Chapter 2

Literature Review

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2.0 Introduction

Decision-making by individuals is a very strange phenomenon. We have observed over the years that when individuals are asked *why* they have made certain decisions, explanations seem to be quick. But when they are asked to explain *how* they have arrived at such decisions, they usually shuffle and do not seem to find explanations that easily. But because individuals have feelings, intuition and can simply draw on these as well as their lived experiences enabling them to make judgments, they do somehow find ways of explaining. This phenomenon of people 'appearing' 'not capable' of explaining in detail how they have arrived at certain decision has intrigued us for sometime, but more so when the same notion is extended to decision-making groups. One would have expected that certain decisions, especially those with social implications would always require those making them to be readily capable of justifying them. This does not seem to be the case. Could it be that human beings just make decisions which may have social implications without them anticipating to be asked to justify them? If the answer is no, then why do people 'appear' 'not capable'? (observations). If the answer is yes, then surely there must be some historical evidence of efforts made to correct the situation, or an explanation somewhere indicating why it is difficult to do so, and how such a difficulty could be dealt with. At the same time, it does not occur to us that such signs of being 'incapable' are deliberate or intentional. There must be more to this, and we approach this literature study with these questions in mind. Maybe this only shows that human decision-making is indeed a very complex process. Perhaps the best we can do as inquirers into this complex human activity, is to continue to identify and concentrate on those specific aspects which

stimulate our thoughts, capture our imagination and are of most interest to us. We have identified group decision justification as one such aspect.

We are interested in an enhanced understanding of the group decision-making process and the potential benefits this process could obtain through the introduction of the concept of justification. In addition, we are also interested in finding out what the implications are of introducing the justification concept, with respect to the use and design ideals of group decision support systems.

Based on the observations cited above, we are assuming that the concept of decision justification does **not** *form part of decision-making in general, and group decision-making in particular, or if it does - it is very illusive.*

We begin our study by exploring in detail the work done by previous researchers. In doing so, we identify some of the research questions relevant to our investigation as well as introduce some of the basic concepts, vocabulary, approaches and the underlying philosophical arguments.

We present in this chapter some of the underlying epistemological and ontological perspectives on our topic and discover the links which will guide our further analysis. The topic of our research is:

An analysis of group decision justification and its implications for GDSS use and design ideals

What follows is an elaborated exposition of the relevant literature.

2.1 Understanding Group Decision-making in Organisations

Ngwenyama *et al.* (1996) note that generally, decision-making groups follow a set of agreed upon rules for the process they would like to follow in arriving at a decision on an issue/problem. It is an issue/problem under consideration which brings the group together, although in most recent instances it is organisational requirements. Ngwenyama *et al.* (*op.cit.*) further point out that the urgency, complexity, and frequency of problems confronting organisations necessitates participation of groups of individuals who have a wide range of skills, perspectives, and values. One could go further to say that in organisations; decisions are almost always made by groups. Even in instances where it appears as though individuals have made such decisions, such individuals have to a large extent been informed by an established group. This makes the study of group decision-making important as these decisions often have significant consequences. Group decision-making in government and industry, for example, can influence our lives in many ways, such as through the establishment of laws and rules and the determination of how much we are paid for our work (Guzzo (1982)). Guzzo describes the study of group decision-making as fascinating as well, because the actions of decision-making groups can be puzzling and unpredictable.

The history of the systematic study of group decision-making aligns closely with the history of the study of group dynamics in general. Only relatively recently, however, has group decision-making study received considerable attention. According to Guzzo (1982, p.3), its complexity calls for the development of theory as it is composed of numerous dynamic, interdependent elements, necessitating an interdisciplinary approach. He identifies two major issues to be addressed in the study of group decision-making; regardless of the particular theoretical orientation of the researcher:

- The processing of information
- The social-psychological dynamics of behaviour.

Information processing includes collecting and evaluating information, determining alternative courses of action, and selecting one as preferred. The social-psychological dynamics of behaviour refers to different forms of interaction among group members. A strong mutuality of influence between information-handling activities and social psychological forces has been identified. Guzzo (*op.cit.*) notes further that how information is acquired and evaluated can limit the nature of the social interaction. He cites the use of Nominal Group Technique (NGT, Delbecq, Van den Ven , & Gustafson, 1975) as limiting to social interaction and a syndrome called "group think" as resulting in flawed information processing due to social-psychological forces for concurrence seeking among group members.

In line with these two issues to be addressed in the study of group decision-making, it is perhaps appropriate at this stage to raise the following questions:

- *Having made its decision, that is, having satisfied all the information processing requirements and most of the social-psychological demands of the group; can a group be able to justify its decision when called upon or challenged to do so?*

- *Assuming that a group can succeed in justifying its decision and that it has actually done so, could there be something new to learn or anything helpful to the group itself and others; which arise from the decision justification process?*

- *Can this social-psychological aspect of group decision-making be modelled in a way that could inform the design of an information system aimed at supporting the decision justification process?*

- *Are there some predominant design ideals embodied in such information systems and technologies which will emerge only as a result of the decision justification process?*

These are the four primary research questions of this thesis. We will revisit them together with other secondary questions in the next chapter. As indicated earlier, we are interested in an enhanced understanding of the group decision-making process and the potential benefits this process could obtain through the introduction of the concept of justification. In addition, we are also interested in finding out what their implications are with respect to the design ideals/ principles of group decision support systems.

Cook and Hammond (1982), drawing from a conclusive research by Slovich and Lichtenstein (1971), identified the difficulty in communicating judgment policies by group members as problematic. They note that if decision makers have a poor understanding of their own judgment policies and are unable to describe these policies accurately, it is not surprising that communication between decision makers about complex issues is a highly fallible process often resulting in misunderstanding and conflict. In a decision-making group, group members make trade-offs in arriving at a decision. Being able to justify how they make those trade-offs would be helpful to the entire group. Social Judgment Theory (SJT, Hammond, Stewart, Brehmer, Steinmann,1975) deals with the task of integrating complex, probabilistic information from a variety of sources in order to arrive at a decision. Although quasi-rational in content and approach, SJT does provide a framework and methodology for analyzing the judgment of a decision maker and for communicating information about the decision maker's judgment to himself and others. Our interest is, however, on what one could call "substantiated judgments", not just pure judgments, which leaves little room for a challenge.

Numerous studies have attended to the information processing aspect of group decision-making, while relatively little has been done on the social-psychological aspect. The effect of introducing the concept of justification has been considered only in four traceable instances (De Hoog & van der Wittenboer, 1985; Haggafors & Brehmer, 1983; Bacharach, Bamberger and Mundell, 1995; Toulmin, Rieke and Janik, 1979). In

concluding their exploratory study on the logics of decision justification, Bacharach *et al.* (1995) argue that until we learn more about the criteria by which decision alternatives are evaluated and selected-and the logics of justification underlying these criteria - the "black box" in decision theory is likely to remain quite large.

The question of what comes first between *understanding the decision-making process* and the *decision support system* is well known in the Information Systems field (Mittman and Moore, 1984; Spraque, 1980; Silver, 1991). According to Silver (1991), quoting Markus and Robey (1988); Poole and DeSanctis (1989), decision support systems do not deterministically impose effects on decision-making processes. According to these authors, consequences emerge from interaction of the system with its environments. Based on this, Silver (1991) argues that studying the effects of DSS also requires a means of describing decision-making environments; and it requires process-oriented rather than outcomes-oriented studies. Introducing the concept of decision justification into the decision-making process would thus be expected to affect both the environment and the process itself. Seen from the general systems theory context (total system) as explained by Roode (1993), the question does not arise. They both constitute the total system as illuminated in the following definition:

> "Information systems is an inter-disciplinary field of scholarly inquiry, where information, information systems and the integration thereof with the organisation is studied in order to benefit the total system (technology, people, organisation and society)"

Our contribution is to investigate the extent to which the total system may be made clearer through the introduction of the concept of justification. This will require us to look deeper into systems thinking literature, which we do in the next and subsequent sections of this chapter.

2.2 Introducing the concept of decision justification

In our day-to-day lives we are affected either directly or indirectly by decisions which are made by those with whom we interact, including those that are made by ourselves. The extent to which we become affected varies; depending on the societal level at which such decisions are made. We care very little when such decisions are consistent with our everyday lives and expectations. In aesthetic discussions, for instance, we do not point to undisputed data, facts, or grounds to support our aesthetic claims (Toulmin *et al.*, 1979 p. 51). We are content with what makes us "*feel*" good. In performing their daily tasks, managers 'go on' and do their work - making decisions - without really being too concerned about possibilities of being challenged to justify their decisions. It is the nature of their work - to make decisions - and they will continue to do so; guided largely by their own intuition, and what Giddens (1984) calls *practical consciousness.* According to Giddens, they are knowledgeable actors - and will usually be able to explain most of what they do, if asked.

Instances do occur, however, when we need detailed explanations as to *why* and *how* certain decisions have been made. It is not uncommon to find that no prior serious attention had been paid to the decision-making process, depending on the situation at hand. This *need* for decision justification arises very often, even at the highest levels of society. De Hoog and Van der Wittenboer (1986) noted:

> 'Parliamentary systems of democratic governments are based on the principle that governments have to justify and defend their decisions before an assembly of representatives of the nation. Although the obligation to justify one's decision occurs rather often, this phenomenon has not received much attention from decision theorists. Research tends to focus more on the limited cognitive information processing capability of the human decision maker, while the prevailing psychological viewpoint is that the "social" aspect of decision-making is being neglected.'

Hagafors and Brehmer (1983) have demonstrated that the *need* for people to justify their decisions or judgments causes them to function more analytically and improves their consistency in the decision-making process. However, these results were obtained from individuals as subjects of a well controlled laboratory experiment.

De Hoog and Van der Wittenboer go on to say:

> ".... the problem of whether the necessity to justify a decision influences the way the decision is made deserves more attention."

Although most of their initial hypotheses about the expected behaviour of decision makers used in their experiment were refuted, the experiment conducted by De Hoog and van der Wittenboer contains some interesting results, which to a large extent inform our study. Their results are summarised as follows:

- The necessity to justify one's decision *vis a vis* others has no effect on the kind of decision rules selected for arriving at a decision.
- The kind of information available during the decision-making process has a marked effect on the choice of decision rules, especially when the format permits an easy mapping between rule and information.

- Neither the need to justify nor different information modes influence the number of attributes used in the decision-making process.

In concluding this experiment, they called for more research on the selection of decision rules; noting that the "social" aspects of decision-making deserve attention and a more coherent theoretical framework. No evidence of any further study with a focus on the *need for decision justification* has been found to date.

Since low consistency has been shown to be an important obstacle to resolution of cognitive conflict in a group (Hammond and Brehmer, 1973), a deep insight and understanding of the *decision justification* process by *groups* has potential to make a substantial contribution to group decision theory and conflict resolution.

One needs to emphasise that although such a *need* to justify a decision does arise, it has to be *established.* This is because there is not *always* a basis for raising an "issue". As Toulmin *et al.* (1979) put it, there has to be *grounds* for doubt and *occasions* for argument. There has to be something about a situation that provides an "occasion" for challenging somebody's statements; there has, that is, to be something in the situation that gives rise to a *doubt* about the claims made in those statements.

Toulmin *et al.* (1979: 121) go on to say:

> ".....that unless we can point to the things that create these grounds for doubt, we may simply find the people whose views or actions we are challenging sweeping our questions aside and replying that there is nothing to explain, apologise about, or justify. And they may, in many cases, be entitled to respond in just that way. What, then, is involved in deciding whether an issue really arises at all , in the first place?. Regardless of the context and type of argumentation , the question can always be asked: *Why does this particular position need to be justified?* "

They argue that unless that question can be met – unless a genuine ground for challenging it can be recognised – the challenge, as such , will fail in *advance* of any critical discussion about its merits. We know that this is the case from our day to day experience. So the *need* for rational argumentation (justification) is *established* only after a genuine ground for questioning has been isolated and some reasons have become apparent for taking the proposed issue seriously. There is, however, the other side to this argument. Bacharach *et al.* (1995), note that decades of social psychological research suggest that one of the primary factors shaping human decision-making is the anticipation of post-

decision anxiety and the decision maker's consequent need to reduce it. They indicate that in organisations, a primary source of this anticipatory anxiety is *accountability*. Underlying every managerial hierarchy in complex organisations is some norm of accountability. Quoting Tetlock (1985, p.307), Bacharach *et al.* (1995) go on to say:

> "Accountability is a critical rule and norm enforcement mechanism; the social psychological link between individual decision makers, on the one hand, and the social systems to which they belong, on the other. The fact that people are accountable for their decisions is an implicit or explicit constraint upon all consequential acts they undertake (if I do this, how will others react ?)"

According to this norm of accountability, in order to reduce post-decision anxiety, decision makers must be able to explain their decisions as justified and therefore legitimate. According to Bacharach *et al.*(1995), decisions must be justified not only to those whom the decision maker is directly accountable to, but also to others (e.g., peers, self, subordinates). Toulmin *et al.* (1979) agree with this by saying:

> "It is helpful to start a suitable process of "inoculation", by which we expose our most cherished ideas to systematic attack and begin on the task of building up a more adequate body of reasons in advance of a serious challenge. This may allow us to develop our critical faculties in a way that prepares us to deal more robustly with future attacks on our beliefs."

The fact that decision theorists have so far ignored to explicitly include the concept of decision justification in their models, seem to suggest that this aspect of having to establish the need for it (Toulmin *et al.*, 1979) deserve more attention. Following Toulmin *et al.*'s arguments, one can see that the introduction of the concept of justification immediately poses a challenge to both the questioner (challenger) and the intended respondent (the challenged). The situation would be even more complex in a group setting. One could ask the question:

What would be the expected "behaviour" of a decision-making group within the context of decision justification?

The available literature indicates that an answer to this question is far from being clear. A common approach seem to be based on some application of rules (Tversky,1972; Adelbratt and Montgomery, 1980; Klein and Hirschheim, 1996; Poole, Seibold and MacPhee, 1985). From a structurational perspective as presented by Giddens (1984), structuration occurs as people draws on rules and resources to act, but one must never assume that a single act draws on a single rule. The meaning of any rule (or resources) is determined by other rules and resources to which it is related in social practice.

In part, the above questions can be addressed through Giddens's concepts of *Action, Reflexivity, and Rationalization;* in what he calls the *stratification model* of the agent as shown in Figure 2.1.

The reflexive monitoring of action is a chronic feature of everyday action which involves the conduct of the individual and others. This means that actors not only monitor continuously the flow of their activities and expect others to do the same for their own; they also routinely monitor aspects, social and physical, of the contexts in which they move. The reflexive monitoring of behaviour operates against the backdrop of rationalisation of action - our ability to give account, to ourselves and others. We rationalise - make our conduct "rational"- in discourse, in socially prescribed terms.

Rationalization of action means that actors - also routinely and for the most part without fuss - maintain a continuing 'theoretical understanding' of the grounds of their activity. Gidden warns that having such an understanding should not be equated with the discursive giving of reasons for particular items of conduct, or even with the capability of specifying such reasons discursively. It is, however, expected by competent agents of others - and is the main criterion of 'competence' applied in day-to-day conduct - that

actors will usually be able to explain most of what they do, if asked. The rationalization of action, within the diversity of circumstances of interaction, is the principal basis upon which the generalized 'competence' of actors is evaluated by others. We view this '*demonstration of competence'* as being of particular significance to our study because the literature cited above indicates that such '*assumed competence*" is not always sufficient.

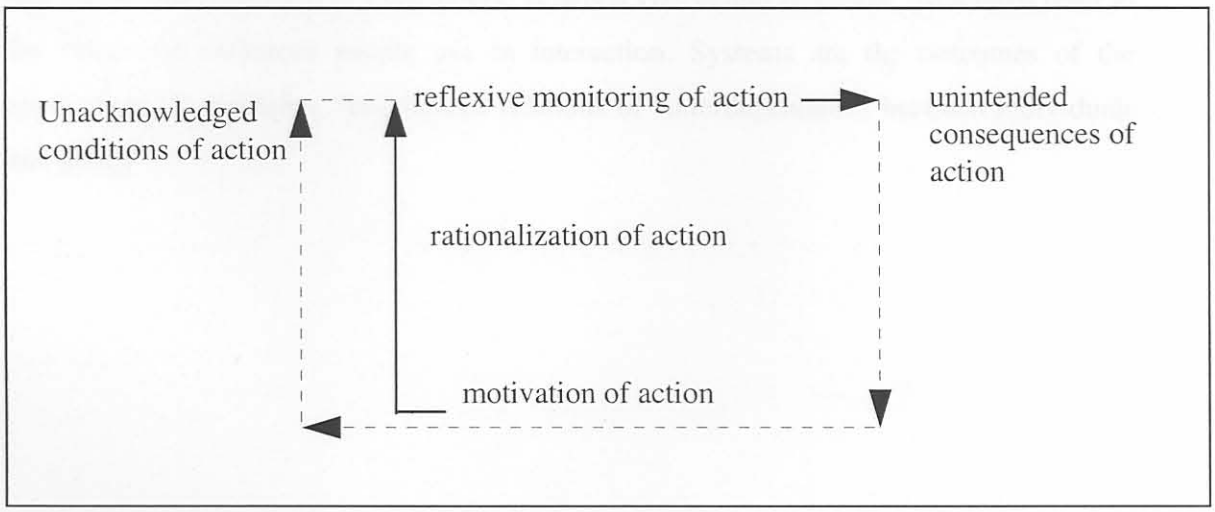

Figure 2.1: Giddens' Stratification Model (Giddens, 1984, p.5)

Motives supply overall plans or programmes - 'projects' - within which a range of conduct is enacted. If reasons refers to the grounds of action, motives refer to the wants which prompt it. Motivation refers to potential for action rather than to the mode in which action is carried on by the agent. It is not bound up with the continuity of action as are its reflexive monitoring or rationalization.

According to Giddens, our day-to-day life occurs as a flow of intentional action (*duree*). However, acts have *unintended consequences*; and, as indicated in Figure 2.1, unintended consequences may systematically feed back to be the *unacknowledged conditions of further acts.*

In contextualizing the work of Giddens to group decision-making, Poole *et al.* (1985) noted that rationalization should not be interpreted as simple account giving. Accountability is a constituent feature of action and the need for accountability is a contextual condition of action that differs for different situations. This is in agreement with Toulmin's schema of reasoning that the need for justification has to be *established.*

If we assume that such a need for decision justification has been *established*, how would we then extend this argument to a group setting?. Can groups competently justify their decisions if asked? With the above notion of the concept of action, can we say that groups are able to "act", just like individuals would do in this context? Poole *et al.* (1985) looked at some aspects of this questions in detail from a structurational point of view.

2.3 Group Decision-making as a Structurational Process

Elements of the theory of structuration

In presenting his unified theory of structuration, Giddens (1984) provides its elements as shown in Figure 2.2. *Structuration* refers to the process of production and reproduction of social systems via the application of generative rules and resources, Giddens (1984). Implicit in this definition is a distinction between *system* and *structure.* Structures refer to the rules and resources people use in interaction. Systems are the outcomes of the application of structures, "regularized relations of interdependence between individuals and group".

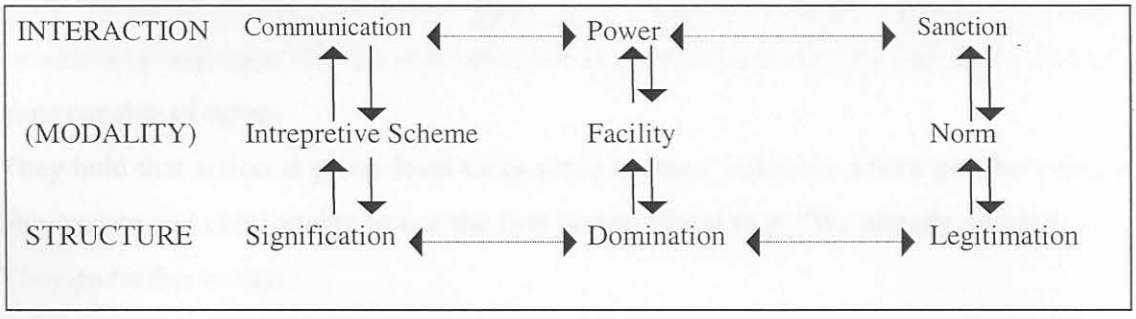

Figure 2.2: Elements of the theory of structuration (Giddens, 1984)

In the above diagram, the top line refers to elements of interaction, the bottom line to characterizations of structures. The middle line refers to "modalities" of structure, "the mediation of interaction and structure" in the process of social reproduction."

According to Giddens, every act draws on all three modalities to some degree: as *interpretive schemes*, to enable or constrain communication and understanding; as *norms* , to enable or constrain action through moral evaluative sanctions; and as *facilities*, to enable or constrain the production or prosecution of action.

The modalities draw on three institutional orders found in historical social systems: the orders of *signification* (language and other code), *domination* (resource allocation and authorization in political economy), and *legitimation* (religion, ethics, law). At the same time interaction draws on these institutions to constitute modalities, it is reconstituting the institutions.

Hence the modalities are the structural site at which the production and reproduction of interacting systems and structural features occurs. Through modalities, structures becomes the *medium* and *outcome* of action. This is what Giddens calls *duality of structure.* Structures are the medium of action because they provide rules and resources people must draw on to interact meaningfully. They are its outcome because rules and resources only exists through being applied and acknowledged in interaction - they have no reality independent of the social practices they constitute.

Structurational conception of a group

We have raised the question earlier on as to whether groups can be said to be able to act, just like individuals do. If the answer to this question were a direct yes without qualification, then the theory of structuration as presented above would be applied to our research without modification.

According to Poole *et al.* (1985), the answer is a qualified yes, arguing that the subject is not a basic unit of action, but rather a produced and reproduced position in a field of structurarion. 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.
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 ....").
They go further to say:

> ".....but that choice must be justified theoretically and empirically, as an outcome rather than a presupposition of research".

This last statement is really at the heart of our research. For one could ask the following question:

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

Our view is that a satisfactory answer with regard to the theoretical justification is located within several philosophical schools of thought, including the meta-theory of structuration itself while the empirical justification should be left to emerge from some applications of

these theoretical groundings. We aim to formulate a framework within which both theoretical and empirical justification could be attainable.

Poole *et al.'s* (*op.cit.*) position that groups can act, that they, rather than actors, can be units of social scientific analysis, has several consequences. One of these consequences is that groups as acting units have a special fragility, because individual members of a group have powers of action. Individuals may act as group members, but they may also act in "self-interest" or even leave the group. The group, like the individual, might be thought of as a "current of signification." One must watch for parallel flows and for cross-currents in the action of both. They then proceed to give a structurational definition of a group in terms of action as follows:

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.*

This definition could be said to be an operational definition as it implies that groups can only be seen through action. A decision-making group is one that engages in the action of decision-making. We can only tell if a group is present through its decision but can not tell *what* makes this decision, or in *what form* the group is present.

A structurational theory of group decision-making

In presenting their theory-in-progress on group decision-making from a structurational perspective, Poole *et al.* (1985) hold that group decision-making can be conceived of as the production and reproduction of *positions* regarding group action, directed towards the convergence of members on a final choice. They focused 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. They 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. From this theoretical explanation, the structurational model of group decision-making can be presented diagramatically as follows:

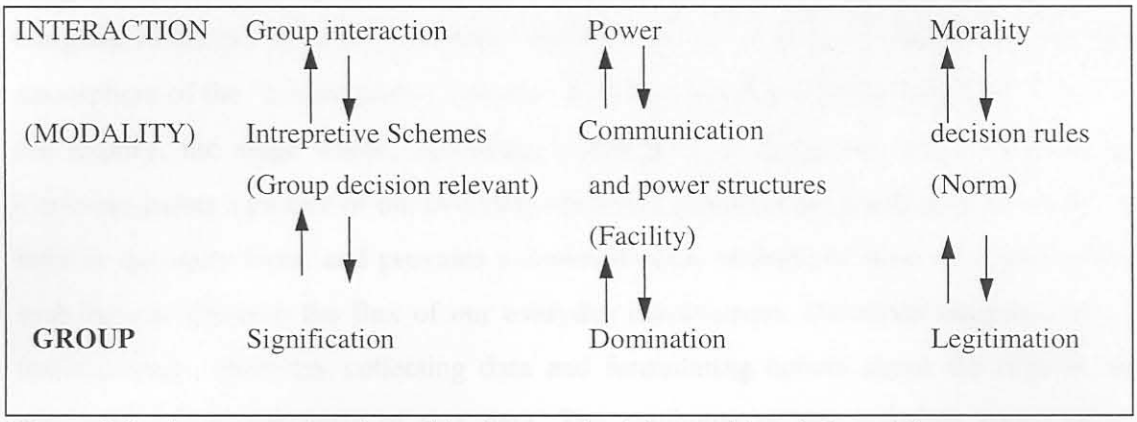

Figure 2.3: A structurational model of group decision-making (adapted from Giddens, 1984)

The vocabulary and theoretical structurational framework presented here will form a substantial part of our research; both in terms of guiding our research methodology as well as the analysis and synthesis of our research results.

2.4 Philosophical foundations of the concept of justification

The two philosophers who presented coherent arguments on the concept of justification during the seventeenth and twentieth centuries are Descartes and Heidegger. The Cartesian model presented the rational view which *requires and encompasses justification*, while Heidegger challenged this view through his concept of *Dasein* and *Being-in-the world.* What follows is a brief account of their arguments taken from Guignon (1979); which provide us with the necessary philosophical vocabulary for our topic. Because of the relevance of their arguments to our topic, and the appropriateness of these arguments in guiding our research approach, we present their account in some detail.

First, the *Cartesian model*. Philosophical arguments on the concept of justification reached the apex with the rise of the Cartesian world-view in the seventeenth century. Descartes methodically and systematically raised doubts about our everyday beliefs from the standpoint of definite assumptions and with a definite goal in mind (Guignon, 1979).

These assumptions include, first, a picture of our plain epistemic predicament as structured by the "*subject-object*" schema, and, secondly, a conception of *justification* and grounding that is supposed to make our everyday beliefs and practices intelligible. Descartes put three prerequisites for his method of inquiry. The first is that we disengage ourselves from our active involvement in the world in order to achieve the vantage point of an unprejudiced spectator. Descartes has prepared himself for his meditations by always wandering "here and there in the world, trying to be a spectator rather than an actor in all the dramas that are played there" (Guignon, 1979). At the outset of his inquiry he assures himself that "I have delivered my mind from every care and am happily agitated by no passion. ....". Only in the refined atmosphere of such a disengaged standpoint, stripped of all its ties to the everyday assumptions that arise from our care and concern, can one achieve the "objectivity" of the contemplative attitude (Descartes, in Guignon,1979, p.11). The Cartesian inquiry that is conducted within the rarefied atmosphere of the "contemplative attitude" may be divided into three stages. In Stage I of the inquiry, the stage which, according to Guignon, is apparently unproblematic, the Cartesian paints a picture of our everyday epistemic predicament, catalogues the belief we hold in our daily lives, and provides a *common sense* account of how we come to hold such beliefs. Beneath the flux of our everyday involvement, Descartes suggests, we are fundamentally observers collecting data and formulating beliefs about the objects that surrounds us on the basis of this data. The catalogue of our common sense beliefs includes both particular propositions and more general propositions that are supposed to be implied by these particular propositions.

The common sense description of our mundane epistemic predicament also includes a natural account of how we come to have such beliefs. The source of our beliefs about the world is the senses. In our normal affairs, we perceive attributes or marks and features of things and on this basis come to form beliefs. "When looking from a window and saying I see men who pass in the street," Descartes says, "I really do not see them, but *infer* that what I see is men...And yet what do I see from the window but hats and coats which may

cover automatic machines? Yet I *judge* these to be men." (Descartes, in Guignon,1979, p. 13). Our beliefs about the objects we encounter in the world are grounded in certain *plausible inferences* we make from observed marks and features of things to facts about the things themselves.

The Stage I description of our ordinary epistemic situation and beliefs we ordinarily hold is designed to pave the way for Stage II of the inquiry. In this stage, an assessment of the grounds we have for our beliefs is made and found to be inadequate. Since our beliefs are based on the evidence provided by our senses and our senses are not always trustworthy, our beliefs about the external world are not as secure as we would tend to think they are. Descartes notes, for example, that "those towers which from afar appeared to me to be round, more closely observed seemed square... and so on in an infinitude of other cases I found error in judgments founded on the external senses." According to Guignon (*op.cit.*), Descartes is not content with piecemeal evidence. He devises what might be called a "systematic counter-possibility" that can be applied to any of our beliefs about the world around us. He suggests that in any case in which I think that I am observing something, I might actually be dreaming. Or, alternatively, it is always possible that an evil demon might be deceiving me into thinking that something is the case when it is not. The pressure exerted by such systematic counter-possibilities is devastating to common sense.

> "*... for if my belief in a proposition, P, is based on certain evidence, E, and if E is always consistent with another proposition that entails the falsity of P, then it follows that I do not really know--cannot really be* certain *about my belief in P."*(Guignon, *op. cit.*,p. 13)

This method of arguing in Stage II seems to be in line with our ordinary way of assessing our beliefs in everyday life. Under the pressures of normal practical affairs we sometimes are compelled to accept certain things as true without much consideration of the grounds we have for our assumptions. The demands of daily life force us to be precipitate in our

judgment, and in this respect we may be seen as ordinarily being somewhat rash and negligent. In challenging our ordinary beliefs, it seems that other than being more scrupulous in considering possibilities, it does not appear that the *method* of considering possibilities is anything more than a natural extension of our ordinary techniques of reflection. Guignon goes on to note: for all practical purposes, I can say that I saw Smith last night because I saw someone who looks very much like Smith get out of a car that looks like Smith's car and enter Smith's house. But if something important hangs on my claim, I might have to be more guarded in what I say. If Smith is being tried for murdering his wife and I am called on to testify, I would be inclined to hedge my claims. I might say, "well, it *looked* like Smith in that lighting, but I can't really be sure." There is a mundane way in which we tend to minimize our claims under oath in a court of law. It seems, then, that the Stage II challenge to our everyday beliefs is on the same plane as mundane, common sense investigation. The stringent requirements are already built into our common sense approach to justification.

In Stage III of the Cartesian inquiry, the attempt is made to rebuild our former beliefs on a more secure foundation. What is necessary, the Cartesian suggests, is to find building blocks that will provide a more secure basis for the edifice of our beliefs. This involves at first a *re-description* of our epistemic predicament based on the findings of the second stage of the inquiry. In Stage I we saw ourselves as observers forming beliefs on the basis of perceived marks and features of things. As a result of the reduction of Stage II, however, all we are left with is the certainty of the *ego cogito* and its *cogitationes.* This last stronghold of certainty - the thinking self within its veil of ideas - must provide the foundation for rebuilding our former beliefs. If the structure of our everyday belief is to be made certain and indubitable, then we must find the machinery to convert the incorrigible data found in our consciousness into a full richness of our ordinary view of the world. The Stage III re-description of our epistemic predicament gives us a picture of the self as a kind of container or receptacle in which a collection of ideas are given with absolute

certainty and incontrovertibility. It thus provides us with the self-grounding ground we hoped to find for making our beliefs intrinsically intelligible.

In summary, then, the Cartesian model of inquiry entails *commonsense*, *rational assessment* of beliefs based on this commonsense and the *justification/re-description* of the assessment. The problem with this picture, according to Guignon, is that it is extremely difficult to see how this thinking subject, the *cogito* can transcend the sphere of its own immanence to gain knowledge of objects outside itself. This led to the argument that this project of justification is *in principle* bound to fail. For if the data immediately given to consciousness is subjected to various interpretations (including the dream and evil demon hypothesis), then such data can never be sufficient to guarantee the truth of our common sense interpretation as opposed to alternative interpretations. The "veil of ideas" cannot determine any one interpretation over other possible interpretations.

In challenging the Cartesian model, Heidegger noted that what is at issue is not engaging at arguments and counter-arguments *within* the Cartesian framework of commonsense view of our epistemic predicament, but rather a re-evaluation of the assumptions underlying that framework. Heidegger holds that the "common sense" position that is taken as more or less "self evident" in the first stage of the Cartesian inquiry is not so much a reflection of our everyday attitude as it is the product of a "*breakdown*" in our ordinary involvement in the word. The "common sense" way of rendering the structure of our daily lives is a philosophical "construct" that has originated at a certain point in history and work as a distorting lens on our understanding of ourselves and our world. Since the "common sense" view portrayed in Stage I is a philosophical construct, it embodies from the outset certain philosophical presuppositions that pave the way for Cartesian findings and *prescribe in advance* the plausibility of Stage III re-description of our epistemic predicament. In his *Being and Time,* Heidegger argues convincingly using a phenomenological approach encapsulated in *Dasein (*there-being or being-there) to show that the description of our everydayness leads us to see that our ordinary situations are

better understood in terms of "*Being-in-the-world*" than in the schematism of the subject-object dichotomy. He argues that in the course of our active lives, we are *engaged* in the world in such a way that there is no distinction to be drawn between an isolated subject accumulating data on the one hand, and the collection of items that are to be known on the other. *Dasein*, as "*Being-in-the-world*", is always "contextualized." The epistemological "subject" only appears on the scene when our everyday dealings in the world have broken down.

It seems clear, however, that the attack on the subject-object ontology by itself will not satisfy the Cartesian inquirer. For he might maintain that Heidegger has simply *ignored* the problem of justification that is the aim of epistemology in the broad sense. Husserl expressed this feeling of dissatisfaction in the marginal notes to his copy of *Being and Time*. Heidegger would agree that the Cartesian inquiry gains its significance through its analogy with science. His argument is, however, very thorough and compelling.

The fact that Heidegger left *Being and Time* incomplete and that he acknowledged that the techniques and procedures for grounding and justifying within the regional sciences are left in order as they are, suggest that there is merit in probing further into the concept of justification, especially in emerging disciplines such as Information Systems. It is possible that by following closely on these philosophical arguments centred around the concept of justification, new avenues could be found in contributing towards both the theory and practice of decision support systems (DSS) in particular, and Information Systems research in general.

The significance of these philosophical arguments to our study is in two ways. The first is that much of science as we know and practice today, is based on the Cartesian model of rationality, which requires and encompasses the concept of justification. Surprisingly, however, this concept seems to have escaped much of scientific research. The second is that the much referenced Simon's (1960) model of rational decision-making, which

informs the development of decision support systems and much of the management science literature, also did not pay any attention to the concept of decision justification. The realization of this omission and an attempt to construct a theoretical framework and its rationale, incorporating and integrating the concept of justification would constitute a major contribution of this study to decision theory in general, and in particular, to group decision support systems research and practice.

2.5 The rationality of value choices in information systems development

Arguing along the philosophical grounding presented by Immanuel Kant, Klein and Hirschheim (1996) provide some very fresh thoughts on the scope of information systems development. They follow Kant's classic view of practical reasoning and suggests that the scope of information system development (ISD) practices should not only embrace rules of *skill*, but also rules of *prudence* and rules for *rational discourse* about competing value standards. Their argument is that without warranted value standards (design ideals), the choice among conflicting goals in the development of information systems cannot be based on reason. They examine the dilemma which results from the inevitability of value choices in the practice of information system development (ISD). They present and discuss the principles by which value choices can be approached in a rational way.

They start by emphasizing the importance of rules in peoples' professional lives in general and argue that most of these rules deals with technical rules of skill and not with rules for *determining value choices*.

> "In carrying out activities, individuals typically follow a set of rules. Tennis players are taught a set of rules allowing them to hit the tennis ball in a fashion which will cause the ball to cross the net landing in the opponents' court. Students follow rules (some formal, others informal) which allow them to score well in their classes. Information systems developers, either implicitly or explicitly, follow a set of rules which help them to undertake their development tasks. Rules then, we would argue, are ubiquitous. They are,

> to a greater or lesser extent, a structured knowledge representational vehicle. They can be used for passing on knowledge on how best to carry out some task, function or activity; or what we ought to do or not do; about what ends are worthwhile and what are the best means for achieving them; and so on". (Klein and Hirschheim, 1996).

Rules of skill are, according to Klein and Hirschheim, concerned with the physical propensity and dexterity to carry out certain operations to achieve specified ends. They are rules which do not question the rationality or goodness of the end towards which they are applied. They are situation dependent and are derived from mathematics and the empirical sciences.

Rules of prudence are concerned with judgments to achieve ends which informed and reasonable people would not question as being worthwhile, such as designing systems which are acceptable to their intended users. They are rules which are said to further the end of happiness.

Categorical rules are concerned with choices where the ends themselves are in question, such as a choice between developing systems which are acceptable to one set of stakeholders (e.g. workers on the shop floor) or another (e.g. a company's shareholders).

Using the *categorical* analogy, Klein and Hirschheim (1996) examine what categoric value choices must be faced in designing information systems, and how these choices may be guided through the exercise of human reason rather than the forces of what they call "blind convention on inertia". By showing some examples of *design ideals* (description of the ultimate good to be achieved through system design) and presenting the argument that information technology is not "neutral", two dilemmas of choices between conflicting design ideals emerged and they presented them as follows:

> "Because of the myth of neutrality and the concomitant inevitability of value choices in the design of computer-based information systems, a practical dilemma exists for both the practitioner and researcher. Because he is supposedly acting for the common good of

> the organisation, the official view of the systems analyst is that of an impartial change agent who can expect voluntary co-operation. If the neutrality of information systems is a myth, analysts are forced to admit that in their work, they are by definition interest bound. They are more like lawyers or partisan advocates. This analogy suggests that partisanship is not necessarily bad, because without lawyers it would be impossible to adjudicate justice.
>
> In general it is safe to assume that there is a certain amount of conflict between different groups in organisational life, and, as a consequence, analysts are forced to take sides. The disadvantaged parties will realize this and view the system developers' actions with suspicion. At best, they will not volunteer information and at worst they will provide false information in so-called counter-implementation strategies. On the other hand, some analysts might decide to side with user interests and oppose systems which threaten the quality of working life, employment, and the like. A dilemma also exists for the academic researcher. According to the orthodox or "received" view that science should be value free, the scientist must not engage in value judgments in his relationship to the object domain, i.e. the field of inquiry. But if the argument on the neutrality myth is valid, then this received view is in conflict with reality, because, for the reasons indicated, the ideal of a value free scientific method cannot be implemented in the application of ISD. Research into improving such applications is not value free because it is concerned with practical advice for designing "good" systems that will necessarily serve some interests, to a greater or lesser degree, at the expense of others. (Klein and Hirschheim, 1996)".

According to Klein and Hirschheim, these dilemmas can be resolved if the doctrine of an impartial professional practice based on a value free scientific method is abandoned in favour of a much broader concept of science. They quote Radnitsky (1970, p. 1) as having proposed such a broader view: "We conceive of 'science' essentially as a knowledge improving enterprise." Knowledge in this sense is not limited to what can be learned from empirical data collection or mathematical deduction, but includes all human insight and wisdom that can be exposed in moral discourse. In *moral discourse*, the competing value

claims are interpreted, related to each other, and justified. They then present a rational approach.

Contrary to the view perpetuated in the literature that it is not the role of the systems designer to get involved in "politics", that value choices should be left to other stakeholders (quoting DeMarco, 1978), Klein and Hirschheim believe that system designers *should* be involved in value choices, and, they proceed to show a way of rationally dealing with these value choices.

If practical knowledge about how to approach value conflicts is accepted into the domain of science, it implies a revival of the kind of concerns which Kant discussed under the concept of categorical rules. In contemporary social theory such concerns continue to be investigated. They selected some element of Habermas' (1984) critical social theory (CST) and critical rationalism to identify the conceptual issues that must be addressed if choices among conflicting design ideals are to be justified by human reason rather than by power or appeal to convention.

CST has proposed a number of principles by which the legitimacy of moral value choice can be checked, or as Habermas puts it, the claims underlying such choices can be "redeemed." These principles relate to the concept of rational discourse. A rational discourse can legitimize the selection of a design ideal because it assures that the arguments of all interested parties are heard, that the choice results in an informed consensus about the design ideal, and the formal value choice is only made by the force of the better argument. Because of the importance of the rational discourse concept, its principles need to be considered in some detail.

According to Klein and Hirschheim, design ideals must be validated by an informed and voluntary (authentic) consensus which has been achieved through a debate which satisfies the conditions of a rational discourse as stated below. The intent of these conditions is to

ensure that all viewpoints and all arguments supporting and contesting each viewpoint have an equal chance to be heard. Basically, a rational discourse is defined by the ideal conditions which should characterize an informed, democratic, public debate. In such a debate no force should influence the outcome except the force of the better argument.

The concept of a rational discourse can be applied to the selection of design ideals at the organisational level. Contrary to the widespread belief that value choices are axiomatic, Klein and Hirschheim argue that they show how logical forms of reasoning can be used to construct arguments supporting and contesting alternative design ideals. It is important that the rational discourse about design ideals arrives at an informed consensus in the relevant community without undue pressures. This provides the prerequisite that the force of the better argument alone decides upon the preferred design ideal or ideals. (There are, of course, barriers to the implementation of the rational discourse concept and these are addressed). If no unique design ideal emerges because of equally strong arguments for more than one design ideal, the tie must be broken by some democratically fair voting mechanism, such as might occur after a parliamentary debate. Quoting Habermas (1973, p. 255 and 256, as quoted), Klein and Hirschheim identify the following four conditions which must be met by a rational discourse: these conditions are also said to define an "ideal speech situation" or a communication community:

- All potential participants in a rational discourse must have an equal opportunity to begin a discourse at any time and to continue it by making speeches and rebuttals, and by questioning and answering. Habermas calls this an equal chance to use communicative speech acts.

- For all participants there must be an equal opportunity to interpret, to assert, to recommend, to explain and to justify as well as to question or to give evidence for or against the validity claim of any of these forms of speech. The purpose of this condition is to assure that in the long run, no presupposition or opinion can escape from becoming the centre of discussion and criticism.

- All participants are presumed to be equally able to express their attitudes, feelings, and intentions. These Habermas calls representative speech acts. They serve as a guarantor against self-deceit, illusions, and insincerity of members among the speech community towards one another.

- All participants are presumed to be equally able to give and refuse orders, to permit and prohibit, to promise or ask for promises, to account and ask for accounting, etc. Habermas refers to these as regulative speech acts. They guarantee that the formal chance of equal distribution of opportunity to begin or continue discourse is realized.

They note that it has been widely recognized that the full realization of these conditions is not possible. However, there are typically two lines of reasoning to address the issue of rational discourse implementation. First, from a practical perspective, it would be sufficient if the implementation of a rational discourse eliminates the worst inequities and assures a reasonable amount of fairness in the arena of communal debate such as might be realized in a well functioning parliament. Second, to deny the practical approximation of a rational discourse is self-defeating, because through the denial one is by definition already engaging in a discourse. As Radnitzky (1973) points out, anyone entering a dialogue in principle presupposes the possibility of a rational discourse. By definition, a signal for dialogue if sincere, entails the willingness to submit oneself to the counterfactual norms of ideal speech, i.e., not to use force, listen to counter-arguments etc. Hence the very attempt to start a dialogue presupposes that a form of communication is possible that is unimpeded by the usual cognitive, emotional and social barriers to rationality, at least to some extent.

> "He who enters a discourse implicitly recognizes all possible claims of the members of the communication community which can be justified by reasonable arguments ... and at the same time he commits himself to justify his own claims against others by arguments. In addition, all members of the communication community (and that implicitly means: all

thinking beings)in my opinion are also obliged to consider all virtual claims by all virtual members, i.e., all human 'needs' insofar as they could make claims to fellow human beings." (Klein and Hirschheim, *op. cit.*).

We need to mention, however, that while there are merits to these notion of rational discourse as presented by Habermas, he has been criticized for denying the link between knowledge and power (Giddens, 1984, p.31; Introna, 2000). Introna argues that when value choices are made, not all choices are equal. He goes on to argue as well that not all have equal power to make their preferred choices stick as "true". He describes, following the work of Foucault, how knowledge and power are linked through *regimes of truth.* We will revisit this argument in the next chapter where our research methodology is discussed.

Klein and Hirschheim note that when applying these principles to the justification of design ideals, the rational discourse would have to move through three steps:

(a) Identification of possible design ideals

(b) Improvement of the information available to all participants in a discourse through critical reconstruction and analysis of the implications of the alternative design ideals,which relates to overcoming motivational and organisational barriers to inquiry, and,

(c) Construction of arguments to form preferences in favour of the design ideal which can marshall the strongest evidence on its behalf. Such evidence might consist in evaluating its congruence with respect to values and democratic ideals accepted at the level of society.

If these steps do not converge on one design ideal, then an additional step is needed to legitimize the final selection of one design ideal through some form of voting. They go on

to point out the following barriers to rational discourse in expanding primarily on points b. and c: In implementing a rational discourse, two key issues must be addressed: (1) the barriers to rationality which exist in the current practice of organisational decision-making, and (2) the nature and principles of arguments by which one can reason about competing moral claims. If conventional logic is limited to deductive reasoning with factual premises and causal laws (as orthodox science suggests), then there is great difficulty in reasoning about moral claims.

> "However, we hope to show that logical principles exist, which allow checking the plausibility of value claims in a fashion similar to the reasoning rules in propositional and predicate calculus. These principles have a similar axiomatic status as the deduction rules in propositional and predicate calculus." (Klein and Hirschheim, *op. cit.*)

We are encouraged by the claim that the type of reasoning presented by Klein and Hirschheim is of the same status as the deductive rules of propositional and predicate calculus, because, then their proposed model of argument could lay a solid foundation for a group decision justification process. Their model is based on the work of Toulmin *et al.* (1979) and uses what is called a "*schema of reasoning", or the logical structure of argument.* The Schema/ Structure which we use later in the construction of our analysis framework is shown in Figure 2.4. It is briefly explained as follows:

" Given grounds, G, we may appeal to warrant, W (which rests on backing B), to justify the claim that C - or at any rate, the presumption (M) that C - in the absence of some specific rebuttal or disqualification (R)."

2.6 Distributed Cognition Process

A decision can *partly* be justified by precisely describing the *process* followed in arriving at it as well as how the *information was structured* and *communicated.* In essence,

individual jugdgement based decisions need no justification as it is mainly based on feeling and intuition. In a group setting (non-normative group) however justification may be necessary if an individual hopes to have any influence on the group decision. In other words, the individual cognition has to be distributed through communication. Understanding the distributed cognition process could therefore form a basis of decision justification in a group setting.

Boland *et al.* (1992) define distributed cognition as a process whereby individuals make interpretations of their own situation and exchange them with others with whom they have interdependencies so that each may act with an understanding of their situation and their interdependencies. It is the process whereby individuals construct and reconstruct a system of roles through interpretation, action and self reflection. In our view, acting with understanding, construction and reconstruction of a system of roles through interpretation, action and self reflection forms part of the decision justification process. Construction and reconstruction of a system of roles can be associated with the *process,* interpretation and self reflection can be associated with *information structure,* exchange of interpretations can be associated with *communication* and acting with understanding can be associated with the *decision itself.* We will use this analogy in further enhancing the construction of our analysis framework of group decision justification.