights offered by this study provide valuable pointers for future health IT initiatives. The NPfIT began with a centralised top-down approach which was abandoned in 2010 for a more modular approach (DH, 2010). Dismantled in 2011 (DH, 2011), the programme has left a legacy of multiple components being driven forward as distinct individual projects. A recent review by the NAO (2013) reported that three programmes (including the Summary Care Record) within the NPfIT have nearly 98% of their estimated benefits yet to be realised. Lessons from the national programme need to be filtered into the implementation of these remnants. This study addresses this by using a combination of academic theory and empirical data to provide an informed understanding of the underlying dynamics between key stakeholders in the NPfIT and the need engage with niche groups of hybrid professionals such as clin-ITs who can act as 'two-way windows' (Llewellyn, 2001) between the clinical and IT domains.

Clin-IT hybrid professionals, though not given adequate representation in the NPfIT, continue to have a sustained interest in technology development, and like clinician-manager hybrids, they too need to balance their clinical and non-clinical roles, and contend with possible friction with their purely clinical colleagues by engaging in identity work. Both, the changes in the NPfIT as a whole, as well as the way in which clin-IT hybrids engage in identity work to deal with their conflicting responsibilities reflect a constant state of flux, resonating with the words of Alice in Wonderland:

> 'I know who I was when I got up this morning, but I think I must have changed several times since then' (Carroll, 2008).

The organising vision of the NPfIT deviated from its original ambitions, and the boundary objects that characterised its different phases have seen cycles of devaluation, transformation and reincarnation (Engeström and Blackler, 2005; McGivern and Dopson, 2010). Though the NPfIT is no longer operational, its remnants offer the potential for 'discarded' and 'devalued' objects to be 'recycled', 'revitalised' and 'reconceptualised' (Engeström and Blackler, 2005), and clin-IT hybrid professionals can potentially play a pivotal role in picking up the fragments of this monumental programme and piecing them together in a meaningful way for clinical practice.

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APPENDIX A: List of respondents

INTERVIEW PHASE 1:

RESPONDENT LIST – INTERVIEW PHASE 1 [SENSITISING INTERVIEWS]		
Respondent	**Details**	**Approximate interview length (hh:mm)**
R1	Staff nurse, Community Hospital	00:25; 01:40
R2	Psychiatrist	00:24
R3	Allied Health Professional (orthoptist)	00:55
R4	Junior doctor (hospital)	00:54
R5	Nurse Practitioner	00:30
R6	Administrative supervisor (health centre)	00:59
R7	Requirement Analyst & Content Management Executive in a clinical software company	00:20
R8	Locum GP	02:05
R9	Hospital staff nurse.	00:25
R10	GP; Director of a clinical software company	00:40
R11	Pediatrician	00:25
R12	Nurse Practitioner; Clinical lecturer	00:40
R13	Programme Manager, National Technology Adoption Centre	00:30
R14	GP; Director of a clinical software company	00:40
	Total:	**11:32**

Distribution of interviewees by role [Phase 1]					
Primary role	**GP**	**Hospital Doctor**	**Nurse**	**Allied Health Professional**	**Other (IT/Admin)**
Number of interviews	3	3	4	1	3

INTERVIEW PHASE 2:

Distribution of interviewees by role [Phase 2]			
Clinical role*	**GP**	**Hospital doctor**	**Nurse**
Number of interviews	13	10	5

Note: Few respondents no longer practiced in a clinical capacity at the time of the interview, but have been included in this count as their new (IT/managerial/advisory) roles are informed by the clinical training and experience they have acquired

Respondent	Professional bodies		Government/ DH/NHS bodies	Consumer & patient groups	Industry	Policy advisors/ politicians	Academia	Other	Approximate interview length (hh:mm)
	Clinical	Non-clinical							
1	✓								00:27
2	✓					✓	✓		00:40
3			✓						00:56
4	✓						✓		01:00
5	✓		✓						02:37
6		✓							02:40
7		✓							00:36
8							✓		00:17
9			✓						00:53
10	✓		✓						00:57
11				✓					00:30
12			✓						00:48
13	✓								00:23
14	✓								01:02
15	✓								01:11
16			✓					✓	00:54
17			✓						05:22
18		✓			✓				00:41
19			✓						00:46
20				✓					00:40
21			✓			✓	✓		00:46
22	✓								00:31
23			✓		✓				00:40
24			✓				✓		00:31
25			✓						00:39
26	✓						✓		00:43
27					✓		✓		00:55
28			✓						00:52
29			✓				✓		00:43
30			✓			✓			00:38
31		✓	✓						01:41
32	✓		✓						01:06
33	✓		✓						00:52
34						✓	✓		00:34
35					✓		✓		00:48
36			✓		✓				00:32
37			✓		✓				00:31
37	**12**	**4**	**20**	**2**	**6**	**4**	**10**	**1**	**36:22**

Clinical professional bodies	Royal College of General Practitioners, Royal College of Physicians, Royal College of Nurses, Academy of Medical Royal Colleges, British Medical Association
Non-clinical professional bodies	National computer organisations, e.g. British Computer Society
Government/ DH/ NHS bodies	Department of Health, Connecting for Health, NHS Information Authority, National Clinical Advisory Board, Care Records Development Board
Consumer & patient groups	Patient Information Forum, Patient Concern

APPENDIX B: Categorisation of documentary data sources

	Organisation	Year	Title
Chief Executive Reports	DH	2002	Department of Health. 'Chief Executive's Report to the NHS April 2001 – March 2002'.
	DH	2003	Chief Executive's Report to the NHS
	DH	2004	Chief Executive's Report to the NHS
	DH	2004	Autumn Performance Report
	DH	2005	Chief Executive's report to the NHS
Business Plans	DH	2006	Business Plan.
	DH	2007	Business Plan.
	DH	2008	Business Plan.
	DH	2009	Business Plan.
	DH	2011	Business Plan - quarterly data summary
	DH	2011	Data Transparency plan
	DH	2011	Business Plan.
DH reports, papers, consultations, responses	DH	2000	The NHS Plan.
	DH	2000	Good practice guidelines for general practice electronic patient records.
	DH	2001	Building the information core - implementing the NHS plan
	DH	2001	Wanless Interim Report: Securing our future health: taking a long-term view
	DH	2002	Wanless Report: Securing our future health: taking a long-term view
	DH	2002	Wanless. Summary of Consultation Responses
	DH	2002	Delivering 21st Century IT Support For the NHS: National specification for integrated care records service. Consultation Draft.
	DH	2002	Delivering 21st Century IT support for the NHS. National Strategic Programme.
	DH	2002	Delivering 21st Century IT Support For the NHS: Summary of the overall procurement strategy.
	DH	2002	Companies registering expressions of interest for Local Service Provider and/or National Application Service Provider contracts.
	DH	2002	Delivering The NHS Plan. April 2002.
	DH	2003	The National Programme for IT in the NHS: Key Elements of the Procurement Approach
	DH	2004	Wanless Report: Securing good health for the whole population: Final report - February 2004
	DH	2004	The NHS Improvement Plan. Putting People at the Heart of the Public services. Executive Summary
	DH	2004	The NHS Improvement Plan. Putting People at the Heart of the Public services.
	DH	2005	Good practice guidelines for general practice electronic patient records.
	DH	2006	Report of the Ministerial Taskforce on the NHS Summary Care Record.

	DH	2006	Our Health, Our Care, Our Say - A new direction for Community Services
	DH	2009	NHS 2010-2015: From Good to Great. Preventative, People-centred, productive.
	DH	2009	The NHS Constitution
	DH	2010	NHS constitution for England.
	DH	2010	National Quality Board Annual Report.
	DH	2010	Liberating the NHS: Greater Choice and Control. A consultation on proposals.
	DH	2010	The NHS Constitution and WhistleBlowing – consultation
	DH	2010	Healthy Lives Healthy People
	DH	2010	Healthy Lives, healthy people – Impact Assessment.
	DH	2011	Health Is global
	DH	2011	Full Reponse to NHS Future Forum report.
	DH	2011	Government changes in response to NHS Future Forum
NHS Confed. reports	The NHS Confederation	2003	The national strategy for IT in the NHS
	The NHS Confederation	2003	National Programme for IT: an Interview with Richard Granger and Peter Hutton.
	The NHS Confederation	2004	Electronic Booking – An Initial Guide To Implementation.
	The NHS Confederation	2004	The NHS Care Records Service.
NHS Direct; NHS IA	NHS Direct	2005 to 2010	107 press Releases from NHS Direct from 2005 to 2010
	NHS Information Authority	2002	Share With Care! People's Views on Consent and Confidentiality Of Patient Information.
CFH	NHS CFH	2004	Making IT Work. March 2004, Issue 1.
	NHS CFH	2004	Making IT work. August 2004, Issue 2.
	NHS CFH	2004	Making It Work. December 2004, Issue 3
	NHS CFH	2005	Making IT work. July 2005, Issue 4
	NHS CFH	2005	Making IT Better.
	NHS CFH	2005	Business Plan 2005-2006
	NHS CFH	2005	Business Plan Summary
	NHS CFH	2005	A Guide to the National Programme for IT (NPfIT)
	NHS CFH	2007	Better Information Better Health.
	NHS CFH	2007	The National Programme for IT Implementation Guide. Version 5, July 2007.
NHS	NHS	2003	HealthWhich? And NHS National Programme for IT. (2003). The Public View on Electronic Health Records.

	NHS	2005	An Introduction to NHS PACS.
	NHS	2006	Proposal for GP Systems of Choice. 2006 March
	NHS	2006	Proposal for GP Systems of Choice. Briefing for the NHS. Update. 2006 June
	NHS	2006	Proposal for GP Systems of Choice. Briefing for the NHS. Update. 2006 October.
	NHS	2007	Memorandum of Information. (GP Systems of choice).
	NHS	2011	The Care Records Guarantee
	NHS Future Forum	2011	NHS Future Forum's Recommendations To the Government.
National Audit Office	NAO	2002	NHS Direct In England
	NAO	2005	Achieving Improvements Through Clinical Governance: A Progress Report On Implementation By NHS Trusts
	NAO	2005	Patient Choice at the point of GP referral.
	NAO	2005	Financial Management in the NHS. NHS summarised accounts 2003-2004
	NAO	2005	A safer place for patients: Learning to improve patient safety.
	NAO	2006	NHS Direct 2004-2005: Qualification of Audit Opinion
	NAO	2006	The National Programme for IT in the NHS
	NAO	2005	NHS Connecting for Health Process Capability Appraisal prepared for the National Audit Office by Qinetiq. (*Supporting data for NAO 2006 NPFIT report)*
	NAO	2007	Prescribing Costs in primary care.
	NAO	2010	Management of NHS hospital Productivity.
	NAO	2010	Short Guide to the NAO's work on the Department of Health
	NAO	2011	The National Programme For IT in the NHS: An update on the delivery of detailed care record systems
	NAO	2011	Managing High Value Capital Equipment
	NAO	2011	Procurement of consumables by NHS acute and foundation trusts.
	NAO	2011	NHS Landscape Review.
	NAO	2013	Review of the final benefits statement for programmes previously managed under the National Programme for IT in the NHS. *Memorandum for the House of Commons Committee of Public Accounts.*
Public Accounts Committee	PAC	2007	Department of Health: The National Programme for IT in the NHS. *Twentieth Report of Session 2006-07*
	PAC	2011	The National Programme for IT in the NHS: An Update on the delivery of detailed care record systems
Other monitoring bodies	House of Commons Health Committee	2007	The Electronic Patient Record. Sixth report of Session 2006-07.
	Major Projects Authority	2011	Major Projects Authority Programme Assessment Review of the National Programme for IT

BCS	BCS	2005	BCS Response to NAO Investigation of NPfIT
	BCS	2011	Preparing the NHS for an information revolution. BCS report on the NHS Information Revolution consultation on proposals
BMA	BMA	2009	NHS 2010-2015 From Good to Great. Preventative People-centred, productive BMA summary
	BMA	2010	BMA. 2010 Oct. Response to Equity and Excellence: Liberating The NHS.
	BMA	2010	Briefing. Equity and Excellence: Liberating The NHS
	BMA	2010	March. Briefing Note: NHS Choices.
	BMA	2010	June. An NHS Beyond The Market
	BMA	2010	NHS Operating Framework 2011-2012. (December 2010)
	BMA	2011	BMA Response to NHS Future Forum consultation.
	BMA	2011	BMA Response to Liberating the NHS – Developing th healthcare workforce. March 2011.
	BMA	2011	BMA 2011 January. Survey results by Ipsos MORI for response to Equity and Excellence – liberating the NHS
	BMA	2011	Briefing. Social Enterprise Briefing Note.
	BMA	2011	NHS Outcomes Framework 2011-2012.
RCP	RCP	2009	Improving clinical records and clinical coding together – a project with the Audit Commission.
	RCP	2010	The case and vision for patient-focused records.
	RCP	2010	Response to Equity and Excellence – regulating healthcare providers.
	RCP	2010	Response to Equity and Excellence – Local democratic legitimacy in healthcare.
	RCP	2010	Response to Equity and Excellence – Commissioning for Patients.
	RCP	2010	Response to Equity and Excellence – Liberating the NHS
	RCP	2010	Oct 2010. RCP response to Liberating the NHS: Transparency In Outcomes
	RCP	2011 ?	RCP Response to Liberating the NHS
	RCP	2011	Response to Liberating the NHS – greater choice and control (Patient Choice consultation response)
	RCP	2011	Response to NHS Constitution and Whistleblowing Consultation
	RCP	2011	March 2011. Health and Social Care Bill Committee. RCP Written Evidence.
	RCP	2011	Feb 2011. Health select committee: commissioning follow-up inquiry. RCP response.
	RCP	2011	May 2011. NHS Listening Exercise. RCP Response
	RCP	2011	Response to Healthy Lives Healthy People. 'Health Select Committee: Inquiry on public health'.
	RCP	2011	June 2011. RCP Summary of Government's response to Future Forum
	RCP	2011	RCP Response to Future Forum Report. June 2011.
	RCP	2011	Summary of government's response to future forum

	RCP	2011	Leading for quality.
RCGP	RCGP	2001	Valuing General Practice (Joint paper with BMA, Response to NHS Plan, and also couple with the Response to the Wanless consultation)
	RCGP	2001	Securing our future health: Taking a long term view-The Wanless (Interim) report (Response to Consultation)
	RCGP	2010	Response to Equity and Excellence Liberating the NHS
	RCGP	2011	The Health and Social Care Bill - Second Reading brief. Briefing paper.
	RCGP	2010	Health and social care bill committee - transcript
	RCGP	2011	Letter to Cameron regarding Health and Social Care Bill from Clare Gerada
	RCGP	2011	2011 May. Analysis paper on health reforms. "The Government's Health Reforms: An analysis of the need for clarification and change by the RCGP"
	RCGP	2011	Response to future forum listening exercise.
	RCGP	2011	Response to healthy lives healthy people consultation.
	RCGP	2011	Response to Healthy Lives, Healthy People: Our Strategy for Public Health in England
	RCGP	2011	Response to healthy lives healthy people consultation – transparency in outcomes.
	RCGP	2011	Response to Liberating the NHS - An Informatoin Revolution
	RCGP	2011	Response to healthy lives healthy people consultation – funding and commissioning routes for public health.
RCN	RCN	2004	Speaking Up: Nurses and NHS IT Developments
	RCN	2007	Electronic Personal Health Records – Emergence and Implications For The UK. (Note: *not an RCN Publication*)
	RCN	2011	Response to NHS White paper Equity and Excellence: Liberating The NHS
	RCN	2011	Response to Liberating The NHS: Transparency In Outcomes
	RCN	2011	Response To Liberating the NHS: Commissioning For Patients
	RCN	2011	Response to Liberating The NHS: Local Democratic Legitimacy in health
	RCN	2011	Response to Liberating the NHS – Regulating Healthcare providers
	RCN	2011	RCN Response to Liberating the NHS: Achieving Equity and Excellence for Children
	RCN	2011	Response to Liberating The NHS: Greater Choice And Control
	RCN	2011	Response to Liberating The NHS – an Information Revolution
	RCN	2011	Response to Liberating the NHS – Liberating the healthcare workforce
	RCN	2011	Response to NHS Future Forum Listening Exercise

APPENDIX C: Interview Agenda

Themes	Points to be covered as time permits
Personal opinion/experience of EHRs	- Efficiency/benefits at workplace as a result of EHR use? - Ease of use? - Patient-doctor interaction; Doctor-nurse interaction/boundaries
The *need* for a national care record service	- Views on the felt need for a national care record service when the NPfIT began
Feasibility	- Views at the start of the project, vs. current views - What was done right/wrong? - Opinions on procurement strategy, and the quality of systems to be made available to clinicians
Expectations	- Discuss their expectations from the NHS Care Record Service at the start of the programme, and to what extent these were met
Discussion on Summary Care Records (SCR)/Detailed Care records (DCR) - **Patient access and empowerment regarding the same**	- Usability & Ease of access to one's own SCR: ask them their own experience - SCR/DCR contents – what details they think it should contain - Patient 'ownership' of own records/data, and potential consequences of this on safety and healthcare delivery
User/public engagement and communication	- Discuss respondent's views on how DOH engaged with his/her professional group, and whether their views were considered in later developments/decisions in the project - General views on how DOH engaged with *other* stakeholder groups
Retrospective thoughts on the project – past successes (?) and future progress	- NPfIT as a failure vs. (partial) success – thoughts on this? - DOH's positive updates on the electronic record component vs. conflicting evidence provided by other stakeholders: possible explanations? - Thoughts on whether/how the programme and its NCRS component shifted focus/priorities during its journey - Extent to which the original vision of 'transforming the way healthcare is delivered' was achieved - Priorities going forward? (*Standardisation; Interoperability; Patient engagement; Clinician engagement;*)

APPENDIX D: Overview of selected key events in the NPfIT.

	Evolution of the NCRS	Government/ DH/CFH	Accountability bodies (NAO/PAC/Health Select Committee)	Engagement mechanisms/disruptions/ restructuring	Leadership	Suppliers and procurement
2002		Feb: Meeting at 10 Downing street sees conception of NPFIT; June: "Delivering 21st century IT support for the NHS" report: integrated record; no mention of Spine			October: Richard Granger appointed NPFIT Director General	
2003	Concept of the 'spine health record' put forward by clinician-led groups					April: GP contracts signed off for GP choice, QMAS systems (independent of NPFIT); December: LSP contracts signed with CSC, BT, Accenture
2004				April: Head of National Clinical Advisory Board steps down; National Clinical Leads appointed; RCN – Oct 2004 document: Speaking Up; Nurses and NHS IT developments	Sept: Joint Senior Responsible Owner of the NPFIT (A.Halligan) leaves	January: LSP contract signed with Fujitsu
2005		Care Records Guarantee published		Jan: Porter Novelli PR company appointed to manage public relations for NPFIT April:NPfIT renamed Connecting for Health (CFH) and established as new agency replacing NHS IA		Fujitsu switches from IDX systems to Cerner Millenium
2006	March: GP Systems of Choice established		April: A dossier of concerns drafted by 23			July: BT switches from IDX systems to Cerner Millenium;

Year						
			academics June: NAO Report highlights delays			Sept: Accenture withdraws; CSC takes over
2007	Spring: Piloting of SCRs triggers privacy concerns; June: SCR consent mechanism to be made hybrid between opt-in/opt-out		March: PAC Report highlights delays, incapabilities of suppliers, lack of clinical engagement; June: Electronic Patient Record inquiry by Health Select Committee	April: National Local Ownership Programme (NLOP) introduced Sept: Care Records Development Board closed	June: Richard Granger resigns	
2008	Increased efforts by RCP, AOMRC to define professional record keeping standards				Jan-April: Gordon Hextall takes over from Granger; September: Christine Connelly and Martin Bellamy jointly take over NHS CFH	May: Fujitsu contract terminated, with BT to take over some of Fujitsu's work
2009			PAC Report on NPFIT (Progress since 2006)		Martin Bellammy resigns	
2010	March: BMA call for suspension of Summary Care Record rollout	New Labour gov replaced by Conservative-Liberal Democrat coalition government; Central approach declared unnecessary				
2011	Good practice guidelines for GP EPR, version 4 – (RCGP, BMA and DH)	September: NPFIT dismantled	May: NAO Report (Update on detailed care record systems) June: MPA Review of the NPfIT			