Supporting Knowledge Management and Organisational Learning in Multinational Corporations

Julie Travis[‡]   and   John R. Venable[†]

[‡]School of Information Systems
Curtin University of Technology
Perth, Western Australia
TravisJ@cbs.curtin.edu.au

[†]Department of Information Technology
Murdoch University
Murdoch, Western Australia
J.Venable@central.murdoch.edu.au

Abstract

Management of Organisational Learning and Knowledge is a complex and difficult task. Doing so within the context of a multinational corporation presents even more difficulties. Like many large organisations, most multinational organisations are highly distributed. This presents problems in terms of the inability to get groups of people together for group activities concerning knowledge management and organisational learning. The highly distributed organisation also presents difficulties in disseminating knowledge from one part of an organisation to other parts. Multinational organisations also commonly contain a variety of different cultures. The cultural differences can occur at a number of different levels, between individuals, between the individual and the organisational unit, between different organisational units, and between countries. In this paper, we propose a number of ways of addressing these difficulties for facilitating knowledge management and organisational learning in the multinational organisation, including the use of adaptable systems thinking approaches, group support systems, and digital library technologies. In particular, we propose using these technologies in combination as a way of addressing the twin difficulties of the highly distributed and culturally differentiated organisations that multinational organisations often are.

Keywords: Multinational Corporations (MNC), Group Support Systems (GSS), Soft Systems Methodology (SSM), Organisational Learning, Knowledge Management, Digital Libraries

1. Introduction

Just when global communities seem to be providing us with common languages, easier ordering and delivery systems, Internet trading and standardised media structures and technologies, we find that cultures are not really homogeneous, and distance may not be the real problem, but a symptom of culture. In fact, we cannot take a culture free approach to management within multinationals, as national culture dictates organisational behaviour. Within cultural diversity there is a particular set of norms, roles and values that have to be understood for effective communication, team-building and shared vision across international boarders. We address these issues with a view to the multinational company as a learning organisation, within which knowledge may be managed as process or object.

2. Multinational Corporations

In the following sections, we define what we mean by the term "multinational corporation" and discuss the nature of the multinational organisation. Note that "corporation" is used synonymously with "organisation" and "company" in this paper. We further examine issues that multinational corporations face, and that need to be

addressed. We propose how these issues might be handled through organisational learning and knowledge management.

2.1 The Nature of the Multinational Corporation

The term "multinational corporation" is not new, and yet there are many related terms that are often the cause of confusion when discussing the nature of such an organisation. Multinational corporations may be *transnational, international* or *global*, according to their different ways of operating. *Internationalisation* means that national companies are increasing the spread of their economic activities across international boarders, whereas *globalisation* is a form of internationalisation, which:

> "…*implies a degree of functional integration between internationally dispersed economic activities*" (Dicken 1992: page 1)

Dicken also makes a distinction between terms he says are often used interchangeably, ie transnational and multinational, where:

> "… *the term 'transnational corporation' [is preferable] to the more widely used term 'multinational corporation' … because it is a more general, less restrictive term. The term "multinational corporation' suggests operations in a substantial number of countries whereas 'transnational' corporation' … implies operations in at least two countries, including the firm's home country. In effect, all multinational corporations are transnational, but not all transnational corporations are multinational.*" (Dicken 1992: pp 47-48)

Applegate *et al* (1996) use the terms interchangeably for example. Hence, our paper is written for the multinational corporation, being a company that operates in various countries (international) as well as having some degree of functional integration (global). From now on we shall also refer to the multinational corporation or organisation as MNC (which also includes transnational corporations).

2.2 The Multinational Corporation Situation

When companies cross international boundaries, we generally find that various factors in the external environment impact the company greatly in one country and not in another. The global MNC in particular may be **interdependent** in economical terms, but **independent** politically (Spybey 1996). Some countries have clearly defined procedures regarding international relations that are enforced through bureaucratic administration. However, the spread of mass consumption, communication and production means that international division of labour is increased, international finance and loans yield more opportunities to play the money markets and there are improvement in forms of invoicing, communication and delivery (Spybey 1996). These conditions vary with different issues and within these issues the culture provides for added complexity or degrees of difficulty.

A large number of issues have a basis in **cultural diversity**. With the advent of the Internet, electronic commerce, satellite transmission, fibre optics, and a proliferation of personal computers, the basis of how we do business has changed dramatically within the last decade. In terms of the MNC this means that there are far greater economic opportunities, but these exist in an organisation where cultural differences may become obstacles to making the best of those opportunities, or where no effective strategy exists to address those differences in culture. Furthermore, cultural differences translate to many layers of culture. These are the culture of individuals, between individuals, of the organisational, between organisational units, of countries and between countries.

At all these levels, difficulties partly lie in the ineffective or ineffectual learning about those levels of culture, and in transforming the "right kind of information" into knowledge and then sharing and disseminating knowledge from one part of an organisation to other parts. Managers may then find that they are having to manage at the edge of boundaries as ambassadors of a national part of a multinational corporation.

Different types of cultures present a situation where we have very complex interactions between the roles, values, and norms as components of culture. A different set of roles, values and norms of society may exist, and these may differ from those within the organisation, those of an individual and those of regions and countries. Within countries and between countries, managers have difficulties with conflicting traditions. More often than not, these traditions cannot be compromised because they are the very fibres of society. Applegate *et al* (1996) remind us that countries with high birth rates and low labour cost structures view their world and their opportunities in a very different way from countries with mature industries, shrinking labour population and well established bureaucracies that provide the necessary stability for communications and technology infrastructures.

3. Organisational Learning and Knowledge Management

In this section we discuss the concepts of knowledge management, the learning organisation and double-loop learning relevant to knowledge management. We examine different perspectives of the nature of knowledge management and recommend an enriched world-view beyond the acquisition, provision, storage and dissemination of new information. We suggest how these combined concepts could assist in addressing the difficulties that are inherent within multinational companies.

3.1 Data, Information, and Knowledge

We find it useful at this point to make a distinction between data, information and knowledge. We understand *data* to be useless unless attributed with meaning and use, *information* as data with value, purpose, organisation and evaluation, and *knowledge* as a state of understanding attained that enables us to use information to make informed decisions.

Gupta (1998) states that for *information* to become *knowledge*, humans must make **comparisons** of situations, weigh up the **consequences** of using information for decisions and actions, consider **connections** (how one piece of knowledge relates to another) and **communicate** other people's perspectives about the information (herein after referred to as the four Cs).

Wenig's gives this definition of knowledge and relates it to information (1996).

> *"Knowledge is understandings [that] the cognitive system possesses. It is a construct that is not directly observable. It is specific to and not residing outside the cognitive system that created it. Information, NOT knowledge, is communicated among cognitive systems. A cognitive system can be a human, a group, an organization, a computer, or some combination."* (Wenig, 1996)

If knowledge is not external to our cognitive processes, managing knowledge as an external, technical object will not be effective and may lead to failed systems. Systems managers that do so do not perceive their systems as being social systems with humans as a basis for knowledge creation and knowledge sharing. No underlying assumptions about the nature of the organisation are challenged; no reflection or reflexion leads to action; no reflective learning is taking place. We discuss the human/social nature of knowledge and knowledge transfer further below.

3.2 Learning Organisations

There are several definitions of the learning organisation. We present three slightly differing definitions, each with its own merits, below:

"…*an organization learns if any of its units acquires knowledge that it recognizes as potentially useful to the organisation*." (Huber, 1991, p. 89)

"*A learning organization is an organization skilled at creating, acquiring and transferring knowledge, and at modifying its behavior to reflect new knowledge and insights*" (Garvin, 1993, p. 78)

Learning organisations are "… *organizations where people continually expand their capacity to create the results they truly desire, where new and expansive sets of thinking are nurtured, where collective aspiration is set free and where people are continually learning how to learn together.*" (Senge 1997b, p. 3)

Huber (1991) identified four major areas of organisational learning. These are:

(i)   *Knowledge Acquisition*: "The process by which knowledge is obtained."

(ii)   *Information Distribution*: "The process by which information from different sources is shared and thereby leads to new information or understanding."

(iii)   *Information Interpretation*: "The process by which distributed information is given one or more commonly understood interpretations."

(iv)   *Organisational Memory*: "The means by which knowledge is stored for future use." (Huber, 1991, p. 90)

3.2.1 Information Vs Knowledge Distribution

Huber uses the terms "information" and "knowledge" interchangeably (Huber 1991), which is not in accordance with our definitions above. Information can be readily distributed, but knowledge cannot. Knowledge can only be communicated as experienced and applied information. When receiving information, a corresponding understanding does not necessarily follow. We must supply the information together with enough of its context and in such an applied way that it can be *interpreted and become knowledge to the receiver*. To effectively distribute knowledge, one must also allow for the receiver's cognitive processes of *assimilation, awareness, insight,* and *reflection* (before action). There is usually a time factor inherent in the knowledge process. Other processes, such as socialisation, may also operate.

We further distinguish two different modes of information distribution. *Knowledge push* is when distribution occurs at the time that the knowledge is acquired. The newly acquired knowledge is distributed to everyone who (hopefully) needs it. *Knowledge pull* alternatively captures new knowledge into organisational memory, for later retrieval and use based on specific demands. In either case a process to supply the correct information that should transform into knowledge.

3.2.2 Double-Loop Learning

It is important to understand whether knowledge acquisition is contained within a single-loop or a double-loop cyclic learning process. Single loop organisational learning...

"…*involves the production of matches, or the detection and correction of mismatches without change in the underlying governing policies or values. .... A second type, double-loop learning,*

does require re-examination and change of the governing values. Single-loop learning is usually related to the routine, immediate task. Double-loop learning is related to the non-routine, the long-range outcome" (Argyris and Schön 1978).

Beyond the routine organisational learning tasks (e.g. as described by Huber, 1991), the learning process must begin in a way that will then determine whether it is useful (or add sufficient value). When we examine existing values, reflective re-examination adds insight and meaning, determining how knowledge is to be used in practice. However, determining how knowledge is used, is not usually related with the gaining of knowledge.

3.2.3 The Five Disciplines of the Learning Organisation

Senge (1997a, b) suggests that the core of the learning organisation should be what he calls the five disciplines, of which systems thinking is the fifth and most important.

- **Personal Mastery** - learning to expand our personal capacity to create the results we most desire, and creating an organisational environment which encourages all its members to develop themselves toward the goals and purposes they choose.

- **Mental Models** - reflecting upon, continually clarifying, and improving our internal pictures of the world, and seeing how they shape our actions and decisions.

- **Shared Vision** - building a sense of commitment in a group, by developing shared images of the future we seek to create, and the principle and guiding practices by which we hope to get there

- **Team Learning** - transforming conversational and collective thinking skills, so that groups of people can reliably develop intelligence and ability greater than the sum of the individual's talents.

- **Systems Thinking** - a way of thinking about, and a language for describing and understanding, the forces and interrelationships that shape the behaviour of systems. This discipline helps us to change and improve systems more effectively, and to act in tune with the larger processes of the natural and economical world. The soft (as in adaptable and interpretive) systems thinking movement from the UK also suggests that we operate in a social world where we are continuously re-negotiating the world and the realities in which, and with which, we operate. (After Senge 1997a, page 6).

For effective change and knowledge management and the learning that must accompany the process of realised and effective improvement, it is recommended that all five disciplines be used together. As Godbout (1998) states, organisations are more learned when their knowledge workers learn to apply the five disciplines to generate the desired collective behaviour.

A criticism of Senge's (1997a,b) five disciplines is that, to us, systems thinking is a broader, higher level concept than the other four 'disciplines'. While Senge's description hints that "systems thinking" is more of an intellectual framework that should guide the other four disciplines, we argue that it is also a way of thinking about, describing, and understanding forces that shape the behaviour of systems. Adaptive or "soft" systems thinking also encompasses other methodologies and techniques that are relevant to learning organisations. One such methodology, which may be applied and used as an adaptable framework to reconstruct its own stages, is Soft Systems Methodology. We also consider that some of Senge's other four disciplines may be of most immediate use than others concerning particular issues relevant to MNCs. We consider these issues in section 5.1.

3.3 Knowledge Management

We shall define knowledge management at the very least as "The management of the acquisition, evaluation, preservation, dissemination, assimilation, and use of knowledge

within an organisation." Its fundamental goal is to improve organisational learning. Gupta (1998) further suggests that knowledge management must encompass strategies for choosing, capturing, and sharing knowledge. This involves making decisions about the kind of value to be provided to whom. Gupta (1998) states that value creation should be a core activity of knowledge management.

Knowledge management may be viewed as managing knowledge as an *asset* or *objects*. Alternatively, it may be viewed as managing knowledge as the process of *knowing* where we support the receiver's cognitive interpretation processes (assimilation, awareness, insight, and reflection). It may also be viewed as a combination of both and, in terms of organisational learning, we believe that it should be (after Godbout 1998).

3.4 An Integrated Model

The learning organisation and effective knowledge management should encompass more of the process of transforming information into knowledge. Double-loop learning must be engaged for meaningful knowledge management. Figure 1 illustrates our conception of the learning organisation within a knowledge management framework, integrating concepts of learning organisations (Huber 1991, Senge 1997a, b), double-loop learning (Argyris and Schön 1978), and knowledge management.

Figure 1: Knowledge Management and Organisational Learning
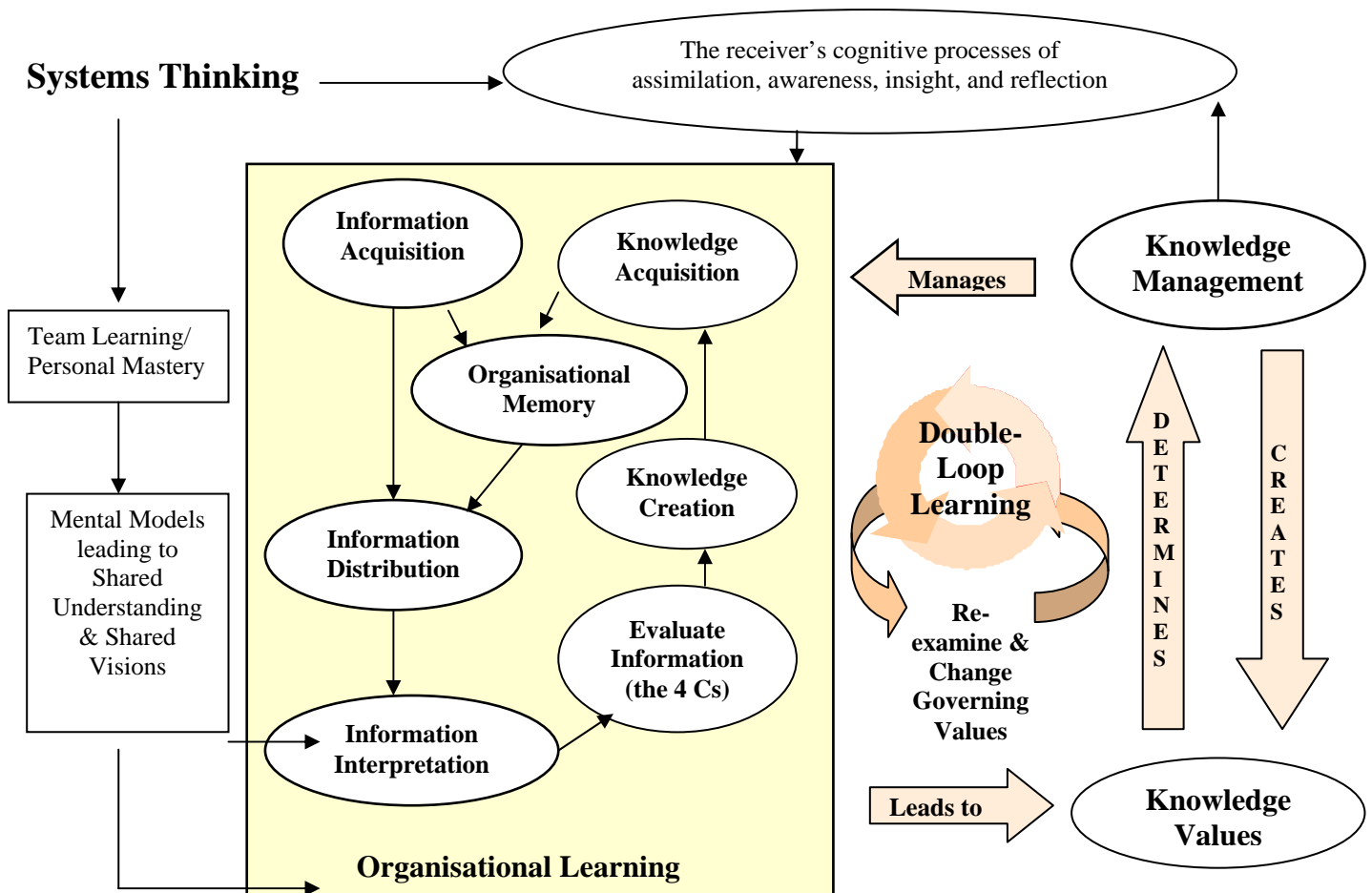
4. Issues in Knowledge Management and Organisational Learning for the MNC

There are a number of issue areas relevant to organisational learning and knowledge management that are significant to the MNC in some way. In this section we define some of the relevant issues and address their implications for organisational learning and knowledge management in the MNC. The issues addressed are: sociopolitical, (use and meaning of) language, information interpretation, local constraints, information distribution, and availability local constraints, organisational memory and knowledge dissemination (After Applegate *et al* 1996; and Huber 1991). These factors are liable to inhibit the growth and/or functioning of the MNC. Later (in section 5) we suggest what could be done from a systems-thinking perspective where learning and knowledge management principles are most significant.

4.1 Sociopolitical

Sociopolitical differences between units of MNCs need to be thought through very carefully to rationalise costing structures, product acceptability, different levels of organisational maturity and different national priorities. For example, the UK and Denmark both place more significance on their welfare systems than does the US. Malaysia and Indonesia place less importance on food and environment than on building a sound technical infrastructure. *Implications for the MNC* This is where environmental factors will differ between countries in terms of policy, procedure, the legal system and the political system. These factors in the broad sense will always be *independent* rather than *interdependent.*

4.2 Language

As relevant documentation and reports need to be discussed and strategies need to be formulated by executives, a common language needs to be used to do so. Language here does not just mean the language of the country, but the language of the profession, of the industry and of all the levels of culture mentioned previously. Language is signal and symbol. It may be used to create or destroy or provide information and critical thinking leading into the knowledge formulation process. *Implications for the MNC* If we do not fulfil this basic requirement in terms of employees speaking the same language across MNC boarders, error, miscommunication, mishaps and potential misfortune will occur. Meanings are bound up in the use of language, but language must be carefully defined as to meaning. Often people refer to nations being divided by a common language, so the UK, Australia, and the US may use the English language as their first language, but the same words often have very different meanings and may even offend in one country where they would not offend in another. According to Applegate *et al* (1996) frequently higher level managers do speak the language of the parent company, but lower level managers do not which would tend to slow up business somewhat.

4.3 Information interpretation

"Information interpretation, as an organizational process rather than as an individual process, was found to require empirical work for further advancement." (Huber 1991) In fact here may be many interpretations and many realities expressed as groups within the organisation would use the same information in different ways and in different contexts. *Implications for the MNC* It is difficult to understand and interpret obtained information due to the decontextualisation of the information within organisational

memory. The lack of context makes it far more difficult to utilise the 4 Cs to add value to information for the process of knowledge creation. This leads to (1) inefficiencies and delays, (2) incorrect interpretations and subsequent incorrect actions, (3) failure to make the right choices and to use information wisely.

4.4 Local Constraints

Local cultural traditions could inhibit the development of coordinated systems and orderly technology transfer between countries. Different holidays, trade union regulations, tax systems, working hours and duration of work all affect productivity and the way business is carried out. ***Implications for the MNC*** The implications here is that skill bases may differ and organisational and computer systems may also differ. The result may be mismatched information systems where data structures mean that data and information is not recorded in the same way between MNC units. This may lead to inconsistencies in records, databases and knowledge bases (if they exist) and in missing or incomplete information. Constraints specific to the local context as part of the MNC would have an impact on the success of the whole corporation. Therefore, business unit alignment issues also need to be addressed. In other words, better planning must be done with local constraints and cultural diversity in mind. In terms of cultural diversity something seemingly as simple as repeatedly not respecting religious and national holidays may cause dissension between MNC units.

4.5 Information distribution

"A key aspect of information distribution, namely how organizational units possessing information and units needing this information can find each other quickly and with a high likelihood, was found to be unexplored." (Huber 1991). This issue may also relate to how information might best be distributed to remote units of the MNC. ***Implications for the MNC.*** When someone within the MNC acquires some potentially relevant knowledge, it is difficult to know what others within the organisation don't know or what information they need (and hence, what information should be distributed to whom). This leads to: (1) failure to capture important information and store it into organisational memory (Huber 1991), (2) disseminating information to people who don't need it (knowledge push [supply]), which in turn leads to (3) inefficiencies and (4) information overload at best. At worst, information needed throughout the MNC will only get to a part of the corporation. If the nature of this information is about strategy or at a strategic level this will affect the performance or image of the company if it does not deliver. Having stated the worst case scenario, different systems may need to be created and used I different countries, such as a different order entry in France than in the UK as distribution patterns and geographical requirements were different for example. However, this is about the design of a computer system to fit the culture, not necessarily about information that needs to be shared in the capacity of learning and the creation and use of knowledge.

4.6 Availability

It is difficult to know what organisational information is available and from where (people or shared organisational memory). This leads to: (1) failure to search within the organisation for the information, (2) inefficiency in searching for the information, (3) not finding information, and (4) inefficiencies of being interrupted by information seekers, either for information that is available elsewhere or for information not held by the person being interrupted. ***Implications for the MNC*** existing approaches to

organisational memory do not adequately facilitate search. The memory is not organised into ways that allow ad hoc searches with a high probability of locating the information. The search for information may need to consult a large variety of systems, with different interfaces and information contained in each. There is also little information about where to find various kinds of information so that one can choose which system to make use of. These inadequacies lead to not only being able to acquire appropriate information, but in being out of touch with current market trends and forces.

4.7 Organisational Memory and Knowledge Dissemination

According to Huber (1991, page 107) "Organisational memory, as a determinant of organizational learning and decision making, was found to be much in need of systematic investigation." Knowledge dissemination and corporate memory are closely related and will be discussed together. In addition, this topic is also related to information interpretation. *Implications for the MNC* In terms of knowledge as an object, this topic must address linkages between information, information transference and usage, knowledge as corporate and individual knowledge, core competencies, vision and focus. In this way we can demand knowledge (pull - as a deliverable object) or supply knowledge (push - as the result of knowledge processes formulated through experience and skill).

5. Suggested Approaches for Improving Organisational Learning and Knowledge Management in MNCs

There are a number of approaches, techniques, and/or technologies that could be applied to improving organisational learning and knowledge management in the MNC. Travis *et al* (1996) suggest using soft systems methodology for enhancing organisational learning, as well as the possibility of using a number of different information technologies, including messaging systems, discussion systems, group decision support systems, workflow systems, cooperative/synchronous document editors, and cooperative work (process) planning systems. Courtney *et al* (1998) also propose IT support appropriate for various forms of inquiring organisations, including databases, expert systems, knowledge bases, and GSS.

In this section, we recommend and discuss Soft Systems Methodology (GSS), Cognitive Mapping, Group Support Systems (GSS), and Digitial Library Technologies as aids to organisational learning and knowledge management in the MNC.

We consider that GSS can also facilitate knowledge management by supporting and enhancing the use of SSM and hence the organisational learning resulting from SSM, as described in the previous section, and by supporting knowledge capturing and dissemination.

5.1 Adaptive, Interpretive Systems Thinking and SSM

Soft Systems Methodology (SSM, Checkland 1981, Checkland and Scholes, 1990) has been proposed as a way to enhance organisational learning (Cavaleri 1994, Travis *et al* 1996). A "soft systems thinking" approach may be used effectively as a learning tool as:

> *'Soft' systems thinking is derived from many elements of the interpretive perspective which frame organizational learning as the continuous redefinition of people's beliefs* (Cavaleri 1994, page 262)

SSM is a means of learning and reaching mutual understandings of the present and the desirable world, in order to seek improvement on the current situation. The initial

emphasis of SSM is on learning rather than goal-seeking. As an inquiring system, SSM aims to help people to learn by employing techniques such as rich pictures and problematiques to facilitate the expression and sharing of different perceptions. This enriches the understanding of issues that are perceived in a subjective manner. It is assumed that the situation can be improved upon where situations are explored through systems models rather than through structured engineering methods.

Once the situation is expressed, systems improvements rely on the processes of learning and accommodation and not on optimized outcomes (after Cavaleri, 1994). A systems thinking language draws on principles to incorporate and communicate *issues* and *accommodations* rather than problems and solutions where problems are 'perceived' problems (Checkland, 1985). This is most appropriate in the MNC where many decisions must work on a basis of satisficing as accommodations are more practical than consensus. Even when solutions are arrived at, they are not the end of the learning process; there are no permanent solutions, only improvements involving a continuous series of accommodations.

SSM is based on the double-loop learning principle where governing values are in a perpetual state of being re-examined and re-valued. It would therefore be most appropriate to relocate four of Senge's disciplines and subsume them into a soft systems paradigm as the underlying principles would support the aims of the disciplines. SSM provides a number of techniques, such as root definitions and conceptual models, where systems models are constructed and viewed as intellectual constructs rather than maps of the actual world.

SSM is able to incorporate any learning technique (or technology) within the methodology so long as the ability to learn *how* to learn and to reevaluate the process of learning how to learn is not compromised.

As for SSM's contribution to organisational learning and knowledge management in the MNC, SSM techniques can be used as a way to achieve several of Senge's other four disciplines, including the shared mental models, understanding, and vision and team learning necessary for effective organisational learning. These forms of organisational learning can in turn be used to improve mutual understanding and appreciation of relevant aspects of the sociopolitical situation, language, and local constraints. They can also be used to directly support information interpretation.

Furthermore, the system thinking concepts embodied in SSM make SSM a particularly appropriate method for guiding the ongoing (re-)conceptualisation, practice, and improvement of knowledge management, including the management of organisational learning and its components: knowledge dissemination and organisational memory. In particular, root definitions and conceptual models of organisational learning and knowledge management activities can be constructed and compared with existing activities, in order to discover gaps and suggest feasible and desirable changes to existing structures.

We further suggest that the *supporting* technologies described below should also be viewed from a 'soft'-systems-thinking perspective and used to encourage creative and self-inquiring learning systems.

5.2 Cognitive Mapping and SODA

Cognitive mapping and SODA (StrategicOptions and Decision Analysis) (Eden 1989) are techniques commonly associated with soft approaches. They have direct application to Senge's mental models and team learning disciplines. They can also be applied to

information interpretation and to modelling and decision making about the concerns of organisational learning and knowledge management. Cognitive maps can also be used to construct representations of sociopolitical and local constraint knowledge structures, thus aiding reaching mutual understandings. Cognitive mapping techniques could even be used to address language issues in a way similar to semantic maps.

5.3 Group Support Systems (GSS)

Group Support Systems have been proposed as a way to facilitate SSM (Venable *et al*, 1996a, 1996b). We postulate that using a GSS provides a number of advantages that are relevant to addressing the issues of support organisational learning and knowledge management in MNCs. First, GSS can be used to support aspects of SSM (described above). Second, *Distributed* GSS can be used to deal with difficulties arising out of the highly distributed nature of MNCs. Third, GSS can be used to directly support learning and management activities relevant to organisational learning and knowledge management.

Group support systems can be used for two key aspects of knowledge dissemination: capturing of knowledge (into a shared form of organisational memory), thus supporting knowledge pull, and allowing retrieval of that information. In particular, a GSS would allow: capturing and exploration of the decision-making rationale, capturing, exploration and expression of SSM issues, assumptions, perspectives, and the relationships between them, and the subsequent searching, retrieval and reconstruction of captured knowledge.

The capturing of knowledge occurs as a natural by-product of the use of a GSS, thereby reducing the need for the individual to choose what information to capture and to take time-consuming action to do so. However, the exploration as knowledge process would encourage a mix of approaches as time often needs to be taken for meaningful communication and expression of the issues. From expression, exploration and recorded information, the knowledge processes and objects may be stored in a GSS. This provides a rich description of the situation and context, supporting information interpretation. The ability to search for and locate knowledge previously captured in a GSS varies by product.

5.3.1 The Use of SSM & GSS to Address MNCs

Firstly, in terms of culturally sensitive issues inherent throughout MNCs, the ability to make anonymous contributions allows a more free and open discussion of issues, assumptions, and values which is key to gaining an understanding of different positions and possible actions that follow from them. This is seen as particularly useful when dealing with sensitive issues such as culture, language, and local practice. Secondly, discussion tools allow relationships to be explicitly created and set down between different positions and issues. The record of those positions, issues, and relationships means that they can be returned to at any time, for example when reconsidering decisions or during subsequent rounds of planning. Thirdly, the ability to use tools for rating, ranking, and voting facilitates preferences priorities and decision-making about the position to be adopted by the group or it will facilitate a selection of a limited number of options for further consideration and discussion. The result is that one can make a better application within the paradigm of 'soft' systems thinking.

5.3.2 Distributed GSS

Our current work is looking at the use of distributed group support systems to allow the application of SSM in situations where the stakeholders are highly distributed, for example in a national or multi-national corporation, or in a virtual organisation. A distributed GSS makes possible a distributed, asynchronous application of SSM. While this effectively addresses the issues of distance in multinational corporations, this needs to be guided by a skilled facilitator.

5.3.3 Direct GSS Support of Organisational Learning and Knowledge Management

The development of organisational learning and knowledge management may be done by groups, such as steering committees. These groups might even be comprised of people from different cultures and/or from highly dispersed locations (and thus be supported as in 5.3.1 and 5.3.2 above). In any case, the issues in determining appropriate goals and practices for organisational learning and knowledge management are not simple and can be served by a GSS.

5.4 Digital Library Technologies

Digital library technologies are concerned with providing for wide dissemination and availability of information. The aim is to make the service available anywhere. Wider information distribution and availability is essential to leveraging the knowledge obtained by the organisation.

Digital library technologies are another way to provide supporting technology and a service regarding corporate knowledge, organisational memory, knowledge dissemination and information interpretation. Digital library technologies are becoming available that support storage and maintenance of *very* large collections of information (e.g. as in NZDL 1998), which can be heterogeneous in both format and content. Such capabilities would be very useful for supporting organisational knowledge management because the forms and content of organisational memory are also extremely diverse. Digital library technologies could be employed to support the integrated storage of a wide variety of data sources, including databases and data files, documents, internet and intranet web pages, GSS sessions, newsgroups, bulletin boards, and electronic mail. This has implications for linking data, information and knowledge that may be used across MNC boundaries to enhance the knowledge management and learning processes.

The ability to search quickly and flexibly for information is very important if we are to enable information distribution characterised by *knowledge pull*, or a demand for knowledge, rather than just *knowledge push*, or a knowledge-based demand. Some digital library systems offer the particular advantage of allowing full-text, structured queries for *ad hoc* searches for information in these large collections (e.g. Witten *et al* 1998, NZDL 1998). Some digital library technologies allow searches to remain active, so that new, relevant information captured into organisational is immediately passed on to interested members of the organisation (a knowledge push approach). The flexibility to chose either knowledge push or pull (or both) according to individual preference or need is very useful.

Multilingual digital library capabilities also offer interesting possibilities for helping to overcome language barriers.

6. Current Research

We are currently engaged in and are planning a number of research projects to address several issues. In particular, we are investigating the use of GSS to support the use of SSM and the possibility of using digital library technology to support the searching for information within the records resulting from GSS sessions.

6.1 Research Method and Design

In this paper and our research, we propose new approaches and technologies or the employment of existing approaches and technologies in novel ways and combinations. Building and applying these technologies is systems development used as part of information system research in the sense described by Nunamaker *et al* (1991). They proposed a double path research cycle for systems development in information systems research, consisting of conceptual work, system development, and evaluation, either experimentally in one cycle or in real organisational situations in the other. Evaluation then feeds back into conceptual work. In interpreting our use of organisational applications, lessons learnt inform us of new concepts, which in turn initiate further research cycles. Hence we can employ an inductive method by transferring significant outcomes into appropriate theories that may be applied in practice.

Thus far, our evaluation research has employed role-playing simulations of industry conditions that are both exploratory and experimental. Therefore, for our evaluation work, we have combined interpretivist and positivistic paradigms. In future evaluations in actual situations, we plan to use the action research approach.

6.2 Ongoing Research Projects

In our case, we have used role-playing simulations of multinational situations to investigate the process of knowledge management and learning. We further explore the various supporting technologies, suggesting their usefulness for knowledge management and learning within a multinational context. Two such research projects are described in the following sections.

6.2.1 GSS4SSM Project to Facilitate Learning

The GSS4SSM project is concerned with applying a GSS to support the distributed application of SSM. We have designed and built a web-based system for doing this, which is built around the Discussion*Web* GSS (McQueen, 1996). We have just completed a pilot study in which a group of 46 final year undergraduate students participated in a large, simulated requirements investigation study on a controversial subject regarding environmental problems and issues. The simulated systems resembled multinational systems with varying functional units and cultural differences. The students were assigned and assumed various, diverse fictional stakeholder roles throughout the simulated exercise. We have already learned a great deal about what is practical or not and have many suggestions for improvements and enhancements. Issues raised included the nature and extent of facilitation, as well as how to teach enough SSM in the distributed environment to enable the stakeholders to participate effectively. Following further assessment and enhancement of the GSS4SSM system, we plan to put it in use in live projects using an action research method. We believe that putting such a system into use will raise important social and political issues that will require further investigation.

6.2.2 GSS Linked to Knowledge Distribution

In this research project, digital library techniques are used to make enhancements to the Discussion*Web* system in order to further facilitate knowledge distribution, by making the results of the GSS fully searchable and easily retrievable by members of the organisation. This research is in process. As above, we plan to use pilot studies and action research as methods where SSM is the applied systems methodology. Important issues, such as privacy of information contributed to GSS sessions and maintenance of GSS anonymity are being addressed and will continue to need to be addressed.

7. Conclusions and Future Research

We have discussed the nature of the MNC in relation to culturally specific issues and the implications of those issues for knowledge management and organisational learning. We have identified some ways to view knowledge management and organisational learning within a "soft" systems thinking paradigm. We have proposed and investigated the use of techniques and technologies that support SSM as an application through case simulations to facilitate learning and knowledge management, and can carry forward the outcomes of that research to investigate learning and knowledge management in practice within industry.

In terms of future research, an interesting possibility is to use SSM to guide the practice of the learning organisation and knowledge management as a process within MNCs. This would specifically address the cultural diversity of MNC and the ensuing issues. The use of GSS and digital library technologies offer exciting prospects but require further, extensive investigation. It will not be until such technologies are tested and put into practice that their real impacts will become apparent.

References

Applegate, Lynda McFarlan, F Warren and McKenney, James (1996) *Corporate Information Systems Management: Text and Cases*. Boston; McGraw-Hill

Argyris, C (1982) *Reasoning Learning and Action: Individual and Organizational.* San Franciso: Jossey-Bass

Argyris, C (1990) *Overcoming Organizational Defences.* Boston: Allyn & Bacon.

Argyris, C and D. A. Schön (1978) *Organizational Learning: A Theory of Action Perspective*. Reading: Addison-Wesley

Cavaleri, Steven A. (1994) 'Soft' Systems Thinking: A precondition for Organizational, Learning *Human Systems Management.* Vol 13, pp. 259 - 267.

Checkland, Peter (1985) From Optimising to Learning: a Development of Systems Thinking for the 1990s, *Journal of the Operational Research Society*. Vol 36, No 9, pp 757-767.

Checkland, Peter (1981) *Systems Thinking, Systems Practice*. Chichester: Wiley.

Checkland, Peter and Jim Scholes (1990) *Soft Systems Methodology in Action*. Chichester: Wiley.

Dicken, Peter (1992) *Global Shift, the Internationalization of Economic Activity* - 2nd ed - New York: Guildford Press, 1992

Garvin, David A (1993) Building a Learning Organisation *Harvard Business Review* July-Aug - pp 78-91

Godbout, Alain (1998) Information Vs Knowledge, URL http://www.km-forum.org/ajg-002.htm pp 1-3 (accessed 2 November 1998)

Gupta, Jatinder N. D. (1998) Knowledge Management: the Next Revolution in Information Technology, a seminar given at Murdoch University; Western Australia (July 1998).

Huber, George P. (1991) Organizational learning: the contributing processes and the literatures, *Organizational Science.* Vol 2, No 1 (Feb), pp. 88-115.

Kennedy, M. M. (1983) Working Knowledge, *Knowledge: Creation Diffusion, Utilization.* Vol 5, pp. 193-211.

Knowledge Management, Program on Social and Organizational Learning, George Mason University, web page http://psol.gmu.edu/Home/perspectives.nsf/da3a8b6eae16663c852565550063089d/d6196 f3494e4a5d88525657e005e981c?OpenDocument (4 November 1998).

McGill, Michael E. and John W. Slocum (1993) Unlearning the Organisation, *Organizational Dynamics.* Vol 22, No 2 (Autumn).

McQueen, Robert J. (1996) Discussion*Web*, url: http://www.cs.waikato.ac.nz/isdiglib/dw/ (accessed 2 November 1998).

Nunamaker, J. F. Jr., M. Chen, and T. D. M. Purdin (1991) Systems Development in Information Systems Research, *Journal of MIS.* Vol 7, No 3 (Winter), pp. 89-106.

NZDL (1998) *The New Zealand Digital Library*, web site, http://www.nzdl.org/ (accessed 13 October 1998).

Senge, Peter M. (1997a) *The Fifth Discipline Fieldbook: Strategies and Tools for Building a Learning Organisation,* London: Nicholas Brealey Publishing

Senge, Peter M. (1997b) *The Fifth Discipline: The Art and Practice of the Learning Organization.* London: Century Business.

Senge, Peter M. and John D. Sterman (1992) Systems Thinking and Organizational Learning: Acting Locally and Thinking Globally in the Organization of the Future, *European Journal of Operational Research*. Vol 59, pp. 137-150.

Schein, Edgar H. (1993) On Dialogue, Culture and Organisational Learning, *Organizational Dynamics*. Vol 22, No 2 (Autumn), pp 40-51.

Spybey, T (1996) *Globalization and World Society*, Cambridge: Polity Press.

Travis, Julie, Gregg Boalch, and John R. Venable (1996) Approaches for the Learning Organisation: A Comparison of Hard and Soft Systems Thinking," *Proceedings of the Information Systems and Audit Control Association Conference (EDPAC'96),* Perth, Western Australia, 26-29 May 1996, Promaco Conventions, Inc., Canning Bridge, Western Australia, pp. 487-500.

Venable, John R., Julie Travis, and Marc D. Sanson (1996a) Requirements Determination for an Information Systems Digital Library, *Proceedings of IIMA'96*, pp. 35-46.

Venable, John R., Julie Travis, and Marc D. Sanson (1996b) Supporting the Distributed Use of Soft Systems Methodology with a GSS, *Proceedings of WITS'96*, pp. 294-298.

Venable, John R. and Julie Travis (1998) WAFIS study web site, http://www.it.murdoch.edu.au/~jvenable/wafis/ (accessed 2 November 1998).

Wenig (1996) Discussion in *The Knowledge Management Forum: What is Knowledge Management* (web pages), last updated 31 March 1996, http://www.3-cities.com/~bonewman/what_is.htm (accessed 2 November 1998).

White, G (1990) Natural Language Understanding and Speech Recognition *Communications of the ACM*, Vol 16, No 1 pp 57-91

Witten, Ian H., Craig Nevill-Manning, Rodger McNab, and Sally Jo Cunningham (1998) A Public Library Based on Full-text Retrieval, *Communications of the ACM*, Vol 41, No 4 (April), pp. 71-75.