

CHAPTER 7

7 CONCLUSIONS

7.1 Introduction

To date the literature has not clarified the role of the intranet in knowledge sharing, as was demonstrated in Chapter 2. This is because earlier research has been conducted across different organisational settings where intranet implementations have been too immature to generate useful findings. Furthermore, in these previous studies undue attention has been paid to the intranet as the privileged artefact of the implementation of which it is a part, at the expense of the context in which it is positioned. The research presented here has addressed these problems by investigating a single, maturing intranet in depth. Close reference has been paid to the environment in which it was developed, with specific attention paid to the other actors with which it was associated. The output is a sociotechnical analysis derived from an examination of the focal areas of Kling and Scacchi's web model (Kling & Scacchi, 1982), as presented in Chapter 4 and 5. It has also been possible in Chapter 6 to reframe the analysis as three episodes in the life-span of the knowledge management implementation actor-network in which the intranet had a set of significant roles.

The purpose of this chapter is to state and reflect on the findings of the research that is presented in this thesis. It considers the work's validity by examining whether the data collected and analysed (and on which the findings of the research are based) were "whole", and whether they genuinely reflect true "realities" of the case study organisation. The discussion also addresses the reliability of the methods deployed with reference to decisions on what to measure, and to the merit of the research output, as well as the reliability of the research instruments. In short, it is necessary to establish whether or not the procedures taken would produce the same results under constant conditions, and that any discrepancies in the data would be attributable solely to variations in the object of study (rather than to deficiencies of the actual research instrument). As well as assessing the degree to which the study met its aims, this chapter also considers the strengths and weaknesses of research design, suggests how alternative strategies may have enhanced the research, and furnishes some conclusions on the study as a whole. The chapter ends with a short coda to explain what became of the KPMG UK knowledge management implementation after this study was completed.

7.2 Meeting the research aims

This study set out to investigate the role of the intranet in knowledge sharing within the context of a knowledge management implementation in large, distributed, information-intensive organisation. Specifically it aimed to build on previous research on ICTs and knowledge sharing, and to provide an understanding of why intranet technologies often do not deliver on the hopes invested in them for promoting knowledge exchange in the organisations that they serve.

Since the literature on knowledge sharing did not advocate a theoretical approach that could be adopted for this purpose, a broad framework that provided an open-ended template was sought. In the event Kling and Scacchi's web model (Kling & Scacchi, 1982) provided the study with a loose theoretical framework. The work sought to address the gaps in knowledge identified in Chapter 2 through the in-depth investigation of a single, mature intranet established as a key artefact of a knowledge management implementation in a firm that had an external reputation for innovation in knowledge management. This was achieved by examining the perceptions of staff whose work and concerns were most closely associated with the firm's knowledge management implementation and the intranet, and by assessing the wider environment in which the implementation was situated.

The findings discussed in this thesis have contributed to the domain of sociotechnical studies by presenting a single, detailed case study from which a detailed actor-network analysis points to seven main roles of the intranet in knowledge sharing, as already given in Chapter 6. The intranet:

- (1) furnishes individuals and small groups with personal projects;
- (2) demonstrates status;
- (3) connects people together for the purposes of knowledge sharing;
- (4) focuses corporate attention on issues related to knowledge sharing;
- (5) inhibits knowledge sharing;
- (6) provides career direction;
- (7) measures engagement with corporate knowledge management initiatives.

There is variety in the roles identified because shared perceptions of appropriate technology use within specific environments differ (Lamb & Kling, 2002, para 64). So, for example, when the intranet is deployed for the purposes of demonstrating the status of the organisation, the role is determined internally for the benefit of an external constituency. Some of the roles are intended. For example, in this case KPMG expected the intranet to facilitate knowledge sharing. In contrast others are not. For example, here KPMG did not predict that a tool introduced to facilitate knowledge sharing would also have the potential to inhibit it. However, although KPMG did not make such a prediction, from the researcher's point of view this finding was not unanticipated given the indications in previous research that computer implementations planned with high hopes often do not deliver on their promise (see Chapter 2). Equally, the connector role identified strengthens the arguments of earlier studies that the intranet is a form of boundary object (even though such studies have not used the vocabulary of Star and Griesemer (1989)). In contrast, some roles that have emerged from the data in this research are novel in that they appear not to have been prefaced by previous studies, nor deliberately sought by the case study organisation. These are the roles of demonstrating corporate status, providing career direction and supplying measures of engagement with knowledge management within the business. It is interesting that each of these roles can easily be associated with attempts to increase power: public relations power of the organisation as an innovator; career power of the individual and selling power to support an internal corporate initiative.

The work has argued that the broad explanatory factor for these intranet dimensions is the nature of power relations within the case study firm. It concludes that the actor power of those charged with managing a knowledge management implementation, as exhibited in their status, is a major determinant of the degree to which planned initiatives can be delivered. In this case the difficulties experienced by knowledge management staff of attracting attention to their efforts, and capitalising on it when they had the opportunity, had negative consequences. This research has thereby developed the subject of ICTs and knowledge sharing, and added clarification to the role of the intranet in such activity. Furthermore, it has contributed new insight to the theme of power relations in knowledge management. This is a topic which to date has largely been neglected, and not made explicit in the literature (Ekbia & Kling, 2003).

Whilst the research has met its aims in defining the role of the intranet in knowledge sharing, and accounted for the role definitions through the exploration of power relations, there are outstanding questions on these themes that cannot be answered in this thesis. For example, a deeper analysis on how particular roles of the intranet in knowledge sharing come to be established, or the relative strength of each role according to factors such as intranet maturity or user group characteristics would extend this work. Equally a stronger focus on the roles of individuals as knowledge-sharing actors in knowledge markets, as prefaced in the work on the relevance of exchange theories to knowledge management activity, would provide a more comprehensive picture of the role of the intranet in knowledge sharing.

Despite their limitations, however, the findings have implications for researchers and practitioners with interests in knowledge management. For example, for the research community they call into question the validity of examining knowledge sharing by focusing on managerial incentives rather than the context in which knowledge sharing takes place; practitioners may reconsider approaches to staffing arrangements to support knowledge management. Some of the findings of the study that have contributed insight to the main arguments, rather than played a central role, highlight themes for further research. For example, these include claims that: specialists protect their knowledge more fiercely than generalists; reputational rewards for knowledge sharing are more attractive to those who have further to travel in career terms than their colleagues; status differences inhibit the potential for knowledge sharing between groups and individuals; when the message to knowledge share does not match the spirit of rewards on offer, knowledge sharing will not take place. Of additional interest to researchers is the extent to which the findings might be classed as a "theory", i.e. a coherent, succinct statement of a reality that is novel as well as interesting, and is clearly demonstrated in the evidence supplied. This work has theoretical significance as is evidenced in the strength of argument that points to the main findings. Although it is not possible to provide a strong and totally comprehensive generalisation on the role of the intranet in knowledge sharing, the less obvious intranet dimensions identified in the research, and the explanations offered to account for them, demonstrate the theoretical value of the work.

A further theoretical contribution is the indication from this work of the value of Fox's (2000) suggestion that actor-network theory might serve as a tool to illuminate issues of power

relations within communities of practice¹. Thus it can be argued that the work adds to Fox's articulation of community of practice theory. (The value of the research design in drawing out the theme of power issues is examined in further detail below on page 195 below.)

7.3 The suitability of the research design

It was noted in Chapter 3 that research design is important and requires evaluation independently of research results. Here, the decision to generate a case study as research output on the basis of two converging sets of data is discussed with reference to the strengths and weaknesses of the approach.

7.3.1 Research design

The main strategies employed to gather and analyse data for this study, as outlined in Chapter 3, drew on established practice in social research. Where conventions were adapted this was largely due to the local constraints of the work undertaken, with attempts to take into account precedents from similar studies. For example, although recommendations for theory building with case research (Eisenhardt, 1989) influenced research design to a large degree, the nature of the study was such that its output was not intended to meet the goal of shaping new hypotheses. Rather, it was employed to provide explanation of what was observed in the environment studied. Therefore in place of hypothesis shaping (the sixth of the steps advised by Eisenhardt) this research turned its attention to explaining what was found in the case study firm. Equally, since the work was carried out for a PhD, the advice to employ multiple investigators could not be followed.

In practice, the data collection exercises took heed of previous work on the use of grounded theory with case studies. Two sets of data gathered were handled separately. Interview data from meetings with twenty distributed knowledge management staff employed across KPMG's UK business units were fully transcribed and then analysed with the aid of a qualitative data analysis software package (The Ethnograph). These data generated the findings presented in Chapter 4. In contrast, data gathered from over a hundred corporate documents and interviews with Knowledge Management Directorate staff were reassembled manually to build a history of the knowledge management implementation at KPMG in the period 1995-2001. From this narrative, data were extracted to provide details of the infrastructure (Kling & Scacchi, 1982, p.18) and macrostructure (Kling & Scacchi, 1982, p. 16) of the environment in which KPMG's intranet and knowledge management implementation were placed. Actor-network theory provided a means of reframing the findings to present the sociotechnical analysis of the whole data set, and to present the seven roles of the intranet in knowledge sharing as discussed in Chapter 6.

¹ This on the assumption that the groups examined can be regarded as genuine communities of practice. There is some evidence to support this in the data from interviews with distributed knowledge management staff. Some interviewees spoke enthusiastically about the Knowledge Manager and Presence Producer communities, and in the Tax function the wider membership exhibited community of practice activities. See Chapter 5.

Care was taken to ensure that the empirical fidelity of the web model (Kling & Scacchi, 1982, p. 10) was exploited, and that the processes undertaken throughout the duration of the research were robust. For example, in the interviews, strategies were deployed to encourage interviewees to be truthful in their responses to questioning. These included explaining the nature of the confidentiality agreement between the researcher and the firm, and the two-year embargo on the thesis. It was possible to triangulate data gathered from the interviews by examining evidence held in the archive of company documentation. The reliability of the recorded interviews was strengthened by the practice of hand-writing notes during the interviews. The decision to concentrate on a single case study allowed for a close examination of the complexities of the “live” environment to be studied, as well as the more “visible” aspects of the artefact at the centre of the investigation, at a relatively low cost.

The value of the approach can be measured in the contribution that it has made in providing significant new insights on the multiple and fluid roles of a technology artefact, and on the influence of power relations in technical implementations. It is argued that the issue of power relations revealed itself because the methods employed in the research allowed it to do so. The research strategy of following a grounded approach in the data collection process, with a single case study as output, presented in the form of a sociotechnical analysis, permitted a exploration of issues related to the “success” and “failure” of aspects of a knowledge management implementation that produced deeper explanation than previous studies. In addressing the issue of the status of those charged with managing knowledge management across the organisation, it responds to Ekbia and Kling’s call to examine questions of knowledge-sharing practice with reference to the power as an explanatory factor (Ekbia & Kling, 2003). The nature of the work as a piece of academic research, rather than a consultancy exercise, is also important. It brought to the fore topics that may be considered taboo in work that attempts to provide prescriptive managerial solutions for the management of knowledge management implementations, such as strategies based around nagging for intranet content.

7.3.2 Multidisciplinary research

Information science is a multidisciplinary field and, as such, researchers from the domain often engage with theory originally derived from elsewhere, and import tools previously tested in other settings, in pursuit of their studies. This practice is not unique to Information science. Examples are easily identified: studies on human decision making draw on economics, psychology and neuroscience; tools from literary criticism have been deployed for collecting case histories in health research (Hall, 2003, pp. 287-288); management policy theory is supported by research in underlying fields such as cognitive psychology, organisational sociology and political science (Mintzberg, 1979, p. iv). This tradition of borrowing from other domains presents the advantage of generating practical solutions to real problems, such as the establishment of a framework for research in an emerging discipline. In terms of research output, it can help systemise concepts and understandings into a new theory, or a version of an existing theory from a new perspective.

The work discussed in this thesis report is firmly placed in the domain of information science, not least through its presentation as a sociotechnical study in the tradition of the work of Kling and his followers. However, the work clearly draws on other disciplines, either directly, or as mediated by the information science community. For example, it is noted that publications of relevance for the literature review were found in a number of academic domains from artificial intelligence to strategic management, and actor-network theory is first introduced in terms of work completed by Lamb and Kling (2002). An issue of debate is the extent to which a researcher completing a piece of work such as this should venture beyond the home discipline, for example in identifying a theoretical body of literature to support the work to be completed, or in analysing the significance of the research findings. Researchers need to be wary of the dangers of following this path, such as the potential for misunderstanding, or deploying in a naïve fashion, what is learnt from elsewhere.

Taking into account these reservations, it can be argued that the research design for this work might have paid closer reference to research that emanates from the domain of organisational theory. This conclusion derives from two perspectives. The first of these is that a number of organisational theorists have studied the implementation of ICTs. In some cases, the specific focus of such studies has been intranets and knowledge sharing (for example, Huysman & De Wit, 2002). The second reason is that it is evident that some of the findings from this study articulate closely with work completed by organisational theorists. This second point is illustrated below in a consideration of two pieces of work. The first of these, (Ciborra, 2002), presents a set of arguments that can be related to the findings on the adaptation of the intranet in the organisational setting. The second, (Mintzberg, 1979), adds to the discussion of power relations. Both pieces of work demonstrate the value of examining studies from related disciplines when conducting research in the domain of information science.

In his collection of essays entitled *The labyrinths of information* Ciborra (2002) outlines the problems of typical approaches to systems development (pp. 106-107). Some of these are exemplified in this study of KPMG's knowledge management and intranet implementation, for example:

- decision making on the future trajectory of network technologies assigned to staff without adequate knowledge to make sensible choices (p. 63);
- disappointment with projects that are sold on the basis of unrealistic promises (p.107);
- ignorance of the power of the local environment in determining ICT adoption (or non-adoption) (p. 68, p. 87);
- strong influence of the installed user base in determining the development of any new technical infrastructure (p. 61), and subsequent unexpected outcomes of implementations (p. 44, p. 87);
- rejection of formal, global ICT initiatives in favour of ad hoc, local solutions (pp. 80-82);
- lack of interest and compliance with plans on the part of those charged with the implementation when what is planned does not make sense to them (p. 108);

- alienation of staff when anticipated developments are no longer supported and/or discontinued (p. 63).

Although the focus of Ciborra's work is not intranets and knowledge sharing, he makes references of relevance to this theme in reports of studies of earlier technology implementations. For example, he highlights research completed in the mid-1990s in firms that introduced Lotus Notes. In one of these studies the new system prompted the staff into discovering innovative means of knowledge sharing and, in another, knowledge sharing was inhibited (Ciborra, 2002, p. 86). These findings resonate with those on the role of the intranet at KPMG.

The main argument of Ciborra's work is focused on questioning the utility of fixed models and frameworks for ICT design (p. 85, p. 97, p. 109). He declares that "the abstract and sanitized models and methods which represent today's prevailing forms of dogmatism need to be abandoned" (Ciborra, 2002, p. 104). His primary objection to the models is that they do not recognise the power of technical and human agents as actors in the performance of technology design and implementation (p. 8, pp. 61-62, p. 64). In effect, the models are deficient because the spirit of the sociotechnical perspective is ignored.

To address this, Ciborra maintains, organisations need to recognise that ICTs develop as the result of human prototyping, improvisation, tinkering and *bricolage* in local settings: they are not designed and implemented as fully formed products (p. 44) that will necessarily be deployed in a predictable way. Indeed, it is the extent to which human actors adopt and adapt technologies that results in the unexpected outcomes observed in previous studies. Illustrations from his own work, as well as that of others, are deployed to support the contention that: "with *bricolage*, the practice and the situations disclose new uses and applications of the technology and the things" (p. 49). This shift in the technology's deployment is labelled as "drift" (p. 88). The concept of hospitality is also introduced as a means of illuminating facets of ICT adoption and use. Organisations can be viewed as "hosts" that provide an environment for the "guest" technology as an "ambiguous stranger" (p. 116). This perspective of a relationship permits a consideration of multiple types of encounter, and, it is argued, helps account for the "humanization of systems" (p. 117).

Each of these three concepts – *bricolage*, drift and hospitality – can be observed in action in the case study of KPMG's knowledge management and intranet implementation. For example, UKnow emerged as a result of enthusiastic tinkering. Equally, drift is evident, most notably in the effective use of UKnow as a pointer tool. UKnow's eventual designation as actor endowed with greater "social" (as opposed to "technical") standing than in previous studies as boundary spanner, as discussed in Chapter 6, can be explained in the light of Ciborra's exploration of the theme of hospitality.

Rather than adhere to fixed models and frameworks in ICT design, Ciborra argues that organisations should cultivate environments where it is possible to support innovation through sanctioned *bricolage* (p. 53). They should also acknowledge that drift is inevitable (p. 26):

"Managers and specialists need to appreciate local fluctuations in systems practices as the repository of unique innovations and commit adequate resources and attention to their cultivation, even if, or especially when, they fly in the face of more established, structured approaches" (p. 53).

As well as advocating a set of approaches to systems design and implementation, Ciborra also considers research design as part of his argument. It is worth noting that, although he does not explicitly refer to the web model, it is possible to identify the four main elements in his discussion. For example, he advises that attention should be paid to the work of those charged with implementing the system (lines of work) (p. 27) and what matters to them (going concerns) (p. 107). He writes about the power of local resourcing issues (infrastructure) and externalities (macrostructure) (p. 75, p. 96, p. 98). Equally, he considers the various elements that, when placed together, comprise the links in a chain of service provision (production lattice) (p. 73). The work also indicates the value of sociotechnical studies (p. 3) based around the collection of multiple data sets (p. vii), as well as the strengths of the application of actor-network theory (pp. 64-67, p. 84).

A consideration of the discussions presented in *The labyrinths of information* (Ciborra, 2002) thus demonstrates how research conducted in one domain (in this case led by an electronic engineer whose recent work is situated in management, economics and organisational theory) has relevance to another (information science). This is evident both in terms of the research findings, and in the methods advocated. The earlier work of Mintzberg (1979) in *The structuring of organizations* also supports this contention, as will be outlined below.

The structuring of organizations (Mintzberg, 1979) concerns the body of theory on management policy (p. vi), i.e. "the management of the total organization with particular emphasis on its decision behavior" (p. vii). The content of the book is split across two related themes - (1) how organisations function and (2) how organisations are structured (p. 13) - and relates them to policy making. A number of prominent issues emerge from Mintzberg's analysis. Amongst others, these include the impact of (1) decisions on grouping staff, (2) dividing up the work and (3) co-ordinating the workers, and how organisational power bases differ according to organisational form.

As has been noted above, the work described in this thesis report presents the nature of power relations in the case study firm as the broad explanatory factor of the seven intranet dimensions. In the absence of any substantial work on the role of power relations in the knowledge management literature, it is worth turning to Mintzberg's analysis from the domain of organisational theory to seek further explanation of this issue. He presents the persuasive argument that "structure seems to be at the root of many of the questions we raise about organizations" including "strategy formation, organizational democracy and alienation" (p. xii). The value of referring to this work can be shown by considering an example on the theme of the grouping of staff. Grouping of staff creates problems of co-ordination between business units (p. 107). If staff are grouped within business units, as were the distributed knowledge management

staff at KPMG, they typically have good intragroup co-ordination, but this is at the expense of intergroup co-ordination. Mintzberg's line of argument, aligned with evidence from the case study presented, strengthens the contention that the compromise over the positioning of distributed knowledge management staff at KPMG was detrimental to the firm's knowledge management and intranet implementation.

The final section of *The structuring of organizations* articulates a number of organisational forms. The case study organisation fits the profile of the "professional bureaucracy". Of particular interest to this study, given that power relations are significant to the findings, is where power resides in an organisation that takes this form, and the implications of this power distribution. Mintzberg explains that in a professional bureaucracy power lies in the hands of the professional staff, and that "what frequently emerge... are parallel administrative hierarchies, one democratic and bottom up for the professionals, and a second... top down for the support staff" (p. 360). This reflects this study's finding that the "non-professional" staff felt that they were treated differently from (and less favourably than) the professionals. Further comments on the characteristics of professional bureaucracies articulate with the findings presented in this thesis. For example, job specialisation of professional staff creates problems of communication and co-ordination (p. 74), and the most influential support staff in the organisation are those who collaborate closely with the professionals in decision making activities, rather than work autonomously (p. 302).

In his examination of professionals' working practice, Mintzberg also provides hints that help suggest why intranet technologies might not be fully embraced by a large proportion of the staff in a firm such as KPMG. He explains how professional bureaucracies have a greater need for a highly sophisticated knowledge base, than for technical systems (p. 367). He also refers to the high level of discretion granted to professional staff in the execution of their roles. This "encourages many of them to ignore the needs of the organization" (p. 374), as well as makes it difficult for them to be reprimanded for non-compliance (p. 373). Writing about organisations in general, Mintzberg ties together the themes of unequal power distribution and informal communication channels that operate outside, and challenge, formal systems (p. 46).

Although Mintzberg's work is principally about processes related to organisations as whole entities, some of the statements on organisational change have relevance to the stages of the development of the technical artefacts, as related in this thesis report. For example, the power of fashion in determining organisational strategy is discussed: one of the roles of the intranet identified in this thesis is status symbol. Equally, the stages of structural development (craft, entrepreneurial, bureaucratic and divisionalised) (pp. 241-248) parallel the development of UKnow from 1995-2001.

This consideration of Mintzberg's work demonstrates that there is a case for looking beyond the home domain to extend the understanding of research findings, and to identify further avenues for deeper analysis of data collected in the course of research activity.

7.3.3 Limitations of the research design

The research design for this work was not without its flaws. Indeed, the approach is open to criticism for a number of reasons, some of which are common to social research of this nature, and others that are peculiar to this study. First, it would be dishonest to pretend that the literature review presented in Chapter 2 is comprehensive: it is not based on all that has ever been published on ICTs and knowledge sharing, nor on the full body of work on sociotechnical studies. Rather, the literature selected to provide the necessary background to the main body of the material presented in the thesis is a sample. However, care was taken to ensure that the literature review was informed by high quality research publications to provide an accurate representation of current perspectives on ICTs, knowledge sharing and the specific domains of sociotechnical studies of relevance to this research. This is regular practice in research where the subject area of interest crosses several domains.

Another problem, which is common to studies that take a grounded approach, is that it was only at the stage that the full set of data was analysed that it became obvious that additional questioning of the interviewees would have allowed for some important themes to be examined in greater detail. This is illustrated in the description in Chapter 3 of reactions to data gathered at the pilot interview stage: the interviewees who appeared to wander off-topic in the responses to questioning actually provided comments that later revealed important insight. Equally, in Chapter 4 the findings on the nature of the knowledge to be shared and the systems to support this cover concerns about two issues: the confidentiality of information and the failure of individuals to realise that the knowledge they held was actually worth sharing. It is surprising that none of the interviewees mentioned the highly technical nature of the knowledge held by their "professional" colleagues in the business units. This may imply something significant about the nature of relationships between the two sets of staff and the degree to which the distributed knowledge management staff understood the technical nature of the work completed by their colleagues. However, on the basis of the data collected at the time, it is not possible to draw any firm conclusions on this issue. Had it been anticipated, appropriate questions would have been designed to pursue this theme. Similarly, the order in which data were collected and analysed had implications for the extent to which individual issues could be explored. For example, the interviews with distributed knowledge management staff were conducted before the analysis of the company documentation. This meant that at the time of the interviews little was known of the firm's official knowledge management policy and plans for the intranet. This was advantageous in that the researcher started the interviews with a blank mental model of the knowledge management implementation at KPMG. However, a drawback of this approach was that it was not possible to follow up with the interviewees attestations that were later found to be at odds with the evidence held in the company documentation. For instance, in Chapter 4 attention has been drawn to the distributed knowledge management staff's claims that it was not they who held responsibility for content ownership and editorial control of intranet resources. However, it is known from the detail of Chapter 5 that the intention was for the distributed knowledge

management staff to perform this role. Whilst it has been possible to draw tentative conclusions on this mismatch of plans and practice², the opportunity to explore these issues further with the interviewees would have been available had the official line on content ownership and editorial control been known at the time of the interviews.

The work also suffered because of the researcher's position as a part-time student who pursued her work along an individualistic path whilst also working full-time as an academic. This is a problem common in PhD research. Inevitably there were periods of disengagement from the research due to the demands of the teaching calendar. Equally, the physical distance between the researcher based in Edinburgh and the main site for data collection in London imposed some constraints. For example, the relationship with KPMG was such that to drop into the firm's offices unannounced for a couple hours at a time to catch up with data collection work, such as working through the company archive of documentation, would not have been a problem. A temporary staff card and log-in permissions to the intranet were granted throughout the course of the study, and there was always a free desk available as a base on KMG's floor at Dorset Rise. However, due to the distance between Edinburgh and London, and the practicalities of fitting the research in around other commitments, each visit had to be planned in advance. Careful attention needed to be paid to time scales to make the most of the time on-site, and time had to be devoted prior to setting off so that plans for practical arrangements such as travel and accommodation could be made. Detailed records were kept of all research activity in order to minimise continuity problems with the work, and regular e-mail contact with members of staff at KPMG kept the dialogue open in periods when other commitments meant that little time could be devoted to the research.

The decision to focus on a case study as both the *input* to the research process as an empirical unit, as well as the *outcome* of the research in the form of the qualitative description in this thesis is open to criticism. Case study research in general is often believed to lack rigour, result in biased accounts and present findings that cannot be generalised. It is also deemed unnecessarily time-consuming and difficult to execute well (Yin, 1994, pp. 9-11). It is clear that the new knowledge that this research has generated is context-dependent: a set of systematic processes has produced a time-specific exemplar of a knowledge management implementation in the UK firm of single company situated in a certain industry. The insight is relevant to the time at which the units were studied, as well as their "place". Indeed, it is the focus on the environment in which the intranet was placed that generated some of the most significant findings of the research as a whole. An exploration of whether or not the findings are generalisable has not been a major concern of this work³: the intention was to draw on the

² Possible explanations were that: (1) messages on strategy from the centre did not reach those at the extremes of the business units; (2) distributed knowledge management staff took actions that lowered their status; (3) distributed knowledge management staff wanted to distance themselves from a flawed system; (4) distributed knowledge management staff felt that ownership should be devolved to the professional staff to encourage everyone to take a stake in the knowledge management implementation.

³ It is known, however, that at least two other large firms in the sector approached knowledge management in a similar way with a centralised knowledge management function and distributed knowledge management staff, Hazel Hall PhD 2004

"power of good example" (Flyvbjerg, 2001, p. 77) to present a case study to be read in its entirety. Nevertheless, it is suspected that the issues raised in this thesis on the role of the intranet and power relations in knowledge management are applicable in other contexts. The contention that case studies lead researchers to seek verification of preconceived ideas and thus present biased accounts is dismissed by Flyvberg (2001, p. 84). In this work the grounded approach guarded against such an outcome: any bias in the findings was due to the subjective stance of the data subject under examination (interviewee or content of a document), rather than that of the researcher. There is no doubt, however, that the work was time-consuming. For example, identifying documents in the company archive that *might* have held relevant information was a lengthy process. The reformatting the data gathered in two stages took much effort, not least because due to the multiple data formats this had to be done manually. It was impractical to use The Ethnograph for this work because the relevant data was scattered in small sections across many documents, some of which did not exist in electronic format. However, conducting this work in a thorough, systematic manner was important for the research to be well executed.

The methods employed to collect data are also subject to review. Often data collected using interviews is open to problems such as interview bias, misdirected prompting and issues of question wording. These problems were evident at times in this research during the interview process. Attempts were made to minimise these effects, although it is unlikely that interference was eradicated completely. For example, in one case a member of distributed knowledge management staff struggled to answer all the interview questions posed. To address this problem the line of questioning had to be made more explicit than for the other interviewees. Thus not all interviewees were treated "equally" and, in this case at least, prompting responses brought to the fore topics that the interviewee may not have initially considered worthy of comment.

One issue worth discussing is whether or not the distributed knowledge management staff actually told the truth in the interview setting. Prior to their meetings they knew a little about the research, and that it was sanctioned by the Knowledge Management Directorate. There was a danger that they might lie in their interviews in order to give a good impression of themselves, or of the firm. There is evidence in the interview transcripts that in a couple of cases some interviewees were guarded in their responses at the start of their interviews. For example, although very willing to participate in the research, one interviewee questioned the level of confidentiality being offered in the interview setting because he was afraid that he might incriminate himself in his responses. In contrast, another leapt at the opportunity to speak openly because he felt that he was always on his guard in the everyday work environment. (It is an interesting co-incidence that the interview with the single Knowledge Manager who initially objected to participating in the research failed to record due to a technical problem with the

and an intranet as the main artefact of the implementation. KPMG, however, was unusual in that it publicised its implementation widely, mainly through conference presentations.

recording equipment.) It is also the case that in some circumstances interviewees did supply incorrect information in their interviews. For example, one Knowledge Manager calculated in November 2001 that he had been in post for three and a half years. This response was accepted as accurate at the time. However, the time-line of the knowledge management implementation created later from data gathered from the company documentation showed that this individual could only have been in a knowledge management role for a maximum of three years: the first knowledge managers were employed across the firm from late 1998 onwards. His response would indicate that his position as a Knowledge Manager pre-dated this. Whilst this was a simple miscalculation, other "inaccuracies" in the interview responses were significant for what they added to the research findings. This can be seen, for example, in the analysis of the confusion over who owned intranet content and its editorial control, and whether KPMG rewarded knowledge sharing.

It is also worth highlighting the timing of the interviews with regards to the wider political environment of autumn 2001. The first five interviews were conducted just three weeks after the September 11th attacks in the United States. By the time the second set of interviews was conducted the war in Afghanistan was underway. There was a degree of nervousness in the city of London at the time. The heightened state of alert meant that everyone was aware that companies would evacuate their buildings if they sensed any danger. In the event one of the interviews was interrupted by an alarm in KPMG's building at Dorset Rise. This instantly modified the researcher-data subject relationship as the employee of KPMG took charge of helping "the visitor" evacuate the building safely, and the discussion in the privacy of the office environment on knowledge management switched outside in the street to whether or not lives were at risk. Fortunately the interviewee had enough time that afternoon to continue the interview beyond the allocated time slot, so the full interview schedule was used. The impact of this incident was therefore limited to a temporary interruption and change in participant roles. Under different circumstances it could have cut the interview short, or destroyed the interviewer-interviewee rapport established prior to the unexpected interruption.

The value of the material used to generate the findings of Chapter 5, i.e. the company documentation and the interview data from interactions with staff of the Knowledge Management Directorate, also merits discussion. The main advantage of using the company documentation was that it was generated for a purpose unrelated to this research and therefore there was a high level of confidence in its authenticity and credibility. However, documents are social products and as such reflect the subjectivity of their authorship. Added to this, there was a lack of documented evidence on the early stages of the knowledge management implementation, and even in the later stages it was evident that decisions made often went unrecorded. To fill the gaps two members of staff (Goody and Simpson) were able to provide oral accounts of activity. However, it should be borne in mind that the value of this data relied on what could be remembered, and one of the people who contributed information had not been at the firm for the full period under scrutiny. For these reasons the data on which the findings of

Chapter 5 are based were treated with caution, and their derivation made obvious in the text of the thesis.

This research may be criticised for the degree of ambiguity apparent in some of the findings presented. In places, rather than answering questions on the main themes of the study, the thesis points to further areas of debate. These “new” questions identified cannot be answered on the basis of the data gathered. For example, there is ambiguity in the role of the intranet as career ladder in that it is a ladder that appears to provide and deny access simultaneously. Another example is relevant to the matching of themes from the literature on knowledge sharing and ICTs with the findings from the case study. Officially KPMG used only a narrow range of incentives in its attempts to encourage knowledge sharing. The most significant of these was the provision of suitable technical infrastructure. This was combined with limited efforts to grow a knowledge-sharing culture in particular business units, plus a commitment to implement rewards systems. Since the full range of incentives discussed in the literature was not considered by KPMG, it was not possible to examine them further with reference to this particular case study. The impact of this is that questions on the relative merit of incentives for knowledge sharing raised in the literature review remain unanswered. Thus, on the basis of data collected for this research, the role of the intranet in knowledge sharing cannot be assessed against other factors that might be deployed to promote such activity.

Finally, this work might attract criticism for the way in which it modified grounded theory. In some respects the work followed the advice of grounded theorists. For example, it aligns neatly with Denscombe's five main characteristics of grounded theory (Denscombe, 1998, p. 217). The coding of the data collected followed the grounded approach, as described in Chapter 3. The processes were intended to ensure equitable treatment of the data – to be rigorous, clear, transparent, intentionally objective – but, as is the case with any research of this nature, this cannot be guaranteed. Whilst this is drawback of the approach taken, like many of the criticisms levelled here, it is one that is common to social research simply because this is the way in which knowledge is constructed. In other respects the approach deviated from those advocated by grounded theorists in a number of ways. It was not possible, for example, to start the research without having first learnt something about knowledge sharing and intranets from the literature. Furthermore, the practice of member checking to verify participants' responses and guard against researcher bias was not conducted due to practical constraints of the part-time work, as noted above on page 201 above.

7.4 Alternative methods for further insight

Given the deficiencies of the research design, as outlined above, attention is now turned to consideration of alternative methods by which insight on the role of the intranet in knowledge sharing might have been derived. Perhaps the most obvious approach, and one that would have addressed to an extent the issue of generalisability of findings, would have been to investigate the role of the intranet in knowledge sharing by the means of multiple case studies across a single sector. Whilst this was an attractive proposition in theory, two practical

constraints rendered it impossible: time and access. The time commitment experienced in examining just one case study organisation proved enormous. To replicate this across several organisations would have been a huge burden. Added to this, it is unlikely that access to data subjects in other firms would have been as easily achieved as it was with KPMG⁴, especially if it were known that the researcher was accessing competing firms in the same sector. Therefore, even if time were not an issue, there would have been difficulties with access. In the unlikely event of these two conditions being switched, i.e. access provided, but time restricted, compromises in the extent of data collection would have been necessary. For example, a straightforward approach might suggest the gathering of data by survey rather than by interview and/or the examination of company documentation. However, this would not have allowed the depth of analysis evident in the research presented in this thesis, and much important contextual information would have remained undiscovered. Added to these arguments is another based on one of the main findings in the literature – that knowledge sharing is a local activity. If this is accepted, then attempts to analyse knowledge sharing across a variety of settings for the purpose of providing generalisations would appear to be misguided.

This work maintains that the examination of a single case study was the most appropriate means to investigate the role of the intranet in knowledge sharing. In this case this was achieved by interviewing those officially charged with implementing the firm's knowledge management strategy, combined with a review of details held in the archive of company documentation on knowledge management in the firm. The distributed knowledge management staff members' reports on what they did in the work environment and what concerned them, i.e. their lines of work and going concerns (Kling & Scacchi, 1982, p. 17), provided evidence of how the staff they served treated the intranet. This data, in combination with evidence on the infrastructure and macrostructure of the computing environment (Kling & Scacchi, 1982, pp. 17-18) led to an appreciation of the intranet's role. However, one drawback of this analysis is that the opinions of the end-users of the intranet were not elicited. Strategies that could have taken into account their perspectives may also have been valuable.

An ethnomethodological study where the daily practice of the professional staff, i.e. their methods, were examined may have been appropriate in this case. For example, participant observation, where the staff in the business units could be observed at close quarters, would have provided the opportunity to experience actual knowledge-sharing activity in the firm within live contexts. Data collected in this way may have been more valuable than that of *perceived* practice, as determined in the interviews with the distributed knowledge management staff. It is suspected that moving the focus of the research onto the practitioners who used knowledge in the firm directly for the purposes of revenue generation would have allowed the exploration of issues identified in the literature in Chapter 2 that did not re-emerge in the analysis of data in Chapters 4 and 5. These include communities and social capital, and the possible relevance of social exchange theory to knowledge sharing. Close attention to these groupings, who may

⁴ Access to KPMG was eased through existing professional ties between the researcher and Goody.

have exhibited genuine characteristics of communities of practice, might also have generated data to extend Fox's (2000) ideas on community of practice theory and power relations.

Equally, research design based around social network analysis could have been considered had the focus of the research fallen on the professional staff. It could have been used as a tool to investigate patterns of relationships and community structure to understand how knowledge is exchanged in a corporate environment. The role of the intranet would have emerged in the context of the various strategies employed for knowledge sharing. For example, using such an approach it would have been relatively easy to assess whether UKnow was a tool for connecting people to people, or people to information. Other benefits would have been the opportunity to map out resource dependencies in the firm, understand the extent to which the type of relationships between actors impacts knowledge-sharing practice, and explain the levels of negotiation in knowledge exchanges. Such work would have built on previous work that has used social network analysis in studies of information and knowledge transfer. For example, early social network analysis considered interpersonal networks and the transfer of information (as well as material goods) (Scott, 2000, p. 230). In the 1950s researchers followed up earlier work on group co-operation and leadership and this stimulated studies on the transmission of ideas and innovation from the 1960s onwards (Scott, 2000, p. 15). Granovetter's *Getting a job* is about information flows (Granovetter, 1974). More recently social network analysis has been suggested as a tool for mapping knowledge flows in the draft guide to good practice in knowledge management produced by the British Standards Institution (Kelleher & Levene, 2001, p. 25).

Whilst these alternative strategies were attractive, practical constraints within KPMG and factors of the wider environment determined that they were not feasible. Access to end-users would have been very difficult to negotiate because the majority of them worked on the basis of "charged out" time. If interviews were to be held they would have to have taken place in the participants' own time. Changes in the business environment over the time period in which this study was completed also contributed to reluctance on the part of the Knowledge Management Directorate to attempt to provide introductions to end-users as data subjects. Access to the firm as a case study organisation was arranged at a time of business confidence in December 1999. Just five months later, however, the dot com bubble burst. The terrorist attacks eighteen months later destroyed any optimism of a recovery, and soon afterwards in December 2001 Enron ushered in a series of accounting scandals. Employees were less willing to talk to outsiders in such a climate, especially for a piece of research that did not align with their primary professional interests. Even if the data collection had relied solely on participant observation there would have been difficulties securing agreement for the researcher to act as observer (total participation or participation in the normal setting would not have been feasible given the technical nature of the work executed in the business units at KPMG), especially given fears of client confidentiality.

7.5 Conclusions from the research

The completion of this work provided more than an articulation of the role of the intranet in knowledge sharing, as discussed in Chapter 6. In terms of its contribution to sociotechnical studies it also identified power issues as a significant factor in understanding the “success” of knowledge management implementations. In addition, the research output has highlighted the enduring value of Kling and Scacchi’s web model (Kling & Scacchi, 1982) as a loose framework for qualitative studies of computer system implementations. It is anticipated that as well as being of interest to those engaged in sociotechnical studies, the findings presented in this thesis will be relevant to the concerns of the broader knowledge management community, and also to researchers and practitioners with interests in managing new initiatives across large organisations. It is argued that whilst this work provides valid and reliable findings on the basis of the two sets of data collected, there is much scope for similar studies to look at issues related to knowledge sharing and computer implementations from the end-user perspective. In such work closer attention can be paid to the more intimate, social aspects of knowledge sharing. At a personal level, executing the work as a PhD provided an excellent apprenticeship in research design and implementation. Knowledge and understanding of research processes grew considerably over the period in which the work was undertaken.

7.6 Coda

The period of investigation of the KPMG knowledge management implementation actor-network as presented in this thesis ended in December 2001. This coda, based on information provided in an interview with Goody in December 2003, provides insight as to what became of the actor-network in the following two years.

In Chapter 5 reference is made to a statement by UEP in 2001. This hinted that knowledge management work would be redistributed in favour of Knowledge Managers working in the business away from the centralised knowledge management function. Interviewed in December 2003, Goody outlined how such a change was implemented in 2002 (Goody, interview, 4 December 2003). KMG was dissolved and the centralised knowledge management staff were assigned to the Marketing function as two sub-groups: (1) Web Services and (2) Research and Information Services. Around the same time a programme of redundancies within the firm was announced.

The functions kept their knowledge management teams (including Consulting, which by this time was a separate business). All interviewees from the functions remained in post with the exception of one Presence Producer who was made redundant, and the two “out-of-box” Knowledge Managers whose appointments to knowledge management roles had always been intended to be short-term. The markets and infrastructure groups lost their knowledge management teams. One interviewee remained within his Market, but no longer as a Knowledge Manager. Four interviewees were redeployed to the centre in one or other of the

two new groupings. Of the remainder of the former distributed knowledge management staff, four Knowledge Managers took new posts within the firm, and one was made redundant.

Goody explained that although the prominence of the term “knowledge management” was lost within the firm, it continued to exist as an activity. In the functions it was the responsibility of the Knowledge Managers. In the markets and infrastructure grouping it was facilitated by Business Support Managers.