

**TOWARD AN UNDERSTANDING OF
ORGANIZATIONAL LEARNING AND KNOWLEDGE MANAGEMENT:
A CASE STUDY OF STRUCTURATION AND SENSEMAKING IN
BRITISH PETROLEUM'S KNOWLEDGE MANAGEMENT TEAM**

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ABSTRACT

Recently, an increasing amount of research and literature has focused on knowledge management, organizational learning and virtual teams. This paper uses Schwandt's (1994, 1995, 1999) dynamic organizational learning model, that considers both cognition and action, as a framework to explore the factors that a virtual project team (the *British Petroleum Knowledge Management Team*) used to contribute to a multi-national's learning, along two-dimensions: structuring and sensemaking.

The major study conclusions addressed in this paper are: (1) the dynamic interaction among the structuring factors, and sensemaking factors, human values and emotions, plays a central role in effective organizational learning. Strong sensemaking factors overcame weak or absent structuring factors; (2) a successful virtual project team has both learning and performing components, and uses collaborative technology as an enabler of that learning.

To further the study of organizational learning in virtual teams the authors propose further fieldwork on the sensemaking factors, specifically trust and conversation.

Keywords: Structuring, sensemaking, learning, performance, virtual teams, technology

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1. INTRODUCTION

In recent years, an increasing amount of research and literature has focused on concepts such as the 'knowledge-based economy' (Drucker, 1993; Prusak, 1997, Botkin, 1999), 'organizational learning' (Senge, 1990; Popper & Lipshitz, 1998), 'virtual teams' (Lipnack & Stamps, 1997; Townsend, DeMarie, & Hendrickson, 1998; Duarte & Snyder, 1999) and 'computer-supported collaborative work' (groupware or collaborative technology; Orlikowski, 1992a; Orlikowski & Yates, 1994; Schrage, 1995; Lloyd & Boyle, 1998). Yet, much of our understanding of organizational learning is not based on empirical field research. After nearly 30 years, the research "in large part remains murky, confused, and difficult to penetrate" (Dixon, 1997; Garvin, 1993).

In the field, organizations are focusing on teams as a means to deliver results in a knowledge-based economy. Project teams have varied communication, coordination, and information needs. These teams are often virtual, working from physically dispersed offices, working from home, or traveling, creating new logistical problems. Companies increasingly rely on communications and information technology (IT) to support their globally-linked knowledge workers. At the same time, the continuing pace of change and competition have sparked significant interest in the way organizations process, distribute, and store information, as well as how they create new knowledge and learn.

To ensure that knowledge, created by teams, is transferred to the organization for use in future projects, organizations are establishing large-scale knowledge management functions and initiatives. Technology, in the form of collaborative technology, is a major mediator for the communication, coordination and information sharing actions involved in these initiatives. To remain competitive today, firms must leverage individual expertise related to industries and functional specialties between organizational units and across multiple locations to meet customer needs quickly. Despite a growing body of literature in both organizational learning and groupware research, there are few studies on the relationship between the two areas. Exceptions are the empirical study of a groupware implementation by Riggs, Bellinger and Krieger (1996) and Neilson's (1997) case study exploring the influence of a collaborative technology—LotusNotes®—on organizational learning. Extending knowledge of how teams contribute to organizational learning, and the role of collaborative technology, has potential to both improve knowledge management initiatives and increase the return on investments in collaborative technology.

To provide context for this study, the following definitions were used:

1. *Collaborative technologies*: A subset of groupware, collaborative technologies provide sets of tools that support two or more people engaged in achieving common objectives [using communication and information sharing technology] (Martin, 1994).

2. *Computer-supported cooperative work*: Research area that studies the use of computing and communication technologies to support group and organizational activity (Olson & Olson, in press).
3. *Groupware*²: Networked computer software and hardware that enables synchronous and asynchronous collaboration for increased productivity (Engelbart, 1992).
4. *Knowledge management*: A process that systematically makes use of the knowledge in the organization through tools and techniques that applies the knowledge to business problems. The process enables a collective group to capture, share, and use available knowledge, lessons and practices to deliver business results.
5. *Organizational learning*: The process that enables an organization to transform information into valued knowledge which, in turn, increases the organization's long-term adaptive capacity (Schwandt, 1999).
6. *Sensemaking*: Literally, the making of sense (Weick, 1995). An interpretive process that is necessary for organizational members to understand and to share understanding about features of the organization; e.g., what it is about, what it does well and poorly, the problems it faces and how they should be resolved (Feldman, 1989).
7. *Structuring*: A dynamic integration of organizational structures, roles, norms, objects and processes (Schwandt, 1999).
8. *Virtual team*: A team that has members dispersed across distance and time, who are linked together by some form of electronic communication technology, and who are only able to physically interact as a team on a limited (infrequent) basis (Sessa, Hansen, Prestridge, & Kossler, 1999).

1.1 THE PROBLEM

The primary problem that drove this investigation was the need to understand the factors that contribute to organizational learning. Major efforts to integrate structural factors (e.g., information technology, norms, roles, leadership) and group or team process factors (e.g., mission, objectives, goals and values) to support knowledge management and organizational learning have led to newly created positions with titles such as chief learning officer, chief knowledge officer and director of knowledge management (Ward, 1996). It is assumed that technology is a key requirement for virtual teams (Opper & Fersko-Weiss, 1992; Lipnack & Stamps, 1997; Duarte & Snyder, 1999). The importance of studying the use of collaborative technology from the social and group perspective is well-supported (Morosini, 2000; Darr & Goodman, 1995; DeSanctis & Poole, 1994; Johnson-Lenz & Johnson-Lenz, 1994; O'Hara-Devereaux & Johansen, 1994; Orlikowski, 1992a; Rheingold, 1993; Schrage, 1995). Thus the secondary problem the study addressed was how collaborative technology contributed to organizational learning during a virtual team's project.

1.2 PURPOSE OF THE STUDY

The 14 month case study was designed to learn how a virtual project team contributed to organization-wide learning, with specific interest in two dimensions: structuring and sensemaking. The structural dimension of organizational learning focuses on specific

² Groupware and collaborative technologies are often interchangeable. Collaborative technologies will be the primary term used in this study.

mechanisms—information technology, roles, norms, leadership, rewards and recognition, education and development—that contribute to a team’s learning and performance. The sensemaking dimension of organizational learning focuses on shared values, language, schema, and scripts. The study interpreted how the team continually processed, interpreted, and acted on new information, thus creating new knowledge in the process of meeting team goals. The team goals, to actively contribute to knowledge management, made this study an optimum case.

1.3 RESEARCH QUESTIONS

The major research question for the study was: *In what ways, if any, did the virtual knowledge management project team contribute to organizational learning?*

A key supporting question was: *In what ways, if any, does collaborative technology play a role?*

Subquestions considered the following:

1. What structuring variables were evident in the virtual knowledge management team and how did they contribute to organizational learning, both within the virtual team and at the organizational level?
2. What sensemaking variables were evident in the virtual knowledge management team and how did they contribute to organizational learning, both within the virtual team and at the organizational level?

2. CONCEPTUAL FRAMEWORK

This study used Schwandt’s (1994, 1995, 1999) dynamic organizational learning model as a framework. Schwandt’s model has previously been used to analyze dynamic actions related to organizational learning in a field setting (Casey, 1992; Johnson & Gorman, 1999; Hinds, 1995).

2.1 THE DYNAMIC ORGANIZATIONAL LEARNING MODEL

This study specifically focused on the learning and performance elements of the General Theory of Action (Parsons, 1968) that are viewed in the Schwandt model as necessary requirements for long-run adaptive capacity.

The Organizational Learning Systems Model (OLSM) (Schwandt 1994, 1997, 1999) represents an effort to describe the organization as a dynamic knowledge-creating system and, for the purposes of analysis, to operationalize a model that addresses the complex nature of organizational learning. Schwandt posits that organizations are social systems that change as a result of both performance and learning. Schwandt’s grounding in Talcott Parsons’ (1951) Social Action Theory calls on Parsons’ identification of four, integrated elements to social action.

1. *Actor/subject*: an individual, group or collective.
2. *Situation*: the physical and social objects to which the actor relates.
3. *Symbols*: the means through which the actor relates to different situations and assigns meaning to them.
4. *Rules, norms and values*: the guiding factors for the actor’s relations with the social and non-

social objects in his/her environment (Rocher, 1979).

2.2 THE FOUNDATION – PARSONS GENERAL THEORY OF SOCIAL ACTION

Parsons defined four functions (Figure 1) that are a system of dynamic patterns of human acts: (1) adaptation to the external environment; (2) goal attainment; (3) integration of all parts of the organization; and (4) pattern maintenance to reinforce prevalent behaviors and the organization’s cultural patterns.

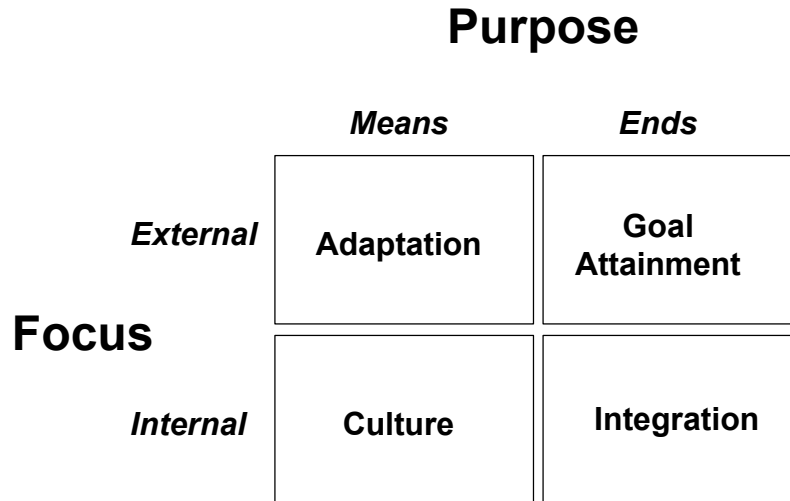


Figure 1 : Parsons Four Functions

These four functions can be generalized to all levels of analysis (individual, group, organization, and society). The theory addresses how human systems integrate psychological, social and cultural elements of organizational dynamics. Parsons addressed actions from three perspectives: actions associated only with performance, actions associated only with learning, and actions associated with both learning and performance simultaneously. For analysis purposes, Schwandt, Casey, and Gorman (1998) assume that the actions can be separated into two independent subsystems: performance and learning. Although Parsons (1968) postulated that social systems change through both performance and learning actions, his work with learning was limited compared with his work on other aspects of the action theory. Parsons (1968) postulated that information internalized into knowledge changes the conditions of the actions, as well as the actions themselves (structuration).

The Schwandt model addresses a need to expand on Parsons' work on the learning subsystem, which is described below.

2.3 SCHWANDT’S ADAPTATION – EMPHASIZING THE LEARNING SUBSYSTEM

Schwandt (1994) views organizational behavior as more than performance. He sees the creative capacity that influences the collective’s cultural values and uses this view to describe how an

organization learns as a system. His model emphasizes the learning aspect of change in Parsons General Theory of Social Action, and emphasizes the relationships and integration of the subsystems, which allows the organization to increase its learning capacity (Gundlach, 1994).

The four functions of Schwandt’s learning system (Figure 2) and the Parsons (1968) equivalents are as follows:

1. The *Environmental Interface Subsystem* (adaptation), which is the locus of information intake and output and requires mechanisms to secure, filter, and expel information.
2. The *Action-Reflection Subsystem* (goal attainment), which creates valued knowledge from new information, the goal of the learning system.
3. *Dissemination/Diffusion or Structuration³ Subsystem* (integration), which transfers information and knowledge within the organization, thus integrating the learning system. Dissemination techniques are formal procedures and policies that are purposefully directed. Diffusion techniques are informal communication, rumors, and formal communication. Electronic mechanisms are central to this subsystem for virtual teams.
4. The *Meaning and Memory Subsystem* (culture or pattern maintenance), which maintains mechanisms that establish criteria for judgment, selection, focus, and control of the organizational learning system. Beliefs, values, assumptions, and artifacts—the cultural components of the organization—are included in this subsystem.

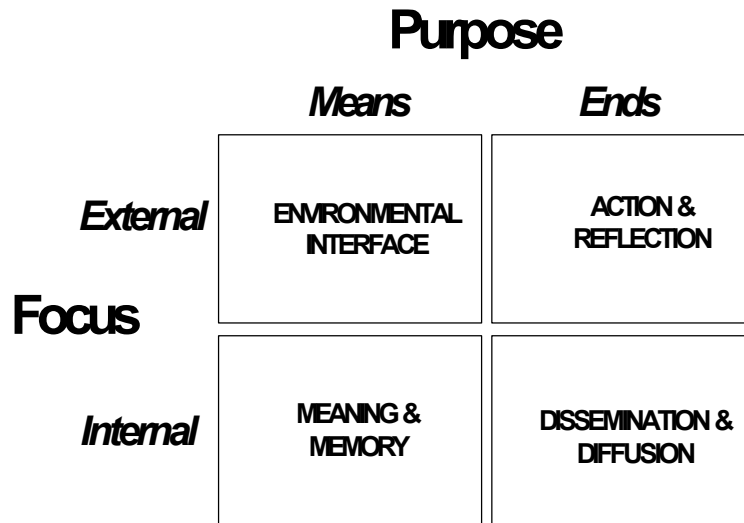


Figure 2 : Schwandt Learning Subsystems

Schwandt’s four learning subsystems are interdependent. The arrows in Figure 3 show the relationship between the products of the subsystems. These interchange mechanisms are the elements of input and output that Parsons (1968) defined as a medium of interchange / exchange.

³ Early versions of the model identified the subsystem as ‘Dissemination/Diffusion’. Later versions label this subsystem ‘Structuration’. In the figures the earlier name is retained.

The interchange mechanisms are processes, procedures, and roles manipulated by the collective and individual actors who produce invisible networks. They are patterns of action that allow for mutual exchange among the subsystems. The media of interchange / exchange are as follows:

1. *New Information*, output of the Environmental Interface Subsystem. The learning system accesses new information from the external environment and from within. The subsystem's function is adaptation. New information comes into the system from outside and leaves the organizational learning system through the adaptation function.
2. *Goal-Referenced Knowledge*, output of the Action-Reflection Subsystem. The goals of the learning system are to adapt through learning. This is different from the goal of the performance system, which adapts through performance. Both contribute to the organization's ability to change for survival. For analysis purposes, the two subsystems are separated.
3. *Structuring*, an output of the Dissemination-Diffusion subsystem. The integration of organizational structures, information technology, roles, policies, procedures, and processes produces a dynamic result—structuration. The structuring media of exchange integrates the other three subsystems in the organizational learning system. Structuring mechanisms allow for information and knowledge to move within the learning system and the organization.
4. *Sensemaking*, an output of the Meaning and Memory Subsystem. Sensemaking functions to accomplish pattern maintenance. The sensemaking produced and transferred from the Meaning and Memory Subsystem is represented by language and symbols. This medium makes sense of actions through reflection, moves and classifies goal-referenced knowledge into stored memory, and is required by the Dissemination-Diffusion Subsystem to generate appropriate structuring. Language and symbols—defined as words, signals, and knowledge structures (schema and scripts)—are the means that the Meaning and Memory Subsystem uses to communicate with other subsystems. Language and symbols are required to produce useful explicit information, goal-referenced knowledge and the structure for organizational learning (Schwandt et al., 1998).

These four interchange media can be measured via organizational variables such as industry conferences (new information), strategy formation processes (goal-referenced knowledge), roles and norms (structuring), and schema/scripts (sensemaking).

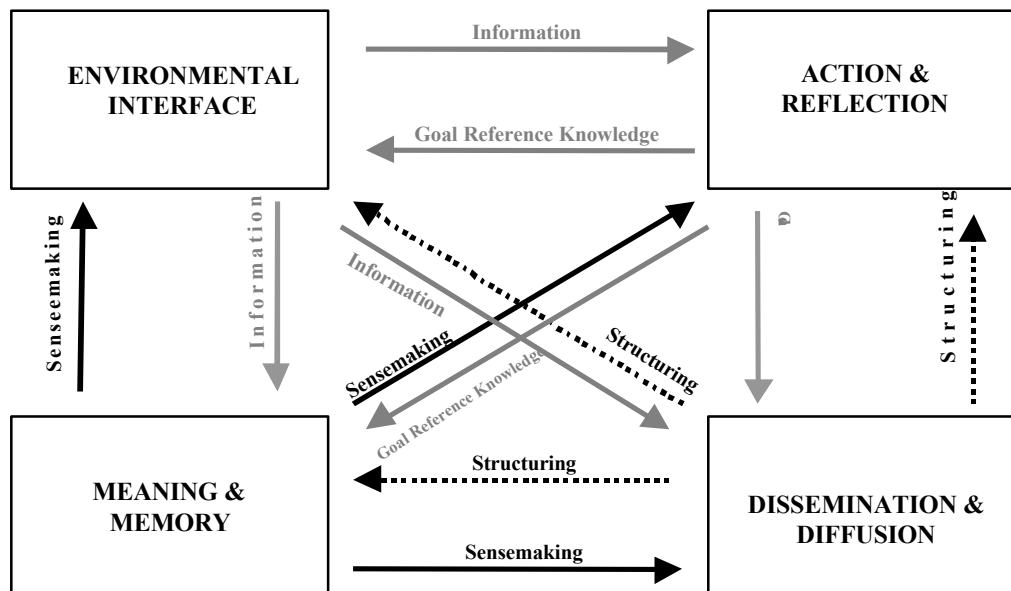


Figure 3 : Media of Interchange in Schwandt's Learning Subsystems

This study focused specifically on the structuring and sensemaking interchange media in a goal-oriented virtual project team. Structuring variables included in this study were information technology, roles, norms, leadership, rewards and recognition, and education and development. Sensemaking variables are related to collective cognitive schema and behavioral actions of the team that are essential for organizational learning, and included values, language, scripts, and schema. Values represent an understanding of the operative culture. Language is a symbolic representation of assumptions. Scripts and schema are two terms for knowledge structures, which are the framework within which meaning is created. Schema represent shared meanings, mental models or frames of reference defined by Senge (1990 : 8) as “deeply ingrained assumptions, generalizations, or even pictures or images that influence how we understand the world and how we take action”. Scripts are a special type of schema devoted specifically to the retention of context-specific knowledge about events and event sequences.

This study explored a number of structuring and sensemaking variables suggested in previous research using the Schwandt OLSM (Casey, 1995; Geigle, 1997; Gundlach, 1994; Hinds, 1995; Schwandt, 1994, 1999), with emphasis on collaborative technology as a structuring element that was expected to be critical to the functioning of a virtual project team.

3. THE STUDY TEAM

The context for this study was one goal-oriented, virtual project team (VPT). Based on project requirements, the team selected had been formed with the intention of creating an optimum combination of skills and resources. Team members were physically, and often geographically,

dispersed, not co-located. The team members could contribute to their team project at any time, from any place, and were comfortable and experienced using technology.

The site selected for this research was the Knowledge Management Team (KMT) at BP. The principal participants in the virtual project team (the KMT) were 11 knowledge workers supporting the entire company of 55,000 employees. They were located in Sunbury, London, and Scotland (UK), in addition to three part-time members located in Houston (Texas), Warrensville (Ohio), and Sunbury. The concept and core members of this knowledge management project came from the Virtual Teamworking Project, begun in 1995, to implement sophisticated technology to link employees and contractors who needed to share work, or expertise, at the same time from different places. This initial project created the foundation of the KMT's central tenets: to integrate people, processes, and technology.

The initial KMT was formed in 1997 to “accelerate the pace and benefits of BP’s transformation to a learning organization, and maintain the momentum of existing knowledge efforts. Each KMT member joined the team with a commitment to participate in the long-term BP effort to innovate organizationally by developing systems, processes, teams, and individual employees in order to improve performance outcomes. The individuals on the team and in the knowledge management community provided a wealth of data about organizational learning and about the mechanisms by which organizational learning can, and did, influence learning and performance within BP.

A second group of participants, who provided insight for the study, were selected members of the knowledge management community of practice (KMC) – a group of BP professionals (160 as of November 1998) interested in the field of knowledge management. All KMT members were by definition members of the KMC. The purpose of interviewing KMC members, beyond the team itself, was to validate the interpretations derived from the KMT member interviews, communications (email, telephone, etc.) and observations.

4. FINDINGS

Since the focus of the study was on the learning subsystem, the performance subsystem terminates with evidence that the KMT completed its performance goals. The two sub-questions related to structuring and sensemaking variables follow the learning construct. Figure 4 identifies themes and findings related to:

- (a) structuring variables (IT, roles, norms, leadership, rewards and recognition and education and development); and
- (b) sensemaking variables (values, language, scripts and schema).

The themes and findings related to the collaborative technology construct are integrated into the learning subsystem as one of the IT structuring variables. This is indicated by the [A] symbol on the Figure 4.

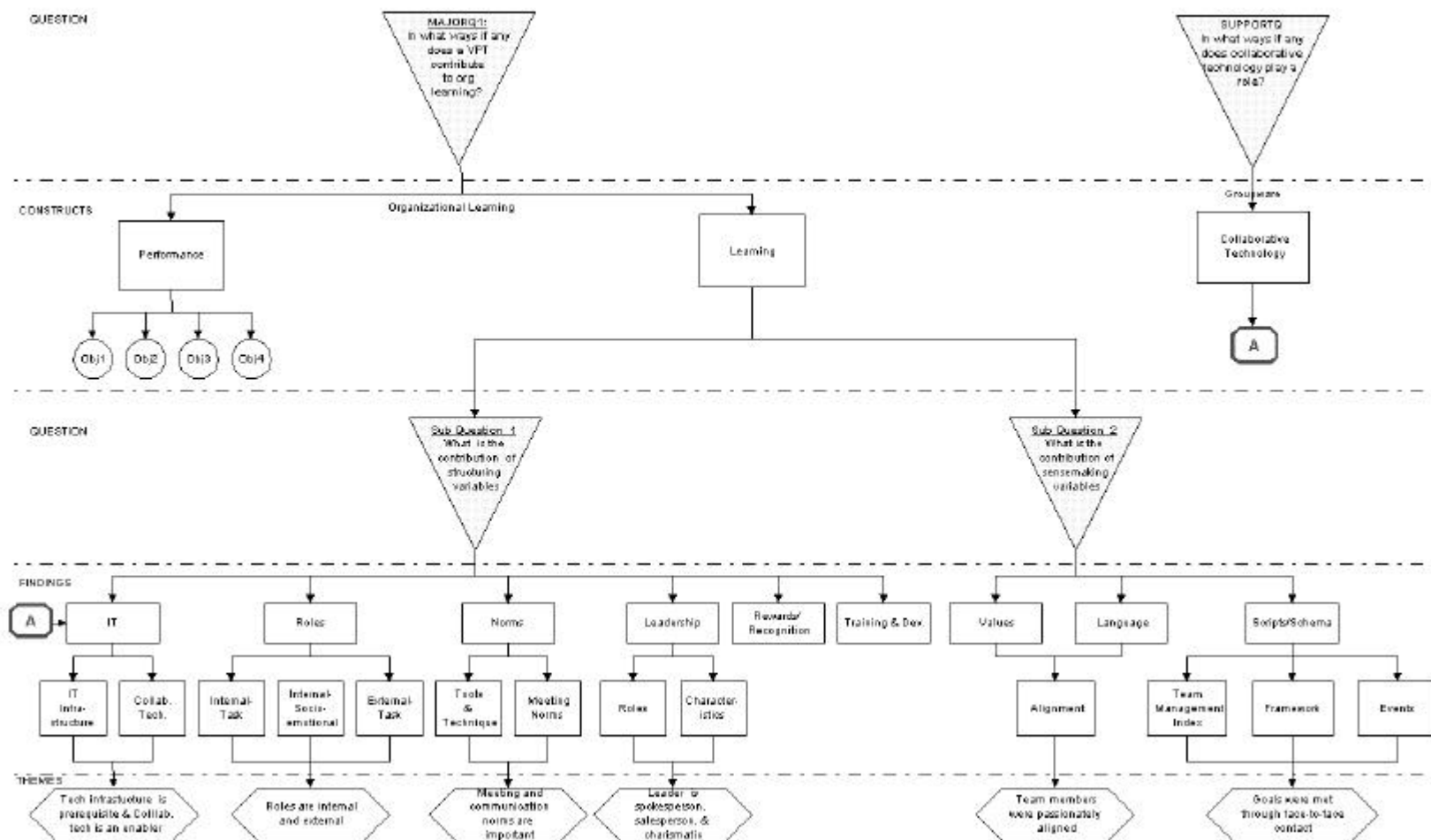


Figure 4 : Flow of Major Research Questions, Findings and Themes

4.1 LEARNING SUBSYSTEM

The researchers sought to understand elements that contextually define each of the structuring and sensemaking variables as reported by the study’s informants. After a short discussion of each variable from the perception of team members, the findings are summarized.

4.1.1 Structuring - Medium of Exchange

Figure 5 is a guide through subquestion 1 describing the six structuring variables and principal themes: IT, roles, norms, leadership, rewards and recognition, education and development. Detailed analysis of the coded interview transcripts, as well as observation at face-to-face meetings and informal conversations, revealed rich descriptions and these were summarized into 30 structuring principal descriptors

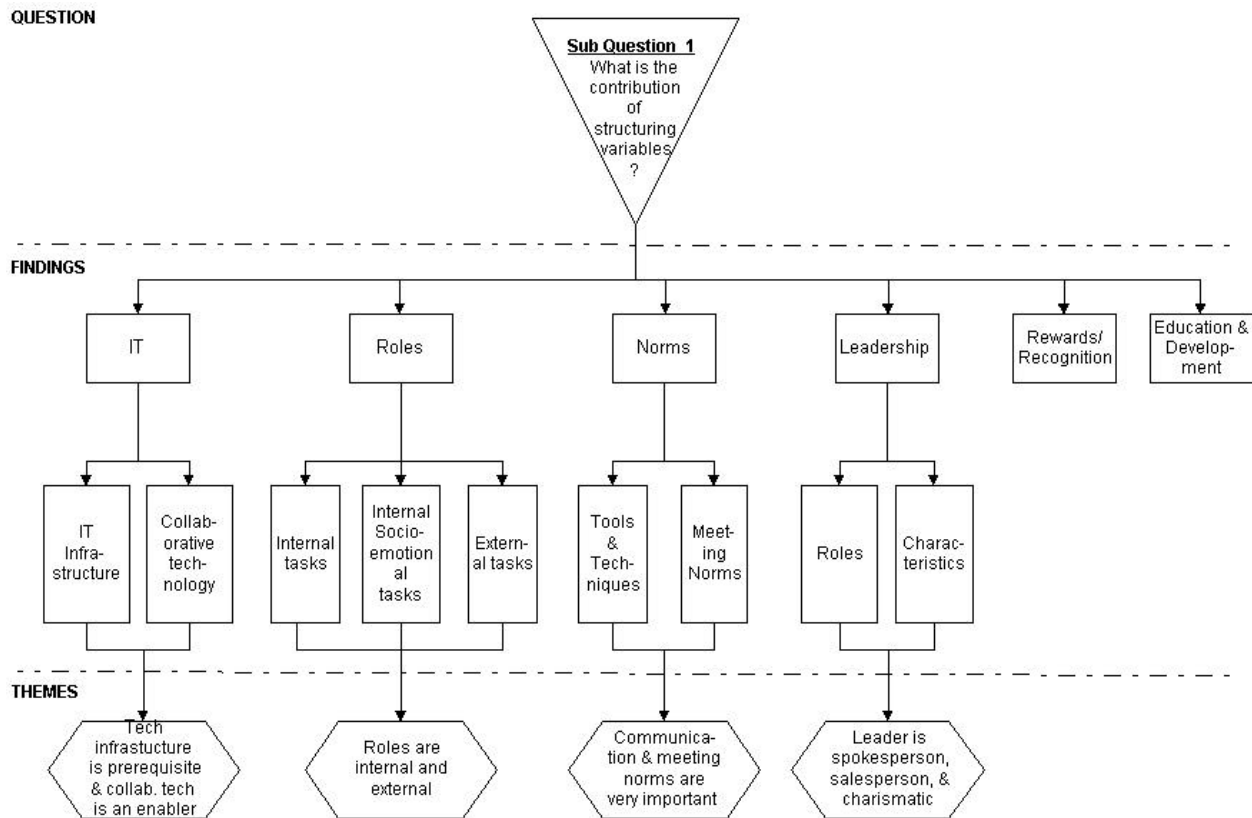


Figure 5 : Subquestion 1 – Findings and Themes.

4.1.1.1. Information Technology

Team members individually, and as a collective, actively used both the IT infrastructure and collaborative technology. This study divided the IT variable into two conceptual elements: *IT*

infrastructure (composed of hardware, software, electronic networks, standards and support that allow employees to access applicable computer applications) and *collaborative technology products* that use the IT infrastructure to facilitate communication, coordination, collaboration and information sharing.

IT Infrastructure:

Team members recognized that a standard IT infrastructure is a prerequisite for virtual teams. At BP this requirement was met through a common operating environment (COE), a blueprint for technology that ensures that every BP computer meets minimum hardware and software standards. Negative aspects arise when the tool is too rigid or unavailable. BP has a strong commitment to developing a company-wide IT infrastructure as a strategic function and capability. The team members recognized that the IT infrastructure was a prerequisite for their team to operate virtually and expected connectivity and universal availability. A few team members complained about not being able to add nonstandard software or being behind in implementing the latest release of a particular software product, because of strict corporate guidelines about COE. The team also recognized that the organization-wide communication technology was rarely addressed directly, except when it did not work. Many team members indicated dependence on the existing IT infrastructure when they were asked directly, but did not volunteer the information. Among team members there was general awareness of possibilities for technology, as well as the limitations of the current environment. There was however optimism that, as technology capabilities evolved (e.g., more robust search engines), current limitations would diminish.

Collaborative Technology:

The KMT members were active users of 'standard' (not customized) technologies (i.e., Microsoft Office, Microsoft Exchange). They did not differentiate between communication, coordination and collaboration functions for information sharing. Tools were used for different purposes (e.g., email, phone, PCvideoconferencing) and were preferred by different team members. Most team members explicitly acknowledged that communication is complex, particularly in a virtual team.

4.1.1.2 Roles

Team members recognized that they assumed both *formal and informal roles*. In some cases the roles were defined and assigned, or assumed, by multiple team members. In a few cases the role was unique to a team member with secondary responsibility assigned to, or assumed by, another or other team member(s). The major factor differentiating roles was whether they were internal to the team (team process) or external (boundary spanning).

Within the KMT there were five role categories identified (Bales', 1950) that separated group activities into socio-emotional and task-specific: (a) *intragroup, internal to the KMT* – supporting the team's social/emotional issues; (b) *intragroup, internal to the KMT* – supporting the KMT's task issues; (c) *cross boundary – internal to BP* – supporting client business projects to meet their business objectives.

The KMT members explicitly described roles directly related to organizational learning,

supporting the learning and performance subsystems for individuals, the KMT, business projects and the organization. In general the roles were reported to help workers share their learning and to demonstrate different approaches to sharing information. Each team member described himself and others on the team as playing multiple roles. The team members also valued outside perspectives and experts. Outsiders supported the KMT in every role category. Although the leader was the primary and positional leader, many people performed leadership functions based on the given context.

Discussion about individual and team roles generated more principal descriptors than any of the other structuring variables.

4.1.1.3 Norms

Norms are associated with *procedures, tools, techniques and rules*. Table 1 lists KMT norms, with specific techniques, tools, and procedures identified by category or type. For example findings related to norms were derived from conversations that described norms that the KMT established, as well as norms participants recommended as good or best practices for future knowledge management efforts. Communication and team meetings were the most significant procedural norms. The tools and techniques the team developed as components of the knowledge management toolkit were central to the team and BP.

Norm	Type
Peer Assist	Technique-face-to-face activity
After Action Review	Technique-face-to-face-activity
Retrospect	Technique-face-to-face or electronic activity
Knowledge Asset	Technique-creating an electronic history of a topic or activity
Learning History	Technique-obtaining a written record of a project or event
Virtual Teamworking	Tool-hardware, software and coaching process
Use of KMC discussion database for general knowledge management interchange	Tool-software and facilitation techniques
Connect	Tool-software
Standard presentations e.g., for engagement	Tool-electronic content
Connect	Tool-software
Team meetings every other Thursday	Procedure-agreement
Meeting formats-agenda, notes,	Procedure-agreement
Quarterly team performance review meeting with outside facilitator-Away Days	Procedure-agreement
PC (VT) (or phone conference) attendance at team meetings if face-to-face not feasible	Rule-expectation

Table 1 : KMT Norms Identified During Interviews

4.1.1.4 Leadership

Leadership, in four areas ((Tissen, Andriessen and Deprez, 2000), emerged as a significant descriptor in the KMT analysis: (1) the area of knowledge management in which they will be expected to *sense and respond, combine and connect*, and *create and produce* unstructured knowledge, (2) the area of team management in which they must *direct and guide, coordinate*

and control, and *participate and develop* high potential in colleague team members, (3) they must involve themselves in talent management to *detect and develop*, and (4) they will have to become involved in self management and self development by applying *refresh and refocus* at regular intervals in their career (discussed further in the education and development section).

4.1.1.5 Rewards and Recognition

Rewards and recognition from the perspective of structure (compensation and bonus policies and procedures) were not mentioned in the interviews. Many respondents touched on the subject as it applied to their *sense of accomplishment* and *motivation*. These comments are discussed in the sensemaking section on values.

4.1.1.6 Education and Development

Professional development was expected (by the researchers) to be important for KMT members who were moving from scientific backgrounds to the relatively new field of knowledge management. This was not the case, since KMT members received *no formal, or collective, training on knowledge management* – except through presenting and attending conference. The only seminar KMT members attended introduced an instrument to evaluate individuals' preferred roles in a team. Personal development was also not something raised by KMT members. In addition there was no mention of a training or development requirement in anyone's personal performance goals.

The team members were very aware of the need to develop and deliver knowledge management awareness education for BP business project clients or potential clients. Several team members mentioned specific programs that were offered. However, they were not standardized to embed the tools and techniques that the KMT developed.

In retrospect all the team members stated that not developing a formal course was a mistake and limited the knowledge transfer of the team's work. Everyone agreed that a formal training program is critical for institutionalizing knowledge management. They were also aware that by not having the requirement to build a standard training program in the performance contract, it was not done. It remains an open task in the team objective to raise knowledge management awareness.

4.1.2 Sensemaking Medium of Exchange

Figure 6 is a guide through the three sensemaking variables: values, language, and scripts/schemas.

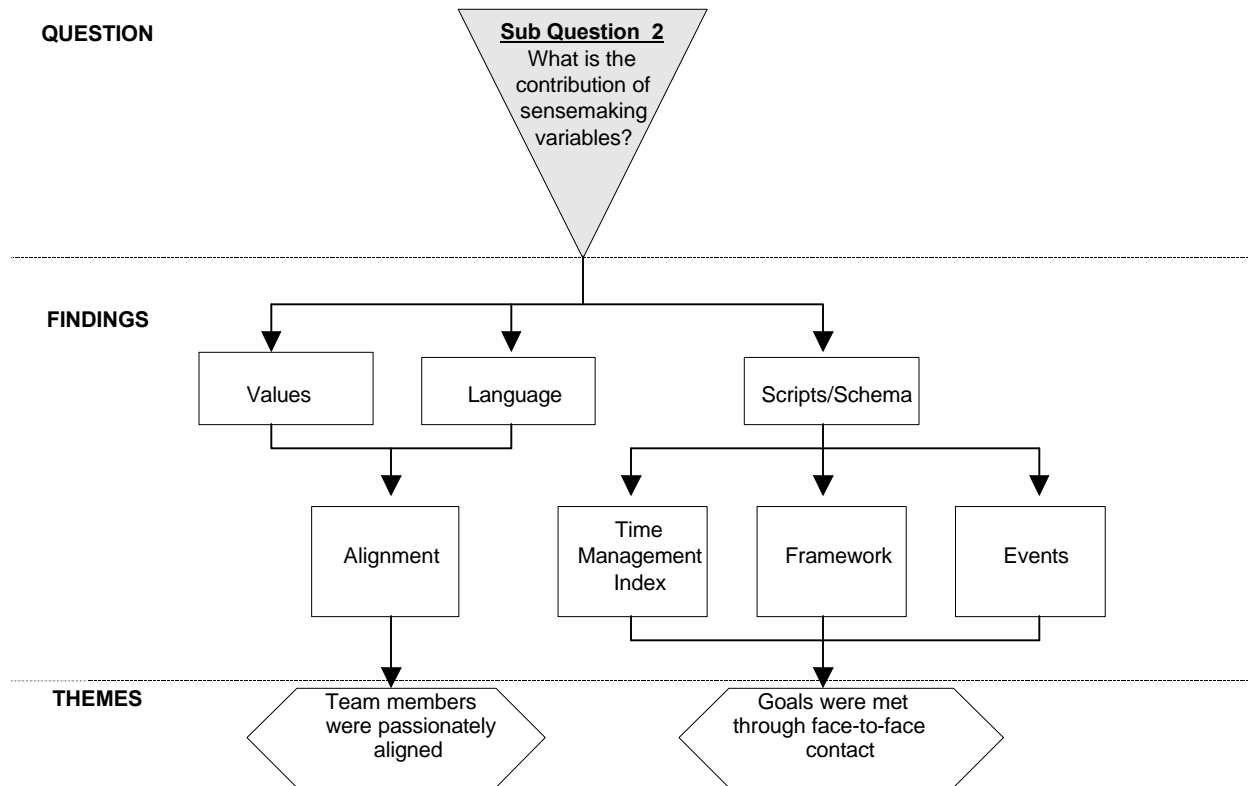


Figure 6 : Subquestion 2 Findings and Themes.

4.1.2.1 Values

Open business values (Morosini, 2000) are the degree to which a team's, or company's, key social actors share, enact and communicate to others basic principles of behavior which encourage learning, sharing of information and insights, and transparent communication. Values were evident and often expressed explicitly by KMT respondents. For example, the commitment to continuous learning was a common theme. In addition to explicit statements, many of the team values were also implicit in discussions and observations. What also became evident from our research was how the team's members and leaders embraced, acted and communicated those basic values – which appeared to be more important than the values themselves. In many respects, the strong passion for the new knowledge management discipline, and the will to make it succeed, drove the team's accomplishments.

Values that were expressed explicitly or implicitly by respondents related to rewards, learning, and the significance of time to accomplish change.

Rewards and Recognition

Even though the importance of *motivation* is recognized, no integrated theoretical

framework has thus far been developed – especially in the field of knowledge management. What is clear though, is that established motivational theories, such as Maslow and Herzberg – successful for industrial bureaucracies, will not necessarily work for the new generation of knowledge workers. In practice, many different approaches have been used to optimize motivation with varying degrees of success (Van Breukelen and Van der Vlist, 1997).

In general, we believe that motivation (therefore learning and performance) is directly related to personal, organizational, and societal values, and motivation is therefore looking at why people do the things they do. It is about people's drives, wants, needs, values, goals, emotions, accomplishments and actions (Tissen, Andriessen and Deprez, 2000). Individual motivation in the KMT was highest when the following circumstances and norms were met and valued:

- when a team member believed that what he or she was doing would lead to certain outcomes (performance-outcome expectancy);
- when a team member felt that he or she was playing a meaningful role at the start of something significant to the organization (performance-outcome expectancy);
- when a team member believed that he or she would be recognized (with little or no financial rewards), both within the team and in BP, for the contribution they have made (internal recognition expectancy);
- when a team member was made aware of articles, books and conferences citing the BP KMT as a world-class leader in knowledge management (external recognition expectancy);
- when the team member believed that his or her own, personal learning was of value and could contribute to the KMT learning (individual-team learning expectancy);
- when a team member believed that his colleagues were committed to the goals and objectives of the KMT (team-performance expectancy);
- when a team member believed that the desired levels of learning and performance were possible, given the resources, competencies and skills he or she possessed (effort-performance expectancy and effort-learning expectancy);
- when the team member believed that he or she was seen to be assisting and developing others (interpersonal-performance expectancy) ;
- when a team member communicated his or her desire to sustain the team effort of the KMT, through agreeing to the equal distribution of performance bonuses (team sustainability expectancy); and
- when a team member witnessed his or her colleagues choosing to continue to work in knowledge management, rather than return to their original disciplines (team sustainability expectancy);
- when a team member believed that he or she would be continuously learning something new – since knowledge management is a relatively underdeveloped discipline (personal-learning expectancy).

Learning

The three key areas of learning (*social, cognitive and feedback*) were spoken about by every team member as critical to personal, team and organizational goals. Many examples, showing the effective use of KMT tools to accomplish learning objectives, were reported.

The KMT exhibited time-based perseverance and focus on embedding knowledge management concepts and tools in the organization, and Stewart's (1997) 'virtuous cycle' became evident ("People learn to do things that become stories that become documents that go on a network that people use to learn how to do things"). Team members reported individual successes, disappointments, and failures. Interviewees were well aware of the iterative learning that came from pilot projects and other diverse projects.

Learning as a collective (team or BP as an organization) was important to all the team members, which led to the importance of sharing information to accomplish learning. All team members were committed to both sharing and acquiring information. One member described it as "openness." Listening to team members, it was obvious that there was a genuine desire to share what they know. There was frustration when someone offered to share, and the offer was not accepted.

Culture

Several members mentioned that, outside the KMT, the prevailing BP organizational culture takes precedence over team norms. Most KMT members were long-term BP employees (17 years average) and aware of the history of the dominant engineering culture. Team members described the culture as one dominated by cowboys, analytics, and engineering – which obviously had implications with regard to, what Davenport and Prusak (1998:102) terms, the learning- and knowledge 'viscosity' (the richness or thickness of the knowledge transferred and how much of it is actually absorbed and used within the organisation) and 'velocity' (the speed with which knowledge is disseminated throughout, and moves through, an organization). The KMT members expressed joy in their *ability to act differently* within the KMT social network.

Team members also recognized the BP culture as not oriented towards mandates, creating an imperative for the KMT to engage with people to voluntarily adopt processes, etc. Values and assumptions were consistent within the team, but in many cases the members were aware of the tension that resulted from the creative dualities arising from within themselves as individuals, and with the KMT and the BP culture, thereby creating a need for balance (bounded tension).

4.1.2.2 Language

A major factor in the success of any virtual team project is the common, and shared, language of its members, which serves to build trust among them. Without it, individual team members will neither understand nor trust one another. The first component of trust is predictability – hence, the issue of time raised in a previous section. We usually use the word 'trust' to mean that we believe that people will act in a predictable good and positive manner. We can just as well

believe that people will act in a bad or negative manner. Trust is only the positive face of predictability: the negative face is just as important. Either way, we increase our ability to predict through communication and the establishment of language norms. Nonaka and Takeuchi's (1995) emphasis on 'redundancy' (overlapping areas of expertise) and Allen's (1990) discussion of 'cultural mismatch' as a barrier to technology transfer both recognize the importance of common ground. Hence, initially all that team members had on which to build trust was their commonality of expertise and experience (performance track record) within BP. Later, they would develop and appreciate a shared language and trust then became a 'feeling'. All KMT members, in our research, used the same language to describe the team's strategy and tactics. In many cases, the language was reflected in tools and techniques and were embedded in scripts. For example, every team member during the interviews stated the central concept of learning before, during, and after an event. It became doctrine for the team. The language discussion does not address differences in country of origin, although those were obvious and a source of humor between the researchers and the team.

The awareness of the need to learn was included in the language used by team members during conversations. It is also noted that this language of knowledge management was not yet embedded in the general BP culture, which at times was an issue for team members. In BP's engineering culture, rationality and analytic language are norms. KMT members were aware of the shift in their use of language from analytic to language related to senses, relationships and feelings. The word "passion" is used specifically and demonstrated in the words and actions of interviewees.

Team members were aware of language that did not match the mental models (world views) of engineers. Several team members recognized a few of their colleagues as evangelists. Faith was frequently mentioned as a characteristic of the team's work, as in the following statement:

"There is an act of faith for knowledge management as opposed to building a platform and delivering a specific result ... The team is driven by a common belief in delivering something worthwhile."

Over time the KMT evolved consistent people-oriented usage of some common terms (network, VT). The term "network" was also often used by team members. Outsiders sometimes assumed that they were referring to a technology network. In this study, the technical network issues are addressed in the IT infrastructure section. The context for KMT members using the term "network" is the formal networks within the BP organizational structure and at times communities of people who share interests (the learning network).

4.1.2.3 Scripts and Schemas

The team was consistent in describing scripts and schemas that are central to their work. The scripts included an overall framework for the team's work, a model that integrated people, process and technology functions, and an instrument with its associated model used to understand individuals' preferred roles within the team. These scripts were repeatedly used throughout the fieldwork, during interviews and observation. In addition to scripts, the team had many schemas related to their 'journey.' The team members were consistent in describing important events (episodic memory) during the KMT project – building their story-memory.

One of the major accomplishments mentioned by all team members is the development of the *knowledge management framework* that guided the team's work – an intersecting circle model for people, process, and technology—the key components of the team's approach to organizational learning and basic to all KMT discussions and presentations. Several team members emphasized that the early focus at BP, and most companies, has been technology, and more money has been spent on technology than on processes and people. The KMT however recognized the importance of people and process and worked at the intersection of the three components to accomplish learning before, during and after a project.

During interviews, many informants referred to an individual in a specific role. For example, the internal team member who packages materials for distribution was described as a 'completer/finisher.' When the researcher probed for the meaning of these roles, members described a team role assessment instrument, the *Team Management Index (TMI)*, which provided a foundation for the team's internal understanding of themselves and each other.

Individual interviewees responded to the question about team effectiveness by describing specific events or episodic memory. This view was corroborated during the all day Retrospect on February 12, 1999 when the team used the map constructed as pre-work to trigger the discussion of the team's journey. The events most often mentioned in the interviews were the Milan Knowledge Exchange that formed the KMC and the Innovation Colloquia. These events were face-to-face and a combination of face-to-face with webcasting respectively. At the face-to-face Retrospect, team process events were also discussed as critical—creating the engagement presentation, developing the knowledge management framework, quarterly review meetings, and reports to the knowledge management steering committee.

The Milan Knowledge Exchange (September 1997) was conceived and implemented as an event to break through other initiatives competing for change attention. One hundred people were brought together to share best practices in knowledge management. Some attended at the urging of KMT members, whilst others came because of the strategy fit and it was something people could relate to. The meeting was an opportunity for the KMT to reveal their plan, with the goal of obtaining input and ownership from attendees. One KMT member described the Milan Knowledge Exchange as “the most successful event as [a] team.”

Another event orchestrated by the KMT in 1998, and a highlight in the team's collective memory, was the Innovation Colloquium. This was a face-to-face meeting attended by forty BP business unit executives as well as external innovation experts, a futurist, a senior officer from the U.S. Army and executives from innovative companies. A member of the KMT said, “Since the topic was innovation, we wanted to use innovative methods of getting people to participate in the event.” Therefore, the KMT supported the colloquium (they did not initiate it). People who could not attend the event personally were encouraged to attend virtually. More than 1,700 of the 20,000 BP employees with Intranet access attended.

Key deliverables were developed and major breakthroughs occurred in same-time communication, most often face-to-face. In addition to the major events described above, every team member raised the importance of team meetings for social reconnections, creating team plans, models, and presentations. Though everyone agreed that face-to-face was valuable many informants described very positive same-time different-place work sessions.

The next section summarizes the study findings.

5. SUMMARY FINDINGS

This section summarizes the findings that answered the research questions. The primary research question - In what ways, if any did the virtual KMT contribute to organizational learning? - was answered: *Yes, through the successful completion of performance goals, which included measurable performance as well as learning.* The KMT performed, learned and contributed to BP's learning and performance. The final integrative finding at the end of the section explains this answer in detail. The findings that immediately follow specifically answer the subquestions related to the structuring and sensemaking variables studied: IT, roles, norms, leadership, rewards and recognition and education and development as well as values, language and scripts and schema.

5.1 INFORMATION TECHNOLOGY FINDINGS

Finding 1: The team identified an IT infrastructure as a prerequisite for a virtual team to function.

Without the technical infrastructure that supported communication and information sharing, the team could not have functioned.

Finding 2: Collaborative technology enabled organizational learning. No customized collaborative technology tools were used to facilitate the team's knowledge-based work.

Although respondents stated that they could not have functioned as a virtual project team without collaborative technology, they were aware that the technology without other structuring and sensemaking variables would not have produced organizational learning.

Finding 3: Once the leaders understood the deep drivers of their social- and learning structure, they moved to support it with suitable sets of information practices, resources and capabilities.

All these elements were central components of the information infrastructure, by which we mean not only IT, but also the ways in which key management information was gathered, analyzed, shared and utilized by people. Their challenge was one of developing suitable routines and resources to continuously collect and codify information, and facilitate communications between individuals across the KMT, as well as the wider community. The main goal of such an information infrastructure is to strengthen and expand a company's social structure of learning (and not vice versa) (Morosini, 2000:247).

5.2 ROLES FINDINGS

Finding 4: Five separate but integrated role categories operated internally within the KMT, externally within BP, and externally to BP.

Internal and external roles were central to the team's existence and success. Within each category there were functional and behavioral roles assigned and assumed that facilitated the team's work as a virtual project team. All the case study participants made assertions relating to the importance of five categories of roles within the team:

Intragroup:

- Supporting the KMT's socio-emotional issues.
- Supporting the KMT's task issues.

Cross-boundary:

- Supporting client business projects.
- Supporting and participating in the KMC.
- Gaining recognition for BP in the business community as a knowledge management organizational learning leader.

Most participants in the study and all the team members were aware that the multiple roles performed by KMT members were a key factor in meeting their goals. The roles were often informally defined and evolved during the life of the team.

5.3 NORMS FINDINGS

Finding 5: The team perceived meeting (communication) and information storage norms as essential.

Although norms evolved over time, having clear and simple rules for communication (e.g., meeting frequency and document storage) were even more critical than if they had been co-located. When asked to describe team processes, everyone mentioned the importance of the meeting every two weeks to “catch-up” and the quarterly face-to-face review sessions to accomplish specific team tasks.

Finding 6: The time taken to establish norms differs from one person to the next

Beyond the rules mentioned above, team members reported differing personal levels of need for connection. Several found it difficult to meet their own expectations of communication in the virtual context and recognized how difficult it is to adopt the norms personally. As time went on the team institutionalized more of the processes successfully.

Finding 7: A policy of minimum norms allowed for the necessary flexibility for learning.

It is interesting to note that no policies were identified as critical to the KMT. This was explained as a BP norm of very few mandates, which translates into a minimum number of policies. Policies were limited to corporate safety, legal and ethical issues.

Finding 8: Developing tools and techniques was a component of the team goals and performance contract: to develop and implement tools and techniques to support BP in an ongoing learning process.

The KMT's knowledge management framework included seven tools and techniques —After Action Reviews (AAR), Connect, Knowledge Assets, Learning Histories, Peer Assists, Retrospects, and VT (PC video conferencing and associated coaching)—that enabled teams to learn before, during, and after a project was complete. Information on these tools was available through KMT publications and the Website. Some KMT members actively facilitated the use of these tools for business projects.

Finding 9: Use of, and people's views regarding the impact on the organization of, the tools varied among members.

Team members did not share the same perceptions about how processes like AARs should be implemented. However, all described it as a facilitated group process at the end of an event. A team member explained his view of the AAR as a personal learning tool. Other team members viewed the AAR as a group process. This demonstrates the challenges in transferring learning. Although team members reported AARs as highly successful, they disagreed on the impact such tools had on the organization and recognized that people used the tools differently. While many participants were adamant about the value that could be associated with these techniques when they were used, many recognized that the techniques and tools were not always used within the KMT itself and in the broader BP organization. They were aware that the techniques and tools were not yet institutionalized (part of the “fabric”).

Finding 10: Lack of time was repeatedly identified as a major barrier to institutionalization of the KMT techniques.

Participants articulated time-related challenges of developing processes and procedures that would be implemented and institutionalized. Team members believed that once people recognized the value to themselves and their team they would “find the time.”

Finding 11: The lack of shared norms at the beginning of the team’s formation was a barrier. Members stated that defining norms early in a team’s life is desirable, but a team also needs time and experience working together, preferably face-to-face to be effective. Everyone recognized the change in the team’s effectiveness once they added shared norms, which they defined as providing “structure” to the work. When he was asked what he would do differently with a new team based on his learnings from the KMT experience, the leader responded as follows:

“The thing I would do differently would be to immediately establish some processes and techniques to back up the communication process. I would set up a structure [definitive norms: rules and procedures] realizing it won't be perfect.”

Finding 12: Measurable task-related norms aided learning and performance.

The team perceived task-related norms as easier to adhere to than behavioral norms because task-related norms are often measurable. Many team members described norms related to team meetings but recognized there was a lack of norms for virtual communication, sharing non-project-related information and experiences. One team member observed that the team itself had difficulty implementing its techniques. The team was disciplined about identifying and documenting their task-related processes. Respondents were aware that they were unusual as a team in having most of their concepts and processes written down. They had a process to create an ongoing users guide to share within the team and with others. But this did not include social or interpersonal information. Several participants described the need to feel connected to the other team members.

Finding 13: Time-based process norms, and inter-personal relationships aided performance.

Process norms, e.g., meeting times and frequency of communication can be established and will facilitate the team process. The informants recognized that it took time for the team members to be comfortable with themselves and each other so that they behaved as a collective. There was

no consensus on the definition of “being comfortable” but there was a sense that “we knew when it had happened.” The most significant norm that all the participants spoke of was the importance of the face-to-face meetings (Away Days).

The leader reflected on his experience of the need for explicit norms and a structure.

“In a virtual team, you need to be very specific, and you actually need to go after some of this stuff which would happen more normally or obviously in a face-to-face situation, which is why, by the way, we had so many Away Days.”

Individual differences were evident when team members discussed their needs for interaction within the team. There was universal awareness that it was more difficult to remain “connected” with members who were rarely physically together, but the need for “connection” and frequency varied. Traveling team members found it difficult to stay in touch. Respondents were aware that it was not a technology issue; you could always use the phone. At the end of a day participants found it difficult to call or e-mail, for an informal check-in that would have been natural at the end of the day in a co-located environment. The effort on the part of virtual team members must be very conscious.

Finding 14: Structure and pre-work contributed to successful face-to-face time.

Setting up team procedures was effective according to the informants. All participants mentioned meeting standards: they met every two weeks and always had an agenda, an outside facilitator and meeting notes. Over time a procedure evolved where an individual team member volunteered or was appointed to personally contact anyone who was not able to attend a meeting (face-to-face or via voice or PC video conferencing).

Finding 15: The absence of stakeholder norms made organizational learning (beyond the KMT) difficult.

Many informants were aware that norms were required beyond the team and its tasks and that they had not created an effective process for non-task related information transfer. The need to inform stakeholders (not team members) was evident, and the informal mechanisms of co-located teams were not available.

Finding 16: The scheduling and timing of face-to-face meetings has an impact on the usefulness of the meetings.

The need for face-to-face communication at the right times was acknowledged by all the KMT members. This raises issues about the ability of a project team to function without any face-to-face connections.

5.4 LEADERSHIP FINDINGS

Finding 18: During the KM initiative the leader was identified as the team “salesperson” and spokesperson, and was recognized as having a charismatic personality.

The importance of the leader himself was a universal theme (from KMT and KMC members). The combination of the leader’s position, appointment by a senior executive committee, and personality were key factors in the team’s success, particularly at start-up. Participants spoke of

the leader's role but were most emphatic when they described his personal characteristics. "Charismatic" was the most frequently used term. "Powerful", "a presence" and "strong" were other adjectives associated with the leader.

Finding 19: Visibility of the team leader is important to the team's success.

Everyone recognized that there was one appointed leader of the team who gained high visibility within and outside BP. All the team members were aware that the KMT's success depended on influence and that the leader was a critical element in gaining access to business project leaders to raise awareness about knowledge management and the contribution the team could make to a business project.

Finding 20: Personality friction can sometimes deplete individual member's commitment.

Some of the same personality traits and actions that contributed to success were at times seen as detrimental to individuals within the team. The principal descriptors related to leadership overlapped with roles and characteristics attributable to the team leader.

Finding 21: Sharing accountability and responsibility – rules that still apply.

Making a team responsible and accountable for its own performance obviously has repercussions for the team leader. He therefore had to avoid 'knowing what was best' for the team, act in a facilitatory role, and provide learning opportunities in undiscovered areas for individuals in his team – principles which were equally valid in the industrial age. The leader's perspective was that leadership issues aren't different working virtually... [As a leader you should] provide a framework, then build people's confidence and trust enough to allow them to push against the boundaries and framework that you've created as a leader.

Finding 22: Relationship building, inside and outside of the KMT, enables success.

Relationship building is a key element in the KMT processes. The leader stated his belief in building on existing relationships with internal and potential internal BP clients. He also expressed a strong commitment to reciprocity.

5.5 REWARDS AND RECOGNITION FINDINGS

Finding 23: Rewards (essentially financial) were not dominant subjects for team members – but recognition and individual motivation was.

Intrinsic rewards were discussed more often than compensation. Individual team members were motivated by a number of expectancy factors (described earlier): performance-outcome expectancy, internal recognition expectancy, external recognition expectancy, individual-team learning expectancy, team-performance expectancy, effort-performance expectancy and effort-learning expectancy, interpersonal-performance expectancy, team sustainability expectancy, and personal-learning expectancy.

5.6 EDUCATION AND DEVELOPMENT FINDINGS

Finding 24: No formal training programs were adopted as part of the KMT initiatives.

The team acknowledged the importance of training programs but recognized that formal training had not been developed due to lack of time (or perhaps priorities). A training program was also not an item in anyone's performance contract.

5.7 VALUES AND LANGUAGE FINDINGS

Finding 25: The team was passionately aligned on mission and objectives, but tactics were individual and situational or context-based.

The team spoke, and was aligned along, a common language. Cohesion and alignment within the team at the mission and objectives level was considered a critical success factor. A corollary was the expertise and autonomy of each team member to develop his or her own process based on context. The team was totally aligned on their mission: to embed knowledge management principles and the framework established by the KMT in the BP organization. The overall goal was passionately and emphatically described by many of the team members. Beyond the aligned mission and objectives, team members (particularly the people consulting on business projects) felt autonomous. Some members could be described as sole practitioners doing what needed to be done at any specific moment (and reporting back to the group periodically). This was a preferred operating method for the team members, who seemed to want some structure and support but autonomy in working on their individual projects. However, team members personal identity was not relevant during team presentations or when they told a story.

5.8 SCRIPTS AND SCHEMA FINDINGS

Finding 26: KMT deliverables (goals, outcomes) were developed at face-to-face meetings.

Participants described face-to-face events as being the time when the team was most successful. An outcome of the face-to-face meetings was often an important team deliverable, e.g., strategy, presentation, project plan, or concrete artifacts that were stored in the Memory and Meaning function of the OLSM. Times that were least successful were when contact and connection were minimal and lack of communication and leadership was reported.

To summarize, the study found 26 dominant themes—twenty-four related to structuring variables and two related to sensemaking factors—that supported the KMT's organizational learning. This concludes the section describing respondents' perception of the KMT's contribution to organizational learning. The next section describes the integration of the learning, seen through the lens of the sensemaking and structuring media of exchange, with collaborative technology in the virtual KMT.

5.9 OVERALL INTEGRATIVE FINDINGS

There was a duality in the interaction between structure (rational technical processes) and sensemaking (human values and emotions) that synthesizes the two rather than opposing them (dualisms). The KMT contributed to both learning and performance subsystems that represent organizational learning. On the face of it, the KMT interviews focused on structures, the roles people play, tools and techniques developed, and uses of technology. The intense conversation and stories describing the team's successes and difficulties were recurrently social, rather than technical. The focus of team members on embedding the knowledge management concepts in the organization was clear and evident in every conversation.

Finally, collaborative technology in the form of information bases provided structure, but not all information in the databases was knowledge. The transformation of information into knowledge

depends on human input. Knowledge Assets as an artifact can be considered a structuring element with a “how-to” information component. This might include procedures, formats, etc. For information to become knowledge, the human experience (values and emotions) must be added (e.g., describing the action, including what happened, who was involved, what could be done better in the future, etc.).

6. INTERPRETATIONS AND CONCLUSIONS

The major thrust of this descriptive case study was to understand if a virtual project team contributed to organizational learning. The study results suggest that the knowledge management team (KMT), a virtual project team contributed to organizational learning at the team and British Petroleum (BP) levels and that collaborative technology played an enabling role. The KMT’s contribution to organizational learning was evident as it continually reused available information; processed, interpreted, and acted on new information; and created new knowledge in the process of meeting the team goals. An unanticipated conclusion was that collaborative technology should be defined and analyzed as one of the structuring variables in the dynamic process of organizational learning and not considered as a separate construct because of the virtual team context. Conclusions related to the specific subsystems, functions, and variables in the OLSM follow the discussion on the performance and learning subsystems.

The overarching study conclusion is that a virtual project team (the KMT) which actively uses collaborative technology is a team that both learns and performs. The performance and learning subsystems are inextricably connected. Optimally, the learning and performing subsystems of the OLSM are closely integrated. Thus, the major study conclusions are:

Conclusion 1: A successful virtual project team, has both learning and performing components that contribute to organizational learning and, actively uses collaborative technology.

Conclusion 2: The KMT contributed to organizational learning through knowledge management initiatives such as creating a knowledge management framework that included specific tools and techniques.

These conclusions indicate that the performance and learning subsystems can move closer together, with the ultimate goal of integrating learning with performance activities so that the two become an interlocking spiral. In this study, the movement occurred through the processes, procedures and tools the KMT developed and defined as knowledge management.

After determining that the team contributed to organizational learning, the study produced two conclusions highlighting the ways in which the team contributed.

Conclusion 3: For the virtual team, length of time (life of the team and project duration) is a significant factor in performance and learning.

Conclusion 4: The dynamic interaction (dualities) among the rational technical processes for movement of information throughout the organization (structuring factors) and human values/emotions (sensemaking factors) played a central role in effective organizational learning

at the team and organization levels. Strong sensemaking factors overcame weak or absent structuring factors.

6.1 STRUCTURING VARIABLES CONTRIBUTION TO ORGANIZATIONAL LEARNING

An overarching conclusion from this study is that the impact of the structuring variables addressed depends on individual team members' perceptions and actions and is also situationally dependent. This supports the findings of Schwandt and Marquardt (1999).

Conclusion 5: An IT infrastructure was a foundation for organizational learning. The KMT took the infrastructure for granted.

Conclusion 6: Collaborative technology alone did not support organizational learning. Collaborative technology is an enabler.

If All You Do Is Build It They Will Not Come (Gorelick, 1995). This proposition was supported by this study and can be applied to both collaborative technology as a structuring variable and the more generic change process (knowledge management) that was the team's mission. Collaborative technology affects team structures, communication, coordination, and performance. Electronically supported teams can develop a rich communication structure that is different from (but supplemental to) more traditional communication structures with less hierarchical differentiation, broader participation, and more fluctuating and situational leadership structures (Sessa et al., 1999). The study validates the assumption that collaborative technology can help individuals and teams work together virtually in a qualitatively better way. Figure 7 is a model of the conclusion related to elements that constitute collaborative technologies' contributions to organizational learning through communication, coordination and collaboration.

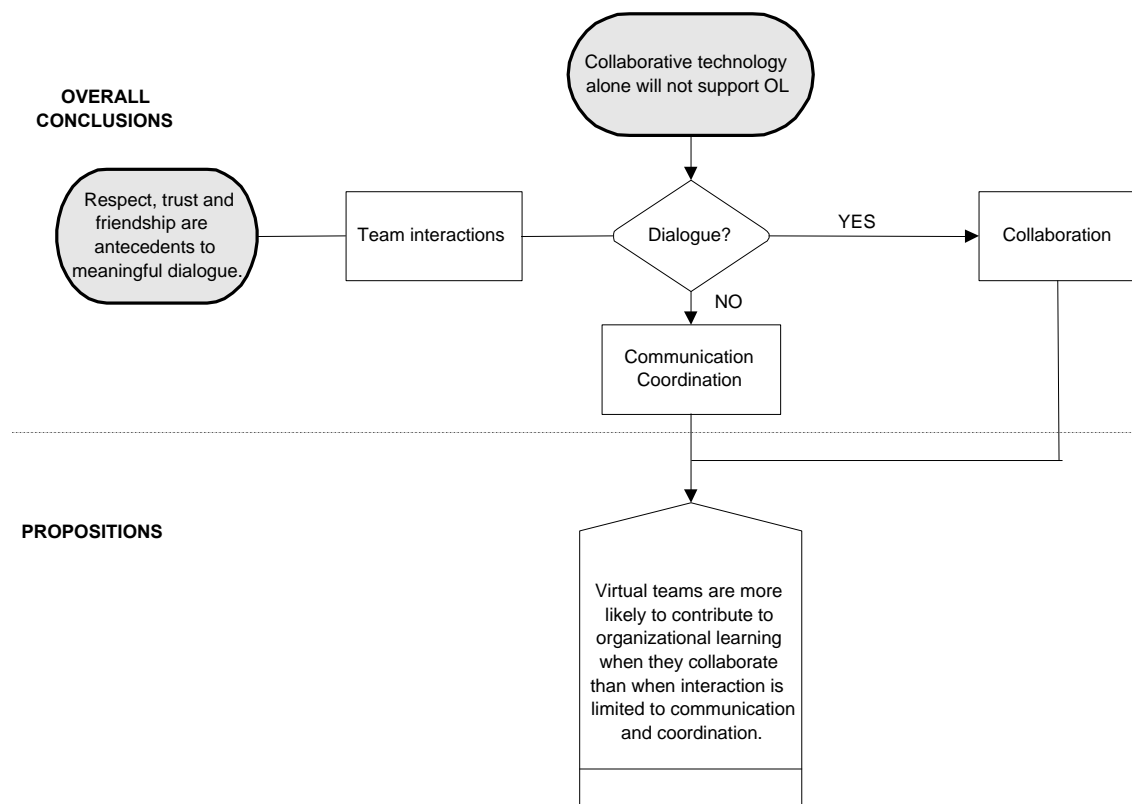


Figure 7 : Antecedents of Collaboration

The study findings emphasize that the processes the tools support are highly dependent on the sensemaking variables, including values and language. Several team members explicitly recognized trust as a prerequisite for successful teamwork. Trust is increasingly noted as a success factor for teams and for virtual teams particularly (O’Hara-Devereaux & Johansen, 1994; Handy, 1995; Lipnack & Stamps, 1997; Jarvenpaa, Knoll & Leidner, 1998). Trust, coupled with respect and friendship (terms used by the team leader), is an antecedent to team interactions that include dialogue. Dialogue, in its Greek root form means “meaning flowing through,” is essential for collaboration (April and Cradock, 2000; Issacs, 1999, Schrage, 1995; Senge, 1990). Successful trust building hinges on three components of dialogue: intention, preparation and mechanics.

According to Senge, Kleiner, Roberts, Ross and Smith, (1994:353), dialogue is a “sustained collective inquiry into everyday experience and what we take for granted.” Being able to engage in people’s stories and experience (personal knowledge) is an indicator that we are building trust and a sense of community. People have to have a degree of trust to tell their stories to others, and when they do and people begin to know each others’ stories, it creates a sense of connection and belonging, and trusting relationships – so necessary for successful collaboration. Without dialogue, team interaction is limited to only communication and coordination, both of which are elements of successful projects. However, dialogue is the differentiator that leads to

collaboration, a process of shared creation where two or more people with complementary skills interact to create a shared understanding where none had existed or could have existed on its own (Schrage, 1990). April (1999) sees the process of conversation and dialogue as “forcing one, in a sense, to make explicit things we could not [or did not] talk about.” Knowing people’s stories – their hopes and fears, their expectations and disappointments, their insights and insecurities, their aspirations and avoidances – strengthens the connection, enriches the relationship and generates care, because we get right into people’s personal experiences and knowledge. People’s stories illuminate the diversity of their experience (even if it has been in BP), challenges the plausibility of perspectives, and captures the flow of changing realities.

We noticed that there were patterns in the KMT values that guided their conversations and engaged their stories, which, when realized, created positive connections and caring relationships. It was this way of relating to each other, termed ‘relational practice’ by Lewin and Regine (1999), that provided continuity for people in times of rapid change and possible fragmentation.

Everyone on the team suggested meaningful conversation as critical to the team’s success. Not unexpectedly, the researcher found that the majority of the communication in the KMC discussion database was information sharing or dissemination and advice. This might be attributable to the logic-based analytical engineering culture dominant in BP and might have broader implications for virtual teams, supporting Daft and Lengel’s (1986) media richness theory that face-to-face interaction facilitates perception of complex events and invention of innovations. Members of the KMT who were able to use technology disputed this, saying same-time, different-place (PC-VT) combined with other tools allowed them to have rich interactions. Electronic connectivity, it appears, enabled informal, non-linear conversations which, unlike agendas in regular meetings, are pathways to unexpected, non-linear results. The study supports Webber’s (1993:32) position that:

“... conversations are the way knowledge workers discover what they know, share it with their colleagues and in the process create new knowledge for the organization. The panoply of modern information and communication technologies can help knowledge workers in this process. But all depends on the quality of the conversations that such technologies support.”

Conclusion 7: New and different roles were required for the virtual team to contribute to organizational learning.

Conclusion 8: Socio-political themes play out to influence the organizational knowledge structure and effectiveness of virtual project teams.

The process of developing the organizational knowledge structure is ongoing and continuous. Changes in a company’s environment (internal and external) may be perceived by many members and each may interpret it in different ways. However, when the change begins to affect company performance (positively or negatively), and when it cannot be adequately explained or predicted through the existing knowledge structure, it creates a challenge to that existing

knowledge structure and creates an interactive effect among the organizational participants, their roles, their environment and their behaviour (Bandura, 1977; Davis and Luthans, 1980). Of the structuring variables investigated in the study, role was the factor that received the greatest proportion of discussion within the interviews and generated the largest number of principal descriptors.

Overall the consistent pattern described by participants in this study was that both individual and collective roles are more flexible and fluid in virtual teams. Duarte and Synder (1999:121) state that the ability to balance coordination and collaboration with autonomy is a more complex challenge for virtual teams than for co-located teams. "Virtual team members may be tempted to work independently because coordination and collaboration are more difficult in a virtual situation." Hence, the degree of consensus about goals and about the means of achieving them influences the effectiveness of a virtual team.

Also, within the wider BP organization, socio-political themes, such as credibility and power, added to the challenge for the way in which these team members were working. Political processes are evoked when different coalitions (e.g., managers, analysts and support staff) within a firm who hold alternative schemas advocate their own positions through such mechanisms as task forces, project teams and special reports (Lyles and Schwenk, 1997; Prahalad and Bettis, 1986; Lord and Foti, 1986). These different coalitions attempt to influence others and to gain the agreement of others about the coalition's interpretation of events (Lyles and Mitroff, 1985). Changes in the organizational knowledge structure occur as a result of the impact of the interpretation of environmental events, results of past organizational actions, the influence of the key decision-makers and the advocacy position of coalitions within the firm.

Conclusion 9: Explicit norms about technology use and face-to-face contact were required for organizational learning at the team and organizational level.

A study conclusion was the importance of norms to guide the work of the team. The team literature identifies the need for norms, defined as policies, procedures, and rules, for all teams. Explicit norms relating to internal team processes as well as technology use are even more important to virtual teams than to co-located teams (Lipnack & Stamps, 1997; Haywood, 1998; Duarte & Snyder, 1999), a belief supported by the study findings. For the KMT, having explicit norms was a critical element of the team's interaction and the framework and tools they developed to accomplish their mission. The major procedure adopted and propagated by the KMT was for learning to be done before, during, and after a project. In conjunction with this procedure, several tools and techniques were developed. The tools can be mapped to the elements of the learning subsystem in the Schwandt OLSM.

Conclusion 10: Formal actions related to education and developments were not taken but the KMT recognized them as important activities.

6.2 Contribution of Sensemaking Variables to Organizational Learning

Conclusion 11: Enthusiasm, passion, and alignment (or cohesiveness) were critical for organizational learning.

6.3 Organizational Learning, Structuring, & Sensemaking: Model and Assessment

Schwandt's (1994) model is based on Parsons General Theory of Action, which states that the action system of an organization includes individual, group, *team* (italics added) and organizational actions. For analysis, the theory considers performance and learning as two independent subsystems. The two are dependent on each other and interdependent; working together, they allow the organization to change and adapt to its environment. In addition each subsystem includes functions represented by "black boxes." There is no methodology to analyze the subsystems of actions as yet. Schwandt suggests we use the interchange processes through which the subsystems relate to analyze the interrelationship of the action subsystems (Schwandt, Casey, & Gorman, 1998:12-13). Using this interchange media concept provided a method to symbolically represent the result of each of the subsystem functions.

The complexity of the combination of structuring and sensemaking variables operating in this study supports Schwandt's premise that "organizational learning is a process manifested in patterns of actions and attributes of changing social systems rather than causal relationships between isolated variables" (Schwandt, 1994). There is an underlying assumption in the model, supported by the study that a change in one variable will probably result in change in one or more of the other variables. Furthermore changes in individual variables may result in changes in one or both of the subsystems (Giddens, 1979).

Assessing the extent to which the variables that emerged in this study affected the learning subsystem is beyond the scope of this study. The study's findings led to Figure 8. It uses the OLSM model to represent BP's organizational learning at the individual, team, business project, and organizational levels. The central KMT box is largest only for explanatory purposes. The solid rectangle has three subsystems represented, because of the dual objectives and three roles within the team (internal social-emotional, internal task, and external- business projects). The learning system applies to the entire team. The first performance subsystem represents the measurable performance of the KMT. The last section of the model represents BP as an aggregate organization. The model has lines from each of the performance subsystems at the individual, KMT and business project level into the relevant organizational learning subsystem.

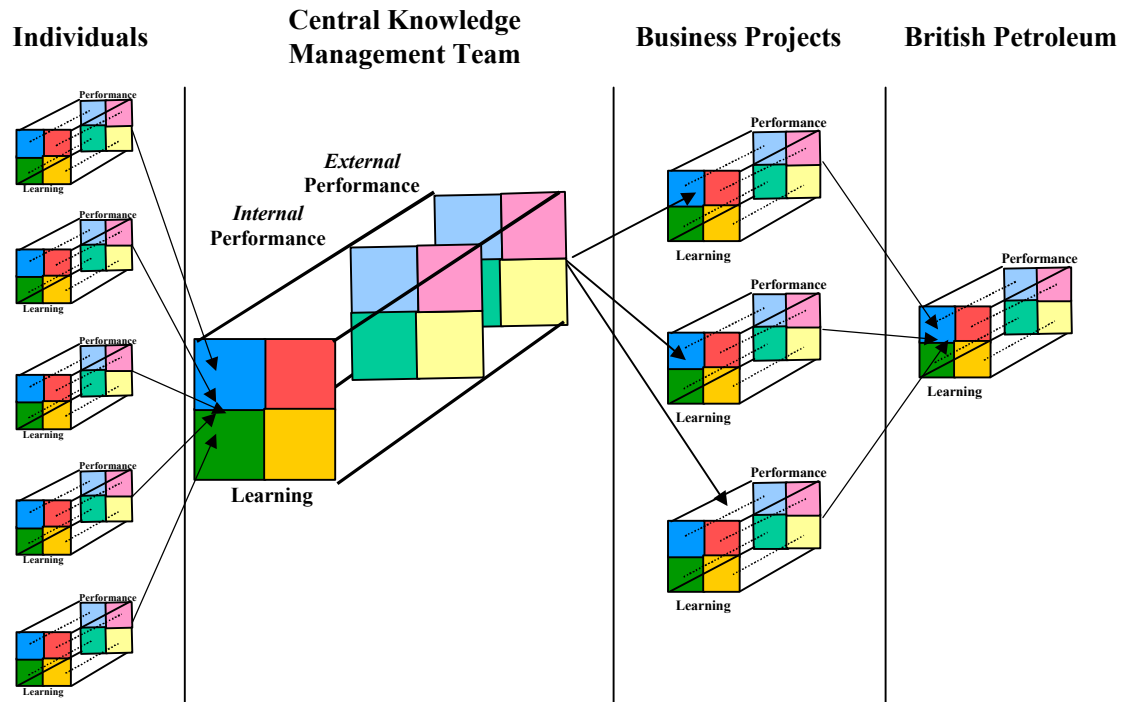


Figure 8 : Performance through Learning at Four Levels

This study used Schwandt's model for analysis of the BP KMT. The researchers propose extending the model. In this version the two subsystems are integrated to the extent that they cannot be separated. Learning will occur continuously in the process of performing. This supports the KMT's overarching objective to institutionalize performance through learning. When the institutionalization is complete and the two subsystems are aligned, organizational learning will be an integral or core function within business units as accounting, IT, Human Resources and others, have become in many organizations. Organizational learning might no longer be an intervention or tool for organizational change but will be part of ongoing business processes. In order for this to happen structuring and sensemaking factors must be addressed.

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