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Abstract

Actor-Network Theory has found some favour in information systems research as a tool for interpretation and description of sociological phenomena surrounding the use of information systems. This paper presents the case of a more proactive use in an action research project within a Corporate Bank. Here the researchers used the ideas as a device for understanding the turbulent social and political context of the research and to plan and manage the intervention.

1. Introduction

There has been increasing interest by academics (but not practitioners) in the potential for using sociological theories in the field of information systems research. The motivation for this has been the errors of omission and commission that may arise when information systems are regarded solely as technical artefacts composed of hardware and software rather than as social systems enabled by technology.
The theories given most attention are the actor-network theory (Callon 1986; Latour 1987) and structuration theory (Giddens 1984). These are quite different in nature to IS theories such as, say, object orientation. They represent 'grand theory' and are intended as frameworks for sense-making rather than a basis for analysis-for-action; they are a devices for interpreting and describing so as to improve understanding rather than managerial tools or techniques for intentionally guiding the user towards or away from any particular future action to change the situation. The consequent lack of prescriptive advice or specific techniques for operational use has meant that the impact, visibility or knowledge of ANT or structuration theory in the world of IS practice is very slight.

This paper suggests a practical role for the ideas of ANT, describing an active use of actor network theory as part of a change-intervention within a major UK Corporate Banking. Here it was found that the concepts of actor-network theory could be usefully employed within the context of an intervention using the soft systems methodology (SSM). The case is instructive since the ideas of ANT were found to be of greatest value not in the conduct of the work for the client but in the management of the social and political context of the action research project. Following a description of the problem situation, we show how the 'lens' of actor-network theory guided the intervention, sensitising the would-be problem solvers towards political actions.

2. The context of use

The work described here took place within a major UK financial institution, hereafter described as Corporate Banking. Corporate Banking was a major competitor within its industry and a long term, sophisticated user of IT. The researchers were engaged on a two-year action research project with Corporate Banking, focussed upon the organisation and management of business change projects and how the accompanying subsequent information systems were developed.

Corporate Banking wished to engineer a change in the way that information systems were developed, including a re-orientation away from the conventional view of 'IS projects' meeting the needs of 'users'. Instead, a more integrated view of business change projects that might necessarily involve changes to IT support was to be engendered. The authors were to facilitate the introduction of this change and help the client to understand why an earlier, pilot roll out of a new development approach had met with no success. This intervention in the affairs of Corporate Banking was the ABC project, and what would be understood as 'the project' by anyone within Corporate Banking).

This intervention was, however, also the vehicle for academic research concerned with the social construction and enshrinement of norms in IS methodologies, carried out in a long-standing tradition of action research.

There were therefore essentially two projects to be planned, managed and delivered. The first, the ABC project, was institutionalised through the project approvals process of Corporate Banking and accompanied by the conventional commercial project paraphernalia of PIDS and project reviews. The second project, the academic piece of action research, was in no way so formally defined but thought to be of primary importance.

Both of these projects were conceptualised using the Soft Systems Methodology (Checkland 1981) and understood to require appropriate forms of monitor and control activity. And both were carried out within the particular context created by two factors.

The first of these was that Corporate Banking had approximately two hundred change projects included within the individual programmes that together constituted their Five Year Change Plan. The business importance of the individual information systems was large, with several million pounds of trade being handled daily. In addition, the organisation was facing an unusually high level of mandatory projects. These were projects that had to be done in order to comply with legislation or market requirements rather than for any promised increase in bottom line figures. This meant that, there was intense pressure to deliver projects, in the words of one senior manager, "All On Spec, On Time and On Budget – or better". The researchers' action research was itself viewed as a change project and subject to the same pressures. Moreover, it would be reviewed and judged against the same criteria as other projects and summarily cancelled should performance be judged appropriate.

It was clear from the beginning therefore that the researchers' efforts were always to be divided between the 'action' (the work within Corporate Banking), the 'research' (the learning gained from that work in terms of theory and methodology) and the managing of the two. The latter would not consist of merely managing the project activities but also ensuring that the project 'stayed alive' through political action if required (Dunning-Lewis 1998; Dunning-Lewis and Townson 1998).

The second important contextual factor was the atmosphere of insecurity and unease to be found in Corporate Banking. This was a traditionally paternalistic organisation, valuing its staff, providing generous working conditions and where staff, until

recently, might be employed for much of their careers. . There was now, however, common opinion that the parent corporation was performing poorly and accepted norms were no longer valid. . Media articles had publicly identified the poor performance, share prices had dropped dramatically and there was shareholder dissatisfaction with recent results. Staff were aware that the cost-per-transaction figures for the parent bank were several times higher than those of its competitors and the organisation was now exposed. This meant that, even within the profitable area of Corporate Banking, there were staff concerns over future job prospects and an increasing managerial emphasis upon cost cutting. Over the period of the research the poor morale and fears of staff were further by the cutting of budgets and several projects being cancelled or 'frozen' partway through despite meeting all their required performance targets.

Such concerns became apparent at the start of the action research project. The early analysis of the situation, as captured in a rich picture diagram (Lewis 1992), suggested that the severity of these factors would accentuate the difficulties that might anyhow be expected in respect to the change that was to implemented. A great deal of attention would therefore need to be given to the different forms of politics faced in interventions (Dunning-Lewis, 1998), namely the politics of the situation, politics regarding the intervention, politics of the consequences of the intervention and the politics of the intervention itself.
It was the last of these, the politics of the intervention, which occupied much of the time in meetings between the researchers. Changes in personnel, the worsening financial position and stringent financial requirements all meant that the researchers had to continually adapt to changing circumstances if both the intervention, and the action research that relied upon it, were to continue. It was in giving structure and clarity to these political assessments and planning of what to do next that the concepts of ANT were found useful.

3. Utilising ANT ideas

Concerned with the sociology of science, the actor-network theory was pioneered by Callon (1986) and Latour (1987). It attempts to explain and interpret social and technological developments, privileging neither a technically focussed view nor one of social change. Instead, it incorporates a 'principle of generalized symmetry', where both human and non-human elements are considered as 'actors' (or 'actants') each capable of affecting the other. In doing so if refuses any 'change in register' when moving from the technical to the social aspects of the problem situation (Callon 1986).
The principal focus is upon

> "… *the creation and maintenance of coextensive networks of human and non-human elements which in the case of information technology, include people, organisations, software, computer and communications hardware, and infrastructure standards*."
>
> (Walsham, 1997, p.466-467).

Parts of these networks might be relatively fixed, have properties of 'irreversibility' and be difficult to change; but the networks are essentially mutable with ever shifting alliances between the contributing parts.
Walsham (1997) reviewed a number of papers in the infromation systems research literature that made use of actor-network theory and there has been interest in using the concepts in a variety of ways. There have been attempts to use ANT as an

interrogative device to examine events in IS development (Underwood 1998), understand implementation and innovation (Tatnall and Gilding 1999), re-assess IS histories (Introna 1997) and underpin new IS methodologies (Atkinson 2000). There have though been few attempts to take the use of ANT ideas outside the realm of the IS academic and use them actively as a basis for action.

In the Corporate Banking case the ideas of ANT were originally introduced in relation to the ABC project carried out within Corporate Banking. It was thought that an interpretation in the terms of ANT of why past IS rollouts within Corporate Banking were judged to have 'failed' might suggest what to do better in future. The surprise for the researchers was to find that the concepts and language of ANT were more useful in interpreting the current problem setting and suggesting political actions. Use of ANT therefore spread upwards, to the management of the action research and it is this more active use of ANT concepts that will be further discussed.

The need for way of discussing the management of the project in more than just terms of timetables and deadlines was accentuated by the composition of the research team. The first researcher was permanently located within the City of London offices of Corporate Banking. Together with their previous employment by another branch of the parent organisation, this gave them ready acceptance and permitted both participant observation and a deep understanding of the social milieu and interactions.
The second researcher had, however, only intermittent and far more formal interactions with Corporate Banking. Visits were made to enable interviews or workshops but the 'outsiderness' of this researcher was always proclaimed by the visitor's security badge that had to be worn at all times.
The resulting periods of disassociation meant that despite frequent email contacts each face-to-face meeting entailed a period of review not merely of the progress of the research project but also of events in the wider system and how the research project should adapt to these.

Once the researchers adopted ANT as the device of discourse about the intervention then the periodic meetings between the researchers became re-structured. The first part of each meeting was concerned the conscious building and maintenance of a network of aligned interests, such as would better ensure continuation of the ABC project. Separate discussions and systems modelling could then address the content of the ABC project itself. This simple distinction between the two projects was to prove extremely powerful.

Networks of actors and alliances

Within ANT the concept of actors in a network is a distinctive one, for Callon and Latour (1992) consider that humans and non-humans cannot be either hierarchised or considered separately. There has been debate about the philosophical validity of giving equal status to human beings and non-human artefacts (Walsham 1997) but the notion is perhaps less revolutionary in the field of IS than elsewhere. Systems charts conventionally show people, devices and other systems interacting together through interfaces and in object-oriented analysis people, devices and other information systems are represented iconically identically as actors in Use-Cases (IBM-Rational Software 2002).
The formation and maintenance of robust networks of aligned interests was to become a continuing theme of the research.

Initially, the ideas of ANT concerning networks were included in the framework of ideas (Checkland & Scholes 1992; Hindle *et al* 1995) that were to be used in the ABC intervention. It was believed that insights would be obtained into how to successfully implement new working practices for IS development.
As the work progressed, the early analysis revealed the political and social complexity within which the ABC work was to take place. It became clear that the higher level, academic action research project that was based upon the ABC project was perhaps even more dependent upon such networks. It would not survive if the researchers did not pay careful attention to nurturing and creating a network of actors all of whom thought it in line with their own interests that the ABC project, and the research project depending upon it, should continue.

The conduct of this piece of action research was therefore distinctive in two ways. The first was in the distinction made between the 'two projects' involved in the action research, this distinction being formalised by the structure of the project meetings. The second was in the continual attention to the formation and maintenance of networks of aligned interests. Three examples of what this meant in practice are as follows.

Seeking new alliances

At one point in the project the researchers perceived growing threats to the ABC project. The pressures on cost cutting were increasing and a major IT infrastructure project had been cancelled halfway through, despite meeting all of its milestones and targets. More cancellations would follow a review of all current projects.
The ABC project reported to the head of IS Development but this person was not acting as any form of 'project champion' (Beath, 1996). They had already required that the ABC project focus on the system testing area, work that less crucial but could be completed independently of any continuation of the main project. This suggested that no future defence of the project could be expected. It seemed that the network of aligned interests was becoming too weak to withstand the pressures that were accumulating.

There existed however another group within Corporate Banking that was powerfully positioned and had until now not been part of the network. The Quality and Standards Group existed independently of the IS Group and reported to a higher level. Involvement with this group had so far been only at the level of ensuring that the proposed new ABC framework did not contravene any quality standards.
Recognising the value of enrolling this group led to a re-presentation of the ABC approach, with ABC now being talked of as an ensurer of quality product delivery rather than (as previously) as a means of aligning IS products with business requirements. The ABC project was thus consciously re-invented and over a period of weeks there was a positive effort to persuade Quality and Standards that adoption of ABC was a logical necessity if quality was to be ensured. In the language of ANT a translation was being attempted and Latour's fifth translation strategy of "whatever your want, you want this as well" (Latour, 1987, p.121) was being proffered. The efforts were partly facilitated by earlier moves (see below) to link ABC to the project management standards and use of the Prince 2 project management framework.
These attempts were successful, leading to a senior manager from Quality and Standards becoming a co-sponsor of the ABC project. This meant that any cancellation of the project no longer lay entirely within the remit of IS Development.

The researchers felt their actions had been justified soon afterwards, when the ABC project was reduced in scope but not included in the list of cancelled projects.

Enrolling a new network node

When the ABC project was initiated there was a formal requirement for a project leader, appointed from the senior staff of Corporate Banking. The individual given the task had experience of the earlier attempts to introduce changes to business systems development and had been involved in the pre-project planning for ABC. They could be thought of as already well integrated into the network of interests. When that individual chose to leave the organisation their replacement was appointed by the IS Development manager. An important actor in the network of aligned interests had therefore changed.

The new project leader was thorough and diligent but, it seemed, less interested and committed to the aims of the ABC project than his predecessor. They would though be judged on the running of the ABC project along with their other duties, with annual bonuses etc depending upon satisfactory performance.

ANT proposes that aligned interests are created by enrolling allies and the translation of their interests must be such that participation will lead to the network's maintenance. A form of translation was therefore required, to align this individual's perception of the ABC project with their own ambitions and interests.

Latour suggests it is necessary

> " *... to pass through the contenders' position and to help them further their interests. In the linguistic sense of the word translation, it means that one version translates every other, acquiring a sort of hegemony: whatever your want, you want this as well*" (Latour, 1987, p.121).

A set of deliberate decisions were therefore made to take care that involvement with the ABC project was made as public and high profile as possible. Getting reports of ABC into the company magazine, which circulated inside both Corporate Banking and the parent organisation, was one way in which this was done. Another was to ensure that ABC was specifically named in Corporate Banking's Annual Review document. Organising lunchtime discussion groups about ABC, hosted by the project leader, was another tactic. The researchers were also able to offer professional expertise in reviewing a report prepared by the manager and identifying some areas for improvement.

None of these things were logically necessary activities (in terms of SSM modelling) or really progressed in any way the ABC project. They did though both draw the new manager into the network and, by making association with the project public and undeniable, meant it would be hard for them to disassociate themselves from any perception that the project was not successful. The translation of interests was thus achieved.

Exploiting possible black boxes

Within ANT, when enough cohesion is obtained in order that an organised whole is formed from an assembly of disorderly and unreliable allies, when "many elements are made to act as one" (Latour, 1987, p. 13 1) then a 'black box' can be said to have been created.

A black box has properties of irreversibility, for it cannot be easily disassociated, dismantled, renegotiated or re-appropriated. Networks that are anchored in places to black boxes will therefore tend to be more stable and resilient that those that are not.

This led the researchers to ask whether there were in the problem situation anything that might be considered as a black box and might be employed to advantage.
A strong possibility was soon identified, namely the PRINCE 2 project management procedures together with their institutionalisation in Corporate Banking. PRINCE 2 (CCTA 1996) was a set of nationally recognised project management procedures that Corporate Banking had formally committed itself to using. There was never heard, from any source, any suggestion of any kind that PRINCE 2 should not be followed in both business and IS projects. The Quality and Standards Group were the apostles and policemen of its use.
A number of documents were then produced that located use of the ABC approach in relation to PRINCE 2 and attempted to forge a definite linking of the two. The linking was formal procedural in that it was proposed how the documentation and timing of the two were to be related together. But it was also implied in that discussions of the two were always made together and the same person became responsible for the training of staff in both.
In practice, the attempted linking of ABC to PRINCE 2 proved only partially successful. Their complementarities could to be a two-edged sword. Both, for example, required the definition of a business case for any change project (promoting the association) but required slightly different information in a slightly different form (confusing and annoying staff and suggesting redundancy). No degree of 'spin' could overcome the fact that ABC had actually been designed with no consideration to it being used in conjunction with PRINCE 2; this mistake was not one that we would make with the implementation however, and association of the ABC project with the black box of PRINCE 2 was emphasised throughout the research.

4. CONCLUSIONS

This paper has given a glimpse of how the use of sociological ideas, in this case drawn from the actor-network theory, may be used in information systems research. In this case we began by using the ideas to think about how to organise a change in Corporate Banking's working practices. It emerged that there was greater utility in using those same ideas as a language for discussing and planning the social and political interactions and machinations that necessarily surround information systems research done within organisations. We used the ideas of networks, enrolment, translation and black boxes to reflect on how to make the intervention happen and ensure the continuation of the ABC project.
In doing this we openly rejected the view of collaborative research with organisations being a pure act carried out by detached, uninvolved individuals. Instead, we embraced the richer alternative of collaborative research being the result of a complex nexus between various actors (human and non-human), sometimes coloured by the promotion of personal interests, and in a flux of changing circumstances and context. Making sense of what occurs and what might be done in such interventions is therefore difficult and we may learn from how sociologists attempt to give shape to stories of "… political and bureaucratic struggle, of technical and financial controversy and management disagreement" such as the development of the TSR2 fighter aircraft (Law, 1988).
The results of the analysis-action-reflection loop that was facilitated by the use of ANT concepts were sometimes not dissimilar from the conclusions that would have been reached or action taken by an experienced consultant or researcher. This is not surprising since it echoes the need for reflection in practice advocated by Schon (1983), Schein (1999) and others discussing intervention. The use of ANT concepts

however providing a grounding in social theory and a consistent body of ideas that was preferable to relying upon past professional experience or craft knowledge.
We do not claim to have used 'the Actor Network Theory' (even if there is any single definition of what that might be). Undoubtedly much that we did might offend an ANT purist. We have though shown how some of the concepts to be extremely powerful and appropriate analytical devices. For collaborative forms of research such as action research they provide a lens through which to review the research setting and a language for discussing the turbulent events in which the research is located, complementing the management of budgets and time-scheduling that is conventionally labelled as project management. This we believe to be important because of the suggested appropriateness of action research for research into information systems (Mansell 1991; Stowell *et al* 1997; Checkland & Holwell 1997; Baskerville & Wood-Harper 1998; Avison *et a*l 1999). With such methods the management of the intervention activities becomes a requirement of the research but little attention has been given to this or how it is to be done. The use of the ideas of ANT may contribute to improved understanding and more explicit, more defensible basis for using engaged research methods.

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