Implementing complex innovations in fluid multi-stakeholder environments: experiences of ‘telecare’.

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Abstract

‘Telecare’ is the use of information and communication technology to facilitate health and social care delivery to individuals in their own homes. Governments around the world are seeking to introduce telecare partly to help address the challenges posed by an ageing society. Telecare is inherently complex to implement and operate because it involves combination of technological and organisational innovation in an environment of diverse stakeholders.

Using research on two telecare schemes in the UK, the paper explores the way project complexity, organisational context and project management approach interacted during the planning and implementation phases. The paper discusses how insights from research in related areas, including medical technology and service sector innovation in general, could help to explain why

mainstream telecare delivery has been difficult and draws conclusions on the role of project management in the implementation of innovation.

Keywords: implementation, telecare, telemedicine, health care, service innovation

Introduction

Faced by rising demand for healthcare and health system capacity constraints, governments and care providers are increasingly turning towards information and communications technology (ICT) to help support and enhance existing services. Moves towards ICT enabled care have also been stimulated by innovation in various underpinning technologies – sensors, information processing, user interfaces – and by the falling costs and rising availability of fixed and mobile telecommunications.

The subject of this paper is the implementation of one specific innovation, *telecare*. We define this in more detail below; briefly, telecare is a form of ICT-assisted care provision. It involves the use of sensors within people's homes or worn on their bodies, connected to a monitoring centre and then to a response service. This both provides an 'electronic security blanket' for those at risk of medical or other physical risk and more continuous monitoring to allow the early detection of changes in an individual's condition.

Many countries are seeking to introduce telecare, but while the technology is largely proven, service development is immature. Its potential benefits are recognised in health policy, but there are few examples of sustained, routine service delivery. The numerous small-scale trials and pilot projects have generally failed to move towards more mainstream deployment.

This immaturity makes research into the technology and innovation management processes involved in telecare implementation and service provision challenging. The strategies or business models of potential service providers are either undeveloped or unproven, customer needs are not clearly expressed and there are no 'brand names.' Porter (1998: 215) has noted the difficulties in conducting research on strategy formulation in emerging industries where 'there are no rules of the game.' There are additional problems in the case of telecare this is because of the particular challenges in conducting research on innovation in health service delivery, where interventions tend to be 'diffuse, complex and difficult to define' (Fulop et al, 2001: 10). This not only makes it more difficult to implement the innovation and evaluate its effects (controlled trials are often unfeasible), but also presents special challenges for the *study of the implementation process*. The organisational context within which the innovation has been introduced becomes important and has to be considered.

Our discussion on telecare adoption is grounded in existing research on the influences on the implementation of technology-based innovation in services in general and telemedicine and medical technology in particular. The two case studies presented in this paper are therefore exploratory and our approach is largely inductive. By comparing examples of two different project-based telecare interventions, both carried out in the same health authority with some overlap of personnel, we are seeking to shed light on the micro processes of organisational change (Tsoukas and Chia, 2002).

In the next section we define our use of the term 'telecare' and distinguish 'telecare' from 'telemedicine'. This distinction allows us to draw attention to some important characteristics of forms of remote health and social care delivery which shape their implementation. We then discuss how insights from studies in related areas – the implementation of telemedicine in particular and service sector innovation more generally – could help to explain why mainstream telecare delivery has been difficult. The next section describes the two case studies, their context and their implementation histories. This is followed by a discussion on the extent to which the factors identified in other research can explain the observations in the case studies. Finally, we draw conclusions on the role of project management in the implementation of telecare.

Definition: telecare or telemedicine?

One problem for researchers and practitioners in this field is the loose terminology (Nagendran et al, 2000) – 'telecare', 'telehealthcare', 'telemonitoring' and 'telemedicine' are all used interchangeably, sometimes within the same document (e.g. EC, 2003 or Fujimoto et al, 2000), and have different meanings to different people. All these terms describe the remote delivery of health and social care using ICT. We define *telecare* as a set of services bringing care directly to the end-user. It differs from our definition of

telemedicine, which covers ICT based systems to facilitate the exchange of information between health care professionals – for example for diagnosis or referral – and tends to focus on specific applications such as teledermatology or teleradiology (Debnath, 2004).

A more precise specification of three bundles of potential telecare services is introduced in figure 1. Two of these – *safety and security monitoring* and *personal monitoring* – are largely designed to manage the risks associated with care outside formal care institutions. Personal monitoring can include monitoring people's 'activities of daily living' to detect changes in lifestyle which may indicate an underlying problem (Doughty et al, 1999; Doughty and Williams, 2001). Data from the use of electronic assistive technology (EAT) – which is designed to improve the functionality of the home by providing greater control over features such as doors, furniture and beds – can also be integrated into activity monitoring to provide carers with a better picture of how individuals are coping within their home environment. The third group of services involves care-related information delivered to individuals through the phone, internet or digital interactive TV, and was not investigated in this research.

Telecare services therefore differ from telemedicine in their specific purpose and in the way they relate to the key aims of healthcare: crisis response and prevention. Some telecare services trigger a response to an immediate need, for example a fall or a sudden change in an individual's vital signs. We define this type of telecare as *response mode* (r-mode) telecare. Other telecare

services, either singly or in combination, can provide evidence of a change in an individual's health and social care status. Monitoring 'activities of daily living' in conjunction with data from the use of EAT could provide an indication of a slow deterioration in an individual's condition or contribute to an individual's chronic disease management programme. We define this type of telecare as *preventative mode* (p-mode) telecare¹. The opportunities for pattern recognition of fine-grained data about an individual's condition can be seen as an example of systems which not only 'automate' routines, but also 'informate' them (Zuboff, 1988), allowing decision-makers, here in particular health and social care professionals, access to new types of information/knowledge.

Figure 1. Features of a telecare service

The structural and operational complexity of the innovation is therefore much higher for telecare than for telemedicine: it involves a larger number of stakeholders from across the health and social care services; different parts of the care system tend to have differing perceptions of risk and different value systems which need to be accommodated; implementation may be impeded by an incomplete understanding of the overall care process by any given stakeholder; costs and benefits may fall unequally between different care system stakeholders. Moreover, telecare services which involve risk-management for people with high levels of dependency require close integration with other care services. In contrast, Telemedicine's focus on single acute

¹ Some information services could also fit into this category.

services means there are generally fewer stakeholders and the service is more straightforward – for example, a one-off consultation for a specific patient.

Barriers to the implementation of innovation in care delivery

Most existing research on technological innovation in healthcare has focused on the adoption of medical devices and associated procedures (e.g. Edmondson et al, 2001) or telemedicine (e.g. Grigsby et al, 2003). There has been very little work on the introduction of telecare. However, pointers from this research can be supplemented from research on innovation in other service industries to identify five key areas which might influence the adoption of telecare into mainstream services.

Organisational context and cultures

Recent summative work has begun to identify common themes in the research on telemedicine, which point to the importance of *organisational* and *cultural* barriers to its diffusion. Hailey and Crowe (2003) suggest that the degree to which all stakeholders are involved and cooperate and the stability of management structures are fundamental. Jennett et al (2003) suggest that organisational 'readiness' for telemedicine is related to (1) 'planning readiness' (the development of strategic and business plans, needs assessment and analysis, the identification of clinical, care provider and senior administrative champions) and (2) 'workplace readiness' (preparing staff, introducing change

management processes). Research by the Gask et al (2002) and Finch et al (2003) suggests that political, organisational and 'ownership' issues are important factors shaping telemedicine implementation processes and outcomes. To overcome these barriers there need to be positive links with local or national 'policy sponsors', appropriate organisational structures, and enrolment of actors into cohesive and cooperative groups.

These conclusions are supported by research on implementation barriers in *healthcare technology* in general (e.g. Ferlie et al., 2005). For example, in an exploration of the adoption of minimally invasive cardiac surgery, Edmondson et al (2001) identify a number of success factors for technology implementation in hospitals. These mirror Gask et al's (2002) conclusions and include the need for a purposefully chosen implementation team, 'psychological safety' (trust and openness), appropriate authority structures, discussion of experiences (team reflection) and new forms of team communication. Edmondson et al conclude that the implementation of medical technology innovation is mainly an organisational rather than a technical challenge.

Interesting lessons can also be drawn from studies of innovation in service industries more generally. Organisational and cultural resistance – influenced by an innovation's compatibility with the values and cultural norms of an organisation and the degree to which its results are visible to the potential adopter – has often been identified as a barrier to innovation. It may therefore be necessary for adopters to abandon old organisational

routines, behaviours and mental models (Leonard-Barton, 1995; Rogers, 1962). The role of organisational culture in explaining performance and improvement in a healthcare provider was highlighted in Weick and Sutcliffe (2003).

User needs and demand

For innovation to be successful, technological opportunities need to match *user needs*. The lack of attention to user needs has been shown in innovation research – including studies of medical technology (Shaw, 1998) – to be a major inhibitor in successful diffusion (Rothwell, 1986, 1992). Inadequate understanding of user needs, and an ensuing lack demand for products and services, is also a major barrier in the implementation of ‘smart homes’ technologies, some of which are related to telecare systems. Barlow and Venables (2003) and Gann et al. (1999) argue that this is partly due to suppliers pursuing a technology-push, rather than demand-pull approach, resulting in a gap between consumer requirements for systems which are useful for managing everyday tasks and the products that are available. This is also seen as a problem in the development of telemedicine (Jacobus, 2004).

Another potential factor is the role of ‘lead users’, who experience needs for new products (or services) ahead of other users, and thereby shape the demand for an innovation (von Hippel, 1988). A problem in ICT based innovation in government services is that it is not always clear to system developers who the putative users are (Wyatt, 2000). Moreover, a lead user’s

role tends to be highly dependent on their competencies (Voss, 1984; Shaw, 1985; Foxall, 1988).

In the case of telecare, 'user needs' are especially complex because of the wide variety of stakeholders and their diffuse requirements (Sixsmith and Sixsmith, 2000). As well as medical efficacy, these include cost efficiency, acceptability for patients, technical reliability and fulfilment of legal requirements, and compatibility with the health and social care system. The latter includes both compatibility with the service delivery organisation and the capability for integration with existing systems that support service delivery.

Project complexity

Project complexity is related to the user needs being targeted by telecare and the organisational context within which telecare is being deployed. The wider the range of population groups or health conditions and the greater the number of stakeholders, the more complex a telecare implementation project is likely to be.

Related to this is the extent to which services need to be integrated into the health and social care system as a whole (Barlow et al, 2003b). The higher the level of dependency of a patient, the greater the need for integration of the telecare service they receive with the care system as a whole. For example, maintaining an individual's safety and security within the home is an entirely

different matter from providing the ability to access general health information, advice and support from home. The latter may be provided as a stand-alone service, but r-mode telecare, seeking to manage the risks faced by a vulnerable individual living within their own home, is likely to need close integration with health and social care provision. For p-mode telecare close integration with existing care providers and their information systems is required. Integration requirements therefore depend on the scheme's ambitions, its target population and the nature of other services this target population receives, and consequently on the complexity of care pathways and the range and type of different stakeholders.

The local framework for support

The lack of a supportive policy and decision making infrastructure for those responsible for making telecare procurement decisions can hamper implementation success. In a study of a pilot telecare project for people with dementia, Woolham and Frisby (2002) argue that there is a need for agreed operational protocols and structures for wider diffusion to occur. These include suitable assessment procedures that recognise the technology needs of individuals and local arrangements for securing equipment (cf. Audit Commission, 2000). The development of such an infrastructure may, however, be hindered by a lack of local knowledge or failure by local senior management to appreciate the potential benefits of telecare (Curry et al, 2003). Woolham and Frisby (2002) note, however, that while it is an essential pre-condition, simply

providing local knowledge about the technology is unlikely to be enough to ensure it is used.

The complexity of care delivery – generally involving a multiplicity of organisations from health, social and housing services and the public and private sectors – and the nature of the local framework for support are likely to influence the characteristics of telecare project management. In situations where the policy and decision making infrastructure is weak, and knowledge of telecare is poor or non-existent, a core aspect of project management may involve ‘sense-making’, developing a collective understanding of the project through informal communication (Senge, 1994; Weick, 1995; Edmonson, 2003). There may well be a requirement for rather different management techniques and routines at different stages in the lifecycle of a telecare implementation project, with the conception and design phases emphasising the sense-making and knowledge integration functions, while implementation and operational phases necessitate expertise in more conventional project planning and control functions.

Evidence of potential effectiveness

Evidence that an innovation is likely to have a beneficial impact, gathered through trials and pilot projects, is particularly important in healthcare, where there is an emphasis on high standards of proof of efficacy before new products and innovations are adopted. However, there are tensions within health and

social care policy between the desire for modernisation – including the introduction of telecare – and the requirement for evidence-based innovation. This is also a feature of telemedicine implementation (Gask et al, 2002). In this case, while summative data about individual telemedicine interventions tend to present a picture of clinical and cost effectiveness, as well as high levels of patient satisfaction, systematic reviews demonstrate that many study designs are in fact methodologically weak (Whitten et al, 2002; Mair and Whitten, 2000; Williams et al, 2002; Hersh et al., 2001; Håkansson and Gavelin, 2000).

The notion of ‘triability’, the degree to which an innovation can be piloted on a limited basis in order to reduce the risk of failure for potential adopters, has been seen as a factor improving the likelihood of an innovation’s successful adoption (Rogers, 1962). Small scale telecare trials can provide useful indicators of likely implementation problems and evidence of potential individual outcomes, providing they are set up to be rigorously evaluated. However, it is often unfeasible to evaluate telecare according to the ‘gold standard’ of randomised control trials, desired by many clinicians for the introduction of new healthcare technologies. There is therefore a growing recognition that a more pragmatic approach to evidence gathering will be needed to avoid inappropriately excluding telecare as a care delivery option from the outset (Finch et al, 2003).

Research Approach

This paper presents two case studies of telecare implementation projects in order to explore the relative significance in each of the factors described above. Each project was implemented in the same local health authority, at the same time and shared some personnel. The target population of each project was different, but the basic telecare model was the same – home monitoring of vulnerable individuals with a response service in the event of a problem.

One scheme ('Columba') combined short-term residential rehabilitation of older people discharged from hospital with telecare services within their homes. This represented a fundamental redesign of the discharge process as well as the introduction of telecare. Despite implementation problems in the pilot phase, Columba is now developing into a mainstream service. The second, involving the home monitoring of patients with chronic obstructive pulmonary disease (COPD), had simpler objectives and a tested approach, but was not continued as a service after the pilot phase ended, even though the staff involved judged the scheme favourably.

Much of the research on the Columba project was conducted in 'real time' and spanned its development, implementation and operational phases from July 2000 to December 2002. In addition to an examination of background documentary material, research methods involved:

- Seven workshops with stakeholders from the local social and health care services and the project's industrial partners, directed at specific topics. The

findings from these workshops were consolidated and formed the basis of a further independently facilitated workshop for a different set of representatives from health and social care services and different industrial partners, to explore the generalisability of the emerging findings.

- Fifteen semi-structured interviews with those responsible for planning, implementing and operating Columba, as well as the scheme's project manager. The interviews covered eight main topic areas, designed to explore the decision making processes, project events and history, and perceptions of barriers to innovation.
- Examination of documentary material to provide additional background information and to triangulate the evidence from interviews.
- The researchers attended and took notes at four half day workshops attended by a total of 45 local care staff prior to the start of Columba's operational phase. A questionnaire designed by the researchers was also completed by 40 workshop attendees. This provided information on their views on their prior knowledge of telecare and how it might assist their own clients.

It was harder to research the history of the COPD project because this was carried out after its completion. During 2003 we conducted semi-structured interviews with representatives from each of the principal groups involved in its

development and implementation, including the project manager. A total of eight individuals from four organisations were interviewed. Subject bias was mitigated as much as possible by obtaining a cross-section of responses to similar questions from the various stakeholders. The limited background documentary material available from the project was also examined.

Case study 1: telecare plus intermediate care

Columba is an intermediate care and telecare scheme developed jointly by a local social services department and health authority in north west Surrey, near London. Its overall aim is to provide an alternative to residential care for frail older people discharged from hospital, by allowing them to remain in their own homes following a period of short-term intensive residential rehabilitation. A key objective is to ensure that patients return home from hospital faster and are not re-admitted unduly. The rehabilitation component is delivered in a residential care home, which contains an independent four bed rehabilitation unit accommodating patients for up to six weeks following discharge from the local acute hospital. The unit is designed to replicate home conditions to ensure that its users become as independent as possible. It contains the same telecare systems to be installed in clients' own homes and therefore allows clients and their carers to familiarise themselves with the technology.

The scheme developed from the emerging demands for more community based care services and national government priorities emphasising intermediate care provision. It was partly motivated by the local social services' objective of reducing the number of residential care beds in the area by 25%. Initial estimates suggested that of the 100 frail elderly patients discharged locally from hospital to social services funded residential care annually about a quarter would be suitable for discharge to their own homes, provided an appropriate care package, including telecare was available. The telecare element focused on home safety and security sensors, rather than monitoring individuals' vital signs.

In December 1999 a group of senior clinical and social service staff met to discuss the development of older people's services in the locality. Several members had knowledge of telecare and formed a project steering group to consider how it might be used. In October 2000 a project proposal was developed with funds the local health authority had available for stimulating the development of telemedicine and telecare in the area. The proposal envisaged that the first patients would be recruited by April 2001, following a three month set up, staff training and testing period.

A project manager was appointed in February 2001, and an early task involved bringing together local care teams. According to the project manager, 'reluctant consent' for Columba had been achieved by summer 2001. However, there remained concern about the perceived additional workload and an initial

unwillingness to commit any money to the project. By October 2001 a revised project plan had been published. This proposed the completion of the rehabilitation unit by January 2002 and recruitment of the first patients by September 2002.

During the first half of 2002 the service specification and care process flowchart were developed. The last stakeholder to be brought into the project was the local community alarm service², in early 2002, but expenditure for upgrading its system to accommodate telecare sensors was not sanctioned until mid 2002. Another problem was that this phase in Columba's development coincided with a major national restructuring of health and social care services. The project manager suggested that it was 'very hard to engage anybody during this period' and later left the project in July 2002. Nevertheless, at this point she was confident that Columba would formally begin its service as planned in September as planned. However, further delays occurred during the autumn when workshops for staff involved with the service were organised and Columba finally opened in January 2003. Initially, there were severe problems in recruiting appropriate patients. These were overcome partly by the appointment of a 'project co-ordinator'. Throughout 2003 awareness of Columba grew amongst local care staff and by April 2004 twenty two people had been through the scheme³. Variants of the Columba scheme are now being introduced across the county.

² The community alarm service provides a basic monitoring and response system for vulnerable individuals and currently serves about 1.5m people in the UK as a whole.

³ Evaluation of Columba's impact on patient outcomes and care process is continuing. Patients are tracked for 26 weeks after leaving the rehabilitation unit and at the time of writing, nine had

Case study 2: home COPD monitoring and response

The second case study involves a telecare service aimed specifically at supporting patients suffering from COPD. The proposed project was also located in north west Surrey and there was some overlap in personnel with the Columba scheme. The project was designed to allow patients to remain in their home and through regular monitoring⁴ predict and intervene during the early onset of acute exacerbations of their disease. Through this, it was also felt that earlier discharge of those who are admitted to hospital could be achieved.

The project's origins lay partly in a UK government funded programme to apply the expertise of the former defence research agency (now privatised as technology company Qinetiq) in civilian applications. This programme included funding for several telemedicine and telecare projects. Following discussions with members of the local hospital and mutual contacts with an interest in telemedicine and telecare, a plan for a telecare trial with a clinical focus on COPD emerged in September 2000. It took a further twelve months to develop the project and secure funding from the local health authority, with Qinetiq playing the role of de facto project manager, as well as developing software for

been able to return to their own homes and seven to sheltered accommodation. Fifteen patients had been shown to have made a short or long term improvement to their condition. In general, care staff felt that rehabilitation had helped to rebuild patients' confidence to live independently. The potential availability of telecare as a risk management tool was felt by staff to have widened the options for accommodation and contributed towards the process of confidence building.

⁴ The project aimed to make use of already available technology designed to collect daily measurements of pulse oximetry, weight and other vital signs. This was to be backed up by continuous ambulatory monitoring of SpO₂ and ECG for one or more 24 hour period every two weeks during the trial phase.

the monitoring protocols. At this point, a formal project manager was appointed. The health services company Nestor was also brought in at this point to provide the patient monitoring, using one of its medical call centres. By December 2001 fifty four patients had been identified and the trial service began. This carried on until April 2002.

In this project care was taken in the setup phase by Qinetiq to develop a shared understanding of the project's aims and objectives among the different organisations involved. This was explicitly informed by concepts from De Wit and Meyer (1998), Wooldridge and Floyd (1989) and Mintzberg and Waters (1985) and focused on the development of a strategic consensus between stakeholders in relation to strategy, style, structure and superordinate goals. Through workshops and meetings, a number of task related lessons were identified. These included the need for clear objectives and expectations and the need to create capacity for change. Qinetiq also identified process related lessons, including the importance of leadership, trust building and avoidance of 'blame' and 'not-invented-here' culture, and the need for commitment and critique.

Operationally, the COPD monitoring service proved successful in terms of patient satisfaction (the daily phone call was regarded as beneficial by patients and monitoring was felt to have improved self care). No technology related problems were reported. The team were unable to conduct a detailed cost / benefit evaluation of the trial, but an independent study reported estimated a

c.50% decrease in hospital admission rates (Dale et al, 2003). Despite its perceived success, Qinetiq's withdrew in April 2002 and Nestor's involvement was ended for reasons of cost. Initially NHS Direct were brought in to take over the monitoring service, but this proved impractical, and the trial was discontinued.

Discussion

We have outlined above how existing research on telemedicine implementation, on the adoption of medical technologies and on technology-based innovation in service industries has highlighted some possible influences on the implementation telecare. We have also suggested that the complexity of care delivery makes careful project management particularly important during the project conception, design and implementation phases, and later, during the initial stages of operation. We will now discuss the relative importance of these factors in influencing implementation outcomes in each case study. The main points of the following discussion are summarised in table 1.

Table 1. Summary of potential explanatory factors in each case study

A fundamental problem observed in both the Columba and COPD projects was the absence of a clear set of users who expressed a demand for the service and were able to drive it forwards during the initial project phases. The COPD project arose because a coincidence of interests – Qinetiq had funding available

and a local clinician had knowledge of telecare – rather than a specific need identified within local policy. According to one interviewee, the project was largely ‘designed around the budget.’ In Columba, representatives from health and social services were involved from the outset, but the project’s leadership was never formalised. It was never made explicit which organisation held overall responsibility and several individuals claimed to be project ‘champions’. The lack of an obvious champion added to the confusion over funding responsibilities. Funding was required from both health and social care, but in the case of the latter, according to one interviewee, ‘(t)here had been an early verbal commitment by social care ... but there was no discussion with senior managers to pin this down.’

Another major issue, common to both cases, was the impact of changes to the *organisational and policy context* within which the projects were situated. Both were being developed and implemented at a time of major changes to the structures responsible for funding and delivering care provision in the UK. The replacement of the local community health trust by a primary care trust and the restructuring of social services compounded the ownership problems surrounding Columba, and led to further confusion over funding responsibilities. This also meant there was considerable turnover of personnel, ensuring that it was necessary to ‘... keep selling (the project) and pushing it up the political agenda’, as an interviewee put it. This was less of an issue in the COPD project, where the goals were less ambitious, the target group more clearly defined and the care pathways were simpler and involved a smaller number of

stakeholders from across the care system. However, here the coincidence of the announcement of the National Programme for IT (NPfIT, a complete modernisation of the IT infrastructure for healthcare in the UK) and the COPD project appears to have limited its prospects for further development. This is because none of the three hospitals potentially involved in a scaled-up COPD service are prepared to invest in an electronic record-keeping system for its patients until there is clarity over the preferred regional NPfIT supplier.

A specific issue raised by researchers on the deployment of telemedicine is the extent to which projects take place in a context where there is a *local supporting framework*, with agreed operational protocols and procedures, and knowledge of telecare and its potential. Since both projects were located in the same geographical and administrative area, both suffered from the same lack of support and limited local knowledge. In the case of Columba, however, it became clear during the detailed planning stage that the project would only work if care staff had the necessary awareness and appropriate skills. For this reason, a unit was established in a local hospital to demonstrate what the technology could do and act as a focus for training health and social care professionals. Workshops and training days were held for various stakeholders, which helped to establish operational protocols.

A major problem experience in both the projects, however, was the disruptive effect on the existing activities of staff involved. The time available for project conception design, planning and implementation was severely constrained

because staff – including the project manager in the case of Columba – had to fit project meetings around their day-to-day duties. It was common to hold meetings during the lunch break, for example.

The similarities in the approach to *project management* in each case also need to be highlighted. In both Columba and COPD, the project manager was not provided with sufficient authority to make and follow through planning and implementation decisions. The role of the project manager in each case was poorly defined. In the COPD example, while the tasks included bringing different care agencies together, much of the job was spent identifying and interviewing potential patients, i.e. involvement in the actual operation of the scheme. And in Columba, for considerable periods during the planning and implementation stages there was no project manager at all, although a dedicated operational manager was appointed once the scheme began (see above).

There were, however, important differences between the Columba and COPD schemes in other areas identified as important for supporting innovation: *project complexity*, the *demand* for the service and understanding of *user needs*, and the *evidence* forming the basis for the proposed innovation.

The COPD project was relatively simple in its objectives and architecture. The target group had a specific condition rather than general frailty and fewer stakeholders were involved. In contrast, because of its focus on post-hospital rehabilitation of very frail elderly people, the existing care process prior to the

development of Columba was already very complex. A large number of teams from health, social services and the voluntary and private sectors were involved. All met similar, but slightly different needs. Teams had overlapping skills and job specifications and only interacted with each other peripherally. No one group had an overview of the entire process. Because of concern over possible problems in integrating Columba in the event of the trial's success, it was decided during the planning stage not to create a new stand-alone 'Columba team', but to involve established teams. This, however, meant that it was extremely difficult to identify and enrol all the necessary stakeholders and develop shared care protocols. Enrolment continued incrementally throughout the planning period as information about the project was diffused locally and operational procedures began to be developed. Eventually there were six distinct groups involved in the scheme at an operational level, drawn from the hospital, housing and social services. Briefing meetings had to be held with over sixty staff. Mapping and agreeing operational procedures and structures was therefore extremely complex – this task was originally planned to take about four months but was not completed until eleven months after the scheduled completion date.

Associated with the higher degree of complexity in Columba were initial problems arising from differing *organisational cultures* between the various stakeholders. This does not seem to have been as much of an issue in the COPD case, because it was relatively self-contained and did not involve social services. For Columba, though, the move to a community based care model

appears to have exposed differences in approach to client risk management, especially between health and social services. Clinicians tended to view the hospital and other institutional settings as environments where patients could be 'looked after' and their safety ensured. Social service personnel weighed the risk associated with discharge options differently, tending towards a perspective that emphasised rehabilitation, 're-enablement' and the promotion of independence. The differing approaches to hospital discharge assessment – arising from varying attitudes to risk management – were a significant factor behind the time taken to agree operational procedures.

There were also differences between Columba and COPD in the *demand* for the service. At a general level there was clearly a need for services to both support people with COPD and meet the needs of a rising elderly population. COPD is a widespread, and increasing, problem, both in the UK and elsewhere (Egger et al, 2000). The condition has a major impact on healthcare services – in the UK as a whole between 3 and 4 million COPD exacerbation episodes a year occur (Dale et al, 2003), particularly during winter when the demand for hospital inpatient beds is greatest (Rees, 2001). And Columba met a set of general local policy objectives for older people's care: the *Surrey Community Care Plan* (May 1999) highlighted both the need for shorter, more intensive forms of care to promote independence and the role of assisted rehabilitation in the community in reducing the reliance on hospital care. Another policy document (*Information for Health LIS Programme*, published March 2000) identified the need for intermediate care facilities.

However, the client group for Columba was diverse and experienced a much wider range of needs than the COPD group. The potential demand for a service that discharges patients to the community via a rehabilitation facility was unclear. This question had been raised in May 2001 at a meeting for care teams, where it was agreed there needed to be more clarity over the target group and clinicians had raised the possibility of extending Columba from hospital discharge cases to those living in the community in order to capture a wider group of users. This was not pursued because it was felt the scheme might be overwhelmed by demand. The fears over Columba's restricted market appear to have been borne out. Several of those interviewed during the initial operational phase argued there was an intrinsic lack of demand for the service because people returning from hospital prefer to be rehabilitated within their own homes rather than spending time in intermediate care. Several interviewees suggested that the scheme's focus should now be reoriented to provide care within people's homes directly from the point of discharge.

The possible tension between the desire of policy makers for modernisation of healthcare services and the requirement of practitioners for *evidence* of effectiveness was discussed above. Since telecare frequently supports people with a variety of progressively deteriorating conditions or is preventative in its objectives, measuring outcomes is difficult. In both the case studies – as in the majority of telecare trials – there was therefore a paucity of high quality empirical evidence for the possible benefits of the proposed intervention. In the

COPD example, however, not only is early intervention recognised as beneficial for the long-term patient outcomes (Anto et al, 2001; Petty, 1993; Calverley, 2000), but home care has been shown to be an alternative to emergency admission for patients with acute exacerbations and also to be clinically effective in randomised control trials (Davies et al, 2000; Connor et al, 2002; Cotton et al, 2000). Furthermore, Nestor had already been involved in simple home monitoring trials.

For Columba, while evidence for the benefits of conventional intermediate care schemes (i.e. excluding telecare) is growing (Hyde et al, 2000; Campbell et al, 2001; Mountain, 2001; Steiner et al, 2001; Wilson et al, 1999), it is by no means unambiguous. Research has been made difficult by the variety of models for intermediate care and the organisational complexity of such services (Vaughan and Lathlean, 1999). As we have noted, there were no other schemes that had the same components – intermediate care with intensive rehabilitation, followed by telecare.

Arguably, therefore, the COPD project was sanctioned on the basis of stronger evidence for its potential efficacy than Columba.

Conclusions

Our case studies of two telecare schemes illustrate how a combination of complexity in local care service delivery and the evolving policy context

influenced both the planning and implementation of an innovation. During the implementation phase of each the external environment underwent significant changes: primary care delivery was fundamentally reorganised with the introduction of primary care trusts, the social services department was reorganised and – with particular relevance for the COPD project – a programme to establish a national care record system was announced.

Within this dynamic organisational environment it proved hard for the project managers to identify all the relevant stakeholders and their motivations and needs during initial planning stages. It was also hard to identify potential users from the care services to drive the projects forward, partly because of the multiplicity of potential stakeholders. This hampered planning and implementation by diverting attention, time and focus. Broadly, therefore, while the nature of the particular project determines the number and type of stakeholders that need to be involved, the various factors discussed earlier in the paper – notably project complexity, integration requirements and organisational support – represent a contextual environment that may make it more or less difficult to engage different stakeholders.

The complexity of the proposed service *on its own*, does not, however, appear to have been a significant factor behind relative implementation success in these cases. Both the Columba and COPD projects were targeted at people with high levels of dependency and therefore required careful integration with the care system as a whole. Nevertheless, despite Columba's more complex

ambitions, it was delivered and is now developing into a more mainstream service. The differences in success between the two projects seem to arise largely from the approach to project planning and implementation during the pilot phase and the implications of this for migration to a mainstream service. With Columba it was decided to use established teams and individuals in order to avoid future problems in mainstreaming the service. This was highly resource-intensive, but ultimately successful. In contrast, the COPD scheme involved an equally lengthy project development phase, but it was not possible to include all the potential stakeholders. This meant that opportunities for involving key partners were lost during the design phases, in part leading to problems in developing a service that could be widely implemented once the trial had ended.

A distinction needs to be made between the engagement of stakeholders involved at a *strategic* level and those involved at an *operational*, 'frontline' level. Stakeholder involvement is particularly important in innovative care delivery projects because of the degree of autonomy in decision making held by care professionals and the amount of coordination which is required between different care professionals and services. Health and social care services involve diverse staff from differing organisations, possessing differing cultures and values. These need to be closely involved if pilot projects are to be integrated into mainstream service delivery. However, attention to aligning interests at a strategic level – as in the COPD case – is in itself insufficient because senior clinical and managerial staff will not necessarily bring frontline

staff on board, in part due to their autonomy and discretion over care decision making. In our assessment, therefore, the crucial success factor for projects of this type is the involvement of frontline service personnel in the planning and implementation process from the early stages of project development.

Achieving this requires careful project management, as suggested by the experiences in the Columba and COPD projects. The role of the project manager in this environment should be to focus especially on helping frontline project participants to develop a collective understanding of the project and build trust at operational level. This may require the particular 'sense-making' skills, described above, which might be in scarce supply. We noted above how it is not always clear who the stakeholders and that their role within a project may be influenced by their competencies. Careful project management can help to compensate for deficiencies in knowledge and/or competencies, but the experience of Columba demonstrates how investment in education and training is also required. Here, considerable efforts were made to develop a framework, including a demonstration facility, to help to diffuse knowledge and bring together different stakeholders. In the case of telemedicine, Werner and Karnieli (2003) have also identified importance of educational interventions targeting potential users' attitudes, and feelings of uneasiness and anxiety about technology.

Another role for project management is to help integrate the new service into the existing service delivery system. The case studies suggest, however, that

this must involve mediation between resources devoted to project conception, design/planning, implementation and operation on the one hand and maintenance of existing routines and duties within the organisation(s) on the other. In this regard the experience with the two telecare projects mirrors some of the more general lessons on the impact of project-focused modes of organisation and management techniques on more routine organisational practices (cf. Prencipe and Tell, 2002). The requirements for successful project management in the different phases (planning, early operational phase) thus vary. Different approaches to project management, and probably different personnel, are therefore likely to be needed at the implementation and operational stages compared to the earlier stages.

In the introduction we argued that research seeking to evaluate the impact of health service delivery innovation is complicated by difficulties in defining and restricting its boundaries. The conventional approach is therefore to emphasise the context for the innovation. This is demonstrated in the telecare case studies, which shed light on the relationship between project development and implementation processes and the wider organisational context within which they are located. Comparison between the two projects highlights the relationships between project management characteristics (abilities and stakeholder involvement), project characteristics (complexity, integration requirements) and organisational support and politics (drivers for change in care services, differences in stakeholders' cultures and values) in shaping the planning and implementation paths.

It should be stressed that the changes of this organisational environment limit the generalisability of the research presented here⁵. It is particularly important not to overplay the impact of restraining effects of culture or institutions.

Individuals made a difference in each case, partly through their knowledge of and enthusiasm for telecare, which drove the projects forwards initially, and in the Columba example in helping to embed and diffuse the new practices more widely. The importance of individuals – a ‘situational’ perspective on organisational change – has, of course, been widely emphasised (e.g. Beer and Eisenstat, 1996; Orlikowski, 1996). The immaturity of telecare means, however, that more basic research is needed to gather empirical material on its implementation. Only then will it be possible to develop better models of the relationships between inputs and outcomes of telecare-based care service innovation.

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⁵ Although a similar pattern was also observed in an unpublished evaluation study of twelve other telecare schemes in the UK, carried out for the Department of Health by the authors.

Figure 1. Features of a telecare service

Source: Barlow et al (2004a)

Table 1. Summary of potential explanatory factors in each case study

Influence on telecare planning and implementation	Columba	COPD
<i>Organisational context</i>	Development / implementation was parallel to major restructuring of care provision – confusion over funding responsibilities and turnover of personnel	As for Columba, plus post- trial phase occurred when national IT programme was under development – hence unwillingness to expand the service without clarity over preferred IT suppliers
<i>User needs and demand</i>	Unclear – generalised need and ageing population, but no knowledge of likely system-wide demand	Clearly defined target population with specific need
<i>Project complexity</i>	Wide variety of possible care options, large number of stakeholders and interfaces between them	Care pathways simpler and involved fewer stakeholders from across the care system
<i>The local framework for support</i>	Absence of a clear lead user and/or policy sponsor during initial project phases Project manager not provided with clear role and authority Limited local knowledge of telecare,	Absence of a clear lead user and/or policy sponsor during initial project phases Project manager not provided with clear role and authority Limited local knowledge of

	hence education and training for stakeholders put in place	telecare, but no education and training process
<i>Evidence of potential effectiveness</i>	Growing evidence for intermediate care, but not telecare enhanced intermediate care	Evidence for effectiveness of home COPD care

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