Group Decision Support Systems in Multicultural Context: Potential Influence of Culture in Work Groups

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Abstract

Work in groups whose members do not share the same physical location is becoming increasingly important in today's economy. Some of the factors behind this trend are the globalization of markets, the problems in air transportation, the costs of specialized human resources, the growing speed of decision-making processes, and the new developments in information technology (IT) that lowered the costs of communication. IT-mediated interactions among individuals that do not share the same national culture are becoming ever more common. This paper examines the use of Group Decision Supports Systems (GDSS) in cross-cultural environments. It is suggested that the process of decision making will increasingly require multiple and culturally diverse expertise, and that this expertise may be globally dispersed. By theoretically discussing the cross-cultural use of GDSS, considerations will be made about the possible influence of group members' cultural values in the decision process and its outcomes. A critique will be made of the little consideration, by the Information Systems literature, of this potentially significant variable, and examples will be given of situations amenable to cultural impacts. By proposing some testable hypotheses, this article triggers the discussion of this little-researched topic and to offer directions for future research.

1. Introduction

Technological advances in communication and computing technologies are having an important impact in the development of new organizational forms, facilitating the transition from large, segmented organizations into independent, smaller, and more integrated forms of coupling (GUO et al., 2006; LEIDNER and KAYWORTH, 2006; FULK and DeSANCTIS, 1995). To coordinate the work, individuals and teams with cross-functional expertise interact through faster and smarter communication and decision support systems. In the "post-industrial" world described by Huber (1984), the increased turbulence, complexity, and knowledge demands imposed by the environment will require that organizations make more and ever faster decisions, involving a growing number of contributors in the process. As the world's economic markets become increasingly interconnected, those individuals will most likely be geographically dispersed across various locations, possibly even different countries, and will not necessarily be permanent members of the organization (DeSANCTIS and GALLUPE, 1987). In such a scenario, it is conceivable that different sets of national cultural values held by individuals participating in group tasks will influence various aspects of such processes (LEIDNER and KAYWORTH, 2006). The cultural differences may also be responsible, at least in part, for the variance in the findings and the mixed results of group effectiveness experiments reported by some researchers (GUO et al., 2006).

Information technology (IT thereafter) tools such as email and intranet; collaborative mechanisms such instant messenger, blogs, and wiki; mobile technology; and groupware such as Lotus Notes, Microsoft Meeting, and Webex, among others, have made possible the collaboration of individuals from different cultures in various organizational projects (TURBAN et al., 2007). Younger generations are using abbreviated language in chats and 'facebook'-type exchanges that is creating new standards of relationships and, possibly, cultural changes that are reducing the psychological distance between people in different parts of the world (CALHOUN et al., 2002).

Connors and Caple (2005), in their review of group systems theory and its application in the study of work groups, have proposed a number of elements that need to be taken into consideration in IT-mediated, distant decision-making processes: *complementarity* (and the possibility that different perspectives can lead to conflict), *structure* (and the fact that rules, limitations, leadership traits, power and control can lead to positive or negative decisions), *interactivity* (that creates dynamism through knowledge standards, feedback speed, and the simulation of change, among other factors), *short and fast cycles and stages* (due to external and internal connections with the environments), and *instability and chaos* (because of the constant addition of new information).

More recently, Guo et al. (2006) examined the effects of social norms and cultural diversity in interactions between groups and communities that used different technologies and communication media, among them the internet. Based on the model proposed by Fulk and DeSanctis (1995), these researchers showed evidence of the need to understand the important consequences of cultural diversity and social influence in the use of technology for the performance of group decision-making processes. Among other factors, they emphasized elements such as the degree of *cohesion* among group members, the *similarity* in the way the use of the particular medium is perceived, and the *duration* of the interactions.

In spite of these and other indications of the possible importance of the cultural variable in the use of information technologies, this variable has been neglected in the Information Systems literature. Particularly in the case of the influence of cultural differences in (distant) group decision-making processes, there are significant measurement problems, which may explain the reduced number of recent studies about this topic (LEIDNER and KAYWORTH, 2006; ARDERSON and HILTZ, 2001). To address this issue, this paper proposes the need to incorporate the potential impacts of national cultural differences among group members in the analysis of the use of information technologies such as Group Decision Support Systems (GDSS from now on) in cross-cultural settings.

To do this, some related topics will be briefly examined. In section two the cultural factor will be introduced, with a conceptual examination of its potential effects on individual and group behavior. Section three will discuss aspects of work group dynamics, with emphasis on multicultural work teams. In section four we analyze GDSS, and show evidence of the neglect of the cultural factor in the IS literature. Selected dimensions of cultural values from the cross-cultural comparative management literature will be examined in section five, followed by a discussion of their potential effects on IT-mediated decision-making groups. Finally, in the conclusion, we comment on the need for social scientists and systems designers to cooperate in the development of GDSS.

2. Culture and Individual & Group Behavior

Before we consider the influence of culture on individual and group behavior, it is important to examine the meaning itself of the term. While definitions of the term abound in the social sciences literature, we adopt here Hofstede's (1980) widely used conceptualization, which is particularly suited for a study in the Information Systems area:

> ...*"culture is the collective programming of the mind which distinguishes the members of one human group from another, ... the interactive aggregate of common characteristics that influence a human group's response to its environment" (HOFSTEDE, 1980, p. 25).*

It is clear that the idea of a collective mental programming, or "cognitive map" (LEIDNER and KAYWORTH, 2006) is central to the assumption that culture influences individuals' values, beliefs, and behaviors. Even when institutional theories see organizations

becoming increasingly isomorphic (DiMAGGIO and POWELL, 1983), the behavior of individuals within these organizations continues to show significant culturally-based variation. Hofstede (1980) found that national cultural differences were even more salient in work settings characterized by strong organizational cultures.

Not only is culture likely to affect what one tends to value (DUKERICH et al., 1996), culture has even a stronger influence on the interpretive schemas and behavioral scripts individuals use to understand events and to select behaviors appropriate for a particular situation (LEIDNER e KAYWORTH, 2006; SMITH and PETERSON, 1988). Triandis (1990) relates cultural variables to behavior by positing that the probability of an act is a function of habits and behavioral intentions and that facilitating conditions moderate the way people express habits and intentions in behavior. Culture affects each construct and relationship in his model. He also compares culture to a 'base rate' around which later accidents of an individual's history would build other influences. Other researchers suggest that cultural values are *core* values formed during childhood in contrast to *peripheral* values formed later in life (LACHMAN, 1983) and still others suggest that the cultural composition of the group (homo or heterogeneous culture) can affect the quality of discussion and the context of decision (ANDERSON and HILTZ, 2001). Several lines of research (EREZ and EARLEY, 1993; HOFSTEDE, 1980; THOMAS et al., 1996) suggest that individuals from different cultures evaluate situations and potential courses of action according to different behavioral scripts and sets of values.

3. Work Groups: Major Aspects, Dynamics, and Multicultural Teams

> Work groups have been defined as
> "*individuals who see themselves and who are seen by others as a social entity, who are interdependent because of the tasks they perform as members of a group, who are embedded in one or more larger social systems (e.g., community, organization), and who perform tasks that affect others (such as customers or coworkers)*" (GUZZO and DICKSON, 1996, p. 309).

Groups are considered to have three functions (McGRATH, 1990, p. 27): the *production function* -"the group's contribution to its embedded system"; the *member support function* - "the group's contribution to its component parts"; and the *well-being function* - "its contribution to its own system viability". In terms of the stages of group activity, McGrath (1990) distinguishes four distinct moments: Inception (goal choices), Problem Solving (means choices), Conflict Resolution (political choices), and Execution (goal attainment).

As a result of the growing complexity of jobs and technologies, work in organizations is being increasingly performed by small groups of workers (ANCONA and CALDWELL, 1990; BETTENHAUSEM, 1991; GUZZO and DICKSON, 1996; LEVINE and MORELAND, 1990). Research has shown that work groups were responsible for improved organizational performance, especially in measures of efficiency and quality (APPLEBAUM and BLATT, 1994). These positive results, however, have been argued by other authors' findings (WATSON et al., 1993). Bettenhausen (1991) concluded in his review that "diversity hinders group and organizational performance, especially in times of crisis or rapid change" (p. 356).

Groups are increasingly ad-hoc, with a fixed set of tasks to perform, and their members take generally part in a multiple number of such arrangements. Furthermore, some authors view groups as open systems, "interacting with other groups and individuals in the organizational environment" to make group decision-making processes more efficient (CUMMINGS, 2004; ANCONA and CALDWELL, 1990). Gibson (2001) proposed that

efficiency issues in diverse groups operating in large corporations are in most instances caused by inadequate group management techniques and insufficient attention to the specific aspects of these groups' collective cognitive processes. Cummings (2004) has also emphasized the need for IT-mediated collaboration in the production and sharing of knowledge within these groups. To assist these developments, advances in computers and information technology offer new tools that can influence the processes and performance of groups. Among these, group decision support systems, which will be discussed in the next section, were designed with the idea of improving the decision-making abilities of groups through procedures that structure the comparison of alternative solutions.

While computer-mediated groups are characterized by less interaction and interface than face-to-face groups, they showed superior results at generating ideas. Face-to-face groups, on the other hand, had a better performance on problem solving tasks and tasks requiring the resolution of conflicts. Tung and Quaddus (2002) have found that groups that interact with the use of ITs are faster in the execution of tasks and the dissemination of information. However, these researchers also point out to the fact that ITs may hinder certain decision-making processes that involve conflict situations that might require face-to-face interaction. On the other hand, they also note the significant cost savings that organizations can enjoy when technologies such as video-conferencing and online messaging replace travel and face-to-face meetings.

The use of GDSS led to improved decision quality and level of focus on the task, and increased equality of participation and length of time required to reaching a decision. However, both culturally-homogeneous and culturally-heterogeneous groups using GDSS showed lower consensus and satisfaction with the process and the decision (FLANAGIN et al., 2004; REINIG et al., 2002).

Before moving to the consideration of the link between cultural diversity and team work, one important relationship must be established - the relationship between group and member identity. Bettenhausen (1991), in his extensive review of group research, asserted the enormous influence groups have on their members. Citing social identity theory (TAJFEL and TURNER, 1986), he stressed the importance of "significant others" in providing group members with a sense of who they are. Groups share similar cognitive schemas and scripts that give events meaning, and their common goals serve the purpose of homogenizing membership around a core set of values. Within the group, members seek protection and comfort from an often incomprehensible and menacing world. Leidner and Kayworth (2006) posit the existence of individual *and* collective mechanisms of group cognition, and the fact that both have the capability of influencing the identity-giving processes that occur within groups. These researchers also suggest that the intertwining of these two dimensions needs to be fully understood in case we want to have a more complete understanding of the impacts that group cultural diversity can have on group behavior and decision-making.

The examination of the relationships between cultural diversity and group processes has to be assessed from a brief review of three bodies of supporting literature: (a) the *group dynamics* literature, that sheds light on the effects of group processes and composition on individual and group outcomes; (b) the literature on the *influence of cultural differences*, that examines the effects of culturally based norms on the behavior of individuals and groups; and, (c) research on *multicultural teams*, that focuses on the specifics of these increasingly common work groups.

Group Dynamics. This literature, while in general supporting the basic assumption that group members' attributes will affect group performance, shows mixed results in relation to the effects of composition. Some authors emphasize the *process losses* and lower group

performance that occur as a consequence of cultural heterogeneity (HILL, 1982). Other authors (GUZZO and DICKSON, 1996; SHAW, 1990; COX et al., 1991) have stressed the benefits of cultural heterogeneity in terms of more creative and higher quality decisions. Tung and Quaddus (2002) have raised the issue of the delicate balance that culturally-diverse groups need to maintain between the values held by their members and the diversity of ideas brought by their critical thinking processes. These authors state that this balance has a significant influence on the performance of these groups.

In any case, the moderation effect of task characteristics in group dynamics seems to be supported. The nature of the task has to be sensitive to variations in culture among the group members for those to impact performance (TUNG and QUADDUS, 2002; McGRATH, 1984).

Cultural Differences. The review of the research on the relationship between culture and norms has shown strong support for the influence of values on the behavioral scripts that individuals bring from memory to describe events or behaviors appropriate for a particular situation. These scripts are not only reflective of the values and core beliefs of a culture, but are also amenable for learning and transmission by members of a cultural group. There is also evidence (EREZ and EARLEY, 1993; HOFSTEDE, 1980) for the perspective that suggests that "individuals in different cultures learn different behavioral scripts and sets of values with which to evaluate situations and potential courses of action in group settings" (THOMAS et al. 1996, p. 8). Rokeach (1973) had previously found support for the hypothesis that value-oriented beliefs influenced what individuals accepted as desirable.

In addition, Calhoun et al. (2002) posit the existence of four processes of behavior and individual action that are capable of influencing the cultural-interpretation mechanisms of members of a decision-making group: *intuition* (at the individual level); *interpretation* (the selection of the conscious elements of individual learning and group communication); *integration* (the collective learning at the group and organizational levels); and *institutionalization* (the integration of knowledge by the organization, and its incorporation into the organization's systems, structures, routines, and practices). These authors note that cultural differences are likely to impact group learning more directly in the process of *integration*, by transforming both the group's and group members' interpretative schemes. They call this phenomenon 'reflexibility', in the sense that individuals are continuously impacted by their experiences and, as a consequence, constantly change their interpretative schemes and behavioral patterns, thus impacting their contributions to group work and their relationships with the other group members.

Multicultural Teams. Multinational teams are believed to offer the potential for more innovative and higher quality solutions to the problems MNCs face than monocultural teams (MAZNEVSKI and PETERSON, 1997). Participants of multinational teams bring together different backgrounds, experiences, and world perspectives that are a potential more fertile ground for the treatment of the complex, dynamic global situations these organizations have to deal with in their daily operations. It is worth noting that multicultural teams do not necessarily have to be multinational: the workforce of almost every organization, including domestic companies in countries such as the United States, is becoming increasingly multicultural, *especially due to migrations (RIGBY, 1987; COX et al., 1991).

The same factors that are responsible for the increased problem-solving capacity of multicultural teams can sometimes be the cause for such groups not fully realizing their potential. This paradox is related to the fact that the same different interpretations of the environment that enhance their sense-making and meaning-giving capabilities may also be the

cause of latent disagreement when a decision is to be reached (LEIDNER and KAYWORTH, 2006). In extreme cases, radical different interpretations of the world would cause integration problems that can degenerate to conflict and render the groups inefficient or even harmful to the organization (GUO et al., 2006; SALK and BRANNEN, 2000). Organizations thus face the challenge of improving effective integration in multicultural groups, in order to take full advantage of these groups' potential.

4. Group Decision Support Systems (GDSS)

Computing and communication systems include the already familiar technologies of electronic mail, computer conferences, and audio and audio/video teleconferencing. More complex technology is found in GDSS, which, according to Galegher and Kraut (1990, p. 3) are designed to

> "*improve the quality of group decisions by relying on computer software to guide deliberation and choice; hypertext software systems, designed to permit scholars and students to access and modify a common file, creating a network of linked, text and graphic entries and annotations on a common topic: and "virtual hallways", which combine audio and video technology to provide a continuous link between users at different sites as a way to overcome the barriers to informal communication imposed by distance".*
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> According to DeSanctis and Poole (1994, p. 122):
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> *"a GDSS combines computing, communication, and decision support capabilities to aid in group idea generation, planning, problem solving, and choice making. In a typical configuration, a GDSS provides a computer terminal and keyboard to each participant in a meeting so that the information (e.g., facts, ideas, comments, votes) can be readily entered and retrieved; specialized software provides decision structures for aggregating, sorting, and otherwise managing the meeting information"*

Summarizing the types of activities generally comprehended in a decision-related meeting, DeSanctis and Gallupe (1987, p. 591) listed "*proposal exploration; opinion exploration; analysis; expression of preference; argumentation; socializing; information seeking; information giving; proposal development; and, proposal negotiation".*

There are various forms of GDSS, differing in aspects such as number of users, available technical capabilities, and geographical dispersion of potential participants. DeSanctis and Gallupe (1987) proposed a typology of GDSS by level of sophistication, on the assumption that the more sophisticated the technology, the greater the degree of interference in work groups' naturally unstructured decision process. Kraemer and Pinsonneault (1990) consider that the important distinction is between GDSS and Group *Communication* Support Systems, which do not possess decision-aid tools. The most flexible GDSS designs offer a set of features -a "shell" (DeSANCTIS and GALLUPE, 1987)- from which groups can select during the course of meetings, as needs arise.

Presentation media include a variety of visual modes, and sometimes also teleconferencing capabilities. Software for GDSS has, usually, the following support capabilities (VOGEL and NUNAMAKER, 1990): idea generation; issue analysis and organization; consensus formation through prioritization and voting; policy development and stakeholder identification; systematic evaluation of plans; and presentation of individual and group output. Vogel and Nunamaker (1990, p. 515) suggested that system designers should aim at creating software "that is not merely 'user friendly' but 'user seductive' as a way of encouraging individual involvement in group decision-making sessions".

Automated decision-making support applications have been designed to minimize human involvement in on-going decision-making processes. They are expected to perceive external conditions and apply codified knowledge to provide appropriate, cost-effective responses, requiring minimum levels of human intervention (HARRIS and DAVENPORT, 2006). These applications also provide solutions to recurring managerial issues, based on group-programmed decisions. The algorithms are the result of users' experience in specific sets of business rules, applied to work-flow, rule-based mechanisms. They are capable of predictive analysis, flexible combination of business routines, work optimization through the use of models and strategies, and perceptions of accelerated learning (TURBAN et al., 2007).

Empirical Findings on the Use of GDSS. Anonymity and physical proximity were found to be powerful influences in groups using GDSS. In a series of laboratory experiments, Jessup and coleagues (1988) assessed that, in general, anonymity was positively associated with the generation of a higher volume of contributions from participants and with members' satisfaction with the process. Anonymous, dispersed groups were found to work in a "brainstorming" mode, having generated a higher number of short comments. Kraemer and Pinsonneault's (1990) review found that GDSS increased task-oriented communication, the focus of group members on the task, the depth of the analysis, and the overall quantity of effort put in the process. Additionally, GDSS were found to increase participation and consensus-reaching, the quality of the decision and the confidence and satisfaction of the group members with the outcomes of task and process. The findings related to the effects on decision time were inconsistent. Although the type of decision did not seem to affect the findings, the stage of group development generated variability in performance (GUO et al., 2006; McGRATH, 1990). Table 1 summarizes the most recent research on GDSS.

Culture: The Missing Variable in GDSS Research? A comment is necessary on the paucity in the consideration of the cultural factor in the IS literature. Of all the studies that specifically addressed GDSS, including reviews of the subject that also referred to communication tools (ANCONA and CALDWELL, 1990; DeSANCTIS and GALLUPE, 1987; DeSANCTIS and POOLE, 1994; GALEGHER and KRAUT, 1990; KRAEMER and PINSONNEAULT, 1990; LYYTINEN and NGWENNYAMA, 1992; VOGEL and NUNAMAKER, 1990) only McGrath (1990) -not strictly IS literature- considered the possibility of a cultural variable. In spite of not advocating that culture might be the unique explanation, in certain cases not even a very important predictor variable, it is our opinion that we need to include its consideration in the analysis of GDSS. This paper now proceeds to the consideration of the specific situations where culture might affect GDSS's process and effectiveness (GUO et al., 2006; JOSHI et. al., 2006).

5. Analysis of the Impacts of Cultural Values on the Use of GDSS

In this section, some of the most widely cited studies of cultural dimensions of values and of cultural differences among individuals and groups are briefly reviewed. In each case, practical examples of situations amenable to impact the use and effectiveness of GDSS are provided. Some of these examples come from the popular business press, others from one of the authors' work as private business consultant in the USA and Latin America. The analysis of the data was made independently by the two researchers, in different points in time. The raw data were compared with concepts from the academic literature, using word convergence and idea association. Analyzed data were compared by the two researchers, and differences

and similarities were carefully discussed, in order to identify *practical implications* that could generate propositions supported on theoretical or empirical (anecdotal) bases.

The works of Kluckhohn and Strodtbeck, Edward Hall, Geert Hofstede, and Christopher Earley will be commented. An examination of the work of J. McGrath on the influence of time for group work will also be provided.

Basic Value Orientations (KLUCKHOHN and STRODTBECK, 1961)

These anthropologists posited that the existence of five basic questions to which each society must develop common answers in order to interact effectively. These sets of answers define the society's culture (MAZNEVSKI and PETERSON, 1997). The questions relate to individuals': (i) *relation to nature* (mastery, subjugation, or harmony); (ii) *orientation to time* (past-, present-, or future-oriented); (iii) assumptions about the *basic nature of humans* (good, evil, neutral, or mixed good-evil; and changeable or unchangeable); (iv) views on the essential *relationships among people* (individualistic or collectivist; hierarchical or egalitarian); and *preferred mode of activity* (doing-achieving, being-feeling, or thinking-reflecting).

Practical Implications. In a group process such as GDSS, it can be hypothesized that the consequences of individuals' view about the essential *relationships among people* will have the greatest influence. The reactions and responses of members of individualistic cultures will likely differ from those of members of collective and hierarchical cultures, for example. While the former will try to make sure that their own self interests are preserved, the latter are likely to attempt to preserve group harmony, even at the expense of work outcomes. It seems reasonable to assume that not even the anonymity features of GDSS will completely eliminate or maybe even reduce the impacts of such personality differences.

Individuals' perspectives on their preferred *mode of activity* may also have strong impacts in group processes. Our observations in this section are derived from one of the author's work as consultant to a special steel manufacturing operation with headquarters in Brazil and five facilities in the US, obtained from videoconferencing and IT-mediated business intelligence systems. The company's top managers used the system, and their decision-making process could be characterized as ad-hoc and extremely dynamic.

In a situation requiring immediate action, for example, individuals from a doing-achieving society tried to provide fast answers, skipping consideration of alternative courses of action. This happened independently from the interaction mechanism being utilized, in the researcher's assessment as a result of the harmony-searching, future-oriented and holistic orientation of the decision-makers involved in the process. Under the same conditions, being-feeling groups might not have perceived the urgency of the situation, and would only become involved if they felt that the timing was right. People from thinking-reflecting cultures would have probably engaged in extensive interpretation, and come with an optimum solution maybe too late to be useful. This leads us to

> ***Proposition 1: Groups using IT collaborative tools that are combined with strategic information elements, such as performance measurement systems, will make decisions that show more efficacy (i.e., with objective and precise results) and efficiency (i.e., with lower risk, and higher speed and reliability).***

High/Low Context Cultures (HALL, 1976)

This author described in his widely cited study (1976) the concepts of *high/low context* cultures. Context, for Hall, is to be understood as any situational contingency,

including the physical environment, status/power relationships, roles of participants, and the non-verbal aspects of communication. In high context cultures, the *content* of communication has to be understood in the *context* of these various factors: "in cultures in which people are deeply involved with each other… in which information is widely shared - what we will term high-context cultures - simple messages with deep meaning flow freely" (HALL, 1976, p. 30). In the words of Cateora (1990, p. 133): "communication in a high-context culture depends heavily on the context or non-verbal aspects of communication, whereas the low context culture depends more on explicit, verbally expressed communications".

Practical Implications. In terms of a work-related situation having members of low- and high-context cultures jointly participating in a GDSS session, it can be conjectured that individuals of high-context cultures may have more difficulties operating in the type of "context-free" environment that is one of the main features of GDSS.

This could be observed by one of the authors in her work as a consultant for an American multinational in the agri-business sector, with ten divisions in Latin America, five of them in Brazil. A characteristic of this business, at least in this part of the world, is that it puts together people from very different cultural, technical, and technological backgrounds in decision-making processes that involve outcomes of strategic, long-term importance. During IT-mediated exchanges, the researcher could observe an evident difficulty for technologically-deficient, low-technical-skills participants to interact with counterparts that possessed training, education, and experience not only in the topics of the discussion but also in the IT tools being used for the interactions. Group members who were more comfortable with more personal and informal, face-to-face forms and environments of negotiation showed relative unease with the formality and objectivity of IT and communication tools such as email, instant messenger, and intranet. Considering these elements and observations, we propose

> ***Proposition 2: Culturally-heterogeneous and diverse groups with low levels of cohesion among their members and dissimilar perceptions of IT tools may show difficulties communicating with and using ITs in their decision-making processes. This will cause relatively low decision-making performance (in terms of process speed and decision quality) and higher levels of group conflict (in terms of commitment and trust).***

Cultural Value Dimensions (HOFSTEDE, 1980)

In his well-known research, Hofstede (1980:2004) indicated that half of the variance in countries' mean scores on cultural values could be explained by four basic dimensions: *Power Distance* ("the degree of inequality among people which the population of a country considers as normal"); *Uncertainty Avoidance* ("the degree to which people in a country prefer structured over unstructured situations"); *Individualism versus Collectivism* ("the degree to which people in a country prefer to act as individuals rather than as members of groups"); and *Masculinity versus Femininity* ("the degree to which values like assertiveness, performance, success and competition, which in nearly all societies are associated with the role of men, prevail over values like the quality of life, maintaining warm personal relationships, service, care for the weak, and solidarity, which in nearly all societies are more associated with the role of women"). In 1987, working in collaboration with researchers identifying themselves as the Chinese Culture Connection (CCC, 1987), a fifth factor was identified, that the researchers named "*Confucian Work Dynamism*" or *Long-term/Short-term Orientation.* This factor was considered to be associated with the relative importance of

perseverance and thrift, and with the relative unimportance of stability and tradition, making it possible to be simultaneously proactive and entrepreneurial.

Practical Implications. In recent research, Joshi et al. (2006) have found that organizational members working in different countries showed higher levels of knowledge capture and transfer when using ITs such as collaborative tools. Among the observed outcomes, it was shown that group members improved their practices, increased motivation and commitment, became more proactive, and switched from a hierarchical structure based on power to one based on expertise. These researchers had the opportunity to observe a decision-making group meeting with workers from an auto company, where the group members were located in four different countries. The group was composed of managers in various levels of the organization (directors, managers, and supervisors), and they interacted with videoconferencing, a balanced scorecard software system, and the company's intranet. The session started with a general presentation, followed by an analysis of the metrics that showed decreasing (negative) trends, which were shown in red. All members had experience with the structured methodology for data analysis. It was observed that the managers responsible for the units with negative results showed defensive behavior, in spite of the fact that issues were discussed from the perspective of the company, with a focus on collective responsibilities. Only one member of the group was female, but she had high level strategic responsibility. Her interventions and her acceptance as a member of the group did not raise the levels of risk in the decisions facing the group. Based on these experiences, we present

> ***Proposition 3a: Individuals from high uncertainty-avoidance cultures (professional level, sex, scholar level) would face a feeling of uneasiness when participating in a "brainstorming" type of activity, which might be important in the initial stages of a GDSS session, especially using previous knowledge.***
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> ***Proposition 3b: Individuals from a high Power Distance society may become uncomfortable if they are required to participate in a GDSS session with their bosses.***

Social Loafing (EARLEY, 1989)

Social loafing, described as the reduction in individual performance with increased group size, has shown to have robust characteristics (LATANÉ, 1979; LEVINE and MORELAND, 1990; WELDON and GARGANO, 1988). This phenomenon seems to be particularly common in individualistic societies, where people feel proud of their own accomplishments and derive satisfaction from performance based on their own achievements. Individuals from a collective culture are seen as deriving pleasure and satisfaction mainly from group accomplishments (TRIANDIS, 1990). In an important research result, Earley (1989) found that highly individualistic people performed poorest under conditions of high shared responsibility and low accountability, whereas highly collectivist people did not show this tendency and actually performed better under conditions of high shared responsibility, regardless of accountability. Social loafing in group activities, however, is not inevitable. Research has shown that increasing participants' identifiability and accountability can reduce its occurrence (BETTENHAUSEN, 1991; LEVINE and MORELAND, 1990).

Practical Implications. It is not difficult to imagine the potential effects of social loafing in a GDSS setting. While the identifiability of group members may reduce the problem, it will possibly also remove one of the main features of the system, i.e., the anonymity of the contributions. This particular characteristic has been credited as one of the main sources of

increased, more "democratic" participation, and of more innovative solutions. McGrath (1990), however, posits that this same anonymity may provoke different reactions in individuals of high power distance societies. For these members of the group, it may be important to know the source of a communication in order to bring the "script" for reacting to its content. These individuals may also feel uncomfortable with the lack of order in the transition of "floor turns" (McGRATH, 1990, p. 47).

One of the authors recently had the opportunity to observe some of these reactions and behaviors in her work as a consultant for a Brazilian manufacturing company with ten facilities in Brazil and five in foreign countries, including the US. Contrary to expectations, some high-level directors showed more reserved behavior during the weekly face-to-face planning meetings than at IT-mediated interactions that used workgroup tools. Apparently due to the fact that the IT tools had the capability to record opinions and suggestions, higher quality interventions became more common. Also, ideas were developed more thoroughly, with the presentation of examples and arguments that were supported with web-retrieved, real time information. When presented with this observation, the managers who were participating from the five foreign locations explained that since the interaction used an internet-connected laptop, the availability of information that could be instantaneously retrieved from the web provided the opportunity for more fully-developed and innovative ideas to support the topic under discussion. It is worth mentioning that this organization has a well-established culture, constantly disseminated to its employees and emphasized by its top managers, basically descendants of Italian immigrants and working for the company at least 30 years. They also have a high level of decision control and own the majority of the capital. With this in mind, we present

> ***Proposition 4: When participants of a GDSS-mediated meeting share the same organizational culture and have strategic decision-making responsibilities, they will in general propose solutions that create more value (i.e., are more innovative or present a better fit with the environment) and raise the performance of the organization (i.e., are reached faster and show higher effectiveness). This will happen independently of group size, the presence of anonymity features in the system, and the permissive or prescriptive nature of the IT.***

Time Orientation (McGRATH, 1990)

In his analysis of the effects of the group's developmental stages in group work, the author cites Tuckman's (1965) well-known sequence of the stages of "forming, storming, norming, and performing" that have to be taken into consideration when analyzing groups. He also emphasizes the importance of Gersick's (1988) work about the "mid-life crisis" in a group's life, after which groups that seemed to be losing direction started to move efficiently toward the completion of the tasks. Another significant aspect of McGrath's (1990) analysis is related to the group's "rhythms", or the temporal patterns by which activities are synchronized.

Practical Implications. It is plausible to assume that due to their differences in time orientation, different cultures may have different work rhythms, causing problems of synchronization of members' verbal and nonverbal communication. For example, time lags in response, differential participation of potential sources, certainty/uncertainty as to audience, interruptions, etc., all may have different meanings across cultures. Other factors, however, might mitigate the impacts of different time orientations, such as trust among members or the strength of the organizational culture. We thus offer

Proposition 5: Work groups whose members are culturally diverse will not present communication, time orientation or work rhythm issues as long as the group members have similar levels of technical and educational knowledge, hierarchical status, and that trust and mutual respect are present in their interactions.

6. Conclusion

Communication technologies have augmented the mobility of information and knowledge, allowing organizations to disperse the activities of their value chains around the globe. Communication is a key element of the structure of large, complex multinational enterprises that critically depend on ITs such as GDSS to support the multifaceted demands of their strategy execution (SALK and BRANNEN, 2000). Leidner and Kayworth (2006), Harris and Davenport (2006), Jarvenpaa and Yves (1994), among others, have stressed the distributed and decentralized nature of these organizations' global networks: their dependence on highly-skilled human assets and cosmopolitan management teams; their reliance on virtual work teams and managers; their growing use of self-managed work teams; their independence of physical workplaces; and their diverse workforces. Organizational environments with these characteristics are the appropriate location for studies such as the present, since these organizations critically need this blending of diverse human resources, working in groups and supported by sophisticated communication and decision-making ITs, to match the complexity and competitiveness of their task environments.

We can only agree with Galegher and Kraut (1990) when they suggest that, for the new field of research called Computer-supported Cooperative Work to produce systems that improve the quality and efficiency of intellectual cooperative work, the joint efforts of both social behavior scientists and systems developers are required. The problem is of course not simply one of coordination between different areas of study. The phenomena to be studied are complex and extremely dynamic, with technological change occurring at a very fast pace. The present study intended to raise the awareness of all researchers in this area to the need for the consideration of another important variable, the cultural factor.

Future research in the topic, in our opinion, should focus on longitudinal studies examining variables and issues such as the following:

- The measurement issues of the cultural variable, due to its deterministic nature and its impact on individual behavior (JOSHI et al., 2006; HOFSTEDE and McCRAE, 2004);
- The actual impacts of cultural diversity, through the observation of groups during the process of making IT-mediated decisions. This observation should provide a more clear understanding and a more coherent vision of the factors influencing the process (GUO et al., 2006);
- The impact of cultural differences on the learning curve of GDSS utilization (LOWRY et al., 2007); and
- The influence of collaborative ITs on the outcomes of decision making processes for different types of decisions (real time, individual, face-to-face collective versus distant collective, etc) (TURBAN et al., 2007; CALHOUN et al., 2002).

As a conclusion, we would like to raise the possibility that the insufficient consideration of the cultural variable in the use of GDSS and other forms of collaborative ITs, in the Information Systems literature, may be a consequence of the relatively simplified focus and nature of research in this field. We need to include not only this variable, but also other recognizably important elements such as behavioral differences, power relationships, and

learning capabilities if we ever intend to build a more complete picture of the complex phenomenon of distant, IT-mediated group decision-making processes.

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Appendix

Table 1. GDSS main variables reviewed

Author	Main Variables Cited	GSS Software
Salk and Brannen (2000)	National and Individual culture Network	Computer and Internet tools
Anderson and Hiltz (2001)	Culture hetero/homogeneous	No specific GSS technology
Calhoun et al. (2002)	National culture	Computer and Internet tools
Reinig and Mejias (2002)	Technology support; Identification feature; Culture	GSS software
Tung and Quaddus (2002)	Technology support; Task Type	Decision Conference using HIVIEW
Flanagin et al. (2004)	Quality information Contributions Satisfaction	IT-mediated
Guo et al. (2006)	Group Interaction Culture Diversity	Computer and Internet tools
Lowry et al. (2007)	Quality Communications	IT-mediated
Watson et al. (1993)	Technology support; Culture	SAMM
Vogel and Nunamaker (1990)	Culture; Tool support; Referent power; Communication; Satisfaction	No specific GSS technology
Jessup et al. (1988)	Anonymity; Proximity	No specific GSS technology