Chapter 4

The Research Framework and its Theoretical Grounding

Table of Contents

Chapter 4

Dick Boland will tell you that in order to understand my choice you need to understand my vision of the world - my fears, biases, distortions and questions. Unfortunately, I am not clear on how I see the world. I am somewhat attracted by theories of chaos and my focus today is therefore more likely to be random than logically selected. However, like a competent researcher I have tried to make chaos look like order by producing a framework to guide my remarks.

Enid Mumford

The Research Framework and its Theoretical Grounding

4.0 Introduction

In this chapter, we present the details of the research framework we have constructed in order to guide the rest of this research. When we first presented this framework in chapter 3 (shown in Figure 4.1, previously labeled Figure 3.3), we stated explicitly that it emerged from the literature we have presented thus far, coupled with our own fore-understanding, interests and prejudices consistent with the hermeneutic tradition. Although the theories employed in the framework could be said to be stable, their use in the framework is not stable. It is only our construct to enable us to analyze the data we have already collected as well as that which we still have to collect. It is therefore a construct to inform as well as to be informed by empirical evidence. It is not an "out-there" representation of the world, but rather an "inside-us" construct, in Daellenbach's (1994) systems thinking language.

The framework is decomposed into five pairs of lenses which are used as interpretive schemes embedded within a hermeneutic frame. Although these schemes are based on using existing theories rather than on the application of specific research methods, the pair-wise approach is informed by the work of Visala (1991).

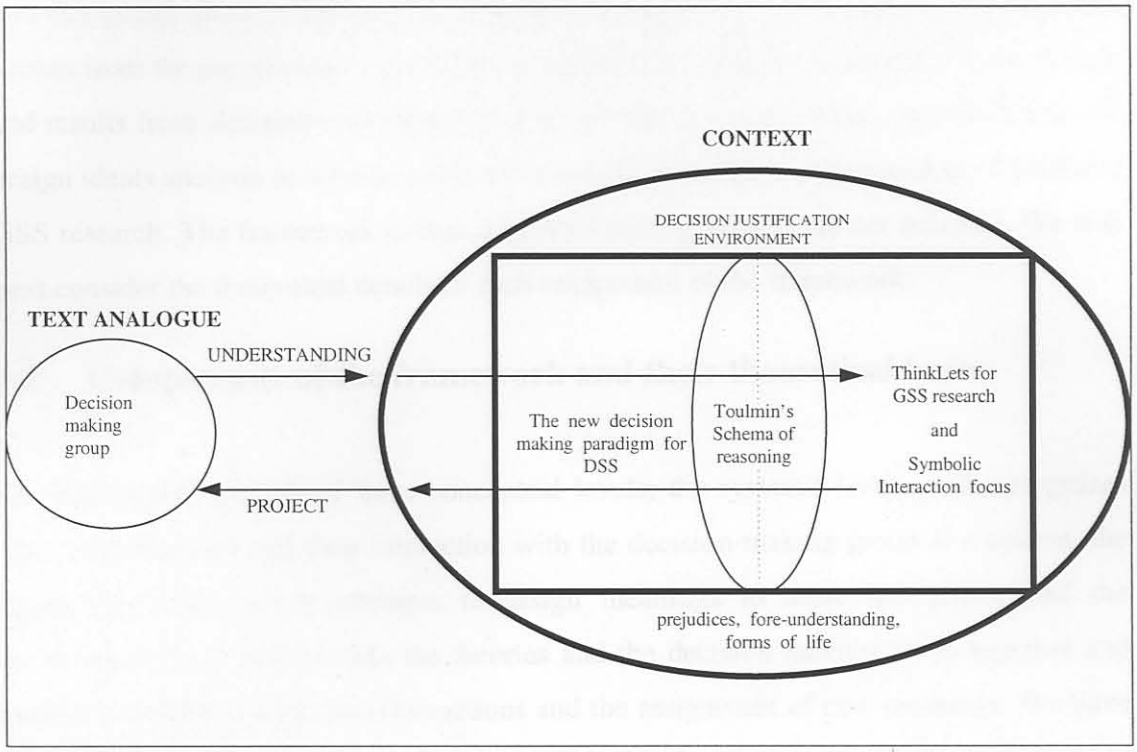

Figure 4.1 (previously 3.3): The systemic-interpretive-hermeneutic research framework

4.1 The evolution and significance of the research framework

A study such as the one we are undertaking here requires multiple levels of analysis. Decision justification at a group level is multi-dimensional. It spans several disciplines and several theoretical and philosophical perspectives. Having identified hermeneutics as the appropriate unifying method of analysis, it became necessary for us to identify from among the various theories we have presented, those that could, in our view, inform and be informed by the decision justification environment within the confines of our research purpose. Courtney's (2001) new decision-making paradigm for DSS, Toulmin *et al.*'s (1979) schema of reasoning and two new strands of GSS research, the one on the use of symbolic interaction (Gopal & Prasad, 2000) and the other on ThinkLets (Briggs *et. al.*, 2001) were identified. These theories were then placed in the hermeneutic cycle, to form part of the *decision justification environment*, with Toulmin *et al.'s schema of reasoning* forming the core of the *decision justification context*. Our understanding of the decision-

making group will be illuminated through the use of Giddens' structuration theory as presented by Poole *et al.* (1985) and Orlikowski (1992).

The framework enables us to pursue both legs of our research purpose in parallel, with results from one leg enabling a further enhancement of the other in a systemic-interpretive-hermeneutic fashion. It also accommodates our philosophical position that the need for decision justification is an essential component of every group decision-making process and makes it possible for us to further probe into ways of introducing this concept into the group decision-making process as well as to understand what its introduction evokes from the process and what the resulting process entails. And finally, it enables data and results from decision-making groups and interpretive case studies on GDSS use and design ideals analysis to inform and to be informed by the new understanding of DSS and GSS research. The framework is thus a theory-building vehicle for our research. We will next consider the theoretical details of each component of the framework.

4.2 Components of the framework and their theoretical bases

The framework consists of three conceptual levels; the *systemic level* which recognizes the chosen theories and their interaction with the decision-making group as a system, the *interpretive level* which attempts to assign meanings to these interaction, and the *hermeneutic level* which binds the theories and the decision-making group together and enables a circular interpretive interactions and the assignment of new meanings. We have briefly mentioned each of these theories together with others in chapter 2. Now that we have identified them as being central to our study, we will go more deeper into their underlying philosophy and relevance to the problem being studied. As we embark on this activity, we ask the reader to bear with us in instances where we repeat some arguments as well as some diagrams presented earlier. We do this in order to keep these theories within the context of the research framework as well as for ease of reference for the reader, enabling the reader to follow the flow of our arguments. We will, however, keep such

repetitions to a minimum, focusing more on those from which new insight relevant to the research framework could be drawn.

4.2.1 The systemic-interpretive-hermeneutic framework

The Systemic level

The systemic (Daellenbach, 1994 p. 22) level refers to the use of systems ideas in our approach to interpretation in terms of the interacting systems. In this regard, we refer the reader to the section on systems thinking which we have discussed in chapter 2. However, it is important to draw from the work presented there some of the systems ideas which directly relate to the framework. Let us re-look at one of Checkland's ideas:

Checkland (1999) reckons that systems thinking offers an important insight into the role of information systems, the sequence from data to information to knowledge. When one system is thought of as serving another, it is a fundamental principle of systems thinking that in order to think carefully about, and conceptualise the system which provides the support, it is first necessary to define carefully the nature of the system served (Checkland, 1981; Winter et al., 1995). This is necessary because how we see the system served will define what counts as support to it.

This idea suggests that the nature of the *decision-making group* within the decision justification environment needs to be carefully defined because it will define what counts as support to it. It means that GDSS use and design ideals within that environment will be defined by the decision-making group. The systemic perspective therefore does not conceptualise the system being served as separate from the one intended to provide the support. It looks at the system as a whole, that is, the whole framework. So, when we use the word *whole* in this thesis, we are referring to *the systemic whole*. It is important to make this distinction here as there is a broad liberal use of the word at the hermeneutic level, where the word *whole* may refer to the *context*. For our framework, we treat *context* as part of the *systemic whole*.

Other very helpful systemic ideas for the framework which were also presented earlier are:

> "...A system is a system inside another, which in turn is a system inside another, etc. All of these systems work together and intertwine to reach or satisfy a specific goal and objective. This is known as an open system. Outputs from one system will be the inputs of another and will influence that system in one or the other way. The system is also influenced by certain external factors that come from various places. According to Daellenbach (1994), systems defined for decision-making purposes are always open systems, since by definition the decisions or the decision-making rules are inputs into the system." (Daellenbach, 1994, p. 39)

The text-analogue (the decision-making group) on the framework could be considered as a rule producing system for decision-making which the group must consider in their decision-making activities. It also enables the decision-making group to project their understanding onto the decision justification environment, which provides a new meaning to their activities. The outputs from the various theories constituting the decision justification environment (the context) enhances further understanding through interpretation by the group. A group interpretation is, however, at multiple perspective level, which we later describe in some detail in this chapter. This idea establishes links at both theoretical and methodological levels of the research framework.

The critical systemic perspectives of Midgley (1991) and Jackson *et al.* (1991) about *defining* system *boundaries* and about *establishing* boundaries *within which* critique can be conducted, as well as complementarism also reinforces the above idea. They recognise the use of more than one theory and more than one method within a single systemic intervention. The concept of 'otherness' could be very helpful to the decision-making group as it could assist the group to engage in a *true social dialogue* in sharing their different perspectives. The results of such a dialogue would in turn inform the theories being used.

The interpretive level

We have so far said very little about the interpretive tradition in IS research. Because our philosophical assumptions are underpinned by the interpretive tradition, we will present this level in more detail here. We will draw largely from the work of Walsham (1993, 1995, 2001), Introna (1997), Klein & Myers (1999) and Flood and Ulrich (1990).

According to Klein and Myers (1999), IS research can be classified as interpretive if it is assumed that our knowledge of reality is gained only through social constructions such as language, consciousness, shared meanings, documents, tools, and other artefacts. Interpretive research attempts to understand phenomenon through the meanings that people assign to them (Boland, 1985; Deetz, 1996; Orlikowski and Baroudi, 1991). Interpretive methods of research in IS are "aimed at producing an understanding of the context of the information system, and the process whereby the information system influences and is influenced by the context" (Walsham, 1993, pp. 4 -5).

Looking at our framework, and taking the text-analogue as the "information system" in this last quote from Walsham, the reader can see a complete agreement. This tells us that the research framework is in line with the interpretive tradition, and would thus enable us to analyse the problem following this tradition. Walsham (1993) describes context as being concerned with multi-level identification of the various systems and structures within which the information system is embedded. In the research framework, this context is the decision justification environment. Walsham goes on to point out that a more subtle set of contexts for an information system are the various social structures which are present in the minds of the human participants involved with the system, including designers, users and any of those affected by the system. Their interpretation of reality, their shared and contested sense of the world, create complex interacting contexts within which the information system, as a human artefact, is drawn on and used to create or reinforce meaning. The context in the research framework share all these subtleties. For

instance, the social structures which could be in the minds of the decision-making group if it knows that it has to justify its decisions. According to Walsham, within this broad style of interpretive research, many specific methodologies can be used to guide the information system researcher. We chose critical hermeneutics as the unifying theory and specific mode of analysis. Myers (1994) points out that one of the key differences between a purely interpretive approach and critical hermeneutics is that the researcher does not merely accept the self-understanding of participants, but seeks to critically evaluate the total understandings in a given situation. According to Myers (1994), critical hermeneutics is one of the constitutive process theories referred to by Walsham (1993) as providing a new approach to research on the social aspects of computer-based information systems.

Walsham's (1993, 1995, 2001) work on the use of theory within the IS interpretive tradition stands out. He demonstrates ways in which various theories can be used in the same study to illuminate various aspects. One of his classic examples is where he developed an interpretive approach to understanding 'the process of organisational change associated with a computer-based information system' (Walsham, 1993, p. 52). He developed an analytical framework through which to examine IS case studies which leans heavily on the process view of organisations. He uses Pettigrew's (1985) work to develop the content, context and process as described in the previous paragraph. Following Morgan (1986), he draws on the 'culture' and 'political system' frameworks of organisation in order to examine the *social process* of organisational change; he then draws on Kling's 'web frameworks' to explore *social context,* and on Giddens' 'structuration theory' (1979 and 1984) to conceptualize the link between social context and social process.

The use of various theories in our research framework is partly informed by Walsham's style. It connects perfectly with the systemic and hermeneutic levels, enabling both the

conduct and the evaluation of the study in accordance with Klein and Myers' (1999) set of principles. We present these set of principles later in this chapter.

We also draw on Introna (1997) for the philosophical insight at the interpretive level. Introna uses the work of Heidegger (1962) to argue that in interpretation, understanding "does not become something different. It becomes itself" (Heidegger, 1962, p.118). We can only interpret that which we already understand. In interpretation we do not acquire additional information about what is already understood; rather interpretation is the "working-out of possibilities projected in understanding" (Introna, p. 189; quoting Heidegger, p. 189). In understanding we already have a primordial sense or reference in the form of an already there network of for-the-sake-of-whichs or of in-order-tos about ourselves and our tools within the referential whole. However, this primordial understanding can be further interpreted in such a way that the ready-to-hand comes explicitly into that sight which understands it. This is accomplished by the taking part, as it were, of the in-order-tos that are already circumspectively understood, and concerning ourselves with what becomes visible through this process. This in-order-to that is now explicitly understood has the structure of something *as* something - as a thing for doing this or for doing that. Drawing on this, Introna concludes that it follows that interpretation is the laying out, the making explicit, as this or that. He again quotes Heidegger (*op. cit.*) who indicate that the 'as' constitutes the interpretation; it makes up the structure of the explicitness of something that is understood. He uses the following example: If asked "what is this?", we can answer (explain or interpret), that it is something which functions as this or as that - we take it to be a chair or a table or a pointer. This, according to Introna, is why Heidegger argues that, in interpretation, understanding does not become something else; it becomes itself; it makes explicit its own possibilities to as this or as that.

This philosophical insight makes two points clearer. The first is that interpretation does not have access to itself. It cannot start without prior understanding of that which is to be

interpreted. The second is that when we use "as", "in-order-to", "for-the-sake-of", we are actually expressing an understanding through interpretation - an understanding of the "text" whose meaning we are seeking. In other words interpretation lead to or restore understanding. According to Introna (1997, pp.76-77), continued interpretation will lead to *in*-sight and, if persistent, to wisdom - that is, being able to act sensibly within the possibilities made explicit by the process of interpretation. This additional insight would assist us in our analysis, especially of empirical data. There is, however, still a sticking point here - how does this wisdom assist the justification process? What makes these sensible acts sensible?

We found the work of Flood and Ulrich (1990) on interpretivist rationality very useful here. According to these authors, interpretivists introduce the idea that a specific action concept can be transparent only in the context of a certain set of *social* rules. It is in terms of these that an actor can be said to be doing some particular thing:

> ' "Beyond" an observation, we are told, is a *set* of social rules, *a social practice*, that can be drawn upon to explain the action.'(Flood and Ulrich, 1990).

They indicate that the interpretivist also introduces a third layer, that of *constitutive meaning*. According to Flood and Ulrich (1990), this is the least accessible layer to the actors, for as a social practice lies behind an observation, a constitutive meaning lies behind the social practice. It is in terms of these meanings that people speak and act. They suggests that in order that these meanings can be more fully appreciated, it is necessary for an actor to adopt a contrasting constitutive meaning and thus "take a look" at his/her own view from "the outside." In this, admittedly difficult way, it is possible to "get a handle" on one's own reality.

> "An interpretivist social theorist is not, therefore, concerned with privileging views by asking questions such as "What is the correct action in a certain social context (typical of what a scientistic view would be)?" Rather than asking what is appropriate, an

> interpretivist thinker would pose the question "what makes it appropriate (surely a key question also to ask a systems practitioner about designs)?" A constitutive meaning, then, is equivalent to a world view or *Weltanschauung* that reflects *a culture's* conception of human needs and purposes." (Flood and Ulrich, 1990).

From these, they conclude that interpretivist rationality can more easily be seen as systemic in outlook because it helps us to "see" people's lives as a whole by uncovering subjectivity and by making dialogue possible where previously only suspicion and distrust "filled the air." They go on to say that interpretivist rationality does this by "opening up" one's own situation to others (and *vice versa*) and by encouraging mutual understanding about what is being done and why it is being done. They summarise the three layers of interpretive analysis as shown in Table 4.1

Table 4.1: Three layers of interpretive analysis (Flood and Ulrich, 1990)

First level: conventional and intentional actions	Second level: social practice	Third level: constitutive meaning
What is done	Set of negotiated rules that explain what is done	Fundamental assumptions that underlie what is done and make it meaningful
Implicit reference to social practice *Example: Family* Embracing *Example: Market place* Buying and selling	Implicit reference to constitutive meaning Generally understood rules referred to by the concept family which define embracing (e.g. to embrace involves some perceived emotional exchange of love and affection) Generally understood rules referred to by the concept market place which define buying and selling (e.g. to buy involves exchanging my money for someone else's goods)	Fundamental *a priori* assumptions The family unit is something that has a particularly important role in our lives and within society It is right to exchange goods and services to maximize one's own resources; open competition is fundamentally important

It seems to us that these three layers of interpretive analysis could provide some guidelines to a decision-making group within the decision justification context. What appears to be necessary is a very specific *social practice* - a practice that we could call a *decision justification social practice,* which would define the *nature of the decision* being made. Such a social practice would enable us to formulate some fundamental *a priori* assumptions for decisions falling within this social practice. It is our argument here that such a social practice is possible, and should, in our view be a deliberate effort of awareness raising through a particular kind of training. We propose such a particular kind of training in the next chapter, with Toulmin *et al.*'s schema of reasoning (discussed below) playing a central role as shown in the research framework. If decision-making groups could always approach their decision-making with this *decision justification social practice* in mind, there may be many benefits for society from this practice. We acknowledge, however, that such a social practice may be politically inconvenient, but social practices need not be politically convenient. As they are valued and practised by society, there could be many instances where those with particular political interests might find such a social practice beneficial.

The hermeneutic level

This is the level underpinning and unifying our research framework. It is based on the principle of the hermeneutic circle as part of philosophical hermeneutics developed by Gadamer (1989). Introna (1997) uses Gadamer's work, together with that of Heidegger (1962), Wittgenstein (1956) and Boland (1983) to arrive at hermeneutic conclusions about information.

The hermeneutic circle is one of the most important conceptual contributions offered by hermeneutics (Introna, 1997; p 65). It expresses the principle that one must understand the parts from the whole and the whole from the parts. As Gadamer (1989, p.259) explains it:

> "The anticipation of meaning in which the whole is envisaged becomes explicit understanding in that the parts, that are determined by the whole, themselves also determine this whole".

The circle works as follows:

We *project* significance onto the text, based on the form of life within which we interpret; we then allow the text to inform the tradition, which is the living context from which we seek to understand. In the hermeneutic circle, we continually adjust our point of view, perspective or horizon, always within our tradition and situation, in an effort to fuse these points of view, perspectives or horizons. We do this in order to achieve understanding and in order to maintain a living and current form of life.

According to Introna (1997), the circle starts in a heuristic manner. The interpreter uses her fore-understanding and prejudices to establish the initial meaning of the text; assuming it to be in some way coherent and understandable. She then relates this meaning to her current situation, tradition or form of life. She now possesses a new understanding of her context; this new understanding is projected back on to the text which opens up new meaning to be projected back to the context. This movement to and fro between the text (the part) and the context (the whole) creates possibilities for understanding, but only if the interpreter persists and continually opens herself to the text. Introna, again quoting Gadamer, calls the circle the dialectic process of understanding, saying that the movement to and fro, "(the) harmony of all details with the whole is the criterion of correct understanding. The failure to achieve this harmony means that understanding has failed" (Gadamer, 1989, p. 259).

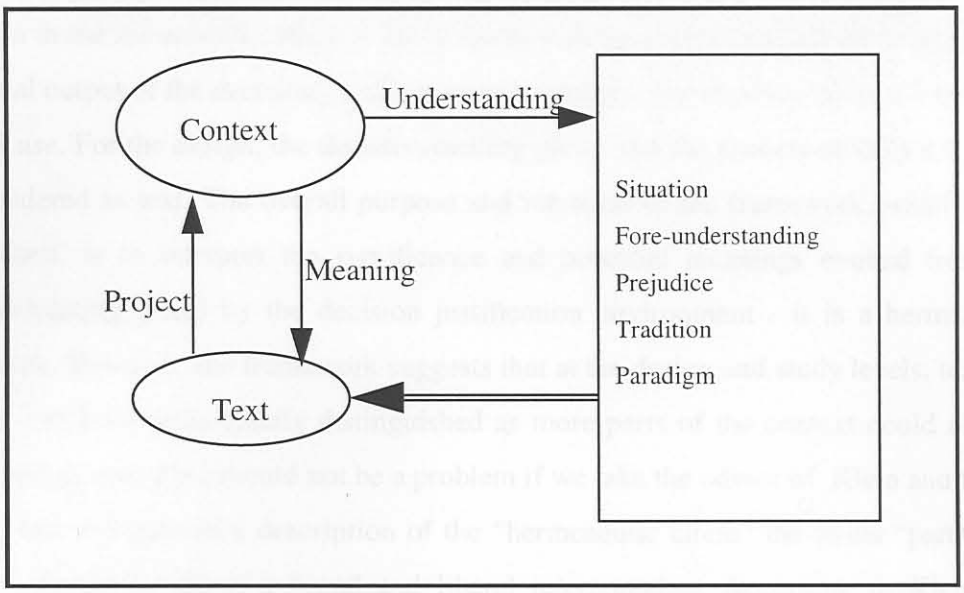

Figure 4.2: (previously 2.5) :The hermeneutic circle (adapted from Introna ,1992, p. 2.25)

Walsham (1993) quotes Boland (1985), who used the work of Gadamer (1975) to relate hermeneutics to phenomenology as follows:

> "Gadamer focuses our attention on phenomenology as an historic act of interpretation, grounded in tradition. He emphasizes the impossibility of stripping away all assumptions as a guarantee of objective knowledge. For Gadamer, prejudice is a positive not a negative thing. Prejudice is the basis of our ability to experience the world ... Understanding ... is a moving dialectic process: a dialogue in which we continuously engage all that is alien to us in a reciprocal, intersubjective relation ... Gadamer argues that the hermeneutic process of interpretation is not some esoteric problem relevant only to translators of ancient text, but a basic problem that confronts us all as part and parcel of our existence in the social world." Walsham (1993, p. 9)

He also quotes Boland on the application of hermeneutics to the study of information systems as follows:

> "... the use, design and study of information systems is best understood as a hermeneutic process ... In *using* an information system, the available output is a text that must be read and interpreted by people other than its author. This is a hermeneutic task. In *designing* an information system, the designer reads the organisation and its intended users as a text in order to make an interpretation that will provide the basis for a system design. This is also a hermeneutic task. In *studying* information systems, social scientists read the interaction during systems design and use in order to interpret the significance and potential meanings they hold. Hence, doing research on information systems is yet another hermeneutic task." (Walsham, 1993).

The last quote perhaps underlines the appropriateness of hermeneutics as both the philosophical basis and an analysis mode for this study. Drawing on this quote, the text-analogue in the framework, which is the decision-making group, could be exchanged with the actual output of the decision justification environment; for example the text from DSS or GSS *use*. For the *design*, the decision-making group and the process of GSS use could be considered as text. The overall purpose and intention of the framework, which is the study itself, is to interpret the significance and potential meanings evoked from the decision-making group by the decision justification environment - it is a hermeneutic framework. However, the framework suggests that at the design and study levels, text and context will have to be clearly distinguished as more parts of the context could also be considered as text. This should not be a problem if we take the advice of Klein and Myers (1999), that in Gadamer's description of the "hermeneutic circle" the terms "parts" and "whole" should be given a broad and liberal interpretation. According to Klein and Myers, they can be parts of a historical story, and then the whole is the proper perspective of the historical context. Alternatively, the parts can be the interpretive researcher's and the participants' preliminary understanding (i.e., pre-understanding) in the study. The whole consists of the shared meaning that emerge from the interaction between them. (Klein and Myers, 1999). In our framework, these terms correspond to "text-analogue" and "context". We will take this broad and liberal interpretation when using these terms,

especially in our analysis of empirical data. As mentioned earlier, we treat "text" and "context" as forming a systemic whole.

The hermeneutic way of structuring and processing information could be a helpful way of sharing understanding and meaning by a group during its decision-making process. The shared understanding and meaning could form a significant part of the justification process. Introna captured this aspect by constructing an "understanding and multiple perspectives" way to view the concept of the hermeneutic circle (Introna, 1992, p. 2.26).

Here the hermeneutic circle is seen as the generation of multiple perspectives. The first perspective is based on current understanding and prejudices. According to Introna, the interpretation will try and render it coherent with this understanding. If this is not possible, the perspective must be adapted for a new understanding to be possible. The new understanding becomes the new perspective that is again projected onto the text from which emerges a new meaning and thus an expanded understanding. Introna notes that this process of repeated and reiterated projection of perspectives onto the text will expand the interpreter's understanding of the text. However, if the process is prematurely terminated (the interpreter closes to the text) then the interpretation and thus the understanding is incomplete and to a degree subjective.

It has already been indicated that because the hermeneutic circle is not a vicious circle, subjectivity cannot be avoided. It is not an evil, but an essential ingredient in the process. According to Introna, it is the interpreter's responsibility to use it creatively and also to struggle beyond it towards the never-ending possibility of further interpretations. The multiple perspective view of the hermeneutic circle can be seen in Figure 4.3.

This alternative description of the hermeneutic circle as presented by Introna (1992) would be helpful in a group decision justification environment, where the need for a dialogue is not optional. In a dialogue, each partner in the dialogue injects a new

perspective and places all participants in a hermeneutic circle. According to Introna, the dialogue is not the joint interpretation of a given text, but the interaction in the production of a continually changing text; where the text itself and not just the interpretation mutates.

In order to adequately analyse the group decision justification process, it is compelling to also look at the characteristics of the *social dialogue* as it partly describes the nature of the decision-making group. This social dialogue would form part of the *social practice* discussed earlier.

According to Gadamer (1989) (quoted in Introna, 1997, p. 67), true dialogue has the following
characteristics:

a. Two or more participants committed to the process;

b. The acknowledgment by both parties that they individually do not have complete understanding, as this would eliminate the need for dialogue;

c. Both participants take seriously the truth-claims of the other party and do not try to destroy the other party's position;

d. The reciprocal illumination of positions by the other party;

e. If successful, the conclusion of the dialogue should take the participants beyond their original points of view in the sense that these are transformed or consolidated by the encounter with the alternatives.

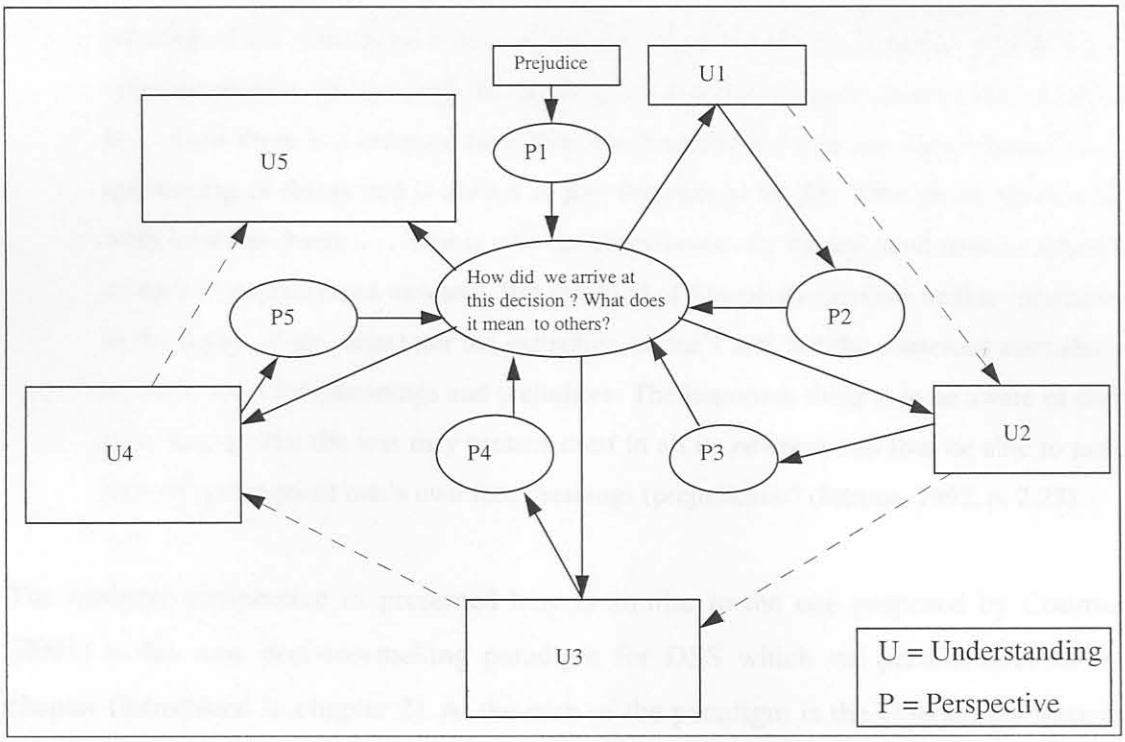

Figure 4.3 Understanding and Multiple Perspectives (adapted from Introna, 1992, p. 2. 26)

One could say that in a decision justification environment, a decision-making group operates at three levels of understanding:

- at the *individual* level through self understanding,
- at *group level* through shared understanding and
- between the group and *others* seeking an equal level of understanding with the group.

In this sense we have a *triple hermeneutic* process in any decision justification process by groups to others and a *double hermeneutic* process amongst the group members themselves in their search for a shared understanding.

Once the group has reached this shared understanding amongst the group members themselves, two levels of understanding would have been achieved; the *individual* and the *group* level. The remaining level of understanding would be that of *others* seeking an

equal level of understanding with the group. The greatest complexity, however, lies in attaining and maintaining this shared understanding by the group itself. Although complex, this level of understanding is attainable, as long as the group continuously opens itself up to new text generated by *others*. There is a stopping criterion as well. Introna (1992) quotes Gadamer as follows:

> "If we examine the situation (of the possibility of misunderstanding the text) more closely, however, we find that meanings cannot be understood in an arbitrary way. Just as we *cannot continually misunderstand* the use of a word without its affecting the meaning of the whole, so we cannot hold blindly to our own fore-meanings (and prejudgments) of the things if we would understand the meaning of another. Of course this does not mean that when we listen to someone or read a book we must forget all our fore-meanings concerning the content, and all our ideas. All that is asked is that we remain open to the meaning of the other person or text. *But this openness always includes our placing the other meaning in relation with the whole of our own meanings or ourselves in relation to it*. . . Thus there is a criterion here also. The hermeneutic task becomes automatically a questioning of things and is always in part determined by this. This places hermeneutic work on a firm basis. . . . That is why the hermeneutically trained mind must be sensitive to the text's quality and newness. But this kind of sensitivity involves neither 'neutrality' in the matter of the object nor the extinction of one's self, but the conscious assimilation of one's own fore-meanings and prejudices. The important thing is to be aware of one's own bias, so that the text may present itself in all its newness and thus be able to assert its own truth against one's own fore-meanings (prejudices)." (Introna, 1992, p. 2.23).

The multiple perspective as presented here is similar to the one proposed by Courtney (2001) in his new decision-making paradigm for DSS which we present later in this chapter (introduced in chapter 2). At the core of the paradigm is the Unbounded Systems Thinking (UST), whose basis is the development of multiple perspectives, a critical aspect of which is open, honest and effective dialogue among all relevant stakeholders in the problem involved.

The three levels described above (*systemic, interpretive, hermeneutic*) are neither sequential nor separable, at least from our point of view. They intertwine, and in other

cases even overlap completely. Although these levels are theoretically significant in the sense that they are always present in the framework, we will not attempt to distinguish them when using the framework in interpreting empirical data. They serve as our mental models. This concludes what we could call the meta-theoretic overview of the research framework. We now separately look at each component and its underlying theory.

4.2.2 The decision-making group

We borrow from Giddens' (1984) structuration theory through the work of Poole *et al.* (1985) and Orlikowski (1992) to give the theoretical perspective of this component of the framework. We start by revisiting some of the ideas from Poole *et al.* (1985) presented in chapter 2, followed by Orlikowski's work. We then relate this component (the "text") to each component within the decision justification environment (the "context") in a "pair-wise" fashion as shown in Table 4.2. This is done in order to keep our analysis manageable. We can therefore say that the research framework is founded on two theoretical bases; Giddens' (1984) structuration theory and Toulmin *et al.'s* (1979) schema of reasoning. These foundations are linked through a hermeneutic process, informed respectively by the work of Poole *et al.* and Orlikowski (decision-making group); and Courtney (the new decision-making paradigm for DSS), Briggs *et al.* (ThinkLets for GSS), and Gopal and Prasad (Symbolic interaction for GSS). By keeping the pair-wise analysis approach, we can present the respective subsystems as in Figures 4.4, 4.5, 4.11, 4.13 and 4.14.

Poole *et al.* (1985), argued that the subject is not a basic unit of action, but rather a produced and reproduced position in a field of structuration. They hold that groups can *act,* and that they can produce and reproduce social structure in the course of acting. They argue that neither our culture nor a considered perspective on the nature of action *requires* that individual persons be the only units capable of acting.

Table 4.2: "Pair-wise" sequence of framework application in the analysis process

	Systemic - Interpretive - Hermeneutic levels				
	1	2	3	4	5
Decision Justification Environment (Context)	Toulmin *et al's* schema of reasoning	Toulmin *et al's* schema of reasoning	Toulmin *et al's* schema of reasoning Courtney's new decision-making paradigm for DSS	Toulmin *et al's* schema of reasoning Briggs *et al.'s* thinkLets for GSS research	Toulmin *et al's* schema of reasoning Gopal and Prasad's focus on Symbolic interaction for GSS
Group decision-making ("text")	Giddens Orlikowski Poole *et al.* without technology	Giddens Orlikowski Poole *et al.* with technology	Giddens Orlikowski Poole *et al.* with technology	Giddens Orlikowski Poole *et al.* with technology	Giddens Orlikowski Poole *et al.* with technology

They hold that action at group level takes place in those instances where members find it appropriate and comfortable to use the first person plural (e.g.,"We already decided ....").

> ".....but that choice must be justified theoretically and empirically, as an outcome rather than a presupposition of research" (Poole *et al.* (1985)).

We indicated that this statement is at the heart of our research and we posed and partially answered the following question (see chapter 2):

What could constitute the theoretical and empirical justification of a group choice as an outcome?

The complete answer seems to lie in the *decision justification social practice* - a social practice that encompasses a method for surfacing the *constitutive meanings* of all group members as they enter into a rational discourse on the decision task. We discuss such a decision justification social practice in chapter 6.

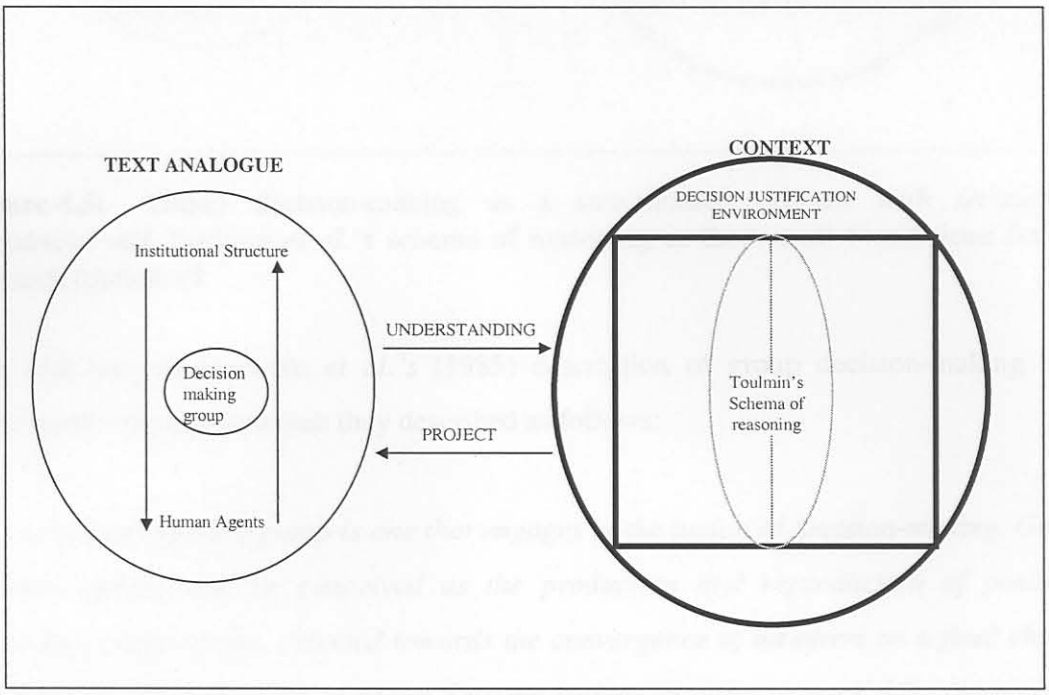

Figure 4.4: Group decision-making as a structuration process and Toulmin *et al.*'s schema of reasoning as theoretical foundations for the research framework

Following Poole *et al.'s* (*op.cit.*) argument that groups can act, that they, rather than actors, can be units of social scientific analysis, we take the decision-making group as our unit of analysis and adopt their definition of a group:

Definition: *A group is that which acts as a group. Only a group can validate an internal role structure or make a social decision, so when a set of people take, or prepare to take such action, they are a group.*

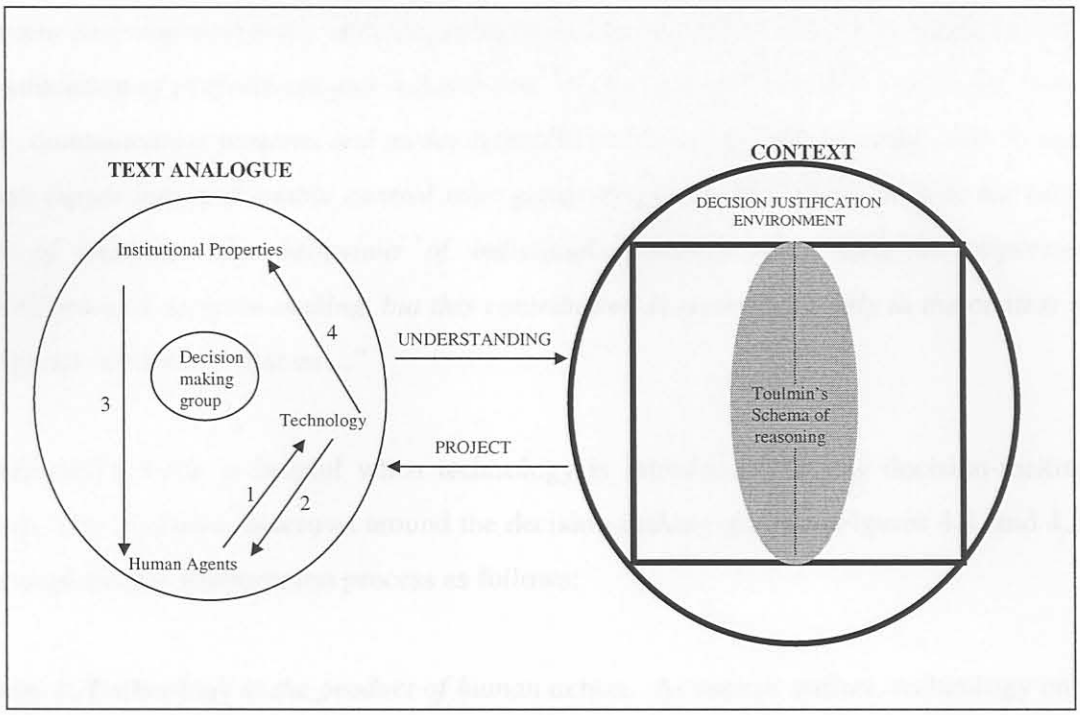

Figure 4.5: Group decision-making as a structuration process *with technology* introduced and Toulmin *et al.*'s schema of reasoning as theoretical foundations for the research framework

We will also adopt Poole *et al.'s* (1985) description of group decision-making as a structurational process which they described as follows:

"... A decision-making group is one that engages in the action of decision-making. Group decision-making can be conceived as the production and reproduction of positions regarding group action, directed towards the convergence of members on a final choice. We focus on three elements of group decision-making in order to track this convergence: members' expression of preferences and the negotiation of preference orders; argumentation as a means of advancing and modifying premises and preferred orders; and strategic tactics members employ to win assent for their proposals. We call these three elements message aspects. In advancing the above message aspects, all the three modalities of structuration are involved- language, norms, and power. Positions are developed through the expression of preferences (valence) and through argumentation

supplying substantiation for personal leanings. The move towards group convergence is accomplished via the accumulation of verbalized preferences and reasons, and also by the strategies used to manage the accumulation process.

To constitute the three modalities in the group context, the levels of interaction are complemented by three constructs often utilized in traditional group research - group communication, group decision rules, and power structures. These "variables" are reconceptualized as structural elements, continually produced and reproduced in group interaction, thereby becoming both the medium and outcome of group decision practices. As enacted through the three types of messages above (preferences, argumentation, tactic), group interaction invokes, constitutes, and reproduces interpretive schemes relevant to group decisions; decision rules serves as normative structures regulating the accumulation of preferences and reasons and "transforming" them into group decisions; and communication patterns and power structures are facilities that (among other things) shape inputs into and enable control over group decisions. The group itself is the basic unit of analysis. The behaviour of individual members does make an important contribution to decision-making, but this contribution is meaningful only in the context of the group interaction system ..."

Orlikowski's work is helpful when technology is introduced into the decision-making group. This is shown as arrows around the decision-making group in Figures 4.4. and 4.5. She explains the structuration process as follows:

Arrow 1: *Technology is the product of human action.* As human artifact, technology only comes into existence through creative human action, and is sustained by human action through the ongoing maintenance and adaptation of technology (automobiles need servicing, typewriters require new ribbons, and even pencils need sharpening). Further, human action constitutes technology through using it. That is, once created, technology is deployed in organisations but remains inanimate and hence ineffectual unless it is given

meaning and is manipulated - directly or indirectly - by humans. On its own, technology is of no import; it plays no meaningful role in human affairs. It is only through the appropriation of technology by humans (whether for productive or symbolic ends) that it plays a significant role and hence exerts influence. It is only through human action that technology *qua* technology can be understood.

The interpretive flexibility of technology operates in two modes of interaction. In the *design mode*, human agents build into technology certain interpretive schemes (rules reflecting knowledge of the work being automated), certain facilities (resources to accomplish that work), and certain norms (rules that define the organisationally sanctioned way of executing that work). In the *use mode*, human agents appropriate technology by assigning shared meanings to it, which influence their task execution. In many organisations, individuals may have little control over when or how to use technology, and hence little discretion over which meanings and elements influence their interaction with it. But these constraints are institutional, and are not inherent in the technological artifact itself. Users can always choose (at the risk of censure) not to utilize a technology, or choose to modify their engagement with it. The notion that technology needs to be appropriated by humans retains the element of control that users always have (however slight) in interacting with technology.

Arrow 2: Technology is the medium of human action. Because technology is used by workers, it mediates their activities. Anyone who has used a typewriter, telephone, hammer, or pencil can attest that technology facilitates the performance of certain kinds of work. That the technology also constrains the performance by facilitating it in a particular manner is an important corollary of this. This influence resembles that posited by earlier examinations of the "impacts of technology" on the use of technology. However, there are two significant differences in the structurational model. One is the recognition that technology cannot determine social practices. Human agency is always needed to use technology and this implies the possibility of "choosing to act otherwise." Thus,

technology can only condition social practices. The other difference is the acknowledgment that technology, in conditioning social practices, is both facilitating and constraining. Technology does not only constrain or only enable, it does both. This dual influence has typically not been recognized in studies that attempt to determine definitively whether technology has "positive" or "negative" effects (Attewell and Rule, 1984; Hartmann *et al.*, 1986). Giddens' (1984) framework allows us to recognize that technology - as a medium of social practice - necessarily has both restricting and enabling implications. Which implication dominates depends on multiple factors including the actions and motives of designers and implementers, the institutional context in which technology is embedded, and the autonomy and capability of particular users.

Arrow 3: *Institutional conditions of interaction with technology.* This influence concerns the nature of human organisations, which is situated action, and hence shaped by organisational context. When acting on technology (whether designing, appropriating, modifying or even testing it), human agents are influenced by the institutional properties of their setting. They draw on existing stocks of knowledge, resources, and norms to perform their work. Often these influences are unarticulated, or reflected on only fleetingly by human agents (Giddens, 1984), and are here referred to as the *institutional conditions of interaction with technology.* Technology is built and used within certain social and historical circumstances and its form and functioning will bear the imprint of those conditions.

Arrow 4: Institutional consequences of interaction with technology. This final influence involves the manner in which human action when it uses technology acts upon the institutional properties of an organisation, either by reinforcing them (more typically) or by transforming them (less frequently). Technology is an "enacted environment" (Weick 1979, p. 260) whose construction and use is conditioned by an organisation's structures of signification, domination, and legitimation. The appropriation and use of technology implies the change or reinforcement of these three institutional structures. These effects –

comprising the *institutional consequences of interaction with technology* - are often not reflected on by users, who are generally unaware of their role in either reaffirming or disrupting an institutional *status quo*. When users conform to the technology's embedded rules and resources, they unwittingly sustain the institutional structures in which the technology is deployed.

When users do not use the technology as it was intended, they may undermine and sometimes transform the embedded rules and resources, and hence the institutional context and strategic objectives of the technology's creators, sponsors, and implementors. This may happen more frequently than one would imagine. Perrow (1983) and Wynn (1988) show how users operating complex technologies often have to deal with high levels of stress, ambiguities, and unstructured local situations that deviate from "normal" operating conditions. In these situations the negotiated or enacted use of technology is often very different to the prescribed, mechanical operation of the technology. Tyre's (1988) study of process technology includes the case of a new grinding machine being introduced into an automated manufacturing plant. Initial integration problems forced project engineers to install a temporary manual "workaround." Although the manual workaround was inefficient, operators quickly learned to depend on it to accomplish their work. Later, when the grinder was fully functional, operators prevented the engineers from dismantling the "temporary" workaround. The new technology with its workaround has become so integrated into operators' routine that it became the "normal" or institutionalized mode of operating the grinding machine.

Poole *et al.'s* work will assist us in describing and interpreting the group decision-making process while Orlikowski's would help us in interpreting the interaction between the decision-making group (the text-analogue) and each of the components with the decision justification environment (context), since each of these components has to do with technology.

We are aware of Jones' (1999) critique of the use of structuration theory when technology is introduced. His critique, however, does give some merits to Orlikowski's work that we are using in this study.

4.2.3 The decision justification environment

The decision *justification environment* constitutes the *context* of the research framework while the decision-making group constitutes the *text-analogue*. The systemic whole includes both. Our aim through hermeneutic analysis is an attempt to make sense of the decision-making group in the context of a decision justification environment. The key question here is what does a decision-making group mean in a decision justification context? More specifically, what do the theories mean to the decision-making group? Next we give the details of the chosen theories and then attempt to relate them pair-wise to the two questions.

Toulmin *et al.'s schema of reasoning*

We will introduce what we will henceforth refer to as Toulmin *et al.'s schema of reasoning*. We do this in some detail as it forms the foundation of our analysis framework. In the next chapter, we will compare the elements of the schema with explanations from various theories presented in this chapter and earlier. Some of our research questions raised in chapter 3 which are answered during this comparison process are clearly identified and highlighted.

Reasoning and its goals

According to Toulmin *et al.* (1979), when certain types of utterances, assertions or claims are made, it is expected of us to support them by giving reasons. The process of giving reasons is called *reasoning*. The importance of reasoning is perhaps best introduced by the following example given by Toulmin *et al.*: