Introduction

The chapter presents a study of knowledge networking in a public sector agency (PuSA) in the UK, where a number of knowledge management initiatives have been introduced since the inception of the UK 'Modernising government' programme of 1999. PuSa is a quasi-governmental body that exists to stimulate commercial innovation and enterprise at national and regional levels. The study involves action research by an observant participant (Czarniawska, 2004), the second author, who worked for a number of years in PuSA. The case unravels some of the social and material consequences of an initiative to build a streamlined knowledge infrastructure. For seven years (1999-2006), senior management in PuSA based at HQ pursued an initiative to build a knowledge network (the 'Knowledge Working' (KW) initiative) across the agency's twelve local subsidiary companies. Our study traces this initiative through a rich documentary archive of historical organizational material and personal research fieldnotes. We focus particularly on a group of infrastructure intermediaries, or 'Knowledge Analysts' (KAs) in PuSA. Like other accounts of public service networking (see for example Bowers, 1994) our study shows that the problems that arise in such projects are often unforeseen and intractable. The study raises a number of issues and challenges that confront managers of complex service infrastructures, and the intermediaries who work with them.

Knowledge Networking in PuSA: a brief history

We start the story in April 1999, when PuSA approved a 'Knowledge Web' project. The project was framed in terms of two main binary objectives: to address culture and behaviour and to improve processes with technology. One of twelve workstreams in this project was concerned with 'Knowledge Networking' (KN), and with the recruitment of 'Special-K People' (also known as 'implants' and 'analysts'), a cadre of intermediaries with specialist skills to manage a core 'knowledge system'; provide professional support, advice and training in managing knowledge; and finally, monitor and maintain best practice in KM.

By July 2002, the 'Special-K People' or 'Knowledge Working Specialists' as they became known, were recruited into a new Knowledge Working (KW) team within the KM directorate at HQ. Structural tensions were present from the start. Whilst the KW HQ team was responsible for developing and implementing tools and techniques for KW, the KAs were responsible for identifying and interpreting the knowledge needs of local staff in the distributed units. Utilising a participation framework called the 'Knowledge Needs Route Map' (developed with the help of an external expert, an IBM consultant between June and November 2003) and a associated KW toolkit, KAs were to recommend and implement appropriate KW tools and solutions, such as communities of practice (seen as a mechanism for harvesting tacit or implicit knowledge) and an intranet (the means to make tacit knowledge explicit).

In August 2003, ten months after the KAs were first introduced, a Change Manager was brought in to provide strategic direction for the KA role. In an attempt to raise the status of the KA role, and ensure that subsidiaries devoted more time to KW, he classified all the work the KAs did as 'knowledge work' and this led to resource tensions. Towards the end of 2003 the KW team, KAs, their line managers, and other interested parties were taken through a two-day workshop and emerged as a trans-subsidiary Community of Practice, or CoP, a further structural complication. As a KW CoP, the KW team and KA's were to operate both vertically (between HQ and subsidiaries) and horizontally (across the different regional subsidiaries). The KW CoP members were geographically

distributed and operated in a virtual manner using technologies such as the intranet, telephone, and discussion groups. However, the CoP was not a purely 'virtual' entity as some members were co-located; others met on occasion and all members met twice a year. The KAs efforts in this initiative were only partially successful, as many of the local subsidiaries resisted to a greater or lesser extent HQ's efforts at integration.

In April 2005 a new CEO at HQ announced that the structure of the organisation would be reviewed. Details of this were not released till August 2006 and in December 2006, the Knowledge Analysts were disbanded – some left for other posts, and some were re-absorbed into other parts of the organisation.

Managing context or building infrastructure?

It would be easy to dismiss the story of knowledge networking in PUSA as another trite tale of an unsuccessful integration initiative that failed to address organization-wide contextual issues of control and coordination. But this interpretation would not do justice to an initiative that was sustained for seven years, and that delivered some of what was envisioned in some of the local units. It would also be easy to dismiss the story as another example of technological tunnel-vision that failed to take account of context in the shape of the practices of local user groups. But this does not work as an explanation either – much of the remit of the Knowledge Analysts was concerned with cultural and behavioral transformation. In this chapter, we pursue a different line of explanation. The Knowledge Network was an attempt to build infrastructure, and there was a failure at many levels of management to understand how organizational infrastructure works. For managers in PuSA, infrastructure was a set of tools and services that would support trans-organizational knowledge work by providing common ground; the project was simply a matter of scoping and implementing, a minor workstream to be delivered by raw recruits. Managers failed to grasp the fundamental role of infrastructure as a site where organizational knowledge is produced, a site that is highly politicised and contentious. They thus failed to engage reflectively with the context of production of which they themselves were a part.

To explain how infrastructure works as a site of knowledge production, we draw on recent studies of knowledge management in project environments (Love, Fong and Irani, 2005), and on emerging work on knowledge infrastructures in science. A recent series of studies by Newell and her colleagues of knowledge integration across units within organisations and within projects have focused on social capital formation. Newell and Huang (2005), for example, provide an account of failure to integrate in cross-functional projects, and Bresnen et al. (2005) have recently published account of a failed network project where lack of social cohesion was a major factor. In the case of PuSA, there is little evidence for the formation of proactive social capital, though a form of bonding in adversity is evident in many of the emails that were exchanged within the cadre of knowledge intermediaries. Lack of social capital does not explain, *per se*, the travails of the PuSA project, and we have pursued the issue of why there was little social capital formation, drawing on a study of conflict between two discourse communities in a public sector power utility by Carter and Scarbrough (2001), one of several that constitute a research agenda based on the work of Foucault (e.g. 1977) in Information Systems research recently reviewed by Willcocks (2006). This alerted us to the effects of shifting regimes of power in distributed organizations where internal and external interests groups are involved in technological and managerial decision-making, and are thus implicated in the processes of knowledge production.

To date, the most comprehensive investigations of knowledge production In the context of very large infrastructures have been undertaken in the social studies of science domain as the research attention of different scientific communities converges on cyberinfrastructure and grid technologies. Very large knowledge infrastructures are the focus of an emerging field of study (Hine, 2006) where ‘memory practices’ are seen not simply sinks for output, but as drivers of science whose analysis allows us to understand how the world presents itself at a given point of observation, how things come to be as they are. Bowker, in a recent (2005) monograph, describes ‘memory practices in the sciences’ in terms of a rich set of infrastructures of differing reach and range. These emerge from complex chains of decision-making about who to involve and who to exclude, what to conserve and what to jettison, what to select and what to reject and so on. Trajectories vary across domains, and have considerable constitutive power. By making some materials available as points of reference and others not, such decisions shape what counts as knowledge in a given domain.

Domains in science, the focus of Bowker's exposition, are discursive communities, and we suggest that his framing of infrastructures, memory practices and the constitution of knowledge can be extended to a wider discussion of computer-mediated organization.

The documentary method

Bowker's text presents a number of methodological approaches to explore these issues. These include historical reconstruction/genealogy, discourse analysis and ethnography. All of these involve longitudinal empirical work and it is for this reason that research into memory practices relies heavily on the documentary method, the tracing of events across an archive of mixed sources.

As we note above, the data that are used in the PuSA study consist of documentary and email and observational material gathered in the course of the researcher's work, of interview data, and of a range of generic documents (such as strategic plans, technology roadmaps, training checklists) from the wider organizational archive, each with its own distinctive discursive power. Three points of view are represented: those of a KA in two of the subsidiaries, and that of HQ. These have provided insight into decisions and negotiations that characterize complex infrastructure work. Analysis of documentation and observations has been on-going: as Czarniawska (2004) points out, important events do not necessarily happen at the point of where an individual researcher observes, but at other times and in different places. In addition, she states that researchers cannot always determine that an event is significant when it takes place: important events are sometimes 'constructed' post-hoc. We have used a time-line, constructed post-hoc, as a primary means of navigation through the assemblage of documents that constitutes the data archive for the study.

Analyzing the knowledge network at PuSA

In analyzing the documentary archive, we have mixed two methods: discourse analysis and structurational analysis, an approach taken by Heracleous (2006; and see Heracleous and Henry, 2005). Historical analysis of knowledge management in PuSA reveals a number of different initiatives, or 'versions' that emanate from the centre (HQ), that can be mapped on a timeline and plotted in terms of key events or stimuli (seminars by influential consultants and gurus, for example, or shifts in personnel at senior management level). The versions

can be linked to competing KM discourses, championed by different senior agency officers at different times. These discourses problematize organisational knowledge in different ways, and the 'solutions' that they entail provide different groups in the agency with an opportunity to bid for resources. The resource implications of a KM discourse may persuade bystanders to participate in a given initiative, as it is in their interest to do so; where they have no interest, they will not take part. In the first phase of the study, we undertook a content analysis of key documents (strategy, planning, reporting), or texts that had traceable consequences for the knowledge intermediaries. A discourse analytic framework (Schultze and Leidner, 2002; and see Schultze and Stabell, 2004) was derived for the study that identified five main knowledge discourse elements from the documentary archive and these were plotted against different discursive formations (Rasmussen, Davenport and Horton, 2006). As high level units of analysis, they provided a starting point for unravelling the often complicated struggles that characterized KM implementation in PuSA, and a mechanism for scoping the Knowledge Network story in terms of three main discourse formations (value, psychology, object) each prioritizing different elements. To explore in detail the consequences of competing discourses in different phases in the knowledge network trajectory, we turned to structurational analysis.

In the analysis of PuSA, we were faced with an implementation that spanned a number of years, involved multiple management arrangements across distributed locations, computer applications and training techniques, and the appointment of specialist staff to facilitate adoption. The Knowledge Analysts who are the focus of the chapter were both producers of and produced by the knowledge network. Their formal duties and responsibilities (as described in project plans) refer to the former. But their power to produce was constrained because their duties and responsibilities fluctuated throughout their period of employment, as they were subjected to and were the subject of tensions on a number of fronts.

To accommodate these conditions, we followed a version of structurational analysis offered by Lyytinen and Ngwenyama (1992) who focus on computer support for cooperative work as their application area. Following Giddens (1984) they present social structures as 'instantiations of social actions over time intervals' (compatible with our time frame in the PuSA study), virtual structures that are conceptualized in terms of the properties of social systems, namely rules and resources. Rules are generalizable procedures applied in the

production/reproduction of social practices, and resources 'signify capacities to generate command over material and social objects. Stability and identity formation are important features of social ordering, and 'ontological security' is an important theme of the paper; ability to monitor intentions and motivation is important here. Giddens provides a summary schema for structurational analysis: three properties of social structure (signification, domination and legitimation) are linked to three core capacities of social agents (communication, power, morality) by three 'modalities' – interpretive schemes (by means of which actors make sense of communicative actions), facilities or the ability to allocate material and human resources, and norms, or sanctions. These are 'inextricably' linked.

In the sections that follow we present the structures of signification, domination and legitimation as they are manifested in PuSA. In the PuSA case, for example, a dominant discourse like 'knowledge management adds value' can be anatomized in terms of signification (what does this mean to participants in the organization?), domination (who promotes this view and what resources can they command?) and legitimation (how does this discourse become naturalized in the organization?). Alternative discourses must compete, and find their niche. In the text that follows we offer a summary account of discourses and structuration in PuSA's Knowledge Network.

Signification: what does it mean to do knowledge work?

In the case of PuSA, we can observe a continuous struggle over signification. This was at its most basic in the terminology used for knowledge management activities. In a PuSA senior management paper written as far back as 1998, KM is mentioned as a mechanism for implementing the organization's strategy and its vision of becoming a knowledge organization. This remained the dominant discourse in spite of challenges from those implementing the Knowledge Network. At the time that the 'KM as strategic asset management' terminology was adopted, knowledge of the economy and labor market helped PuSA formulate a strategy for economic development. For both in-house and out-sourced knowledge services, PuSA operated a consultancy-based model whereby organisational staff or third parties imparted their knowledge to clients. PuSA states that it will "work with knowledge" to develop a strategy for economic

development, understand and manage stakeholder relationships, and develop and deliver products and services to address market failure.

As we note above, the original formulation of the Knowledge Web drew heavily on the 'knowledge management adds value' discourse, a formation that appears to compete with other discourses throughout the project, a struggle that is reflected in continuously shifting nomenclature. The Knowledge Analysts were sometimes referred to as 'knowledge workers'; under this rubric, their remit was presented as "working together more effectively by sharing knowledge with one another; it is about sharing views, ideas, insights, expertise and information, and having the tools, products, systems and processes in place which will allow us to use and manage that knowledge more effectively." But a year later, an alternative definition was offered by the Architecture Authority, a senior management group charged with designing a knowledge strategy for the over-arching NT project: "Knowledge Working refers to the activities and behaviors required by [PuSA] to enable the creation, capture, sharing, storage, retrieval, analysis and application of knowledge. It embraces both the knowledge in the heads of individuals (tacit knowledge and the knowledge held in documents and storage systems (explicit or codified knowledge)." (PuSA, 2004).

In a news item that appeared on the Intranet in January 2003 introducing the KAs, they were described as "catalysts to bring about a change in culture within the network – a culture of Knowledge Working". Despite no agreed definition of KW, an internal job description described the KA as "the individual responsible for ensuring the effective management of Knowledge Working initiatives in their local [subsidiary]. They will work with senior management on the introduction of knowledge tools and new ways of working, ensuring that a knowledge sharing culture is embedded in the [subsidiary]."

Whilst the KW HQ team was responsible for developing and implementing tools and techniques for KW, the KAs were responsible for identifying and interpreting the knowledge needs of staff, and local support work. But there was little scope for KAs to assert a group identity, as the 'needs framework' was developed in

conjunction with an external expert, an IBM consultant. It was clear that the model first envisaged for KW was one whereby the KA acts in a consultancy capacity to identify business issues to address using KW tools and techniques. However, this was never made clear to the subsidiaries when the KA role was first proposed. The KAs were largely left their own devices to communicate their role in their subsidiaries. Some KAs felt that it was difficult to communicate what they did because the term 'knowledge working' was what the external world called 'knowledge management'. As the KW team was a team within the KM directorate and as such was associated with the 'KM' activities of strategy, planning, research and number crunching. The KAs could not recommend KM books or KM websites to other members of staff because they would associate 'KM" with local usage at PuSA's HQ.

Confusion over definitions continued to June 2004 when the Change Manager and the KW Co-ordinator issued a report that was intended to encourage all of the regional subsidiaries to fall into line and subscribe to the KW initiative. Whilst some KAs perceived a job-related task that was not common to all KAs to be KW work, other KAs considered the same task to be an extension of their 'other hats' – the other jobs they did. Around this time the Change Manager contended that there were different perceptions of KW depending on what the KAs thought their role was, what their boss perceived their role to be, and subsidiary circumstances. An attempt was made to define the role to subsidiary staff in terms of diagnosis, solutions, training and support. The appointment of a new CEO led to further review, and in December 2006, the KA team was, as we note above, disbanded.

Domination: whose is the KA resource?

In this section, we re-trace the story to explore a further structural property of the knowledge network – domination. This account throws additional light on signification – the resources that knowledge work mobilized were tightly coupled to what knowledge work means. As we note above, an organizational structure to accommodate KAs as both a central and local resource was implemented in May 2002. A human resource allocation model was proposed that specified the

number of support and operational staff each subsidiary should have. Although PuSA wanted to increase the proportion of staff in 'customer-facing' roles, the resource allocation model dictated that each subsidiary had to recruit a Knowledge Analyst (KA). These were to be included in a new team in each subsidiary. As the imposed ('back-facing') KA support post represented a potential loss of an operational member of staff, the subsidiaries were reluctant to employ people whose role did not demonstrably add value in terms of their own local organizational objectives. Despite their concerns, the subsidiaries were required to adhere to the new staffing structure imposed by HQ, and employ the KW specialists who were being recruited into a new KW team within the KM directorate in HQ. A number of local subsidiaries settled on a compromise, by allocating only a proportion of the activities of the new recruits to KW, thus reserving some resource for their own purposes.

In October 2002, before the KW PuSA team and the KA staff were all in post, the PuSA senior management team approved a conceptual 'Knowledge Architecture' and 'Knowledge Working Strategy'. The Knowledge Architecture and Knowledge Strategy were developed concurrently, in partnership between two PuSA HQ teams. The former was led by the PuSA KW team and the latter by the PuSA Architecture Authority. The strategy determined what needed to be done and the architecture how it should be done. The Architecture Authority's role in assigning resource was to ensure that the ICT infrastructure and business processes of overall transformation project were "co-ordinated and mutually supporting" (PuSA, 2003a). Because the Architecture Authority were to disband following the implementation of the Network Transformation initiative, the KW team was assigned the ongoing role of changing and shaping the architecture in accordance with future organisational priorities. It was envisaged that the KW team would also be the "primary application vehicle" of the knowledge architecture (PuSA, 2003b). In addition, they were also tasked to lead on the development and delivery of the KW strategy (PuSA, 2003c). Not only were the KW team at HQ the strategists responsible for developing KW tools and

techniques, but they were also tasked to support the KAs who would recommend KW solutions and apply them in PuSA.

The PuSA KW team at HQ recognised that KW concept was poorly defined and communicated and that there was considerable ambivalence about roles and line management. In August 2003, ten months after the KAs were first introduced, a Change Manager was brought in to provide strategic direction for the KA role. Two senior managers (the Change manager and the Co-ordinator) would form a bridge between the HQ KW team and each subsidiary KA. Co-ordination included setting up meetings, training events, and a spreadsheet to capture KA activities. A monthly meeting was scheduled to discuss work activities and share implementation experiences. KAs were to choose two projects and were prompted to consider a short description of the project; any network-wide implications or examples of best practice; use of KW tools to support the project; next stages; and support they might require to ensure completion.

The recruitment patterns of the knowledge intermediaries reflected tensions over definitions, which in turn reflect tensions over resource allocation. From the start, the posts were filled in a non-uniform way. In November 2002, seven KA's had been recruited and the remaining five were recruited over the course of the following year. One joined in April 2003, two in July 2003, another in September 2003, and the last in January 2004. There was a mixture of full-time and part-time contractual and working arrangements across the different subsidiary agencies. In two cases, despite the role being communicated as being full-time, the KAs undertook other 'KM' duties. In two subsidiaries, the individuals only found out that they were allocated the KA role when they received a group KA e-mail. They had to undertake KA duties in addition to their usual job functions. So, in some cases the KAs were undertaking the role on a part-time basis, whilst those that were full-time were given additional tasks that the subsidiary deemed important.

Regular monthly face-to-face meetings with individual KAs and each local 'boss' were held, albeit separately. These meetings were an attempt to establish norms

for managing KAs across the organization and to ensure that the KA workload was balanced, to offer advice in implementing KW tools/techniques, gather KW good news stories, and identify areas where KA resources would need to be 'pooled'. But KAs and local bosses never met as a cohort, and the Change Manager and Co-ordinator became the conduit for information on what each KA was doing. During meetings they recommended which KAs to speak to about undertaking a similar subsidiary activity. And if another KA or member of the KW team were required, for example to facilitate a workshop, the two senior managers would act as liaison officers.

In early 2004 a spreadsheet was mandated for KAs to record their activity. This had four purposes. Firstly, to provide an overview of what all KAs where doing to monitor length of time taken to implement KW solutions, plan future activities, and assess where KAs were being overloaded. This it was also suggested would be helpful in discussions on priorities and workload with each local KA 'boss'. All KA work had to be run through the Co-ordinator who would manage time and resources across the network. There was little or no dialogue with each KA's local 'boss' regarding work that KW HQ team wished the KA to undertake, and it was left up to the KAs to clear work with their local 'boss' and complete the worksheet. The spreadsheet was perceived by KAs as being just another mechanism to keep an eye on them. It was also anticipated that the spreadsheet would be replaced by an IT system called Touchpaper. Eventually all KA work would be tracked online and the KW Team, KAs, KA line managers, and customers could monitor the stage a KA intervention was at. However, Touchpaper was never introduced.

In October 2004 it was decided to shift the monthly meetings, an important locus of central control, to a bi-monthly schedule. This was partly due to the fact that meetings were taking up too much time. The KA meeting in December was cancelled and no meetings took place till June 2005. A KW survey around this time suggested that HQ's 'command and control' policy was not working. It was thought the KW Director asked the Change Manager and Co-ordinator to discontinue managing and co-ordinating the KAs. In January 2005 the PuSA KW Director announced that the role of the Change Manager and Co-ordinator had

changed; they would both assume responsibility for managing and delivering the 'tacit' agenda only, a major shift in focus by HQ. In August 2005 the KAs re-instated the KA meetings, but on a quarterly basis. They would now assume responsibility themselves for chairing the meeting and setting the agenda. Whilst the Co-ordinator continued to attend some meetings, the Change Manager did not. Control of the resource had drifted yet again.

The KAs questioned the KW network structure on many occasions. More often than not, HQ developed network policies and procedures with little input from the subsidiaries, the operations arm of the business. Many of the local problems faced involved an issue with a HQ directive that couldn't be solved locally but at HQ level. As such, KAs found it difficult to intervene at a local level. Some KAs questioned whether local issues would be better addressed at a Community of Practice (CoP) level. This, it was felt, would be a better forum for KW interventions. But, some subsidiaries did not consider CoPs to be a local priority, and the KAs were not perceived to be delivering locally if they focused on a HQ initiative.

A survey in 2004 to elicit views of a proposed new KW structure highlighted a number of issues arising from this structural arrangement. It was felt that time spent on HQ and subsidiary priorities were deemed unimportant by opposing parties. In addition, the KAs were unable to focus on the job full-time and were pressured to focus exclusively on subsidiary priorities. To address these concerns, the HQ KW Director recommended that the subsidiaries continue to line manage KAs "whilst exploring increased commitment of KA time to KW activities (across business units where useful)" (KW Survey Recommendations, 2005). Subsidiary management were asked to agree local and network priorities, gain consensus on the KA role, identify expected benefits, and agree what time should be devoted to KA activity (ibid). But, the recommendations fell short of asking the subsidiaries to work with each other and the KW team to concur on priorities, benefits and resource. Instead, the KAs were later asked to submit subsidiary priorities to the PSA KW team.

As we note above, in April 2005 the new CEO confirmed at a staff away day that the structure of the organisation would be reviewed. This involved a great deal of consultation with staff, partners, and stakeholders. The re-structuring announcement was delayed till August 2006. The KM directorate would now be named 'strategy' and the KW team would disband. Two KW teams called 'organisational learning' and 'information management' would now form part of a new directorate that would encompass other support functions in the business such as HR and ICT. The subsuming of KM discourses under those of traditional line management suggests that PuSA's engagement with knowledge networking had proved too complex too manage, and that the Knowledge Network and Knowledge Working initiatives have failed to achieve legitimacy. Hence the retrenchment to an earlier discursive regime, that of traditional lines of business.

Legitimation: how is authority established?

In this section, we go over the ground a third time, to explore legitimation, corporate morality and norms and sanctions. To understand these in the context of PuSA, we focus on perceived authority, performance measurement and training issues. Legitimation issues are tightly coupled with signification and domination: the KAs did not know how to define their role and did not always know whose resource they were. Managers, attempting to secure the KA resource, enacted multiple and conflicting initiatives. Though the KAs were hired at Senior Executive level, there was thus little indication of the organizational norms with which they were meant to comply. Three of the KAs were not on the same salary grading although they were expected to undertake the same role. Like most of the KAs they had little experience of KW (or KM). Out of the KA and KW team, when recruited, only two of the KAs had any formal KM education. This would be addressed through a training programme and the production of guidance notes on what the KA tools were and how to implement them.

Because of the fluid nature of the KA job it was virtually impossible for KAs to identify a forward schedule of work, and hence, articulate the potential benefit the organization might derive from their interventions. Consequently, it was very difficult to attribute any direct value to KW. As we note above, in August 2003, ten

months after the KAs were first introduced, a Change Manager was brought in to provide strategic direction for the KA role. In September 2003 expert groups were set up to provide KAs with the skills they needed to deliver KW. Each expert group was led by a member of the KW team and monthly training ranged from reviewing how an intranet search was conducted at a meeting to shadowing at a community development workshop. More formal training included attending in-house core skills courses such as facilitation, presentation, and influencing skills. Other training included consultant-delivered workshops in consultancy skills and business analysis. In addition, portions of the monthly KA meetings were devoted to development. This included inviting people from different areas of the business to talk about their work and how they thought KW could help.

As we note above, the version of knowledge working promoted in the 2003 Architecture Authority document included a generic vision of all PuSA employees as knowledge workers capable of “positive knowledge exchanges” (or relationships) with texts and people (PuSA, 2003b). The former refers to the contribution to, and re-use of material in, the “knowledge base”. The latter refers to the building and maintaining of relationships with internal and external people in their capacity as individuals or members of groups or networks. This was important as PuSA wanted to manage its relationships to improve customer satisfaction to convince stakeholders, partners, and customers of the economic value the organization provided. This should have boosted the legitimacy of KAs, as they would instill the requisite knowledge capabilities such as skills, technology, tools, processes, behaviors and attitudes to enable these relationships. By improving these knowledge capabilities, it was thought knowledge workers’ would constitute an effective knowledge-based network that would “contribute directly to business results” (ibid). Staff were encouraged to think of themselves as a PuSA community rather than separate autonomous organizations. They were asked to engage in this community by sharing and absorbing knowledge. Although it was the individual knowledge worker’s responsibility to improve their knowledge capabilities, the onus would lie on the KW team and KAs to facilitate this. To be seen as reinforcing an organizational norm would strengthen the KAs’ position.

At a meeting in March 2004 the KAs were told their stakeholders were not happy with their progress. To improve their performance, they would receive intensive training for the first six months and were then expected to deliver locally. However, by this stage most of the KAs had not yet had the opportunity to practice or shadow on many of the tools, and several expressed concern that they were to act as experts on the basis of minimal training. Most of the KAs were not happy to hear that they were not considered to be 'delivering' and not operating at a senior executive level. The Change Manager also issued a mild threat: if the KAs did not perform well they could be downgraded to an Executive level. The published notes for the meeting included a senior executive level job profile to remind the KAs of the level they were expected to operate on.

Discussion and conclusions

The analysis says more about instability than stability. The properties of the network (or system) that are the focal points of structuration in our study are volatile, shifting outcomes of a continuous dialectic movement between managers and groups. The cadre of KAs who were charged with the delivery of a knowledge network was thus unable to consolidate identity, resources or authority that were specific to the group. From the start, identity was compromised by a portmanteau job description that allowed local managers to select attributes to construct idiosyncratic versions of the KA role that produced variations across geographical regions. The KA role, as the analysis shows, also varied over time. In two regional subsidiaries, individual KAs achieved a productive *modus operandi* by working purely at local level according to specific agreements with local line managers, but such individual accommodations could only compromise further the cohesion of the group.

The line managers in charge of KAs implicitly followed a (conventional) 'project management' script. Identity from this perspective meant 'being identified with' externally defined sets of tasks and technologies – tending the intranet, for example, or delivering pre-defined training. KAs found this construction of their roles to be demeaning as they were cast as *attachés*, or at best lieutenants –

leadership was not within the scope of their responsibilities, and power was exercised persistently elsewhere. The creation of the CoP provides an example – this was implemented as yet another vehicle for knowledge sharing (perceived as a technical genre) rather than a means to forge social cohesion and reinforce identity among KAs. The initiative to transform KAs into 'experts' was yet another example – an expert was construed as 'someone who has undergone training', not a knowledgeable authority informed by cumulative experience and reflection.

Our analysis also says more about ontological insecurity than security. Lyytinen and Ngweryama describe the former as the ability to reflect on intentions and motivation. In the case of the KAs, we can see a great deal of reflection on their predicament, and their uncertainty about the intentions and motivation of others – the line managers, and senior managers who issued directives and initiate tasks. These directives produced a patchwork of contractual conditions, reporting arrangements, task portfolios and expertises. This resulted in a from of negative *esprit de corps* – a sardonic sharing of commiseration, an adaptive strategy that may be compared with the 'ironic appropriation' described by Poole and de Sanctis (1990).

PuSA is not, however, a unique organization. The world of fractured authority, dispersed legitimacy, and volatile signification is typical of organizations that operate within large networked infrastructures – the mode that characterises current societal institutions (Giddens, 1990). The certainties of standalone systems development and project management do not obtain in this environment, nor do traditional notions of centre and periphery, when authority and legitimacy are 'leased' to outside experts. Volatility and uncertainty are detrimental at local project level, the perspective of the Knowledge Analysts, and the primary vantage point of the field researcher in our study. But they are less so at a larger level of systemic organization – the vantage point of senior throughout the period of the study: these were triggered by management exposure to the ideas of consultants in seminars, and in the prevailing academic and commercial literature. Thrift (2004) in a recent anatomy of 'knowing capitalism' describes a nexus of industrialists, academics and consultants – the 'cultural circuit of capital'. The

knowledge network is a typical product of this context, inspired by the discourse of the day, and enacted by instant 'experts' who can be re-absorbed and re-deployed in the next wave of transformation. The impetus that drives activity in such environments is not delivery, but vision.

Vann and Bowker provide an alternative description of this phenomenon: in a recent study (2006) of NSF agendas for e-science, they delineate the issues and challenges that face what they call 'technology-bearing labor', one practice among several that constitute infrastructure, or the 'production of IT for epistemic practice' (in this case, scientific knowledge). Commenting on the blurring of production, consumption and design, they highlight the challenges posed by conflicts of 'knowledge production practices' and identify the different interest groups that are involved. These include what Vann and Bowker call 'communities of promise' (p. 73). In the context of our study, public sector agencies, these comprise the managers, vendors, consultants who produce the 'prospective texts' (p.90-91) that drive large-scale infrastructure initiatives. Vann and Bowker suggest that ''Consumers' interest in a technology is organized through their relations of use with the technology, but technology-bearing labour's interest in the technology is organized by the investments of others in their effort to produce it' (p. 85). By focusing primarily on providing a platform for consumers, the Knowledge Network managers at PuSA did not take account of the interests of their 'technology-bearing labor' – the Knowledge Analysts.

Many of the contributions to Hine's (2006) monograph (where Vann and Bowker's chapter appears) are concerned with the challenges of aligning the different interest groups who constitute the very large infrastructures of e-science. As we suggest above, methods and insights from this domain can be applied to other sectors, where more comprehensive accounts of networked knowledge are needed, specifically accounts of the work of what may be called 'infrastructure intermediaries' whose focus is the context of production.

Note: The fieldwork has been undertaken under conditions of confidentiality. The names of the organization, and of some of the roles have been changed.

References

Bowers, J. (1994) The work to make the network work: Studying CSCW in action. In Proceedings of the ACM Conference on Computer Supported Cooperative Work, ACM Press: 287-298.

Bowker, G. (2005) Memory practices in the sciences. Cambridge MA: MIT Press.

Bresnen, M. et al. (2005) A community perspective on managing knowledge environments. In P. Love,, P. Fong and Z. Irani. Management of knowledge in project environments. Oxford, UK: Butterworth-Heinemann, 81-102.

Carter, C. and Scarbrough, H. (2001) Regimes of Knowledge, Stories of Power: A Treatise on Knowledge Management. Creativity and Innovation Management, 10(3), 210 ff.

Czarniawska, B. (2004) On time, space and action nets. Organization, 11(6), 773-791.

Foucault, M. (1977) Discipline and punish: the birth of the prison. New York: Vintage Books.

Giddens, A. (1984) The constitution of society: outline of a theory of structuration. Cambridge: Polity Press.

Giddens, A. (1990) The consequences of modernity. Cambridge: Polity Press.

Heracleous, L. (2006) A tale of three discourses: the dominant, the strategic and the marginalized. Journal of Management Studies, 43(5), 1059-1087.

Heracleous, L. and Hendry, J. (2000) Discourse and the study of organization: toward a structurational perspective. Human Relations, 53(10), 1251-1286.

Hine, C. (2006) New infrastructures for knowledge production: understanding e-science. Hershey, NJ: Information Science Publishing.

Love, P., Fong, P. and Irani, Z. (2005) Management of knowledge in project environments. Oxford, UK: Butterworth-Heinemann

Lyytinen, K. and Ngwenyama, O.K. (1992) What does computer support for cooperative work mean? A structurational analysis of computer supported cooperative work. Accounting, Management and Information Technologies, 2(1), 19-38

Newell, S. and Huang, J. (2005) Knowledge integration processes and dynamics within the context of cross-functional projects. In P. Love, P. Fong, and Z. Irani. Management of knowledge in project environments. Oxford, UK: Butterworth-Heinemann, 19-40

Poole, M. and de Sanctis, G. (1990) Understanding the use of group decision support systems: the theory of adaptive structuration. In J. Fulk and C. Steinfield (Eds.) Organizations and communication technology. Newbury Park: Sage, 173-193.

PuSA (1999). NT Foundation Workshop Presentation

PuSA (2003a) How KM is applied at PuSA . (Internal document)

PuSA (2003b) Knowledge Architecture. (Internal document)

PuSA (2003c) KW Strategy. (Internal document)

PuSA (2004) What is KW?. (Internal document)

PuSA (2005) KW Survey Recommendations. (Internal document)

Rasmussen, L., Davenport, E. and Horton, K. (2006) Initiating (e-)participation through a knowledge working network. In R. Suomi et al (Eds.) Project e-society: building bricks. 6th IFIP International Conference on e-commerce, e-business and e-government (I3E 2006), October 11-13, 2006, Turku, Finland. New York: Springer, 96-108.

Schultze, U. and D. Leidner (2002). Studying KM in Information Systems research: discourses and theoretical assumptions. MIS Quarterly 20(3): 213-242

Schultze, U. and C. Stabell (2004). Knowing What You Don't Know? Discourses and Contradictions in KM Research. Journal of Management Studies 41(4): 449-573

Suchman, L. (1996). Supporting articulation work. In R. Kling. (Ed.), Computerization and controversy: value conflicts and social choices. Academic Press, San Diego, 407 - 423

Star, L. and Ruhleder, K. (1996) Steps towards an ecology of infrastructure: design and access for large information spaces. Information Systems Research, 7(1), 1996, 111-134.

Thrift, N. (2005) Knowing capitalism. Oxford; Oxford University Press

Vann, K. and Bowker, G. (2006) Interest in production: on the configuration of technology-bearing Labor's for epistemic IT. In C. HIne (Ed.). New infrastructures for knowledge production: understanding e-science. Hershey: Information Science Publishing, 71-97.

Willcocks, L.P. (2006) Michel Foucault in the social study of ICTs: critique and reappraisal. Department of Information Systems Working Paper Series, 138. London: London School of Economics and Political Science.

.

.