

Intranets and Knowledge Management: Complex Processes and Ironic Outcomes

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Abstract

This paper considers the adoption of Intranet technology as a vehicle for developing an organisation-wide knowledge management system. The Intranet is described as a de-centred or open technology, which therefore has the potential for multiple interpretations and effects. At the same time, the Intranet is often promoted as a collaborative communication technology. The design and implementation of the Intranet within a large global bank demonstrates the problem of using the Intranet for corporate collaboration, given the interpretive flexibility inherent within the technology. Rather than create a centripetal force, integrating individuals across this particular organisation, the Intranet, ironically, actually created a centrifugal force which reinforced the existing functional and national barriers with electronic knowledge silos.

Keywords: intranet, knowledge management, technological innovation,

which the adoption of Intranet technologies facilitates organisation-wide knowledge management defined as “the broad processes of locating, transferring and more efficiently using information and expertise within an enterprise” [1, 3]. This paper addresses these questions by focusing upon the way Intranets are diffused, designed and implemented within a specific national and organisational context. This analysis thus highlights the way Intranets interact with and change relations among organizational actors and contexts, and examines the emergent organizational effects of such interactions.

The paper begins with an overview of theoretical perspectives on the diffusion and organizational implications of Intranet technology. This highlights the interplay between technology and organization through an analysis, which encompasses the relationships and resources involved, the influence of networks and knowledge flows, and the importance of different ‘communities of practice’. This review leads us to characterise Intranets as a ‘de-centred’ technology. Such technology involves different, loosely coupled layers of functionality encompassing ‘infrastructure’, ‘infostructure’ and ‘infoculture’ [5]. Practices of design and use at each level are constituted by multiple actors, heterogeneous knowledge flows and informal networks. This analysis is subsequently applied to a meta case-study which considers Intranet developments within different areas of a large multinational banking organization - ‘Ebank’. This case allows us to explore the distinctive de-centred features of the technology within the context of its implementation and use as a knowledge management tool. Despite initial aims of knowledge sharing, our study found that Intranet developments encouraged fission not integration and tended to reinforce powerful centrifugal forces operating on the strategic development of the firm. Such effects are explained in terms of the de-centred logic of Intranet development and, in particular, its implementation

1. Introduction

It is increasingly recognised that organisations need to develop better techniques to manage their knowledge assets [1]. In particular, knowledge sharing across departments, functions or geographical locations is discussed as a core organisational competence for many (if not all) organisations [2]. Intranets are often depicted as part of the effective solution to this problem as they have the potential to allow information sharing and collaboration across departments, functions and different information systems within the organization [3]. The rapid diffusion of Intranets, however, is beginning to pose important questions about the development and effects of this technology, including concerns about the process and effectiveness of Intranet implementation [4]. In this paper we consider in particular, the extent to

within highly differentiated 'knowledge communities'. The study thus suggests a cautious approach to Intranet developments that aspire to knowledge integration. In certain highly decentralized contexts, they may have the ironic effect of further reinforcing geographical and functional barriers to knowledge exchange.

1.1. Theorising Intranets

The scope and character of Intranet developments poses important questions for our understanding of the interplay between technology and organization. Where other IS innovations are relatively discrete in their impact, the distributed character of Intranet technology has extensive implications for a wide range of user groups. Moreover, Intranet design not only has effects on workflow and communication patterns but also on the wider array of knowledge management practices within organizations. In theorising these complex interactions, the recent emergence of the 'structurationist' approach provides a useful framework. This highlights the recursive and interactive relationship between user groups, technologies and the structural properties of the organization [6].

This interaction has both processual and structural elements. In processual terms, the development of Intranet technology can be understood in terms of flows and combinations of different types of knowledge. Thus, within the design process the development of hardware and software will call on relatively codified forms of knowledge. On the other hand, the communicative aspects of the Intranet will be much more dependent on tacit knowledge, which is embedded in the shared understandings of particular user groups [7]. It is also important to recognise the importance of both internal and external networks in eliciting different types of knowledge [8]. Finally, implementation of a technology can be viewed in terms of the blending of generic, technical knowledge with the contextualised local knowledge of the user [9].

The process of technology design and use cannot be abstracted, however, from the structure of the organization or the roles played by designer and user groups within that structure. In this perspective, the adoption of information technology is seen as closely intertwined with organizational issues:

'Information technology and organization are truly homologous forms...The articulation of technology and organization recognizes that neither is fixed but that both are changing in relation to each other, and that technology users play active roles in shaping the design of this articulation.' [10:338]

This acknowledges that the institutional properties of the organization, such as pre-existing relationships and the distribution of resources may exert an important influence on the design and use of technology. As Orlikowski [6:405] notes:

"Technology embodies and hence is an instantiation of some of the rules and resources constituting the structure of an organization'.

Such rules and resources can be broadly categorised under three headings; structures of signification which are to do with the meanings circulating within the organization; structures of legitimation which encompass the prevailing norms and values; and structures of domination which highlights the distribution of power [11].

Structural contexts and new technologies alike may be recursively shaped by user responses. Technology itself is selectively appropriated by groups of users whose practices may in turn shape the wider institutional context;

"When users do not use the technology as it was intended, they may undermine and sometimes transform the embedded rules and resources, and hence the institutional context and strategic objectives of the technology's creators, sponsors and implementors". [6:412].

Also, certain user groups, notably top management, may exploit new information flows to enhance control over other groups. It has been argued, for instance, that the transparency produced by information systems may enhance the structural flexibility of organizations, permitting what has been termed a 'centralized form of de-centralization' [12]. Such effects are seen as linked to structures of domination and control within organizations [13].

Applying these perspectives to Intranet technology sheds light upon some of its most important features. One such feature is the Intranet's effect on users. As users of Intranet technology seem to be able to exert a high degree of influence over its development and use, this can be seen as a relatively 'open-ended' and 'equivocal' [14] technology, offering high levels of 'interpretative flexibility' [15]. At the same time, precisely because of this flexibility, such open-ended systems also need to be more carefully adapted to their context:

"This open-endedness offers benefits of flexibility but also creates the possibility that - without adaptation of the technology to the context and vice versa - the technology will not reflect local conditions or communication norms and hence be underutilized or inappropriately utilized"

[16: 424].

The adoption of Intranet technology, in particular then, represents a context in which multiple levels of interaction between technological and organizational factors will be relevant because of the distinctive character of the technology. Where mainframe computers encouraged centralized forms of control and standardized meanings in user interactions, and distributed computing promoted more decentralized control but retained some standardization of meaning, Intranet technology involves multiple constituents and meanings. Such a technology incorporates, according to Bressand and Distler [5], three different levels of functionality and practice, which they identify as:

- Infrastructure: the hardware/software which enables the physical/communicational contact between network members
- Infostructure: the formal rules which govern the exchange between the actors on the network providing a set of cognitive resources (metaphors, common language) whereby people make sense of events on the network
- Infoculture: the stock of background knowledge which actors take for granted and which is embedded in the social relations surrounding work group processes. This cultural knowledge defines constraints on knowledge and information sharing.

Although other studies identify various levels in information technology they are usually specified in terms of the different functional or managerial requirements associated with each level [17]. The value of this account, however, is its ability to expose the divergent and potentially contradictory relationships between these different spheres of activity. This is not to say that these levels are not conflated in practice. Rather, applying our earlier analysis to this model highlights the different configurations of relationships, resources and knowledge deployment implied by each level. To say that information technology and organization are homologous is also to say that these different layers may be as loosely coupled as the different sub-systems of the organization [18]. Thus, at the level of infrastructure, the relevant actors, resources, relationships and forms of knowledge associated with Intranet development are likely to vary significantly from the most important contextual factors and active groups implicated in the formation of 'infoculture'. One would anticipate a greater emphasis on financial resources, on legitimising structures, and on technical as opposed to user knowledge. Although these issues do not cease to operate for the development of Intranet 'infoculture', it seems likely that the crucial enablers and constraints will differ markedly. Discursive resources, structures of

signification and localized user knowledge seem likely candidates for the critical success factors in this setting.

Although this is a highly schematic analysis, it does offer a template to apply to the case-study material, which follows. It also serves to illustrate the distinctive features of Intranet technology. So various are the actors and meaning systems associated with these different levels, it could almost be argued that Intranets are not so much a technology but rather an ensemble of sometimes divergent or contradictory practices. In that sense, we would say that Intranets are a de-centred technology [18]; that is, loosely coupled systems with no core or essential characteristics or significance but rather multiple and distributed meanings and actors [20].

2. Ebank: A Meta-Case Study

2.1. Research Method and Data Collection

Our research methodology was based on an explorative case study approach [21]. While the research focuses on a single company, we were able to collect data from 7 relatively independent Intranet implementation projects (three of which are reported below) which were occurring at about the same time within Ebank in different departments. This allowed us to control for sectoral and national institutional factors influencing the adoption process and focus on organization and technology interactions. While the interviews made it clear that the projects were basically operating independently of each other, they were all nevertheless part of a common organizational initiative - Vision 2000.

Key players were identified from the various Intranet projects and these individuals were interviewed. The interviews were semi-structured and tape-recorded and later transcribed. Each interview took about one hour to complete, and focused on the objectives of the particular Intranet project with which the individual was involved and the networks and resources which were shaping the diffusion, design and implementation processes. In addition, informal conversations and documentary evidence was used in order to obtain rich process descriptions of each project.

2.2. Background to Ebank

Ebank is one of the largest European banks and was created 6 years ago with the merging of 2 independent banks of the same nationality. It is located across 70 different countries world-wide. It has grown not organically but via acquisitions of existing banks across these countries. It consists of a number of different product divisions including domestic, international and

investment banking. Previously IT had been a division in its own right, but following a restructuring in late 1997, it became part of the corporate function.

Two years ago a major global client left the bank because it did not feel that it was getting an integrated service across countries. Thus, despite Ebank calling itself a 'global bank', the reality was very different. It was rather loosely-coupled, with each country and division operating relatively independently and having its own systems which had developed historically. The vision from the top was to create a truly global networked bank. A paper was written by members of the corporate business strategy committee in 1996 recommending that Ebank develop a world-wide communications network (infrastructure) connecting all of its businesses. Moreover, it was recognised that the true competitive advantage for the bank was not simply in financial transactions but in providing knowledge to customers. Thus, the bank takes information from external sources, processes this using its own internal knowledge of financial markets, competitive forces etc. and then sells this knowledge to its customers. So the idea was to develop the 'networked bank' concept to integrate the knowledge existing within the bank - basically a Knowledge Management (KM) vision. The implementation of Intranet technology was seen as the major technology for allowing this vision to be institutionalised. The case description below follows the processes by which this vision was actually articulated.

2.3. Corporate context

A strong discursive element underpinning the various Intranet projects was, therefore, the widespread acceptance within Ebank of the concept of the 'networked bank' and of the importance of organization-wide knowledge management. In all the interviews this central theme was apparent. Moreover, all the interviewees referred to a common start point for their own project, when the idea for developing an Intranet had been 'put on the agenda' within their own particular department or group. This was an Intranet pilot project, which had been started 2 years earlier in 1996, following the loss of the important global customer. This pilot was a very technically-focused project to test out the infrastructure. Initially this was started as a top down, centrally-funded project, with most of the divisions within Ebank being involved. The formal evaluation of the project occurred after about 18 months. Ironically, one of the main conclusions from the pilot was that there was a need for greater overall co-ordination in the development of IT systems across the Bank. However, during the pilot project many of those involved had

recognised the benefits of Intranet technology for their own department and so had started to develop their own independent system, not even waiting for the formal evaluation of the pilot. Funding was not available centrally for these developments so they were supported at the departmental level. The problem was that the pilot had highlighted the perceived benefits of the Intranet and so each division opted to fund the further development of the Intranet themselves. This meant that a whole range of Intranet projects sprung up almost spontaneously and with very little linkage across these projects, although perhaps ironically most had the organization-wide Knowledge Management (KM) vision as the espoused objective underpinning them.

Thus, the original pilot project had been centrally resourced, created an internal network across the various divisions within the Bank, and attempted to use and share knowledge at an organization-wide level. Unfortunately, the outcome of this was the creation of a centrifugal force, which sent multiple groups spinning off to develop their own independent Intranet. There appeared to be a number of factors to explain this centrifugal, rather than centripetal, reaction, including:

Organizational Culture: Ebank had a history of decentralised development, with the corporate centre having a relatively hands-off approach - that is, it had tended to operate a portfolio rather than a corporate strategy. One important reason for this decentralised operation was the fact that Ebank had grown via acquisitions which had meant that the various acquired banks all had their own technologies and cultures. There was a strong endorsement among the interviewees of the advantages of such decentralization, especially for encouraging innovation.

National culture: Interviewees stressed that the national (i.e. Dutch) way of doing business is more step-by-step, and learning gradually, not going for the big change approach.

Intranet technology: Interviewees were enthusiastic about the advantages of an Intranet system, citing its information storage capabilities (there are currently over 3000 databases within Ebank) and its flexibility and the ease of maintaining, updating, accessing and editing. They also stressed that Intranets are easy to set up, once html, which they argued is not a difficult language, is understood. There were many 'hobbyists' especially within IT who had begun to play with html and so develop Intranet pages. Interviewees also pointed out that top management was generally very supportive of IT development - Ebank being among the top 5 spenders on IT in Europe.

Project Approval Process: There was a standard project approval process within Ebank. Before IT projects were

approved they must go through a formal review process. However, there were 3 different levels of this process:

The Corporate IT committee - which involves a review by very senior individuals from across the bank. This occurs when corporate funding is required.

Divisional level committees - where divisional funding is required, projects must be reviewed by Project Portfolio Groups (PPGs) involving senior management from across the divisions and some IT representation. These groups are controlled by the IT strategy unit within each division. The idea of setting up PPGs was to achieve greater co-ordination between projects by combining a business and IT focus. (PPGs had only recently been set up to achieve this).

Departmental initiatives - if at a local level there are sufficient resources, 'experimental' IT projects (locally called 'Quickscan' projects) can be started. This creates enormous opportunities for the decentralisation of IT development. Most of the Intranet projects had not been reviewed at even divisional level.

This analysis, therefore, suggests that the spread of Intranets within Ebank drew heavily on the ethos of the institutional properties of decentralization. Despite the pilot attempts to co-ordinate Intranet development, the legitimacy of organizational decentralization interfacing with the particular characteristics of the de-centred Intranet technology were too strong and countered this centripetal co-ordination attempt. Indeed, in terms of knowledge flow it was clear that the pilot had resulted in very little knowledge sharing across the divisions about the design of an Intranet. It had simply raised awareness of its potential. Each independent project then went on to select, design and implement its own unique Intranet, dependent on the resources, networks and knowledge available to those involved. Analysing these different initiatives in terms of the framework outlined earlier, highlights the impact of this decentralized context and the differentiated knowledge communities within Ebank.

2.4. The Intranet for the Domestic Division: Officeweb

Resources: Officeweb was designed for the Domestic Division (DD) of Ebank, to provide an electronic network linking the branches together. Officeweb was one of the first non-IT based Intranet projects within the bank. While the DD had had some involvement in the pilot Intranet project, a more significant event for them was a 'vision engineering' workshop, hosted by IT, to help identify the IT needs of the various businesses. This had been attended by some senior executives from the DD. The workshop was lead by GC Consulting. The potential advantages of the Intranet for linking together

the branches were identified and those involved were so enthusiastic that they immediately started a 'quickscan' project with a six week deadline. In particular, Intranet technology appeared to offer scope for supporting the more decentralized organizational structure which they were trying to move towards within the DD.

This quickscan project involved a team composed of IT and DD people, plus two external consultants from GC Consulting who designed the graphics for the pilot system. After reviewing various options, the project leader from the DD wanted to introduce a stand-alone notes system, as this appeared to be a simple solution but one which met the needs of the DD. However, the IT representatives on the project wanted to develop an integrated network solution, i.e. an Intranet. This solution won and a proposal for the development of this system - now labelled 'Officeweb' - was approved officially by the PPG. Resources for the project were, however, limited and meant that expertise for designing the system had to come from inside the bank.

Relevant structural factors: Much of the initial impetus came from the legitimizing discourse of knowledge sharing within the Bank. In development terms, however, a good deal of the effort focussed on the interpretive tasks of developing appropriate content for the Intranet.

Networks: The 'Officeweb' team was then set up, mostly composed of individuals who had been working on the quickscan project, but the IT involvement significantly reduced at this stage and the DD were left to develop the Intranet themselves, with IT focusing on implementing the TC/IP infrastructure to support the Intranet across the whole bank. While there was some informal contact between IT and the Officeweb team, this was minimal. Instead, they networked with individuals from the Library function within Ebank about the content for the system and with branch account managers who would be the end users.

Knowledge: Once the project team had developed what they considered to be a useful Intranet package, with content that was needed at the branch level, they moved forward to an on-line trial in 2 branch offices. This was the first time they had used the system on the TCP/IP infrastructure which the IT function had been installing. The outcome was a disaster because the bandwidth of the infrastructure was too narrow for the traffic they were attempting to send - it took 20 seconds to change pages! Even though they had anticipated some problems the Officeweb project team had been 'shocked' by the scale of the difficulties uncovered by the trial. The root of the problem lay in the fact that the Officeweb team had not anticipated the amount of bandwidth the system would require given the amount of information they wanted to

send. The infrastructure problems which the DD faced had not been felt by IT who had a much more highly developed infrastructure. Perhaps because of this, IT did not alert the Officeweb team to the constraints of the infrastructure, although they declared they had not been surprised when they emerged during the pilot! The Officeweb team felt IT had 'not been as open about what they knew would be a problem to Officeweb development' (Officeweb project team member) and there was some bitterness felt.

Usage: Officeweb is potentially extremely important for delivering the decentralized branch network envisioned. The project was stimulated by a vision engineering workshop put on by IT in a bid to integrate IT and business expertise. However, following this workshop, IT took a very hands-off approach in the development of Officeweb, despite the fact that they had knowledge which the Officeweb team was lacking. In terms of business knowledge, the project team sought out advice from both internal knowledge gatekeepers (the library) and end users (account managers). However, the project team lacked technical knowledge because IT did not want to get involved, even though IT were initially involved in selling them the vision of the Intranet and persuading them not to go for a simpler, stand-alone notes system. A lack of resources and knowledge appeared to have been significant in constraining the involvement of more technical expertise and this undermined the implementation of Officeweb (it was not running at the time of the last research visit and they were intending to implement it at a regional rather than a branch level to overcome the infrastructure problems even though this was in total opposition to the decentralization strategy which they were trying to implement through adopting the Intranet). The IT function did not feel that the problems Officeweb was experiencing were their problems, but simply due to the naivety of the project team who did not understand the problem of bandwidth. The IT solution was to make users pay for using the infrastructure. This appeared to contradict the vision of the globally networked bank and KM principles in general.

2.5. Global Transaction Services Intranet: SKAN (Sharing Knowledge Across the Network)

Resources: This Intranet was developed in conjunction with the creation of an entirely new Business Unit (BU) within the bank - Global Transaction Services, set up in 1997 to provide an integrated service for global customers, combining 3 areas that had previously been independent - payments, cash management and trade (e.g. guarantees). SKAN was an Intranet which was

designed to provide the integration mechanism across this globally dispersed BU. The business case for setting up this separate BU was done by GC Consulting and the business case was finally approved on April 24th 1997. There were about 40 GC consultants involved in defining the business case. CG also involved some consultants from a company called KMinc., a UK/USA company which specialises in KM, so that KM requirements were specified by KMinc. within the business case.

Immediately the approval was granted they started talking to two vendors who could deliver the concept of a global network (they had done a data-warehouse project internally prior to this, but this was more a proof of concept than an actual project). GC Consulting were involved in evaluating the bids from the 2 potential vendors (Habn and CIBYL Consultants) and then selecting CIBYL Consultants. (As an indication of the size of the project, it is worth noting that the GTS project is bigger than the yearly turnover of the national CIBYL Consultants organization). Initially CIBYL Consultants had 140 people working within GTS, with very few internal Ebank employees. However, there were communication problems - 'whatever obvious problems you can think of with such an arrangement - we had them' (SKAN project member). So Ebank was arguing for a reduction in the number of CIBYL Consultants people involved to 20-25. CIBYL Consultants argued that they needed to keep 50 personnel on the project - the outcome of this had not been resolved at the time of the research interviews but the belief was that a compromise would be reached of about 40 external consultants working with a smaller number of Ebank employees.

Relevant structural factors: This project was certainly deemed legitimate in terms of the globalizing strategy of the bank and seems to have been designed with the aim of reinforcing and celebrating the autonomy of this newly created division.

Networks: SKAN was much more extensively planned than the other Intranets considered as it was based on the business case used to justify the creation of a brand new BU. The Intranet project itself was divided into a number of sub-projects, one of which was a KM project. A survey was done by CIBYL Consultants/KMinc. to gather the business requirement for both KM and data ware-housing. From this they defined the information systems requirements of SKAN, including both the information needed and the functional requirements of the system, restructuring around the newly formed GTS. Expertise was brought in, it was argued, because Ebank did not have content-developers and knowledge engineers internally, despite the fact that there were so many other divisions and groups experimenting with these ideas at the same time.

Knowledge: CIBYL Consultants came in and divided the large project into lots of sub-projects and problems of communication and integration surfaced. The main problem was in terms of the business focus as CIBYL Consultants had the technical expertise but not the business expertise. So reducing the number of CIBYL Consultants and increasing Ebank people with a business focus was seen as the way forward. However, the problem was that there were few 'spare' Ebank employees as so many of them were involved in other big projects like the introduction of the Euro for 1999 and Year2000 projects.

Usage: KMinc. had pushed the idea that KM was not about building an IT system but about changing the culture so that people were willing to work together and share knowledge. It was acknowledged that this conflicted with current practices which rewarded individuals for their personal knowledge, not their sharing. However, the initial thrust had been to develop the Intranet system itself - SKAN. As with the other two Intranets, the information being put on to SKAN was not new, just collected together electronically for the Intranet. People could thus obtain their information from one integrated source and have the possibility to feedback and set up discussions etc. The infrastructure was working effectively and so allowed the basic SKAN system to operate. However, there were problems with the infostructure. For example, in terms of content, there were frequent complaints that the information was not up-to-date. To overcome this problem they had recently introduced a system to monitor content: each item of information on SKAN was given a rating of 1-3: 1. KM fully-approved content which KM line would guarantee accuracy of; 2. KM line monitored; 3. KM line take no responsibility for content. However, at the time of the interviews it was too early to judge the effectiveness of this process and there was not much optimism about the wide-spread acceptance of these rules.

So in GTS the Intranet project also had a very heavy technical, information focus, despite the original emphasis on KM and the inclusion of KM specialists on the project team. Certainly, the business aspect of SKAN and the need to change culture was discussed but little had been done to impact this despite the fact that it was acknowledged that the reward system contradicted the philosophy of knowledge sharing. In terms of the technical knowledge the expertise had been bought in relying almost 100% on outside consultants and there was very little to suggest that this knowledge was being transferred to internal individuals. External networks were driving the project but these had not been integrated with internal networks even at the local level. The justification for this was the need to push ahead

quickly so money and resources had been 'thrown' at the problem in order to enact the long-term vision of the bank as a global networked organisation. Some of the problems with this approach had recently been recognised and the external involvement had been reduced. However, the prospects of increasing the internal involvement appeared limited because of a lack of slack, given other major projects that internal staff were involved in, particularly in relation to the Euro and year 2000.

2.6. The IT function Intranet: IWEB

Resources: Iweb was developed specifically for use within the IT function. Following the commencement of the initial Intranet pilot, a key manager within the IT group recognised the potential of the Intranet. The Iweb project was started informally, with the setting up of a small experimental group to look at its feasibility - a 'quicksan' project. With a quickscan project, if the technology looks promising after this preliminary study, then a formal project proposal will be put forward. However, in terms of the Iweb development this did not happen and it remained a departmental initiative. Nevertheless, Iweb was particularly well-resourced from a technical point of view, because, being developed within the IT department, they were able to purchase state-of-the art servers to provide the system platform.

Relevant structural factors: Much of the rationale for Iweb had to do with the importance of developing Intranet expertise within the IT function. Although this aspiration was certainly legitimate in terms of the functional structure of Ebank, it clearly had implications for the IT function's power-base and its ability to retain control of key expertise.

Networks: As originally the group did not have its own internal expertise, it brought in two external consultants to work full-time with the internal project team. The selection of the external expertise was based on prior contacts with the particular IT consultancy - GC Consulting. They did not undertake an extensive search of potential sources of expertise both because they believed their existing networks already enabled them to identify the most appropriate source and because it was initially only an experimental project. In the event this proved problematic as within three months the external experts from GC had been dismissed because they were unable to supply the organisational (as opposed to the technical) expertise which was needed (see below).

Knowledge: These external experts worked with a small (5-6) group of internal individuals from the IT department. Given the background of the internal project team members however, the Intranet technical expertise

was soon appropriated internally. Moreover, beyond the immediate Iweb project team, many individuals within the IT function began to 'play' with html during their spare time. These 'hobbyists' were frequently referred to during interviews and were an important spur to the Iweb development.

At the time of the interviews, the Iweb infrastructure was fully operational and they had also developed fairly well-established rules governing what was put on the Intranet and how - i.e. the infostructure. Attempts were being made to make the Iweb configuration the standard for the whole organisation. However, this was being resisted by other groups who had developed different sets of rules and procedures. More importantly, perhaps, there were problems in the actual use of the Intranet across the group of potential users within IT. Iweb functioned as an information system centrally storing information that was previously available only in other forms, often as written documents. Many individuals continued to use these alternative forms when they wanted particular information. This was recognised as a problem and indeed had been part of the reason for working with GC Consulting at the outset - 'the Intranet is not simply about techniques - we can deal with these largely in-house - but it is also about cultural change within the organization - to get the people to use the information on the Intranet' (project manager). GC Consulting was believed to be one of the few national firms which had successfully developed their own Intranet. However, they had been able to force people to use their Intranet by first, requiring all employees to purchase their own PC and modem (at a reduced cost) so that they could all have access to the Intranet from wherever they were, and then simply only using the Intranet to communicate and exchange information. This had worked for GC but it was not an appropriate solution for the bank which included a much broader range of individuals even within the IT group.

Usage: Iweb was well-resourced technically and, because of a lack of internal expertise, was initially developed using external technical expertise, which was identified through previously existing networks. Then, because of the high level of technical expertise within IT, this knowledge was easily appropriated internally. However, the organisational knowledge needed to fully implement an 'Intranet culture' - an infoculture - they found impossible to appropriate from external sources, despite their efforts to do this. Thus, the system was very narrowly defined and was really only an information storage system. Concepts of KM and global networking were not readily apparent and the system was not developing as a vehicle for true sharing of knowledge and experience across individuals and groups even

within this narrow functional group. There was certainly no sharing across this boundary.

3. Conclusions

The three examples of Intranet development demonstrate the importance of resources, networks and knowledge during the implementation stage. The three Intranets were very different in these respects. SKAN was able to call upon a huge pool of resources while Officeweb struggled for even limited internal resources in the form of person-hours to be made available. Iweb fell in-between these two extremes. In terms of networks and knowledge, SKAN made extensive use of a variety of external contacts, but failed to involve internal actors in these networks so that the knowledge was never transferred or appropriated. Officeweb had good internal business links but failed to develop strong networks to link in with the technical expertise which it therefore lacked. Finally, Iweb did involve external networks and managed to acquire technical knowledge so that it could support the Intranet technical development internally, but the project team did not manage to similarly appropriate the business and organisational knowledge required for a fully developed Intranet - the infoculture was missing.

Thus, in none of the three examples had the Intranet been fully appropriated by its users. Officeweb had been thwarted by basic infrastructure problems which stemmed from a lack of technical expertise on the project team. SKAN had been successful in developing the infrastructure. However, the development of SKAN had relied almost exclusively on external expertise for both content and structure and there had been no real attempt to acquire this expertise internally. This created infostructure problems as there was no recognition internally about the importance of keeping the system up-to-date and therefore informationally useful. Iweb had also used external expertise but had at least managed to acquire the technical expertise internally and had developed a set of infostructure rules and procedures for creating and utilising the content on the system. However, this infostructure was resisted by other groups developing Intranets. More importantly, Iweb had not done anything to create the infoculture needed to support the creation and sharing of knowledge across the system, despite the fact that the importance of this was acknowledged. They had attempted to 'buy-in' this expertise as well but had failed as the Ebank culture was so different to that of the company whose expertise they were trying to appropriate here.

While there were severe limitations to the effective utilisation of all 3 Intranets considered, what is even

more apparent is the lack of any synergy across the 3 developments. Indeed, the thwarted attempts by the Iweb team to have their infostructure rules and procedures accepted as standard, demonstrates the conflict, rather than synergy involved. Far from creating a global network integrating functions and groups across Ebank, the development of these independent Intranets could be said to be increasing the barriers, with electronic knowledge silos reinforcing the already existing functional and national barriers. There had been little transfer of learning across the group as a whole - the design process had been negotiated at the local level, bridging, at least in some cases, the external and local internal expertise, often quite successfully. However, the main problem was the wider communication of this expertise across the different business groups, primarily because the different business groups operated so autonomously and had little interaction. This severely limited the broader articulation of the Ebank vision within the specific Intranet developments.

There was increasing recognition within Ebank of the need to provide internal co-ordination and changes had been very recently instigated - dispersing IT into the businesses by creating local business strategy units, creating an Intranet steering committee, and setting up the PPGs to provide a centralised system for the approval of IT project proposals. However, the stress was on creating this co-ordination informally rather than formally and given the history and culture of Ebank it appeared unlikely that this would provide the full network of bridges which were needed to connect the many different 'islands' (both geographical and functional) which currently limited the organisation-wide co-ordination of knowledge. The result was an array of Intranet sites which potentially confused the user and which was unlikely to promote the concept of the global network supporting corporate-wide knowledge sharing and organisational level learning.

4. Discussion

As our case-studies have shown, Intranets are a highly accessible distributed technology, with a multiplicity of functions and a highly context-dependent pattern of usage. In that sense, they represent an 'open-ended' or 'equivocal' technology [6, 14]. In practice, this suggests that Intranets may have a range of organizational implications. For example, they may serve as an important integrating mechanism encouraging communication and knowledge-sharing across a variety of different groups. On the other hand, given their ready applicability, Intranets may conceivably be used as symbols and instruments of sub-unit power and

autonomy, thereby reinforcing divisions across groups within organizations. It was the latter which was more in evidence within Ebank.

Yet while Intranets have the features of 'open-ended' technologies they are often adopted for particular very deterministic purposes. In the case reported here the discourse centred around increasing organisation-wide knowledge management processes. This requires a degree of organizational control over the design and use of the technology. The problem of balancing the centrifugal forces created by adopting an open-ended technology, need therefore to be balanced by including a variety of co-ordination mechanisms [22]. There was certainly not enough effort put into this co-ordination within Ebank, which may not have been surprising given its cultural emphasis on decentralization.

This institutional context influenced Intranet developments in a number of ways. At one level, decentralization as both a structural attribute and a discourse prompted different groups to use Intranet technology to promote their own autonomy. This meant that these differing Intranet initiatives tended to promote centrifugal tendencies within Ebank as each group privileged their own radically differing needs and world-views. However, this centrifugal effect was not attributable to the institutional context alone, for the de-centred nature of Intranet technology itself seems to have militated against whatever integrative functions it might serve. Given the requirements of the infrastructural, infostructural and infocultural elements of the Intranet, our case-study groups found it difficult to achieve the requisite blending of knowledge and resources capable of linking and assimilating different levels of design and use. This may have partly been because the demands of these different levels were contradictory. Infrastructural development, for example, implied standardization and some reliance on the centralized expertise of the central IT function, but a truly meaningful infoculture seemed more likely to grow out of the localized sensibilities of different user groups.

It may be that the de-coupling of these multiple Intranet functionalities also reflects a more fundamental problem to do with the distributed and highly tacit nature of organizational knowledge [23]. These qualities of useful knowledge may themselves subvert attempts to achieve a standardized approach to the sharing of knowledge. Arguably, information systems aimed at knowledge management need to maintain the integrity of the social communities in which such knowledge is embedded. As Boland and Tenkasi, put it:

"Communication systems must....support diversity of knowledge through the differentiation provided by perspective taking within communities of knowing" [24:359].

Following this argument, the notion of a centralised approach to knowledge management as an integrating mechanism needs to be critically scrutinised. If it is not to be homogenizing or de-skilling, knowledge management must incorporate the diversity of perspectives developed by different groups:

“The problem of integration of knowledge in knowledge-intensive firms is not a problem of simply combining, sharing or making data commonly available. It is a problem of perspective taking in which the unique thought worlds of different communities of knowing are made visible and accessible to others” [24:39].

Whether it is possible to make visible these different communities of knowing within a large globally decentralised organisation remains an empirical question, but it is certainly not unproblematic, as demonstrated by the Ebank case.

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