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Diffusion of innovations in the National Health Service: A Case Study investigating the implementation of an electronic patient record system in a UK secondary care Trust.

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Diffusion of innovations in the National Health Service: A Case Study investigating the implementation of an electronic patient record system in a UK secondary care Trust.

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Abstract

The aim of the research was to explore the experiences of consultants during the implementation stages of a major IT programme in a UK health care organisation and to explain what factors affected the adoption of the new technologies. A single site case study approach using semi-structured interviews and project documentation was employed. The data was analysed using a method similar to Template Analysis. It was found that the Trust employed a top down, centrally driven model which was perceived as a technology push, even though it was claimed to be clinical lead. Innovation attributes that were the most influential were the poor performance and its impact on the perceptions of relative advantage, voluntariness and cost. Organisational problems encountered included differences between the structures of the IT directorate and the centralised structure of the organisation. Managing the perceptions of consultants towards IT is an essential element to facilitate the successful adoption of information technology.

1.0   Introduction

For over 50 years researchers and academics have developed theories to explain and predict human behaviour in situations where an individual or a group of individuals are presented with a new idea or product. The theories explain how and why the individual forms an opinion about the idea, makes a decision to either adopt or reject the idea and finally uses the idea or product which in turn usually produces some beneficial outcomes. This is what Rogers (2003) termed the diffusion of innovations (DOI), an innovation being an idea or product that is different or better than what is currently in use.

Since its emergence in the 1960s many researchers have attempted to adapt, develop and expand Rogers' theories particularly in the field of Information Communications Technologies (ICT). For instance Davis (1989) first developed the Technology Acceptance Model (TAM) which was similar in many ways to Rogers DOI model but was specifically aimed at IT innovations. The perceived characteristics of innovations (PCI) model was developed by Benbasat and Moore (1991) and Davis et al (2003) further expanded the TAM to produce the Unified Theory of Acceptance and Use of Technology (UTAUT). This in turn has been extended over recent years.

The influence and application of diffusion theory has become particularly important in programmes involving the deployment of new IT technologies. Over the past 30 years ICT has become ubiquitous in all walks of life, changing the ways in which we work, play and live or lives. Crucially organisations annually spend billions on information systems seeking to improve information workflow and decision making, increase productivity, reduce costs and increase sales and profits. However, despite the vast experience and knowledge acquired over this period by IS practitioners and organisations the media and literature is full of stories of large IS programmes being hugely over budget, behind schedule and not delivering the benefits intended particularly in the public sector (Heeks 2006).

Over the last decade health care organisations have been subject to major IT/IS change programmes. The UK's National Health Service (NHS) attempted to transform its patient services at a national and local level through the use of information technology. The National Programme for IT (NPfIT) was the biggest IT

programme in the world when it was first announced in 2002. Eight years and several billion pounds later the newly elected conservative government decided that the programme would be significantly downscaled and effectively shelved.

During this period the government commissioned a number of studies aimed at evaluating the programme and the reasons for its poor performance. Bate et al (2004), Bratan et al (2008; 2010a; 2010b) are amongst some of the research papers produced which highlighted many of the factors which impacted the delivery of the IT programmes including an adaption of the DOI models within the context of a health service organisation (Bate et al, 2004).

Bate et al (2004) ask what processes are involved in the implementation of innovations in health care organisations and maintain that this is the main area for improvement in the literature. In particular it is argued that there is a gap in the research with context and advocates a mixed methodology approach to provide an in depth study.

This research study aims to add to the knowledge and understanding of diffusion processes in the health sector by evaluation of a major IT programme in a large secondary care Trust in the UK. The subject of this case study is the experience of consultants and their attitude towards IT and the EPR. Consultants generally are known to be sceptical towards the adoption and usage of IT systems as the literature review will show. The interest here lies in whether earlier lessons were learnt and how did the Trust go about engaging this powerful and influential group

2.0   Literature Review

2.1   Development of Health Information Systems in the UK

In 1998 the UK's Department of Health (DOH) published its vision for the future of IT in the National Health Service (NHS). Information for Health (DOH, 1998) laid out the government's aims and objectives for the delivery of patient care through the use of internet enabled technology including access to a patient's electronic health records (EHR).

The Wanless report in 2002 advocated major investment in the NHS IT infrastructure as a result of poor performance of the NHS in comparison with other similar countries

(Bratan et al, 2010a). It also recommended a centrally controlled, national IT programme (DOH, 2010).

The National Programme for IT (NPfIT) emerged following the DOH IT strategy in 2002: Delivering 21st Century IT Support for the NHS – A National Strategic Programme. The aim of the programme was to modernise the NHS through investment in integrated IT systems (DOH, 2010) and to deliver extensive, secure systems and electronic patient records to primary and secondary care (Bratan et al, 2010a).

Initial expected costs of the programme were £6 billion over seven years (Brennan, 2007) but in 2010 this had reached £12.4 billion over ten years with an end date estimated at 2014 (Bratan et al, 2010a).

2.2   Problems and Challenges to the NPfIT

Early research into the challenges and impact of the NPfIT found that the timescales for delivery at the time were unrealistic and that there were major concerns over the impact of IT changes to existing systems (Fulop et al, 2005). It was also concluded that more emphasis should be placed on cultural issues and managing organisational changes and setting expectations as much as technical and functional issues. Similar conclusions were also found by Berman et al (2009) in a study of IT adoption in healthcare in the United States.

Collin et al, (2007) continued this theme with a study on the challenges of implementing the NPfIT in acute Hospitals. This qualitative research study used grounded theory and interviews with Senior clinicians, Trust Executives and IT directors to highlight perceived challenges of the NPfIT across the broad programme. The study found that there was broad support of the programme and its strategic objectives however there were major concerns. This included financial concerns over the cost of the programme, prioritising the implementation over other operational issues, poor communication from Connecting for Health, delays in patient administration systems (PAS), risks to patient safety due to PAS delays, concerns over integration across the NHS and dissatisfaction with choose and book. It was concluded that the programme should set more achievable targets for the delivery of systems and provide better advice about how to implement interim solutions or

prolong the life of existing legacy systems. The study did show support for the programme with senior Trust executives and managers and that this had increased during the research period of 18 months. They also found that interviewees claimed that their staff were keen to adopt the technologies and found limited evidence of resistance to its adoption. However there was anxiety over the capability of programme managers to implement systems within acceptable timeframes (Collin et al, 2007).

A study of five acute hospitals implementing EPR systems by Ali et al (2010) found that the original top-down methodology employed to deliver the National programme has been largely replaced by a process of collaboration and choice based on the local specialised needs and situation. It is argued that the top-down approach should not, however be replaced by a purely bottom up approach but a hybrid, emergent approach is more prudent. Similarly Bratan et al (2010b) argued that the top down approach was not working in the case of the summary care record and that a middle out approach should be used whereby local authorities, government, clinicians and 3rd party vendors should collaborate to create an open set of standards.

Other challenges to the success related to the lack of IT skills and IT and training resources as well as a lack of awareness and knowledge of the overall purpose of the NPfIT (Ali et al, 2010). This was echoed by Wainwright and Waring (2007) who found that the lack of training resources as well as lack of awareness were also evident in local primary care.

A more general study of IT adoption in healthcare in the US (Berman et al, 2009) concluded that technology adoption is more aligned to organisational and cultural issues than purely system functionality and that engagement of clinical staff is the most important factor in implementing health information systems. End user engagement of physicians was also recommended as a key element in the successful adoption of health information systems (Berman et al, 2009; Bernstein and McCreless, 2007) and in particular the use of physician champions (Berman et al, 2009).

Ananden et al (2008) found that many applications being developed in healthcare were not fit for purpose and that more emphasis should be made on cultural issues rather than on technology alone.

2.3   Experience and Perceptions of Clinicians

The lack of involvement in decision-making by clinicians in the NPfIT was also prevalent in the literature. One GP stated that "there was no involvement of the users themselves" (Ford, 2005, pp 516) and described his "daily foaming frustration with the IT systems foisted on us" (Ford, 2005 pp 516). Others (Young, 2005) describe the hunger for the new technology but frustration with the delays.

Bath et al (2009) examined the experiences of GP's and hospital consultants with the choose and book service. The research found that although many clinicians could see the benefits to patients and the reductions in costs in the referral process the uptake in its use was limited due the added administrative tasks they had to complete. It did seem that GP's were concerned over its functionality and usability while hospital consultants were more concerned over the potential increase in their workload and their control over the clinic slot times. There was also evidence that hospital consultants were happier using paper based referrals rather than using choose and book (Bath et al, 2009).

Ali et al (2010) found that the views of clinicians towards the use and benefits of an Electronic Patient Record (EPR) system mixed. Wainwright and Waring (2007) found that many G.P's interviewed in their study of implementing ICT in primary care considered ICT as an obstacle to patient care rather than a benefit. It was suggested that there was widespread resistance to using ICT such as e-mail and electronic booking systems. It was also found that some GP's considered that ICT was de-skilling them as a result of NHS direct and the role of nurse practitioners using decision support tools (Wainwright and Waring, 2007)

In a case study of the adoption and usage of the UK's Summary Care Record (SCR) it was discovered that other than technical issues reasons for non-usage included lack of motivation by clinicians, resistance to the programme by individuals and organisations and lack of training. It was also commented that even though the system

was perceived as easy to use some clinicians were still often unwilling to use the systems and potential benefits were not being realised as a result (Bratan et al, 2010b).

2.4   Technology Adoption Frameworks

The adoption of new ideas and innovations has been the subject of a vast number of research studies covering a wide range of environments, subjects and perspectives. Two of the most prevalent theoretical models which have been used to describe, explore and predict adoption of information technology are the diffusion of innovations (DOI) and Technology Acceptance Models (TAM).

These classic adoption models have been extremely useful and popular when explaining or predicting the adoption and usage of new ideas by individuals where there the user has a choice of whether to adopt or reject the new idea (Gallivan, 2001). Most large scale IT projects in service organisations however are far more complex and explanations of how innovations are adopted and why some may be accepted or rejected have been the focus of many contemporary studies (Bate et al, 2004).

These studies have attempted to explain the organisational factors as well as individual factors which have lead to the adoption or failure of innovations. The classic DOI and TAM models along with other selected models based on organisational adoption processes are now evaluated below.

2.5   Comparison of DOI and TAM

Gallivan (2001) acknowledges that both TAM and DOI theories have had a major influence on adoption research and have been highly successful in developing management processes for delivery of IT strategies and IT adoption. Gallivan argues that the main similarities between the classic DOI and TAM models are:

- Both have perceived attributes of innovations as key predictors e.g. perceived ease of use is akin to complexity and perceived usefulness is comparable with relative advantage. However this comparison also shows the relative simplicity of the TAM in comparison with DOI theory. DOI attributes are extended by Rogers (2003) to include compatibility, trialability and observability. Others also include such attributes as image, and voluntariness of use (Benbasat and Moore and, 1991).

- The dependent variables are intention to use or actual use

- Both are best suited to situations where the decision is voluntary

DOI theory is also based on a wide variety of ideas and technology whereas TAM is aimed at Information technology and information systems. The constructs on which DOI theory is based are much broader including elements such as diffusion networks and communication channels, change agents, opinion leaders and adopter categorisations (Gallivan, 2001). Plouffe, Vandenbosch and Hulland, (2001) compared the original TAM framework (Davis 1989) with the PCI model provided in Banbasat and Moore (1991). It was found that the PCI model outperformed TAM in its ability to predict adoption and it was argued that the use of the more complex innovation adoption models should be used by researchers in IS studies of innovation.

The two models therefore are seen to have considerable similarities and any perceived weaknesses in the frugality of the original TAM were adapted in later versions of the theory (UTAUT) and incorporated some aspects of diffusion theory.

Diffusion research is considered to be applicable to a much greater variety of settings and contexts but does not lose any of its value in a modern day information technology setting. While care must be taken to avoid the research issues such as pro-innovation bias, source bias and selective recall this is also true of any adoption research projects.

2.6 Diffusion and Technology Adoption Research in the Health Sector

Bate et al (2004) completed a comprehensive review of literature in relation to research studies in health care and the diffusion of innovations in health care organisations and developed a model of diffusion in service organisations. This conceptual model includes many aspects of Rogers work and extends this to include attributes such as re-invention (innovations are adopted more rapidly if they can be adapted and modified for use), the soft periphery or fuzziness of the innovation (its ability to fit in with the organisational structures), the riskiness of the innovation, the ability of the innovation to improve performance of the tasks, the transferability of knowledge of how to use the innovation and the availability of support structures (training, help desk) will improve the chances of adoption (Bate et al, 2004).

The model advocates that diffusion is one end of a spectrum of adoption processes with dissemination at the other. Diffusion being the informal and unplanned spread of ideas and innovations and dissemination being the formal, planned and directed process of adoption (Bate et al, 2004).

The user environment is described in terms of a cycle consisting of the system antecedents for innovation (structure, ability to create and transfer new knowledge and capacity for change), system readiness (need and tensions for change, organisational fit, power balance in favour of innovation and available resources), assimilation (soft periphery of organisational fit), implementation processes and consequences (Bate et al, 2004).

The review concludes by claiming that the biggest gap in the literature was related to implementation processes in the health sector and how innovations were routinized and how this related to specific contexts. It was argued that in-depth mixed methods should be used to evaluate these cases (Bate et al, 2004).

A follow up study (Bratan et al, 2008) used this model as a basis for investigating the implementation of the Summary Care Record (SCR) in the UK's National Health Service (NHS). Many aspects of diffusion were used to explain the problems encountered during the change programme and identified areas, which needed to be addressed if the innovation was to succeed. Nine main constructs were used to explain the adoption or non-adoption of the SCR. These were the material properties of the technology, attributes of the innovation, concerns of adopters, communication channels, organizational antecedents, organizational readiness, implementation processes, linkages between parts of the social system and links to the wider political environment.

In summary the UK Governments National Programme for IT has ultimately failed in its goal to have a single national Electronic Patient Record. This has been as much a political as a technical or organisational change failure. The delays and escalation in costs have been attributed to many factors including the size and complexity of the programme, unrealistic targets and timescales, poor communication and awareness of the programme, the use of technology push and top down change processes and lack of involvement and engagement with clinical staff.

Many of the diffusion studies in the health sector have also found that clinicians tended to have negative perceptions of IT systems in general and in the case of the UK's National Programme for IT displayed a reluctance to use the new systems and in many cases resisted its adoption. This is despite many of the leading clinical advocates of the programme maintaining that it had widespread support from clinicians. Therefore the focus of the research will be an in-depth study examining the perceptions, attitudes and experiences of consultants during the implementation of an Electronic Patient Record (EPR) system in a large UK secondary care Trust. This research aims to provide evidence of the diffusion of the innovation and the factors which may affect both individual and organisational adoption.

3.0   Context

The EPR programme had a number of different projects and systems which were developed and implemented over a three year period starting in 2007. The decision to procure, develop and implement an EPR system was a collective decision made by the Trusts executive and board of directors. The main justification for the decision was to reduce costs, improve patient care and reduce clinical risks. The decision was also a politically bold one as the Trust had decided to contract out of the NPfIT programme, mainly due to the delays in delivery, and decided to procure its own EPR systems.

The local IT department had no proven experience or track record of delivering a major IT programme and so external resources were employed and a separate programme team were established. The individual projects within the programme loosely followed a Prince2 methodology.

The main systems being implemented discussed in this research are the Patient Administration System (PAS), electronic prescribing or meds and electronic ordering of results (orders). This system was mainly used by administrative and secretarial staff for managing patient demographic and appointment details. Although this system was not used by consultants in the Trust it did have an impact on the consultants if the system caused errors or mistakes in appointments and clinic details.

An Electronic prescriptions system was rolled out to in-patients wards and at the time of writing is near completion. This system allows clinical staff to electronically manage the prescribing of drugs to patients. This replaces the old process of doctors

writing prescriptions on paper and being administered by junior doctors or nurses. In this case consultants had the choice of either using the new system themselves or getting others to use it on their behalf.

Electronic ordering is used for clinicians to order tests such as blood tests and X-rays and being able to receive the results electronically. Again it is not compulsory for consultants to use this system.

4.0   Methodology

The nature of this investigation implied that the research would be both descriptive and explanatory. Describing and evaluating the experiences of clinicians during the adoption and implementation of the electronic patient record as well as identifying why and how people reacted to the innovation.

As the research was restricted to a single event (the EPR programme) and the experiences of a small group within a discrete environment (the secondary care Trust) a case study method was considered as being particularly appropriate. It is also claimed to be the most appropriate and widespread research method for interpreting the relationship between technology innovations and organisational contexts (Broadbent, Darke and Shanks, 1998).

The case study approach allows the researcher to develop the research design in an iterative fashion and may use many different data collection techniques including interviews, documents and observations (Pickard, 2007).

4.1   An Iterative Approach

Following initial discussions with IT and clinical staff involved in the EPR implementation project a sample was identified for further study. The decision on which group to study depended on many factors including the willingness and availability of staff, impact and status of the IT project within specialities and any other opportunities arising. The initial two interviews were with the lead consultant and pharmacist on the EPR programme. From these initial interviews it was decided to focus the remaining interviews on consultants and their experiences with the new technology. The remaining interviews included interviews with consultants who were

actively involved in the clinical projects as well as interviews with consultants who had little involvement providing a balance of sources.

4.2   Method of Analysis

Diffusion of innovations theories were chosen to analyse the data collected from semi-structure interviews. The Classic Diffusion of Innovations (Rogers, 1995; 2003) was evaluated along with the Technology Acceptance Model (Davis, 1989). Organisational adoption frameworks including Gallivan (2001) and Bate et al (2004) were also found to be very useful in gaining an understanding of adoption processes with an organisational context.

In order to identify themes within the qualitative data acquired the constant comparative method was used. This is most useful for developing theory from multiple sources (Clayton and Gorman, 2005). As prior knowledge was used the process of coding the data followed a process akin to Template Analysis that provided a simple way of categorising the data and allowing the themes to be generated.

The interviews were held over a three-month period between February and April 2011. All interviews were transcribed with only confidential or irrelevant information being omitted. In total five senior consultants and one senior pharmacist were interviewed. The first interview was with the clinical lead for the programme and the second with the lead pharmacist on the programme. These interviews gave an overview of what and how the projects were delivered but also provided details of issues and concerns which provided refined and more focused questioning in the remaining interviews.

Using the constant comparative method each subsequent interview was changed to reflect knowledge acquired and the changing focus of the research. This involved transcribing each interview where possible, and doing some initial coding based on knowledge acquired from the literature reviews. The original codes are listed in appendix A and are adapted from Bate et al (2004), Benbasat and Moore (1991), Davis (1989), Davis et al (2003), Gallivan (2001) and Rogers (1995; 2005).

Following each coding of an interview each interview was reviewed and re-coded as necessary based on the new knowledge acquired.

The final phase of the analysis attempted to find links and dependencies between the emerging categories and sub categories that would lead to an accurate interpretation of diffusion and adoption of the innovation by individuals or groups of individuals within the organization.

5.0 Findings

The extent of usage by clinicians and the organisational assimilation were difficult to gauge based on this small sample of consultants however the experiences during the implementations of the EPR projects and the perceived views and attitudes of their colleagues provide an important insight into how the technologies were being diffused and assimilated in the organisation. More importantly it provides a view from the consultants perspective on how the programme was managed, both good and bad, and how the lessons can used to improve the on-going delivery of the programme. The following sections discuss the main findings of the research.

5.1 Change Model

Bratan et al (2008) found that a centrally driven, top down change model that with timescales and cost being the priority was severally impacting the SCR programme in the NHS. It was recommended that a socio-technical change approach was should be adopted by the national programme. This socio-technical pull model is argued to focus on the benefits and outcomes of the systems rather than the technology being an end in itself (Bratan et al, 2008).

The change model employed by the Trust was it seems predominantly a top down technology push model with its main aims being cost savings. Clinical benefits were seen as difficult to define, quantify and measure. They included reductions in prescribing errors, standardisations of process, better data for decision making and improved efficiency with simultaneous access to data.

It was obvious that great efforts were made to engage clinicians and that the projects were delivered through direct involvement with a small group of technical savvy clinicians and enthusiastic technology exponents. However the programme was clearly driven by cost and timescales that resulted in poorly defined benefit models.

The implementation approach was also driven by costs and timescales with what it seemed as a deliberate policy of fast track delivery of systems and fixing operational issues along the way.

The programme was therefore perceived by some as a technology push and IT driven even though the IT department had little involvement in any decisions and had no real influence on how and when the technology was deployed. The resulting chaos following the PAS go live and the poor performance of the clinical systems will clearly had a negative impact on the perception of both the EPR programme and the IT department.

5.2   Clinical Engagement

There is no doubt that there was a clear vision and intention by the programme team to have clinical engagement as the key to successful delivery. The clinical engagement beyond those directly involved in the project teams however was difficult to achieve. The majority of consultants would only engage when it affected them and attendance at training sessions and awareness sessions was poor. Email and other electronic media were mainly ineffective and training was also seen as being ineffective pre-go live and that the real training occurred post go live.

There was however a view that most consultants did see the long-term benefits of the electronic patient records but the initial poor performance of the systems and the impact on the consultant's time spent on clinical episodes clearly affected their perceptions of the systems. There was also a view that the technology did not always fit or was not flexible enough to follow the processes being used on the shop floor.

The culture and beliefs of the consultants in regard to IT were very mixed. It was generally accepted that historically consultants were not interested in IT and didn't see any clinical benefits in using IT. This view is slowly changing with many, usually younger, doctors now using technology more and more and generally more accepting of IT change. It was suggested that in some clinical specialities it was more or less essential that doctors had IT skills. The example of young doctors migrating from ward to ward and training consultants could be argued to be a sign of the natural emergent process of diffusion in the hospital.

Innovations are more readily adopted if they fit with the cultural beliefs and values of the group (Rogers, 2003) however there were no signs that cultural changes were being addressed during the implementation. The changes to working practices of the clinical staff were however fundamentally being changed and this lead to conflicts from some of the consultants. There was some realisation that cultural changes would be required for future systems to be successful and a different approach to engagement was needed.

The challenge is to set realistic expectations as to the changes to working practices that will be required if the clinical systems are to be routinized in the organisation. The expectation of consultants is that the IT systems should make things easier not more difficult, for patient episodes.

5.3   Innovation Attributes

There were many innovation attributes, which were shown to influence the use and adoption of the clinical systems. In the case of consultants the use of the clinical systems was often perceived as voluntary even if the use of the system was mandatory there was evidence of avoidance. Benbasat and Moore (1991) found that if users perceived that the use of the innovation was voluntary it would impact the rate of adoption.

The decision on when and how to make the transition from a voluntary decision to a mandatory one is therefore of paramount importance. If the decision is made too soon it may lead to disengaged clinicians and affect the long-term routinization of the EPR. If the voluntariness continues too long avoidance may continue and even result in a rejection of the innovation.

Performance was also had a major impact on the perception of the technology by consultants. Even before the clinical systems were delivered the changes to the PAS systems had an indirect effect on the consultants with delays to clinics and lost case notes and the chaos of these early phases did not go unnoticed. Performance issues (log on times, systems crashing and slow performance) were widely experienced by consultants once clinical systems were online. The adoption decision to use the clinical systems was therefore influenced by the unacceptable performance of the systems.

From a consultants perspective there is also limited relative advantage in using the e-prescribing systems or orders systems. Relative advantage is considered to be the main influencing factor over the rate of adoption of an innovation. (Bate et al, 2004; Benbasat and Moore, 1991; Davis et al, 2003; Rogers, 2003). The case for removing paper was made and reducing clinical risk but this was at a considerable cost in the time it takes to complete simple tasks. If the systems are taking up significantly more time for the consultants to carry out daily tasks and therefore spending less time with patients there has to be a big question over whether the system is therefore fit for purpose.

Finally the cost of the systems was perceived to be high and therefore expectations following delivery were also very high. Benbesat and Moore (1991) commented on the perception of cost at an individual level but thought that it had no influence in an organisational setting.

5.4   Diffusion Processes

The diffusion of the innovation by junior doctors could also prove to be the key to routinization and assimilation across the hospitals. The use and adoption of the EPR systems by consultants will become less voluntary and avoidable particularly when the paper records are gradually replaced with electronic records and prescriptions are rolled out to outpatients. These will require even greater changes to the ways in which consultants work with even more time spent inputting data onto computers. Junior doctors are already familiar with the technology, using it regularly and therefore may be more likely to adopt new processes involving IT systems.

Routinization of the innovations occurs when the innovation becomes embedded in the day to day activities and marks the end of the diffusion process in organisations. It is more likely to occur if there was extensive involvement by users and the system had a high degree of re-invention and had the involvement of change champions (Rogers, 2003).

The routinization of the clinical systems in the Trust is still on-going and with the next phases of the programme taking shape the involvement of the users and the ability to adapt (re-invent) the technology to local needs is therefore seen as essential.

5.5   Organisational Issues

The Trusts original decision to deliver the EPR programme was financially and politically driven and the centralised management structure of the Trust provided the programme with a clear mandate and authority to deliver the systems. Bate et al, 2004, however claim that innovations are more likely to succeed if the structure is decentralized consisting of semi-autonomous specialised departments.

Rogers, (2003) also suggests that leaders in a centralised organisation are less likely to be able to relate to operational issues or be able to deliver innovations to meet the users needs. In this case it was suggested that the Trusts "senior management did not know the clinical environment or the people."

The balance of power was clearly with the Trusts executive however and this did ensure that the implementation of the PAS was completed albeit with a great deal of pain and chaos for its users.

The programme was initially lead by an external consultant who had previous experience and helped provide the programme with vision and leadership. However there was a disconnect between the EPR programme and the local IT department which ultimately resulted in major problems and delays. An issue which was addressed following go live however this has resulted in the problems now being perceived as IT issues and perpetuates the feelings that the programme was IT driven.

There was also a feeling that IT was generally thought of as an "ephemeral" group and that the constant changing of key IT staff had had a detrimental effect on the programme.

6.0   Conclusions

This study has been provided a unique opportunity to analyse and evaluate a highly complex event in a large UK health organisation. Unique in that the event was one of the first of its kind with access being provided to senior consultants and pharmacists involved in the delivery of a major IT programme, the electronic patient record.

The current changes in the NHS give this study a much wider meaning and importance in that lessons learnt here can add to the body of knowledge in the IT

adoption theories and potentially aid other Trusts and practitioners who are faced with similar problems to solve.

The main findings of the research echo many of the themes identified in previous studies. Within the context of this research there were also other factors were also revealed: the perception of cost and the diffusion through time by junior doctors.

The perception of cost was considered by Benbasat and Moore (1991) in the perceived characteristics of innovations model (PCI) however it was not thought to be influential in an organisational environment and was therefore omitted from the model. However it was found here that consultants were concerned about the cost of the programme and their perception of the cost may have been a factor in the rate of adoption by some consultants. It is doubtful whether it had a direct impact on the adoption or usage of the systems but it may have influenced the perception of the innovations and therefore the decision to adopt may have been delayed.

The individual decision to adopt and use the clinical systems (meds and orders) was also shown to be affected by the voluntariness of the decision. Consultants could either avoid usage (in the case of prescribing) or choose to not use the systems at all (orders). Benbasat and Moore (1991) refer to the perception of the decision to adopt being voluntary but in this case the voluntariness is very real. The challenge for the Trust is therefore to understand why any avoidance is occurring and also decide when system usage should become mandatory without any clinical risks.

The assimilation of the innovation was recognised as being most prevalent amongst junior doctors. This could be simply because they are expected to use the systems, sometimes in lieu of the consultants, or because they are more accepting of information technology or more likely they just don't know any other way of doing things. The importance for the Trust is that the system usage and behaviour is becoming the norm for the juniors. There was an general view that the next phases of the programme including rolling out orders to outpatients and transferring the patient data into a paper light environment would have a huge impact in the way in which consultants would have to conduct their work. Avoidance or non-usage may not be an option and a huge cultural shift may be required. These changes are expected to take

years to complete and therefore the time element of diffusion comes into play with junior doctors progressing to consultant roles.

Clinical engagement was also found to be a primary factor. The involvement by experienced and key clinical staff in the delivery of the clinical systems was seen as essential and major contributing factor to their success. However beyond these relatively small teams the extent of clinical engagement was seen as poor with many not paying any attention to the programme until they were directly impacted by it.

The heterophilious nature of communications between IT and consultants was also found to be a problem which needed to be resolved.

The attributes of the clinical systems were also a major factor. In particular the poor performance of the systems and slow login times were found to be a major concern. Any clinical benefits being introduced were therefore being overshadowed by the impact on working practices of the doctors and consultants. The time taken to complete clinical episodes was found to be considerably longer as a result of these problems. Even without these issues there was also a feeling that the benefits of the clinical systems were difficult to measure and therefore there was a perception that the systems had not improved the way in which they worked.

Taking all these factors into consideration it is understandable why clinical engagement has been difficult and therefore adoption by some consultants has been slow. The early chaos as a result of the PAS deployment, the delays encountered due to IT failures, constant changes in IT staff, the perceived cost and the poor performances of the clinical systems and the impact on clinical episodes with no demonstrable benefits being realised have all undoubtedly influenced the perceptions of IT and the innovations by the Trusts consultants.

The important lessons for the Trust appear to have been learnt however. The project approach is now one of using small pilots with clinical engagement from the ground up, the EPR programme team has been integrated within the IT directorate and benefits realisation on new and delivered projects is being addressed. Also communications between IT and the consultants have improved and performance issues are being resolved.

The importance of managing clinical engagement and the perceptions of consultants towards IT are therefore seen as the key elements towards success. Ensuring that the clinical benefits are clear and measurable as well as setting realistic expectations to the changes in working practices and affecting cultural changes are therefore essential. These changes would be better served by a ground up approach to change, with decentralised and autonomous groups delivery systems that are sensitive to the real world situations.

It is hoped that the contextual nature of this study will have some resonance within other health care organisations and that consideration to these findings is taken.

In order to provide wider generalisations of these findings it is recommended that a quantitative study into the assimilation of the EPR be completed looking closely at the issues identified here. It is also advised to continue with further qualitative research including more consultants who were not involved in the programme and also involve other clinical roles such as nurses and junior doctors. Also the experience of non-clinical staff during the PAS deployment and the views of IT staff, project managers and trainers would also provide a great more detail and breadth to this study.

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Appendix A – Initial codes

Diffusion themes taken from literature review used during qualitative analysis of data:
1.   Material properties (functions, performance)
2.   Attributes of the innovation (relative advantage, simplicity, compatibility, trialability, observability)
3.   Concerns of adopters (before adoption, during early use, during later use)
4.   Communication and influence (mass media, change champions and opinion leaders)
5.   Organisational innovativeness (knowledge sharing ability, leadership and management, risk taking climate, availability of resources, data capture systems)
6.   Organisational readiness (innovation fit, tension for change, balance of power, preparedness)
7.   Implementation approach and processes (change model, project and programme management, autonomy of teams, resource factors such as retention, quality and training plus alignment of old and new routines)
8.   Linkage between change agents and end users plus communications with similar organisations
9.   The wider environment influences such as political climate and mandates
        Based on Bate et al (2004) and Bratan eta al (2008)
        Additional themes (based on Rogers, 1985; 2003) and Gallivan (2001)
10.   Individual innovativeness (adopter categories such as early adopter, lagger etc)
11.   Re-invention
12.   Type of decision: Individual, authority, collective, contingent
13.   Subjective norms (culture, behaviour and attitudes of consultants)
14.   Voluntariness