Studying the Translations of NHSnet

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This paper explores the ways in which innovative information systems projects take on a life of their own. The paper begins by reviewing some of the more traditional ways of making sense of this phenomenon: resistance to change, escalation and unintended results, before introducing the sociology of translation. This provides a theoretical framework for viewing the transformations that an information systems project undergoes. The framework is then applied to the case of the NHSnet project in the United Kingdom. Using the language of sociology of translation, we consider the underlying stakeholder relations in the case study and draw more general conclusions for the responsibilities of stakeholders involved in an information systems lifecycle.

INTRODUCTION

Few information systems projects follow a straightforward path from initial idea through to widely used working system. Instead, what typically occurs is that the nature of the innovation and the purpose of the project changes many times during the implementation process. Much information systems research attempts to try to explain what goes on over the life of the project. The purpose of this paper is to add one new element to the range of conceptual tools available to the information systems researcher trying to understand what happens to a particular innovation and to demonstrate how the insights from using this tool can add to our understanding of information systems implementation.

The paper begins by reviewing some of the main ways in which the changes that an information systems project undergoes have been conceptualised. These include unintended effects; resistance to change and escalation. The paper then introduces the notion of translation that has been used in the field of science studies and shows how it can be applied to the study of information systems, paying particular attention to the particular kinds of translations that an information systems project can undergo. The paper then presents the case study, namely the introduction of a new shared network in the UK national health service (NHSnet). This project is seen as a series of translations and the paper explores some of the main translations and discusses their implications for relevant stakeholders. The paper ends with a summary and discussion of the benefits of using this approach to analyse the "life" of information systems projects.

UNDERSTANDING THE LIFE OF A PROJECT

There are many different ways in which information systems researchers have tried to conceptualise the life of a project. One approach is to describe the events associated with a project and to talk about them in terms of anticipated, unanticipated and emergent changes. Another approach is to talk about the changes in terms of resistance to change and the mechanisms that can be used to counter the implementation of the system. A third approach is to consider the project as potentially escalating out of control.

Unanticipated Changes

Orlikowski (1996) describes an organisation introducing Lotus Notes as a groupware solution for a firm in the software industry. The firm, pseudonymously known as Zeta Corporation, is the developer of a range of powerful software products in the area of decision support and executive information. Their tools are based around the Omni fourth generation language and allow users considerable flexibility in how to analyse their data. As a consequence, many users have technical queries about how to make the products perform particular tasks. The groupware system was introduced into the product support area to enable the sharing of information about problems between the support team (Orlikowski, 1996, pp. 25–27).

The organisation had previously used a stand-alone system to store details about client problems. The existing system had limitations in terms of inconsistent usage, poor data quality and limited search capabilities. The intention behind the new system was to pool all the data in one, shared system. Thus advisors would be able to draw on the experi-

ences of all previous interactions, rather than just their own. As an illustration of the success of this, the number of records of client problems in the database grew from 4,000 records to 35,000 in the two years from December 1992. As Orlikowski notes, however, the system was successful, in part, because of the particularly cooperative culture in the department. Thus, if the same technology had been introduced into an organisation with a less cooperative culture, it is unlikely that a similar success would have been noted.

In describing the changes that arose as a result of the system, Orlikowski differentiates between anticipated changes, opportunistic changes (which are not anticipated ahead of time, but are introduced purposefully as a result of an unexpected opportunity or event) and emergent changes which arise spontaneously out of local innovation. An example of an anticipated change arising from the system was the ability of managers to control the resources in the department more easily; by being able to monitor the number of calls they were able dynamically to change the allocation of work. An opportunistic change that arose from this was the decision to introduce the role of support partners who had specialist knowledge and who could support less experienced staff who handled the front line of calls. An unanticipated consequence was the way in which these front-line staff dealt with their new support partners. The organisation discovered that many junior specialists were reluctant to reassign calls to their support partners; often they felt that tackling difficult problems would help them to develop their own careers whereas on other occasions, the reluctance arose from a concern not to be seen to be dumping problems on their support partners.

Unfortunately, Orlikowski's analysis goes no further than differentiating between the three types of change. No explanation is given for why emergent changes arise, how they could be prepared for and how they can be controlled.

Resistance to Change

A second way of conceptualising the changes that a project undergoes is through the notion of resistance to change. This is perhaps best typified by the classic paper by Keen (1981) which outlines a variety of approaches which have been used to counter the implementation of a new information system. Amongst the counter-implementation games identified by Keen are *easy money, budget* and *territory* whereby a project is supported because it can be used to support some needed activity within the player's sphere of influence (p. 29). Another game is *tenacity* whereby a project is kept incomplete until one's particular terms are satisfied. *Odd man out* is used by players who give only partial support and withdraw when the project faces trouble (p. 29). Other games identified by Keen include *up for grabs* where a project with only lukewarm support is taken up by another player; *reputation* whereby a manager gets credit for being a bold innovator but leaves the project before the implementation

stage and hence avoids any backlash arising from any problems that exist (pp. 29-30).

Thus, according to Keen, a project is under constant threat of counter-implementation and management must be prepared to take counter-counter implementation measures to ensure that the project succeeds. A similar argument is put forward by Markus (1983) who highlights the political aspects of any system implementation, seen from a perspective which emphasizes the effects of the interaction between the people and the systems.

Escalation

A third approach to understanding the phenomenon is through the notion of escalation. Keil (1995) defines escalation as a continued commitment in the face of negative information about prior resource allocations coupled with uncertainty surrounding the likelihood of goal attainment.

In order to study the factors that can lead to escalation, Keil describes the experiences that CompuSys (a pseudonym) had with a project called Config. Config was a rule based expert system that was designed to help the company's sales force produced error-free configurations prior to producing pricing estimates. Previously the company had made estimates based on incorrect configurations and had to bear the cost of any discrepancies itself. The organisation had had positive experience of another system (Verifier) which was used to produce correct system configurations and was therefore expecting that this project would be successful as well. The Config project was finally terminated 13 years after it was initiated. During this time, feedback about the project was predominantly negative. Eight years after the project was initiated, usage of the system had dropped to less than 2% of all transactions.

A number of explanations were given for the continued support of the project in the face of such negative assessments. Amongst the key arguments identified by Keil are the fact that the project was perceived to have a large net present value, that the project was regarded as an investment in research and development and that the problems appeared to be temporary setbacks rather than fundamental problems of concept.

Moreover, the organisation had a history of successful projects in this area, and the manager of the project was taking a high degree of responsibility for the success of the project. Indeed, Keil argues that the involvement of the strong project champion meant that the project was defended at times when it might legitimately have been cancelled.

Summary

Clearly there is overlap between each of these approaches; for example, what one sees as an unanticipated change could be viewed by another as an attempt at counter-implementation. This again could be seen by another as a project that is potentially escalating out of control. What all

these approaches implicitly share, however, is a feeling that these occurrences are undesirable and avoidable. In contrast to this view, the next section presents an approach which takes it for granted that a project is likely to be changed over its life time and instead tries to understand the ways in which these changes come about. With this understanding it is possible to add a managerial agenda that can try to minimise these changes but the approach still accepts that even then, success is not guaranteed.

THE SOCIOLOGY OF TRANSLATION

The sociology of translation has its origins in social studies of science and the question of how statements come to become facts. Ignoring questions of ontology and epistemology (Searle, 1999; Sokal & Bricmont, 1998) a statement only becomes a fact when other people use it. A scientist may discover some phenomenon in nature but this will only become a fact when it is accepted as such by others (Latour, 1987). Clearly there are important questions about how others come to accept the statement as a fact which are not easily answered (for an appreciation of the complexities here, see Barnes et al. (1996); Collins and Pinch (1993); Biagioli (1999); Fuchs (1992)) but the social process whereby statements become transformed into facts is also important and has direct parallels with the way in which innovations come to be accepted within an organisation.

As Latour puts it: "(A) sentence may be made more of a fact or more of an artefact depending on how it is inserted into other sentences. *By itself a given sentence is neither a fact nor a fiction; it is made so by others, later on*. You make it more of a fact if you insert it as a closed, obvious, firm and packaged premise leading to some other less closed, less obvious, less firm and less united consequence" (1987 p. 25). Thus, the creation of facts is very much a collective process. If a statement is made that solves an on-going dilemma but no one reads it then it is as if it has never been made. "Fact construction is so much a collective process that an isolated person builds only dreams, claims and feelings, not facts" (1987, p. 41).

The issue, therefore, becomes one of making other people take up the statement and use it and there are direct parallels for the case of an innovation. An innovation only succeeds if other people can be convinced to make use of the new system. Unfortunately, there is *no* guarantee that the people will take up the fact or innovation nor that they will use it in the way intended. The innovators must therefore act at a distance (Miller, 1992) to achieve two potentially conflicting ends; they must enroll others so that they participate in the use of the innovation and they must control their behaviours in order to make their actions predictable and commensurate with the intentions of the innovator (Latour, 1987, p. 108).

The case of information systems innovations is made even more complex by the fact that the individuals who sponsor a new system are often very different from those who develop it, who are again different from those who will use the resulting system. The question of whose innovation it is, in these cases, is particularly complex. It is common to find project sponsors trying to convince the users of the benefits of a new system and then the developers trying to reconvince them of the benefits of the particular system they have ended up delivering.

For the innovator to be successful, therefore, two goals must be achieved, or more accurately, the observer must be able to see the actions of the innovator as matching these goals –it is always possible that this is not actually what the innovator intended. First the interests of the other actors must be translated into interests that match that of the innovator and then the other actors must be kept in line and under control.

The first activity, of translating interests, can be done in a number of ways, including the situation where the interests of the other actors already matches those of the innovator ("Here is a system that addresses the concerns you have"). Thus developers provide a system that is intended to address the concerns of a particular user group; experience has shown that such a straightforward solution is unlikely. Another situation arises where the innovator tries to persuade the other actors that they should want the solution proposed ("You should use this system"). The innovator may persuade the other actors that they have a problem and that the innovation provides a solution to that problem. This persuasion may require the users to redefine their identity. For example, the developers of video recorders had to persuade television viewers that they were not just people who missed a TV programme, but that this was an avoidable problem. If they chose to use a videorecorder, they could cease being people who missed their favourite programmes and instead be people who had the opportunity to organise their lives more flexibly as they could always record programmes when they were out.

Again, such situations are uncommon; a more likely scenario is where the other actors can be persuaded to adopt a new innovation that is almost like what they want ("It does most of what you want, so why not make use of it"). Thus they can take up the innovation if they only have to change their identity slightly rather than fundamentally. Another approach is to reshuffle the interests of the other actors, to make them more amenable to the innovation. This can be done by displacing the goals of the other actors: if they don't appear to have a problem then why not create a problem for them (for which you have the solution, of course), or by creating new goals for them and then becoming indispensable for the solution (Latour, 1987, pp. 108-121).

There are obvious parallels here with some of Keen's strategies of counter-implementation outlined above. For example, the easy money, budget and territory games are used by people who are trying to translate the interests of the original project to meet their own ends. Similarly, the up–for–grabs game translates a lukewarm project into the goals of the counter-implementer.

The Config case demonstrates how the various ways in which the project was translated over the life of the system. What began as a system which was designed to provide support for the sales force by enabling them to produce accurate quotations was, at various times, a project which existed because of its potentially huge financial potential, a project that represented a major investment in research and development and hence would provide the experience for future developments, and a project that was closely allied to the reputation of its manager. In each case, the project was translated from its initial intentions and adopted by new people for different reasons, changing the shape of the system substantially.

Having translated the goals of the actors to match those of the innovation, the next stage is to maintain the innovation on the path that it has set up. Here it is important to realise that the control over the innovation is only as strong as its weakest link. For example, a project may have been initialised and may have the support of a senior manager. If this manager leaves the position of support, then the control of the project may be weakened. The reverse situation occurred in the Config case, where the presence of the project champion kept the project going long beyond its feasibility.

The problems of maintaining control and remaining indispensable are also apparent in the case of the "unexpected changes" in the groupware project at Zeta corporation. The unanticipated (as opposed to emergent) changes arise when control cannot be maintained at a distance. Thus, the introduction of the system limited the control that the organisation could have on its front line help staff. They were able to control their jobs by separating out tasks to front line and support partners. They were unable, however, to control how these front line staff undertook their work. Zeta was unable to stop these people from translating their work into their own ends (i.e., they didn't transfer calls to their support partner in part because they didn't want to be seen to be ineffective operators as this would affect their career development plans). However, what they could do is revise their own behaviour (e.g., revise the reward schemes) in order to encourage (or coerce) operators to work as management envisaged. An interesting aspect of the Zeta case was the constant circle of translation, whereby the behaviour of one group had an impact on the behaviour and perceptions of the other.

VIEWING THE TRANSLATIONS IN AN INFORMATION SYSTEMS PROJECT

If we accept that information systems projects are likely to undergo a series of translations over the life of the project, we now have a useful technique for viewing the life of an information systems project and understanding what happens to it. The technique involves viewing the project over its life and identifying the various translations it undergoes. At each of these translations we are now able to determine the kind of translation that is undergone, the reasons for the translation and the effects of each translation.

This approach focuses on particular events and it may be necessary to investigate the context of each of the translations in more detail. This technique will now be used to describe the life of a project in the UK National Health Service (NHS) associated with networking the various actors into an integrated NHSnet.

Background to the NHSnet Case Study

The Information Management Group of the NHS Executive, the body responsible for the execution of health care policy in Britain (NHS Executive, 1997b), launched the NHS-wide networking project in 1993, as "an integrated approach to interorganisational communications within the NHS" (NHS Executive, 1994 p. 6). The objective of the project has been to enhance communication and information exchange between various healthcare providers and administrators. Therefore it has been intended as a response to a number of problems experienced in NHS communications. Such problems include inefficient purchasing, lack of integration, fragmented networks, limited future potential, aging private radio systems, and insufficient resources (NHS Executive, 1994).

The NHSnet is expected to support data communications that cover a variety of information flows across different levels. At a *national level*, it will support messaging between health authorities and the NHS Central Register; at a *regional level*, it will support access to centralised data processing (finance, payroll, etc.); at a *local level*, it will support links between primary care doctors (GPs) and hospitals (for the exchange of pathology test results, referral/discharge details, waiting list inquiries), as well as between GPs and health authorities (NHS Executive, 1994). More generally, the NHSnet infrastructure is expected to cover a variety of business areas, including patient-related service delivery, patient-related administration, commissioning and contracting, information services, management-related flows, supplies of NHS organisations (NHS Executive, 1995). Future links across these areas will rely less on paper and telephone communication and increasingly on EDI and electronic mail messaging.

Since 1996, wide area networking services for data and voice have been available and can be purchased; the NHSnet is available. Yet, despite the technological success of the project, and in particular its completion within schedule, its implementation has suffered from the lack of acceptance by the medical profession. Doctors remain sceptical of the security of this network. Their concerns have been overtly voiced, primarily through the British Medical Association (BMA), the national professional body of physicians in the United Kingdom, but also by their computer security consultants. These parties fear that patient data may be misused by both NHS members and external parties (Willcox, 1995); Pouloudi & Whitley, 2000; (Pouloudi, 1998).

At the moment, although the network is used for administrative and purchasing purposes, its use falls well behind the initial NHS Executive plans which perceived the exchange of patient information as an important implementation objective.

Translations in NHSnet

The NHSnet presents an interesting case of an actor-network that has undergone a series of translations. These translations were noted by recording the viewpoints of the stakeholders of the network (Pouloudi, 1998), those who participate, influence or are affected by it, and are following the network over time, using it where possible to promote their interests, or the interests of the stakeholders that they claim to represent. These stakeholders were identified using the iterative method suggested in Pouloudi and Whitley (1997). The following paragraphs present the problems in the implementation of the system and break these down in a series of translations that the project has undergone.

Although the NHS Executive had piloted the project with doctors at an early stage, it was only after the network started being implemented and adopted at the local level that the doctors, through their representative body, the British Medical Association (BMA), reacted to the use of the network, arguing that it did not safeguard the privacy of medical information. Further concerns were raised when they were expected to have to pay for the service, even though the technological infrastructure was considered dated and unreliable. As a result of their concern, doctors have threatened not to participate in the electronic exchange of data unless they can be convinced that the privacy of patient data is safeguarded. Yet, the NHS Executive have argued that the proposed system is better than its predecessors, *ad hoc* manual and electronic exchange systems: data confidentiality was quoted as one of the shortcomings of the previous situation and one that the NHS-wide networking infrastructure would safeguard (NHS Executive, 1994).

The 1996 conference in Healthcare Computing (18-20 March 1996, Harrogate, UK) provided the opportunity for a direct confrontation of the two sides on the matter:

> The measures we have put in place are to stop anybody who is unauthorised getting at data from, and via, the [NHS-wide networking] system, and one of the key parts of that system is a strong authentication challenge (Ray Rogers, then Executive Director, NHS Information Management Group).

The conflict has since slightly receded since the NHS adopted the BMA's suggestion to encrypt data, published a report on data encryption (NHS Executive, 1996), and thus improved the chances of cooperation on data security with the BMA (Creasey, 1996). Given the advantages of electronic exchange of healthcare data, there has been a general optimism that the NHSnet will be used and the debate will be resolved in a way that leaves both of the currently conflicting parties satisfied.

Underlying the confidentiality debate, the most visible conflict in the NHSnet case system's implementation, we can distinguish three interesting changes in the nature of the NHS-wide networking project as the various stakeholders understand or present the network from different perspectives in order to serve their interests.

Translation 1

First, the debate of the BMA and the Information Management Group on confidentiality has translated the network from *a technical system* (a network infrastructure to support information exchange in the NHS) into a system threatening the privacy of medical information, *an issue of confidentiality*. This issue has been at the heart of the debate because the doctors consider it as a key responsibility (and therefore part of the identity) of their profession. In response to this reaction, and in order to avoid the cost of another spectacular system failure in the NHS (cf. Beynon-Davies, 1995), the NHS Executive (and the government) have responded with a reconsideration of the security issue of the network. The "Zergo Report" (NHS Executive, 1996) proposed the use of encryption to safeguard the privacy of medical records. While the BMA debated which encryption algorithm would satisfy the NHS needs best, it is clear that as a result of this report, the NHS Executive has tried to translate the network, and the discussion about its adoption, back into a technical problem, that of encryption. Their suppliers have supported this view: "Firewall-to-firewall encryption could potentially act as an enhancement to NHSnet security and go some way to placating the BMA" (McCafferty, 1996). In order to face the challenge, the BMA has formed alliances with privacy activists (e.g., Privacy International) and academics on one hand, in order to raise the profile of the debate. On the other hand, they have created an alliance with security consultants, in order to challenge the technical features of the network as well (Pouloudi & Whitley, 2000). Following the debate, the NHS Executive has now made explicit its view of the NHSnet as a "secure national network" (NHS Executive, 1998a), effectively redefining the network.

Translation 2

The alliance between the BMA and security consultants resulted in the security consultant to the BMA at the time, Ross Anderson, becoming the spokesperson of the BMA on the NHSnet implementation:

> We have to take a long hard look at the IM&T strategy and rewrite it so that it is centred on clinical concerns rather than administrative concerns; so that it is oriented towards patients rather than administrators and optimised for the delivery of healthcare rather than as a means of enforcing bureaucratic power and control from the centre (Dr Ross Anderson, Security Advisor, BMA)

The debate about the capability of NHSnet to safeguard confidentiality has been most intense when Ross Anderson was acting as security consultant to the BMA and Ray Rogers

was Executive Director of the NHS Information Management Group. Both people considered the NHSnet as a key system: one that endangers the privacy of medical data or one that is part of a vision to modernise the NHS. To a certain extent, the debate was perceived as a personalised issue, perhaps as both people took ownership of the debate and saw the progress of the network as their 'mission'. Some statements reflected an almost personal rivalry (e.g., *British Journal of Healthcare Computing & information Management,* vol. 13, no. 3, 1996, p. 6). This was noted by those involved ("I regret that discussions between the Department [of Health] and the BMA have been conducted in such a public and fraught environment" (Rogers, 1996)) and by those reporting on the conflict ("that debate was not at all times marked by reason and moderation" (Fairey, 1998)).

Ray Rogers has since been replaced by Ann Harding in the Director's post of the Information Management Group. Subsequently the Group was also dissolved and a new NHS Information Authority established to provide effective guidance in the implementation of the NHS strategy (NHS Executive, 1998b). Ross Anderson, while still a privacy advocate, is no longer acting formally as a security consultant or spokesperson for the BMA. Interestingly, as neither of these previous protagonists of the confidentiality/security debate holds the same position at the moment, the nature of the debate on the NHSnet has changed again and became less intense.

Translation 3

At the same time the Information Management Group was disbanded, the NHS put forward a requirement for all computerised general practices to connect to the NHSnet by the end of December 1999. The NHSnet is now formally described as "the best medium for the transfer of clinical information" (NHS Executive, 1998b). It is not clear, however, whether the compulsory link of GPs to the network will be equivalent to using the network as envisaged by either the doctor community or the NHS Executive. In any case, the network has undergone another translation. Rather than being a system that doctors *will want to use* as originally intended, because it speeds up the delivery of healthcare, facilitates communication with their peers, or is more secure than the systems used previously, it is a network that *they are required to use and pay for*:

Why are we still being pressurised to join a network with such poor performance and functionality, run by people without any wish to deliver what "the users" want? (GP).

This is a translation that is common to information systems implementation, and often underlying resistance to change phenomena. In interorganisational systems in particular where the asymmetry of power between sponsor and adopters is often prominent (Cavaye, 1995), the importance of end-user requirements tend to become undermined by the sponsor's policy and priorities.

Translations in the Broader Context

Our discussion so far has looked at the network and those events that were directly related to its progress. However, these translations should be considered in light of a broader set of changes in the context, which can contribute to our understanding of the NHSnet translations. Because of the importance, the public and political character of the NHS and as a result of the government setting its strategic direction, changes in the political scene or legislation in the UK have a direct impact on the translations of the NHS.

The following list gives an indication of the political scene in a series of additional events and publications with direct impact on NHSnet:

May 1997	Labour government elected
	"In my contract with the people of Britain I promised that we would rebuild the NHS" (foreword by the Prime Minister in (Department of Health, 1997))
December 1997	• "The new NHS"
	"replaces internal market with integrated care" (Department of Health, 1997)
	• "Report on the review of patient-identifiable information" (Caldicott Committee Report)
	This report has been the result of the "increasing concern about the ways in which patient information is used in the NHS in England and Wales and the need to ensure that confidentiality is not undermined" (NHS Executive, 1997a)
	• White paper on Freedom of Information Act
	"to legislate for freedom of information, bringing about more open Government"
September 1998	Information for Health (NHS Executive, 1998b)
	"the Information Management Group will be disbanded and replaced with an NHS Information Authority to provide a lead for the new partnership development and to ensure effective guidance is given for successful delivery of the strategy"
	Deadline for computerised GPs to link to NHSnet: by the end of 1999
November 1998	New Data Protection Act
	Will enhance the protection afforded to patients

It is therefore evident that, as the NHSnet underwent a series of translations, so did the NHS, prompting, in turn, further changes for the network. Also, the membership of the UK in the European Union and the need to comply with legislation on data protection has implications for the translation of the confidentiality debate, especially for the attention given to particular issues and the way in which these are

'translated' in the NHSnet case. It is worth noting that the impact of each change cannot be considered in isolation. Each piece of legislation also undergoes a series of translations as a consequence of the diverse interests that stakeholders – at a European and national level – serve, or wish to be seen to serve.

FOUR MOMENTS OF TRANSLATION

The previous section illustrated some of the translations characterising the NHSnet. These are translations in its technology (Translation 1), in the personal roles of stakeholders (Translation 2), in mode of adoption for the system (Translation 3) as well as in the broader context. Although we have separated them out for the purposes of our analysis, these translations are closely intertwined, not least because stakeholders respond to the views and changes introduced and supported by others thus introducing new changes. The sociology of translation literature presents and explains the changes through 'four moments of translation' (Callon, 1986; Introna, 1997). It is worth noting that these 'moments' are witnessed, but cannot be neatly separated in the NHSnet case. This is because each stakeholder of the network and each related technology or piece of legislation that has an impact on the network goes through similar 'moments' at different points in time. The following paragraphs illustrate how these four moments have been witnessed in the NHSnet case implementation with supporting statements from various stakeholders.

Problematisation: an actor defines an 'obligatory passage point' (an actor network linked by discourses presenting the solution of a problem in terms of resources owned by the agent that proposes it (Callon, 1986; Latour, 1987)). In the NHSnet case, for example, the response of the NHS to confidentiality concerns with the publication of the Zergo report meant that encryption algorithms became at that point the obligatory way to discuss the confidentiality issue:

For the first time the NHS has a strong, total security package. How much more does the Department [of Health] have to do before the BMA acknowledges what a large step forward this package is, and supports what we have put in place? What else is there to do? (Ray Rogers, Executive Director of the Information Management Group at the time).

In the broader sense of this translation moment, we can consider the use of the NHSnet as the primary system for discussing information exchange in the NHS.

Intéressement: actors try to impede alliances that may challenge the legitimacy of the obligatory passage point (or, in the contrary form alliances to support it). In the NHSnet case, this has been evident in the rhetoric used by the NHS Executive to establish the credibility of the network:

The NHSnet is more secure than all the other networks that are out there and will continue to be used until we manage to replace them (Ray Rogers).

This perception was reinforced with the publication of the Zergo report, where, as we noted previously, the debate was translated to focus on the issue of which encryption algorithm would be appropriate for the needs of the NHS and the rights of the patients. Similarly, the formation of the Caldicott Committee obliged the BMA and its allied stakeholders to become less polemic to governmental proposals:

The Caldicott Committee failed to lay down hard and fast rules for patient confidentiality, but because it produced a list of 'good intentions' it certainly made it harder for BMA and other concerned organisations like DIN to continue to breathe fire and brimstone about matters. In this the commission probably served its purpose well. (Chairman of the Doctor's Independent Network).

Enrollment: bargaining and concession – alliances are consolidated. In the NHSnet, some of the stakeholders did not engage in the debate but formed instead an alliance with those stakeholders standing for their interests:

Each local medical committee decides whether it supports the BMA's position and, so far, each committee has universally supported the BMA's position on this to the point that there was no dissent and that's because confidentiality is so closely linked to the general practitioners' hearts really. (Secretary to a group of local medical committees).

Mobilisation: defining the legitimacy of a spokesperson. As the debate about the confidentiality of patient data has been almost monopolised by the NHS Information Management Group and the BMA, it is not surprising that some of the 'by-standing' stakeholders' perceptions about this debate reflected the acceptance (as in the view of the local medical committees above) or reservation about the role, real motivation and legitimacy of the protagonists:

The BMA are on one hand rendering a public service: making sure that patient confidentiality is maintained. But, on the other hand, something else may come out; the BMA will seek some pay-off for sharing information. Let's not forget that the BMA is essentially a trade union, representing the interests of doctors, but cannot be accused of doing so openly because they also have professional concerns for the patients (member of the NHS Central Communications Management Group).

Other stakeholders voice their concern from the absence of another appropriate –in their view–spokesperson:

There was one representative of a patient association at the meeting and I was appalled because they said the NHSnet was a good thing. We have a problem with these people. It is inconceivable that the BMA moved in this debate faster and made suggestions before the patients' associations even made a press release. This will come down as the major anomaly in history (Director General of Privacy International).

Following from this analysis which highlights better the tensions between stakeholder groups that underlie the translations of the network presented in the previous section, we

would argue that all stakeholder perceptions become important to our understanding of translations. Indeed, they are useful in illustrating changes in alliances, attitudes, expectations for the future. At the same time the translations have implications for the role and relationships of stakeholders as well. In the NHSnet case in particular, the translations have a direct impact on professionals and patients as they have to react to the changes and reconsider their relations with other participants in the healthcare delivery process.

IMPLICATIONS BEYOND THE NHSNET

This exploration of the stakeholders in the NHSnet project, their views on the network, and the ways in which they acted to translate the project to better match their own needs, allows us to raise some general issues from the paper. These are applicable to other healthcare applications, such as the GPNet in the UK, as well as other large information systems implementations.

In particular, the translations we have discussed signify for stakeholders a need to consider their role in the actor-network so that they can best promote their interests and safeguard their rights and do this in a way that doesn't shortcut *due process* (McMaster, Vidgen, & Wastell, 1998). The other side of the coin of course is that they also need to respect the rights of other stakeholders. Thus, treating others as legitimate stakeholders can be considered as part of being a responsible stakeholder. This view, in the information systems and management literature, is often limited to predefined notions of stakeholder roles (e.g., 'a manager should make decisions that serve the organisation' or 'an information systems developer should develop systems that are functional and useful to the user/customer'). Blyth (1998) defines responsibility as "a legal or moral obligation for bringing about, or maintaining, a certain state of affairs" (p. 259). Thus, responsibilities may be formal and institutionalised or informal and related to a stakeholder's set of values. Responsibilities can be prescribed, 'felt', taken up to avoid cost or punishment or they may be enabled by certain factors. Blyth, for example, notes that a responsibility also implies elements of accountability, liability, trustworthiness and blame (p. 259). However, the extent to which stakeholders are conscious or able to carry out these responsibilities may also be influenced by their interest, power or perceived legitimacy. The NHSnet case supports these different motivations for taking up a responsibility. Furthermore these motivations are interpreted differently depending on particular stakeholder perspectives.

Going a step further, stakeholders could interpret their stakeholder entity as an obligation to defend their values and interests, either directly or through some representative stakeholder. Direct involvement could signify participation in debates or meetings where their interests and values are discussed. In case of indirect participation, stakeholders have an obligation to contribute to any formal procedures for representation and criticise the representative bodies if they fail to represent the appropriate interests and values or if they fail to represent them appropriately (Pouloudi & Whitley, 2000). Thus, *the rights of stakeholders* (e.g., the right to participate, to be fairly represented, to be considered as a legitimate interested party) *can also be regarded as carrying an obligation for stakeholders to defend and honour these rights.*

This obligation of stakeholders will often need to be recognised by the stakeholder groups themselves rather than be expected or imposed by other stakeholders. This is a consequence of the problems relating to the asymmetry of information or other resources, access, power or perceived legitimacy and the diverse interests and values of stakeholders. If the responsibility of particular stakeholders to participate or otherwise act when their interests or values are at stake is institutionalised, less informed or less powerful stakeholders could find an inability to carry out their duties as stakeholders to be interpreted as a legitimate reason for other stakeholders to override their rights. Therefore there would be a danger of under-representation of some stakeholder interests.

Consequently, stakeholder responsibilities often need to be internalised by the stakeholder group. In practice this is common amongst certain professional bodies that consider themselves as a stakeholder group with a predominantly common set of values and interests. Healthcare professionals are a good example of such a stakeholder group as their fundamental professional responsibilities have remained essentially similar (hence the use of the Hippocratic Oath to this date). Stakeholder responsibilities may be more difficult to define for groups that have been formed more recently and whose representative bodies lack a well defined or a well understood identity by other stakeholder's identity. Clearly stakeholders who lack a group identity altogether, such as the patients rely more on their individual sense of moral responsibility and their perception of rights and responsibilities as a guide to their behaviour and their expectation from other stakeholders.

CONCLUSIONS

The NHSnet case shows that information technology has become part of the day-to-day practice of many healthcare professionals. Thus, they need to be aware of the capabilities and limitations of this technology, in particular to the extent that this may affect their professional responsibilities. Clinicians are not technical experts, and it wouldn't be fair to expect them to be. However, they need to be aware that the use of information systems is likely to have implications not only in their work processes but also in their relations with other stakeholders. If unable to evaluate these, healthcare professionals need to be aware of stakeholders or mechanisms that will help them address technological issues. Recent research reports the case of an NHS hospital trust which has not been able to learn from previous information technology failures in the healthcare area and has repeated common mistakes (Mitev & Kerkham, 1998). They were also unaware of the facilitating

role that parties such as the Information Management Group (IMG) of the NHS Executive could play in their systems procurement and development. In cases however where prospective systems users in the NHS are familiar with the facilitator mechanisms that stem from the IMG's role as the information technology experts within the NHS, the perceived legitimacy of such stakeholders will also come into play. For example, the NHSnet case has damaged the IMG image as they were seen not to take on board important values of other stakeholders and arguably contributed to the dissolution of the group. Certainly, the legitimacy question is complicated by other organisational and political concerns that affect stakeholder relations in healthcare.

For network systems' developers and sponsors, the responsibilities are perhaps more complicated than those of the intended end users. Indeed, unless they succeed in convincing other stakeholders that they have taken their concerns on board, they undermine on one hand the way in which other stakeholders perceive their role and their professionalism and on the other hand the chance of successful adoption and growth of the systems they deliver. The role of interorganisational systems developers can be related to a certain extent to the previous discussion on the problems of stakeholder representation. Developers, being knowledgeable about technology need to understand the perspectives, interests and values of the users and other stakeholders because, ultimately, they will need to inscribe these to the system they build. Certainly, there is an important set of informal norms that cannot be transcribed in an information system. Also, a system 'grows' (cf Atkinson & Peel, 1998) and undergoes a series of translations when it is used, as stakeholders start using it in 'unexpected' ways or use the system as a mechanism to defend or establish values and procedures. It is therefore a major challenge for developers to provide systems that are not perceived to conflict with the interests and values of stakeholders and to 'sell' those that do. In an interorganisational context the reconciliation of diverse interests can become the developer's responsibility. The use of the sociology of translation to analyse previous experience can improve our understanding of information systems change and the subtleties of stakeholder relations and representation. The use of stakeholder analysis can facilitate developers in understanding the scope and difficulties of the task and act according to the distinct context requirements.

More generally, information systems professionals face increasingly complex dilemmas as systems tend to privilege the perspective of particular stakeholders. The information systems literature distinguished between three key stakeholder groups: managers, users and developers. As systems increasingly become interorganisational and are used in domains where stakeholder relationships are political and changeable rather than commercial or predictable, information systems developers need to be more sensitive to the multiple stakeholders, the complicated, evolving and context-dependent nature of their understanding of systems use and the implications that systems use will have for this broad spectrum of stakeholders.

This paper has explored the different stages that an innovative project may undergo. Various approaches for understanding this process have been explored, although each provides limited assistance for generalisable understanding.

After reviewing notions of unexpected change, resistance and escalation, the paper presented the sociology of translation as a mechanism for understanding the various stages in an information systems innovation. This approach, drawing from a sociological understanding of the development of scientific facts, was then used to illustrate the various translations that the NHSnet project undertook in the United Kingdom. The language of the sociology of translation allowed us to see how the basis of the whole project was fundamentally transformed on a number of occasions and saw how these were related to the wider context of the system's development.

The NHSnet, at the moment, continues to be an expectation failure (Lyytinen & Hirschheim, 1987) from both the NHS Executive and the BMA perspectives. Indeed, issues like that of confidentiality and privacy of medical information have not been resolved. However, as a result of the various translations, including changes in spokespersons, in priorities and obligatory passage points, confidentiality no longer appears to be at the heart of the NHSnet implementation problems. At the same time, as many technological issues remain unresolved, including the architecture and storage of the electronic health record, but also organisational and political the responsibilities of stakeholders (e.g., 'Caldicott Committee Guardians' are to be appointed to all NHS organisations to monitor safeguarding confidential patient information), the network will continue to undergo 'translations'. In this paper we explained how these translations are the result of the actions of numerous stakeholders, and importantly, that these stakeholders have a right and an obligation to promote and protect individual rights, such as the privacy of medical information.

More generally, our approach to the lifecycle of information systems as actor networks undergoing a series of translations has proved to be an interesting way to study information systems implementation. By considering different stakeholder perspectives rather than restricting our analysis to actor involvement, we had an opportunity to consider technical, organisational and political issues shaping an interorganisational system. Our case study is another indication that interorganisational systems are political systems. Politics, as often manifested in stakeholder relations but also in the way in which various stakeholders attempt to 'translate' the system to serve their interests, are unavoidable and an integral part of an information system.

In practice, our approach is valuable to the stakeholders immersed in the situation, in this case healthcare professionals

in particular, because it challenges them to make sense for themselves of translations, how these may be triggered by other stakeholder interests or capabilities. From a theoretical perspective, this approach also enables more general discussions about the rights and responsibilities of stakeholders, thus contributing to the normative aspect of stakeholder theory (Donaldson & Preston, 1995), which has been neglected in the information systems literature (Pouloudi, 1999).

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