Negotiating the organisational and policy context for successful technology adoption in the NHS

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1. Aims/Objectives

The aims of this research are:

- to identify the root causes of risk perceptions over technology adoption in the ‘sponsoring’ Trusts;
- to map out the network of actors required for successful technology adoption;
- to understand the policy, organizational and cognitive barriers and resolve cross-boundary issues;
- to assess the extent to which PbR is creating barriers to technology adoption and implementation.

Our specific objectives are:

- To produce recommendations on ‘what needs to change’ for successful technology adoption (such recommendations will seek to change any misguided perceptions of risk through communication and alleviate real risk (e.g. of income loss) through cross-boundary negotiations).
- If PbR funding mechanisms are too rigid, to make recommendations of how local flexibilities can be enhanced.
- To identify any new boundary-spanning roles required to facilitate technology transfer along the adoption pathway.
- To work closely with NTAC to ensure that this research dovetails with their agenda (the technologies we will investigate have been chosen in consultation with NTAC).

2. Background

Background, including NHS context and relevant literature

POLICY BACKGROUND

Policy-makers are particularly mindful of the potential for new technology in areas of current concern: patient safety, health care effectiveness and increased productivity.

Patient safety and health care effectiveness

Policy-makers wish to introduce technology to enable patient safety and healthcare effectiveness. Clinical utility may be contained within secondary care but technologies may also shift focus from late-stage treatment of illness towards much earlier health maintenance and disease prevention. This involves not only timely clinical intervention but assisting individuals (even before they become patients) to understand and maintain their own well-being through ‘near-patient’ monitoring and treatment devices. Technology can also, where appropriate, enable interventions to occur in lower cost primary care rather than in secondary and tertiary settings (Ministerial Medical Technology Group, MMTSG/07/01).

Diffusing technology along an adoption pathway and moving technologies downstream into health maintenance activities and lower cost settings necessitates new organizational boundary-spanning roles.

Productivity

In terms of productivity, there is an expectation that technology will have a positive impact. The Wanless Review (2002) stated that the NHS was a ‘late and slow adaptor of medical technology’. Over the last 20 years medical technology has accounted for 2% of the annual
growth in NHS, under a scenario that Wanless described as ‘fully engaged’, it was calculated that a 3% growth in spending on technology could achieve a 3% growth in NHS productivity (DoH, 2004). However, the current main policy focus for productivity is on raising levels of activity. English Trusts are being funded through Payment by Results (PbR). PbR was introduced following evidence that the cost of clinical interventions varied considerably between Trusts; this variability was not completely explained by differences in case mix, quality of care and hospital infrastructure (Llewellyn and Northcott, 2005; Northcott and Llewellyn, 2003). Under PbR, medical interventions are coded to Health Care Resource (HRG) categories which attract a fixed tariff. Therefore, Trust income rises (or falls) dependent upon activity levels. Past evidence in the NHS indicates a trade-off between productivity and innovation therefore PbR may impede innovation (Llewellyn and Northcott, 2005). Innovating involves exploration; this raises risk (March, 1991). Introducing new technologies always has an initial downward impact on productivity (Fleck and Howells, 2001). A policy climate that relies on financial incentives for activity tends to reduce providers’ propensity to take risks (Hood et al, 2001; Newman et al, 2001, Power, 1997). The Kings Fund (2007) also comment on the potential conflict between PbR and government plans to deliver more community care.

Safety, healthcare effectiveness and productivity

Patient safety, healthcare effectiveness and productivity all demand the adoption of technology. Although, in the longer term, introducing technology should also impact positively on productivity, it appears unlikely that these gains will be realized whilst providers seek to reduce their exposure to financial risk. The Department of Health (2008a,b) recognize this and provide for ‘local flexibilities’ to enable technical innovation. They anticipate that PbR tariffs be ‘unbundled’ to take account of new technologies and the issues arising when activity moves from hospitals into the community (see below). In addition ‘Pass through’ and ‘One stop shop’ payments should be allowed. DoH are also trialling the use of only a sample of Trusts to update the tariff thus speeding up the process of keeping tariffs up-to-date. Up-to-date and unbundled tariffs should help avoid an adverse impact on introducing technologies. Other possibilities are to link funding to normative or actual costs (rather than the average cost) where the provider concerned is demonstrably more efficient. Again having a beneficial impact where technology use is improving efficiency. However, ‘local flexibilities’ are reliant on communication and dialogue between providers and commissioners and, as discussed below, progress is painfully slow. The Kings Fund (2007) reported that there is no centrally published data on the extent to which local PbR flexibilities are being implemented; the limited available evidence is that they are not. Therefore, expectations that PbR can operate in its current form without adversely effecting the adoption of new technology look overly optimistic.

3. Need

Well regarded commentators on the NHS (Klein, 2006; Webster, 2002) have seen technology as its essential driving force. Klein (2006) characterizes the history of the NHS as dominated by technocratic rationalism and paternalism. Although there has been a loss of legitimacy for paternalism (Greener, 2008), scientific advance, as expressed through technological innovation, continues to underpin the quality of health services. However, in the minds of those removed from the complexity of health care provision, there is an almost automatic equation between medical progress and technological innovation. New technologies are thought to engender medical advances in a fairly unproblematic way and medical progress is believed to be assured by technology. However, on the latter Greener and Powell (2008) comment that NHS technology has been constrained by capital availability. This is borne out by the statistics, ‘Spending on healthcare technology per capita in the UK is half, or less than half, that of North America, Switzerland, Scandinavia and Germany’ (DoH, 2004). The former assumption - on the unproblematic introduction of
technology - neglects the organizational and management issues. Health technologies can only be deployed if they are successfully implemented and diffused along a complex adoption pathway.

There is little research on the organizational factors that shape the take-up of non-pharmaceutical technologies in the NHS (Robertson and Jochelson, 2006; Greenhalgh et al, 2004). This is perhaps surprising as there is strong evidence from the private sector that technological implementation always depends upon success in negotiating inevitable changes in human activity and organizational/social context indeed, that this activity/context is actually integral to the technology- equating 'technology' with an artifact is a mistaken lay belief (Fleck and Howells, 2001). In seminal work Latour (1987; 1994;1999) tracked the complex network of actors required to support new technologies and the politicized negotiations which accompany their adoption.. His research has highlighted the issue that however efficacious an innovation may be, its adoption can - by no means - be assured. Innovative technology enters a professional field characterised by entrenched structures, interests, ideas and aspirations. Success always depends upon overcoming resistance and enrolling allies to what can be an ever-shifting support network. Latour's insights are particularly apposite to the health care field. In this arena, there are three main players (policy-makers, clinicians and managers) working within different professional and cognitive boundaries (Ferlie et al, 2005) with, frequently, diverse interests, ideas and aspirations (Mintzberg, 1997), these can easily be thrown into sharp relief when technological innovations are proposed. Moreover the health care arena is characterized by geographically diverse structures with tight organizational boundaries; these can problematize the relationship between technology innovation and structural reforms such as Payment by Results (PbR). Williams and Dickinson (2008) stress that technology adoption is a process rather than an event and sum up on a complex agenda: diverse stakeholders, settings which cross the public, private and third sectors (including hospital, community and the home) and a situation where some technologies are mandated by the National Institute for Clinical Excellence (NICE) whilst others are voluntary. Although, in line with the arguments above, ‘mandatory’ by no means implies that the Trusts involved have put in place structures and processes to manage implementation (Sheldon et al, 2004).


Plan of investigation
Our focus will be on technologies which give rise to the greatest perceptions of risk along the lines outlined above. Discussions with NTAC led the identification of three technologies presenting the most complex problems of adoption and implementation. These are: an insulin pump with remote patient management; a lymph node metastases diagnostic for breast cancer; and a system for advanced retinal screening. For the insulin pump (3 participating Trusts) there are difficulties with patient involvement. With the breast cancer diagnostic (4 participating Trusts) and the advanced retinal screening (2 participating Trusts) the sponsoring Trusts perceive risk of income loss as the main sites of use will be outside of their organizational boundaries.

To address the first five research questions the investigation will proceed in two key stages:

Stage 1 - Our first task at Stage 1 will be to conduct a scoping exercise. We will visit all the NTAC sites to form a broad view of the factors that enable or constrain technology adoption and implementation. We will also familiarize ourselves with the extant literature review.

Stage 2 encompasses the primary data collection at the 3 technology projects over 9 sites. As appropriate for in-depth exploration of the macro (policy) and meso (organizational) dynamics of technology adoption and implementation, the project will adopt a contextual
approach. Adopting this logic, structured comparisons will be made between the project sites and the network dynamics within them. There will also be a focus on the specific areas of difficulty at the three sites. At each of the sites we will map the networks required to negotiate adoption and implementation issues.

To address research questions 6,7 and 8:

Stage 3 focuses on the role of NTAC within the network. If NTAC becomes and remains an obligatory passage point (Latour, 1994:37) then once NTAC withdraws the network becomes unsustainable. If, on the other hand, the work of NTAC can become ‘blackboxed’, implying that the NTAC expertise has been absorbed into the network, then they can withdraw and the network will still function. If NTAC's expertise can be codified into the ‘How-to, Why-to’ guides then this ‘blackboxing’ should be achievable.

Methods (including the plan of analysis)
In accordance with Actor Network Theory (ANT) two data collection techniques will be used. Latour and Woolgar (1979) prescribe, first, to ‘follow the actor’ and, second, to ‘examine inscriptions’. In terms of ‘following the actor’ we will track and map the network required to support successful technological adoption and implementation, conducting both ethnographic, observational research (videoed where participants are agreeable) and semi-structured interviews. We will also ask participants to record their situated responses to the on-going flow of network interactions. We anticipate that between 8 to 12 participants will be involved at each Trust. To examine inscriptions we will analyse documents relating to the technology adoption and implementation. There will be aspects of action research (see, for example, the seminal work by Lewin (1948) and recent contribution by McIntyre (2007)) as we will identify the staff required to join the network as well as describe and prescribe the interactions and negotiations that enable technology adoption and implementation.

To improve the validity of the data the team will pilot the data techniques in one of the research settings to refine them prior to the main study. Interviews will be recorded and transcribed. Diaries of notes on the ethnographic research will be kept throughout the research. Transcripts will be made available to respondents as will brief interim summaries of the ethnographic research to acquire additional feedback.

Plan for data analysis
In keeping with the qualitative nature of much of the data the process of analysis will be iterative. However, every effort will be made to structure this process using QSR NVivo software alongside other methods of qualitative data analysis such as thematic or template analysis. Core themes or concepts will first be identified inductively within each setting after which we will seek to verify or qualify them by making further comparisons (Miles and Huberman, 1994:431). The objective of this process of iteration and comparison is to develop robust categories that help us to understand the conditions that either facilitate or hinder technology adoption and implementation.

5. Contribution to existing research

Benefits of research to NHS
Resolving the issues which constrain the adoption and implementation of technologies has clear benefits for patient safety, healthcare effectiveness and productivity. Specifically:

- The production of a mapped network of required actors will function as a template for successful technology adoption and implementation
- The identification of new boundary-spanning roles (eg between primary and secondary care) will ensure that if technologies are moving downstream there are
individuals in place to negotiate this

- Our focus on enabling local flexibilities for PbR when new technologies are introduced will lead the way for this approach to become embedded in systems in the future.
- We will predict how long sites for new technologies will require support based on the time required for NTAC's expertise to become 'black-boxed'.

6. Plan of Investigation

Project timetable
Over the three year lifecycle of this project we envisage key phases as follows:

Phase 1 (1-3 months): Preparing the ground:
- Recruitment and induction of the Research Assistant,
- Initial scoping interviews across all the NTAC sites,
- Initiation of access negotiations with specific cases followed by formal applications to relevant ethics committees/boards. We anticipate that these applications will take at least six months to process.

Phase 2 (4-6 months): Familiarization with the literature review and development of research tools:
- Work with the literature review to refine our understanding of the adoption and implementation issues
- Pilot study to refine main data collection techniques: interviews and ethnographic tracking,
- Completion of general access negotiations with relevant ethics committees and initiation of specific negotiations with key network participants.

Phase 3 (7-11 months): Data collection I
- Conduct of the first technology adoption and implementation site. Production of interim report and feedback to NTAC, AG and research participants. Tape transcription and diary notes.

Phase 4 (9-13 months): Data collection I1
- Conduct of the second technology adoption and implementation site. Production of interim report and feedback to NTAC, AG and research participant. Tape transcription and diary notes.

Phase 5 (11-15 months): Data collection III
- Conduct of the third technology adoption and implementation site. Production of interim report and feedback to NTAC, AG and research participants. Tape transcription and diary notes.

Phase 6 (16-21 months): Data collection IV
- Assessment of the role of NTAC. Production of interim report and feedback to NTAC, AG and research participants. Tape transcription and diary notes.

Phase 7 (22-36 months): Analysis, write-up and dissemination:
- Full analysis of the data
- Production of final report,
- Development of training materials,
- Dissemination of results to participating organisations through workshops and a national conference (to be hosted by MBS). Initial dissemination to wider academic and
7. Project Management

Project meetings will be held monthly to review progress and address any issues that might arise in the execution of the project. A project wiki will be created with access restricted to project members to facilitate coordination and provide a repository for working documents, meeting minutes and fieldwork data.

Interim reports
We will provide reports on emerging findings, tailored to NTAC, SDO and our Advisory Board requirements to the following schedule:

- An early stage process report (12 month) to assess initial progress and identify problems.
- An 24 month report on Phases 1-6
- A 36 month final report and other outputs (see dissemination)

8. Service users/public involvement

Proposals for the involvement of stakeholders
Engagement with stakeholders will be in consultation with an Advisory Group (AG) formed in conjunction with NTAC. Members (aside from NTAC) will be drawn from a wide range of healthcare organizations as follows:

- a Strategic Health Authority (through the R&D Director)
- a Foundation Trust (secondary care)
- a Foundation Trust (tertiary care)
- a PCT
- a GP practice
- a professional association representing clinicians with management responsibilities
- a public/patient involvement organisation
- a charity providing services to the NHS.

Plans for dissemination of results
The main users of this research will be managers and clinicians who are currently involved in technology adoption and implementation.

Dissemination channels
To reach these users we will employ both the dissemination channels of our AG partners (including existing SHA and R&D networks) and our own mechanisms (through the University research centres represented in this proposal) including:

- Action Learning Sets for new managers;
- Masters Programmes for healthcare management and leadership for both new entrants and experienced managers;
- Practice Development Units for clinicians;
- Specialist Registrar Programmes.

The team will identify practitioner conferences to present the interim results and seek feedback as follows:
- The NHS Confederation
- The Institute of Healthcare Management
- British Association of Medical Managers
- The NHS Alliance
- NHS Institute.
The team will seek to publish in practitioner and academic journals including:

- British Medical Journal
- Health Service Journal
- Organization Studies
- Public Administration

9. References

References


Department of Health (2007) World Class Commissioning www.dh.gov.uk/worldclasscommissioning,


Ministerial Medical Technology Group, MMTSG/07/01


Williams, I. and H. Dickinson (2008) *Knowledge for Adoption: A Review of the Literature on Knowledge-based Facilitators of Technology Adoption in Health Care*, University of Birmingham, Health Services Management Centre/NHS Institute for Innovation and Improvement.


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