

FORMULATING AN ORGANIZATIONAL KNOWLEDGE STRATEGY: THE INFLUENCE OF EXISTING IT INFRASTRUCTURE

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Abstract

This paper questions the influence of a pre-existing information technology (IT) infrastructure on the formulation of an organizational knowledge strategy. We draw on a classification of four different strategic views of IT infrastructure and explore how the historic investment in IT infrastructure enables and constrains the formulation of knowledge strategy in four case organizations. The four case organizations are representative of different scenarios of historic investments in IT infrastructure and knowledge strategy formulation. Our findings indicate that an IT infrastructure that is minimal or fragmented constrains the formulation of an explicit knowledge strategy. We further find that an extensive existing IT infrastructure enables the pursuit of an explicit knowledge strategy, but that even an elaborate IT infrastructure can introduce some constraints on IT facilitated knowledge processes in the organization.

Keywords: knowledge strategy, IT infrastructure, IT investment, knowledge reinvention, codification, personalization

1 INTRODUCTION

Since the early days of computerisation, many organizations have invested in information technology (IT) and systems to support various business functions. Given the constant innovation and growth in the information technology sector over time, organizations have considered investing in a wide range of IT infrastructure comprising networks, servers, desktops, printers, databases, electronic messaging, corporate intranets, and so forth. This investment also encompasses the “human” aspect of the organization’s IT infrastructure (as reflected in the technical know-how, skills, policies, standards, experience, etc., of the various IT infrastructure support services (Weill and Broadbent, 1998)).

Given the magnitude of such an investment over time, much attention has been focused on how organizations can leverage their IT infrastructure to achieve their business objectives (Weill and Broadbent, 1998; Willcocks et al., 1997). One of the more recent considerations in this regard is knowledge management. Knowledge has been positioned as a strategic asset that is tied to the sustained growth and competitive positioning of the organization (Zack, 1999). To manage organizational knowledge effectively, a defined knowledge strategy is regarded as important (Earl, 2001; Hansen et al., 1999; Zack, 1999). The organization’s IT infrastructure is seen as one of the essential resources to support an effective knowledge strategy (Alavi and Leidner, 2001).

Accordingly many organizations find themselves in the situation where their historic investment in IT infrastructure predates their current knowledge management initiatives. This situation raises interesting managerial challenges in the sense that the past conceptions of IT infrastructure may only loosely link to the organization’s current aspirations in terms of knowledge management. In this paper we question how a pre-existing IT infrastructure enables and constrains the formulation of a knowledge strategy in the organization. By the formulation of a knowledge strategy we mean how the knowledge strategy is articulated in the organization (as an explicit strategy statement or implicitly, e.g. as part of the mission/vision), as well as how actionable the strategy is (i.e. if it can actually be implemented in practice).

We explore this question by means of four case studies that we conducted on the influence of IT infrastructure on knowledge strategy formulation. The four case studies are representative of different scenarios of investments in IT infrastructure and knowledge strategy formulation. The first case is a small Australasian consulting organization in the educational sector where the investment in IT infrastructure has been minimal and the knowledge strategy is largely implicit. The second case concerns an Australian plastics manufacturer where the investment in IT infrastructure has historically been towards achieving cost savings; their knowledge strategy is also largely implicit. The third case is a public-sector organization in Australia that provides research and statistical data for economic policy planning and development; their existing IT infrastructure is closely tied to their business strategy and the organization has a clearly articulated knowledge strategy. The final case is a large global management consulting organization where the existing IT infrastructure is viewed as a core competence that extends strategic options and flexibility; this organization has an explicit knowledge strategy and a dedicated knowledge management team.

The structure of this paper is as follows. We review the pertinent literature about business strategy, knowledge strategy and IT infrastructure investment in organizations. We draw on a framework from the literature of four different strategic views of IT infrastructure that organizations tend to adopt. Following that, we outline our research methodology and present the four case studies. We compare the findings from the cases which indicate that historic investments in IT infrastructure influence the formulation of an explicit knowledge strategy and do not necessarily address all organizational aspirations in terms of knowledge process support.

2 STRATEGIC PERSPECTIVES ON KNOWLEDGE STRATEGY AND IT INFRASTRUCTURE

A rich body of literature exists on business strategy, knowledge strategy and strategic views of the organization's information technology infrastructure. Given the scope of the research question, we draw on concepts from the literature about different approaches to knowledge strategy formulation and IT infrastructure. We review the literature on knowledge strategy and especially the codification and personalization strategies of knowledge as supported by the organization's IT infrastructure. To reflect upon an existing IT infrastructure, we draw on literature sources about different strategic views of IT infrastructure investment.

The ideas that underpin knowledge and knowledge management (KM) in organizations are not fundamentally new (Spiegler, 2000) and can be traced to concepts such as the 'learning organization' (Senge, 1990) and 'organizational memory' (Huber, 1991). In addition, the role of information technology in broadly enabling and supporting knowledge work and knowledge workers in organizations has been well documented in the past (Ciborra, 1996; Davenport et al., 1996; Sviokla, 1996). In this paper, we adopt the definition of Davenport and Prusak (1998) of knowledge: "*A fluid mix of framed experiences, values, contextual information, and expert insights that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, it is embedded not only in documents or repositories but also in organizational routines, processes, practices and norms*".

2.1 Business Strategy and Knowledge strategy

Organizations compete in the marketplace to perform activities that are different to their rivals (Porter, 1985; Ruggles, 1998) by executing business strategies. Porter (1996) has argued that business strategy is about creating and sustaining a unique and competitive position, which involves establishing a fit among all the activities of an organization. Zack (1999) has extended this competitive perspective on business strategy to knowledge strategy "*as the balance between knowledge based resources and capabilities to the knowledge required for providing products and services in ways superior to those of competitors*". This perspective of knowledge strategy corresponds to the resource-based view of the firm (Mata et al., 1995) which argues that knowledge-based resources better account for the organization's long-term competitive position in the business environment.

The role of information technology in the implementation of knowledge strategies is widely recognised in the literature (Alavi and Leidner, 2001; Davenport and Prusak, 1998; Kautz, 2002; McDermott, 1999). In this regard, Hansen et al. (1999) have suggested two approaches to knowledge strategy, namely *codification* and *personalization* to inform how knowledge strategies are implemented given the IT infrastructure. A codification strategy primarily focuses on IT infrastructure as a means of codifying, storing and reusing knowledge by means of technologies such as databases, intranets, and portals (Alavi and Leidner, 2001; Davenport and Prusak, 1998; Dunford, 2000; Markus, 2001). In a personalization strategy, knowledge is managed by emphasizing people-to-people relationships and IT infrastructure is tailored primarily to link knowledgeable individuals by means of email, online discussion forums and so on (Hansen et al., 1999; Kautz, 2002). Both these approaches foster knowledge exchange in organizations by largely emphasizing the explicit facet of knowledge (Polanyi, 1966). It has been argued that a robust IT infrastructure is necessary to support, integrate and manage knowledge (Alavi and Leidner, 2001; Davenport and Prusak, 1998; Weill and Broadbent, 1998).

Some literature sources suggest that organizations adopt specific strategic views regarding the depth and emphasis of their IT investment, in line with their business strategies (Henderson and Venkatraman, 1993; Weill and Broadbent, 1998; Willcocks et al., 1997) (there are however also considerable arguments against such a "clear-cut" alignment between IT and business strategy

(Ciborra, 2000; Ciborra and Hanseth, 1998)). In the following section, we review different strategic views on IT infrastructure investment based on the existing literature.

2.2 Strategic Views of IT infrastructure

Of the mentioned sources that advocate a strategic perspective on investment in IT infrastructure capability within organizations, we consider the four strategic views on IT infrastructure investment of Weill and Broadbent (1998) as a basis for argument and analysis in this paper. We chose this particular classification since it offers a simple taxonomy to associate and analyze the organization's IT infrastructure given its business strategy and knowledge strategy, especially from a historic perspective. We expand on our use of the Weill and Broadbent taxonomy of strategic views later on.

According to Weill and Broadbent, organizations primarily adopt one of four different strategic views of their investment in IT infrastructure: *none*, *utility*, *dependent*, and *enabling*. Each view is driven by different strategic objectives, has different levels of direct investment and seeks to deliver distinct infrastructural capabilities.

The *none* view of IT investment reflects the situation where the organization has no common organization-wide view of their IT infrastructure (Weill and Broadbent, 1998). Every business unit invests independently in information technology and thereby the organization loses economies of scale and synergies associated with a shared IT infrastructure (Weill and Broadbent, 1998).

The *utility view* of IT investment captures the situation where the IT infrastructure is primarily built to achieve low cost and efficiency and thereby improve the economies of scale in the organization (Weill and Broadbent, 1998). As a result any investment beyond cost savings/efficiencies would be resisted in this particular strategic view.

The *dependent view* of IT investment is driven by the organization's business strategy. Here the view on investment is influenced by the current business plans that articulate specific strategic goals encompassing the current business strategy and strategic intent of the organization (Porter, 1996; Prahalad and Hamel, 1990; Weill and Broadbent, 1998). The scope of IT infrastructure is derived from clearly defined business strategies. A balance of cost savings and strategic flexibility in terms of IT investment forms part of such a view (Porter, 1996; Weill and Broadbent, 1998).

The *enabling view* of IT investment represents the scenario where IT infrastructure is regarded as a core capability and is robustly incorporated and resourced within the strategic perspective of the organization (Weill and Broadbent, 1998). The enabling view brings an extensive infrastructure capability and opportunities to extend strategic options (even beyond the current strategy) in the organization (Porter, 1996; Weill and Broadbent, 1998).

As mentioned, there is some controversy in the literature surrounding the normative perspectives of Weill and Broadbent regarding the formulation of an IT investment strategy in line with a given business strategy. One of the arguments raised in the literature is that these different views on IT investment drift from one mode to another without clear explanation (Ciborra and Hanseth, 1998) and as such, the normative advice of Weill and Broadbent is questioned. In this paper we steer away from the normative aspects of Weill and Broadbent and apply these four strategic views only to classify the historic approach to investment in describing the existing IT infrastructure in the case organizations (i.e. with the benefit of hindsight).

This literature review indicates that the link between business strategy and knowledge strategy has been widely addressed in past research. In addition, the link between business strategy and IT strategy has also been explored at length. However, the link between knowledge strategy and IT infrastructure remains less clear, especially with regard to how a historic investment in IT infrastructure enables or constrains knowledge strategy formulation.

3 METHODOLOGY

We chose the case study approach (Neuman, 2000; Yin, 1994) to examine and analyse the different views of IT infrastructure investment in the context of knowledge strategy formulation. We selected four organizations of which their historic investment in IT infrastructure corresponds to one of the four investment views as outlined earlier. This enabled us to explore the relationship between each organization's historic investment in IT infrastructure and how this has influenced the organization's knowledge strategy formulation in depth (Benbasat et al., 1987; Yin, 1994). We use the pseudonyms EduCo, ManuCo, StatCo and GloConCo for the case organizations.

Data was collected from multiple sources including formal interviews, information systems observations and documents about IT infrastructure, business strategy and knowledge strategy (Neuman, 2000; Patton, 1990). We have conducted thirty-two formal interviews and follow-up interviews in the four case organizations (7 in EduCo, 11 in ManuCo, 4 in StatCo, and 10 in GloConCo). The formal interviews were semi-structured using an interview guideline (Neuman, 2000; Patton, 1990). The interview guideline consisted of mostly open-ended questions and was developed from themes based on the research literature on IT infrastructure, systems and knowledge strategy¹.

The formal interviews lasted mostly for about an hour and were audio-taped and subsequently transcribed. To check the internal validity of the data, the interview transcripts were verified with the interviewees to identify possible errors (Neuman, 2000; Yin, 1994). Additionally, we took detailed notes during the interviews. The interviewees were mostly senior managers who were involved in decisions about investments in IT infrastructure as well as managers involved in the formulation of knowledge strategies. We focused on managers who had a good recollection of their organization's IT infrastructure investment, and on managers who had an understanding of their organization's current or implicit knowledge strategy/approach. Other sources of evidence consisted of documents such as IT infrastructure information, strategy reports, organizational charts and related information on knowledge management in each organization. In addition we also examined the IT infrastructure in these four sites (e.g. the basic networks, databases, intranets, and portals in use at the case organizations).

The data collected in the four cases form part of an ongoing study of the relationship between knowledge strategy and existing IT infrastructure. We analysed the data based on the four strategic views on IT infrastructure investment and the knowledge strategies observed in each case organization. In analysing the data, we made use of investigative (data) triangulation where the authors worked independently and collaboratively in view of the evidence and interpretations thereof (Patton, 1990; Yin, 1994). This was pursued in a repetitive method concluding in the set of analyses presented in this paper.

Data analysis was done in each case by identifying themes in the data (Miles and Huberman, 1984) such as strategy statements, knowledge processes, existing IT infrastructure, as well as relationships between knowledge strategy and IT infrastructure. In identifying themes, we compared and linked specific statements from the interview transcripts with those in other interviews, but also other relevant documents that we obtained. In this process we employed techniques such as coding, classifying and pattern matching (Miles and Huberman, 1984; Yin, 1994). We also applied these techniques in cross case analyses of the data to identify similar and distinct themes between the case organizations (Yin, 1994).

¹ A copy of the interview guideline is available upon request from the authors.

4 CASE STUDIES

In this section, we present the four case studies. The cases illustrate the existing IT infrastructure and knowledge strategies of these organizations. The existing IT infrastructure in each case reflects one of the four strategic views of IT infrastructure investment as identified earlier: none, utility, dependent, and enabling.

4.1 EduCo (the 'none' view)

EduCo is a consulting organization in the educational sector with branches in most of the major cities in Australia and New Zealand. It is a member-based organization comprising of a large network of student advisers, counsellors and consultants based in the two countries. EduCo provides a range of services that includes advice to international students on living and studying abroad, policy development for international agencies that recruit students, and advice to universities on issues associated with international students. EduCo's primary business focus is the dissemination of pertinent knowledge to its members and ensuring that expertise is available to them when required to solve clients' problems.

EduCo does not have an explicitly articulated knowledge strategy. However, the organization's mission statement does make implicit reference to the culture of support and knowledge sharing between its members. Information and knowledge is shared between the members mainly through interpersonal networks. Much of the organization's documentation is in hardcopy format and is shared between member-branches via the postal system.

The IT infrastructure in EduCo is minimal; the organization has an e-mail system and a simple website. E-mail is the primary means of transferring messages and electronic documents between members, and for interacting with clients. Each EduCo branch is responsible for its own IT infrastructure services. EduCo's approach to investment on IT infrastructure can thus characterised as the *none view*, with no clear firm-wide IT infrastructure strategy in place.

The organization's current IT infrastructure and information exchange processes hamper their aspirations in terms of knowledge sharing between members and branches. The President of EduCo commented:

"The lack of IT is restricting the process of dissemination of [codified] knowledge, because much of the knowledge and materials are in hard copy documents and these are physically being moved around [between the branches via the postal system]...The handover of information is sporadic and is often delayed ...This [process] is not very effective...there is inconsistency and it often takes 6 months before someone has the material to work, given their stated role."

Given their existing IT infrastructure and desire to share knowledge between members, the Vice-president of EduCo noted the following additional constraint:

"One of the problems that we have had is, although we use the technology to share the information, we have not necessarily used the technology to store the information. And over the years that gets lost, that's a huge problem for us as an organization because strategically we want to be able to capture the information and not reinvent the cycle all the time."

The Vice-president also raised the need for an IT infrastructure to enable timely exchange of knowledge between members in the organization:

"... We want a centralized database that can be instantly updated by the members themselves about various aspects of past and present experiences on international

student-related issues. That's why we are looking for a new website that has all sorts of facilities as well."

The president of EduCo also commented on the constraints of their existing IT infrastructure on their knowledge strategy development:

"The lack of IT is restricting...we certainly can make much more use of IT than we have in the organization... So we need to develop our knowledge strategy, and then work out the appropriate application or use of technology to do that most effectively."

4.2 ManuCo (the 'utility' view)

ManuCo is located in one of the states of Australia and is involved in the manufacturing and selling of polyvinyl chloride (PVC) powder to the local and overseas market. It is an organization comprising of process engineers, chemists, technology managers, operational staff and other technical specialists in chemical manufacturing. The process of manufacturing PVC is knowledge intensive and relies on the integration of expertise from different parts of the organization. The market demand for PVC in Australia is higher than ManuCo's current productive capacity. Given the dynamics of their market the business seeks to harness the learning and experience of its specialist employees in order to maximize the productive output of the plant.

The knowledge strategy of ManuCo is not articulated, but is implicit in their business philosophy. Still the organization is keen to formulate a specific knowledge strategy geared towards increasing the productivity of the manufacturing plant and reducing the existing redundancies and inefficiencies in their manufacturing and related business processes. The need for a knowledge strategy to address some recurring problems is reflected in CEO's comment:

"In a manufacturing plant getting one shift talk to the next shift, talk to the technical guys, talk to the maintenance crews and actually pool their resources from past to current experiences for an optimal solution is actually quite difficult, particularly as shift blokes are only on site a few days a month during daylight hours. During the rotations they don't share very often. So in the last 8 years that I have been involved in this plant, they keep solving the problem over and over again."

The CEO further explained how ineffective sharing of knowledge leads to productive inefficiency:

"We lost 5000 tonnes in production through the operating group last year. They got it wrong and all those things [that went wrong] are known and should not have occurred. So in a [worker's] whole lifetime, a specific problem may only come up once. When it comes up, they have never seen it. But it has happened 15 years ago and someone else knew the answer. That's the challenge we have to get beyond."

ManuCo has a wide range of IT infrastructure services and transactional systems all geared to reduce cost and save time through automation of specific processes. These include a variety of databases, control and production scheduling systems, an intranet, a website and so on. Of particular mention is a sensor-based communications infrastructure installed at their clients' premises that remotely detects the level of PVC powder in stock and automatically alerts ManuCo to re-supply when stock dips below an agreed-to level. ManuCo's approach to investment in IT infrastructure to date can thus characterised as the *utility view* whereby they have invested in IT infrastructure only if that contributed to an increase in efficiency or cost reduction. The various IT applications are however mostly standalone systems, developed to support a particular manufacturing/business process. The different systems are not well integrated and run on different computing platforms. The General Manager Technology commented on the dispersed nature of their different systems:

"Lots of the early work tends to die within the IT system. This is referring to the files sitting somewhere, no longer accessible conveniently, no longer accessed and known

about by the new people in the organization. They don't have a clue that the information exists. This eventually leads to knowledge reinvention."

4.3 StatCo (the 'dependent' view)

StatCo is a public sector organization in Australia. It provides a range of services including research data and statistical content, advice for policy development, and economic planning for its clients. StatCo has offices in every state capital city of Australia. The organization comprises a network of economists, statisticians, researchers, and technology analysts. The business focus is primarily on the production and communication of pertinent research reports about various facets of the Australian economy.

StatCo has an explicit knowledge strategy and a 'knowledge program' in place. The knowledge program consists of a comprehensive set of current knowledge initiatives, while new initiatives are implemented as business conditions change. The knowledge strategy addresses the collaboration, capture and use of information between the employees of the organization. In addition the knowledge strategy concentrates on codifying the knowledge embedded in the business routines and processes of the organization.

StatCo has invested in an extensive IT infrastructure that comprises of large networks, communication tools, stored audio and video clips, an intranet, and multiple databases. Information stored in these various repositories is integrated across the different components of the whole IT infrastructure by means of codified meta-data. For example, when an employee develops a new report for analysing a particular industry, s/he is automatically alerted of relevant related documents (e.g. past analyses, policy recommendations, audio and video clips, etc) that are associated via the meta-data.

Investments in their IT infrastructure investment have historically been aimed to support their research processes and can thus be classified as *dependent* on the business requirements. StatCo considers their IT infrastructure as crucial to support knowledge work processes in the organization. The Director of Knowledge Management at StatCo elaborated:

"The current IT infrastructure is dependent on our strategy and, everything we have been working on in the last few years is towards improving the processes of getting something from one end to another... from the start to finish the processes are essentially linked to systems...Also statistical reports published in one department can be accessed and used in another department...with the help of systems that links them through. So IT is doing a lot to assist the processes...and supports our employees to work knowledgeably rather than to manage knowledge."

The tight coupling of their IT infrastructure in supporting their research processes does however introduce some challenges with regard to personal knowledge exchange beyond process boundaries. The Director of KM noted:

"Some people always look out to gather information externally, others are more focused with what information they have, so it is to do with the personal behaviour ...it is the hard part for the organization to influence...One good way is to extend the IT to facilitate and enable the change in the personal behaviour."

4.4 GloConCo (the 'enabling' view)

GloConCo is a large multinational consulting organization with offices worldwide. The organization provides consulting services in general management and technology-focussed areas. GloConCo consists of a vast network of consultants, business analysts and technical specialists in the various facets of business consulting. Knowledge is regarded the core asset and primary revenue engine of the

organization. The business focus of the organization is oriented towards codifying, storing, reusing and selling knowledge.

GloConCo has a clearly articulated knowledge strategy and the organization has a dedicated 'knowledge team' to support and manage a wide array of knowledge initiatives. The knowledge team consists of knowledge analysts, account managers, and technology specialists responsible for different regions of the business (e.g. Australasia, Europe, and North America). The knowledge strategy predominantly focuses on the codification and reuse of knowledge in the form of experience gained from past consulting projects. Given their highly competitive business environment, GloConCo's knowledge strategy aims to enable consultants to generate new business by drawing on the codified experience of other consultants who have developed solutions to similar problems elsewhere in the world.

GloConCo has developed an extensive global IT infrastructure over many years and a wide range of applications is in place. The infrastructure includes a vast array of global networks, communications tools (e.g. e-mail, teleconferencing), groupware applications, numerous databases, portals, an intranet, search tools, etc. Information stored in these various repositories is integrated and structured by means of rich, but complex 'taxonomies' (hierarchies of related topics). The emphasis of their IT investment extends even beyond their current strategic needs, *enabling* new modes of working. For example, the 'knowledge team' is experimenting with the latest available technologies that may facilitate innovative modes of work in the future. Of particular mention are so-called 'e-rooms' that enable customers and consultants to collaborate online on current projects. The Knowledge Management Leader – Europe explained:

"We see technology enabling us to get information for people when they need it. Essentially, we have consultants around the world with various client engagements who need to access systems remotely, access codified knowledge and reuse it. We are very dependent on technology to enable us to get knowledge for people when they need it."

The size and depth of the current IT infrastructure also renders it quite complex. To some extent this complexity impedes effective knowledge exchange within the organization. One of the constraints is that employees are not always aware of relevant knowledge that is codified and stored in the various systems globally. This is compounded by consultants' busy schedules and time constraints in locating relevant information within project deadlines. The Knowledge Management Leader – Europe explains:

"At the global level we have a number of access issues. I think the navigation of the portal was not as intuitive as it could have been. Some of them are confused about where to go for information and we think the lack of knowledge awareness [among employees to search for relevant codified knowledge] is part of it."

5 ANALYSIS AND DISCUSSION

In this section, we discuss the findings from each of the cases and thereafter analyse the findings across the cases. A comparative summary of the four cases appears in Table 1. The case organizations represented in this paper each have a different strategic view of their IT infrastructure investment. We now discuss how these different views have manifested in the organizations' knowledge strategies.

At EduCo, the minimal existing IT infrastructure constrains the organization's ambitions in fostering knowledge exchange between their members to the extent that the knowledge strategy is not formulated explicitly. Due to their reliance upon e-mail exchange of documents between individuals, there is a lack of a central codified repository. This results in knowledge loss and even the re-creation of knowledge (i.e. reinventing solutions to problems which have previously been solved by someone elsewhere in the organization).

In the ManuCo case, the fragmented existing IT infrastructure that was created over time also constrains the formulation of an explicit knowledge strategy. The organization clearly realises the need

for a more integrated approach to link their various standalone repositories of information to enable employees (especially the shift workers) to capture and exchange know-how with each other. As in the EduCo case, the inadequacy of ManuCo's IT infrastructure also results in knowledge loss and reinvention, and only an implicit 'knowledge strategy'.

In the StatCo case, the knowledge strategy and IT infrastructure can be seen as mutually dependent and this is reflected in their explicit knowledge strategy. Over time, the case organization has invested in an IT infrastructure that enables their research processes to draw on past knowledge work via their codification strategy. At the same time however, the case might suggest that the tight coupling of their existing IT infrastructure with their processes constrains knowledge exchange between individuals beyond the process context.

In the GloConCo case, the existing extensive IT infrastructure has enabled the articulation of an explicit knowledge strategy for the organization. Similar to StatCo, the organization has invested over time in an elaborate IT infrastructure that enables the business to harness past consulting experience in generating new business via a codification strategy. At the same time, the size and complexity of this vast IT infrastructure also imposes some constraints on the consultants in locating relevant codified knowledge in a timely manner.

In comparing the cases, we argue that an insufficient (minimal or fragmented) IT infrastructure (as in the EduCo and ManuCo cases) constrains the formulation of an explicit knowledge strategy. In the latter two cases, despite having ambitions in this regard, the organizations have not attempted to articulate a knowledge strategy; they realize their inability to *operationalise* such a strategy, given their existing IT infrastructure. This is reflected in their inability to support their knowledge processes effectively.

Issues in KM	Case organizations			
	EduCo	ManuCo	StatCo	GloConCo
Articulation of knowledge strategy	Implicit knowledge strategy	Implicit knowledge strategy	Explicit knowledge strategy	Explicit knowledge strategy
Strategic views of IT investment	None	Utility	Dependent	Enabling
Existing IT infrastructure and applications	E-mail network and website	Intranet, databases, distributed control systems, website and other systems (not integrated)	Networks, intranet, numerous databases, communication tools, website, and codified processes (integrated via meta-data)	Networks, portals, intranet, numerous databases, communication tools, search tools (integrated via knowledge taxonomy)
Influences of existing IT infrastructure on knowledge strategy and knowledge processes	Minimal IT infrastructure constrains explicit knowledge strategy formulation Lack of codified knowledge, resulting in knowledge loss and reinvention	Fragmented IT infrastructure constrains explicit knowledge strategy formulation Lack of integration, resulting in knowledge loss and reinvention	Extensive IT infrastructure enables explicit knowledge strategy Minimal knowledge exchange beyond processes	Extensive IT infrastructure enables explicit knowledge strategy Lack of awareness of codified knowledge due to size and complexity of the IT infrastructure

Table 1: Comparative impact of IT infrastructure on knowledge strategy and knowledge processes

On the other hand we notice that an extensive existing IT infrastructure, even though it enables the organization to articulate and operationalise an explicit knowledge strategy, does not necessarily address all organizational aspirations in terms of knowledge processes (as is evident in the StatCo and GloConCo cases). In the latter two cases, the predominant emphasis on supporting a codified knowledge strategy with their existing IT infrastructures has ‘crowded out’ some of the potential to enable knowledge exchange through a personalization strategy (cf. Hansen et al., 1999).

EduCo and ManuCo have only recently decided to pursue knowledge strategies. Their historic investments (or lack thereof) in IT infrastructure have however had little to do with their knowledge strategy and aspirations, and we note the constraining influence. In the StatCo and GloConCo cases, the organizations have been investing and shaping their IT infrastructure to support their knowledge work for many years. In addition, IT investments in the latter two cases have been made in line with their knowledge intensive business processes. This may explain their apparent capability in leveraging their IT infrastructure to enable their knowledge strategies.

6 CONCLUSION

We explored the influence of a pre-existing IT infrastructure on the formulation of knowledge strategy in four representative organizations. We analyzed the historic strategic views of their IT infrastructure investment, and how the present IT infrastructure influences the formulation of knowledge strategy and knowledge processes in these organizations. We found that the historical investment in IT infrastructure in the organizations influences their ability to formulate a knowledge strategy. We conclude that an insufficient (minimal or fragmented) existing IT infrastructure constrains the formulation of an explicit organizational knowledge strategy. Our cases show that organizations which have an insufficient existing IT infrastructure have not attempted to articulate an explicit knowledge strategy; they realize their inability to operationalise such a strategy, given their IT infrastructure. This restricts their “knowledge strategy” to a broad or implicit statement that may be difficult to put into practice. We further conclude that having an extensive existing IT infrastructure enables the articulation of an explicitly formulated knowledge strategy. However, our findings show that even an elaborate IT infrastructure can introduce some constraints on IT facilitated knowledge processes in the organization.

Our study has a number of limitations. We specifically focussed on Weill and Broadbent’s four strategic views of IT infrastructure investment (Weill and Broadbent, 1998) in selecting the case organizations. Other conceptualizations of IT infrastructure beyond this framework should be considered in further research. It should also be noted that in these studies we focused solely the influences of existing IT infrastructure on knowledge strategy formulation in these organizations. Other organizational influences such as that of culture, management support, reward systems, etc., may further be considered in exploring the influences and effects on knowledge strategy formulation and related issues associated with the design and complexity of IT infrastructure. Further case studies in other sectors may shed new light on the applicability of these findings to other contexts. We are currently engaged in follow-up studies with these and other organizations to further study the relationship between knowledge strategy and existing IT infrastructure.

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