Wired attraction : effects of ICT use on social cohesion in organizational groups
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Citation for published version (APA):

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The use of information and communication technology (ICT) within organizations has increased markedly in recent years. ICT has certainly shown its worth. Business processes take place far more effectively and efficiently, while distance and time play only a minor role; communication technology makes it possible to speed up and improve communication. But the importance of ICT reaches beyond achieving more efficiency in communication processes, in information exchanges and in productivity changes. ICT exerts an enormous influence on the way organizations operate (Fulk & Desanctis 1995). This dissertation argues that a change in social attraction between organizational members and consequently, a change in social cohesion within organizations, is one of these effects.

Cohesion, or attraction to a group or (organizational) entity, may be considered as one of the faces of social capital (Leana & Van Buren III 1999), or – perhaps more appropriately – as one of the generators of social capital. In cohesive organizational groups, mutual trust is a natural attitude and employees will probably exhibit both the ability and a willingness to cooperate. Cohesion is seen as a key variable in, among other things, models for effective work teams (e.g. Cohen & Bailey, 1997; Hackman, 1987; Sundstrom, DeMeuse & Futrell, 1990). Several social processes and concepts relevant to the smooth functioning of an organization have been argued to be related to cohesion. Examples include: identification (Garud & Wiesenfeld, 2000; Riordan & Weatherly, 1999; Terry, 2000); commitment (Goodman, Ravlin & Schminke, 1987; Hackman, 1976; Carless & DePaola, 2000); Organizational Citizenship Behavior (George & Bettenhausen, 1990; Kidwell, Mossholder & Bennet, 1997) and trust (Bernthal & Insko, 1993). Thus, social cohesion within organizations is a significant phenomenon and factors that affect cohesion can have different implications for the functioning of an organization.

Daft (1992) describes an organization as a social entity or a composition of people and groups of people. These people and the roles/functions they fulfill can be considered the building stones of the organization. An increase of ICT use is often accompanied by shifts in the organizational structure and changes in coordinating activities. People may acquire other roles or functions, gain membership in other groups/networks and communicate through other
channels. These changes may affect the individual’s attraction to or feelings about (parts of) the organization. In this dissertation, I will present arguments to demonstrate that the growing use of ICT affects cohesion in organizational groups. I will also formulate and examine empirically various hypotheses regarding the relationship between the use of ICT in organizations and social cohesion within those organizations.

Formulating causal hypotheses on the effects of ICT is generally somewhat tricky considering the outcomes of former technological developments. The telephone proved to be eminently suitable for personal use and social interaction between people, while predictions had it that the medium was particularly suited to business. Electronic mail, launched as a medium for the rapid exchange of short messages, has now expanded into a medium for distributing documents and even for supporting virtual communities on the Internet. Thus, speculate about the causal effects of technologies based on the current situation may entail denying the fact that technology offers potential new fields. In keeping with Giddens’ structuration theory (1984), Orlikowski (1992) points out that technology not only has “structural” properties, which may affect human actions, but is also a product of human actions. By comparison, in describing the relationship between social networks within an organization and technical networks based on ICT, Contractor and Eisenberg (1990) argue that social networks can be considered both the antecedent and the consequence of the way technical networks are used. Technical networks influence existing social networks and vice versa.

Although the interaction between the use of ICT and the social structure of organizations is complicated, research results still suggest changes in social structures, caused or triggered by the use of ICT (Sproull and Kiesler 1991; Garton and Wellman 1995; Van den Hooff 1997; De Riddler 1998). The explanation may well be that certain basic values, stemming from embracing social structures outside organizations, also affect the development of ICT and its use. This falls in line with Hofstede, Neuijen, Ohayv & Sanders (1990). They argue that “national cultures,” which include the basic values reproduced in the socialization process of child rearing, are more difficult to alter than “organizational cultures,” which are based more on reproduced organizational practices. In spite of turbulent ICT-related developments in our society, the basic ideals of being both productive and efficient are still dominant. Moreover, in the western world, these values are generally combined with the basic value of “individualism” and of personal responsibility (Hofstede 1995). Organizations implement ICT to increase efficiency and productivity, while individual human players use ICT to increase their own efficiency. In addition to these direct, generally anticipated and largely intended effects, there will also be changes in social patterns, in interdependencies and in attention — all generally unanticipated and frequently undesired. These changes produce indirect effects, or what Sproull & Kiesler (1991) term “second level effects,” related to the “weakness” of internal social structures. The turbulent developments in society mentioned here have confronted organizations with the continual need to learn and adopt new practices in order to survive. Consequently, the organizations’ social structures are unstable and can fall susceptible to the purposeful actions of human beings. Thus, while social structures in
organizations may still have a constraining effect on how ICT is used in specific situations, there will also be an undercurrent of change related to ICT use. This is because the firewall of the internal social structure is generally not robust enough to remain unaffected.

1.1 Research question

Studying the possible impact of ICT on cohesion within organizations involves (at the very least) the relationships between the formal organizational structure (the arrangement of groups), the technical structure (ICT, regarded as the broad range of telecommunication networks, hardware and software), and the organization as a "social entity" (which may contain a certain degree of cohesion). Organizations consist of people and groups of people who are assigned to certain tasks in order to contribute to the organization’s goals and mission. These individuals and groups interact and maintain relationships through the exchange of information (communication processes). Information and communication technologies offer new ways of facilitating this interaction and information exchange. Secondly, ICT offers new opportunities for coordinating processes that may result in changes within the formal organizational structure, and thus, the actual composition of groups. (That, in turn, may lead to new technological needs). These relationships are outlined in Figure 1.1. Within this context, we will explore the impact of ICT on cohesion.

Figure 1.1 Relationships between the different aspects of an organization

Cohesion is a group characteristic. In organizations, we can distinguish different types of entities (groups) and relationships between them. A distinction can be made between informal groups (based on friendship, for instance) and formal relations and group formation, which are based on tasks or are embedded in the formal organizational structure. This latter category, which can be described as task-related groups, forms the focus of this study. We made this choice for two reasons. Formal groups or networks form an interesting field of study. They contribute to - or perform - certain tasks in order to fulfill the organization’s goals and mission. ICT is used by organizations in order to improve their work processes and products. In light of that, it is useful and interesting to study social processes, such as cohesion, in these formal groups or networks. Secondly, the growing use of ICT (or a change
of the technical structure) influences both the formal organizational structure and the organization as a "social entity." Changes in the formal organizational structure involve changes in the arrangement of entities and networks and thus influence the social processes between individuals or groups. These changes of formal group structures can be detected more easily, since they have been formalized to some extent and linked to tasks.

The focal research question of this dissertation can be formulated as follows:

**What effects does the use of Information and Communication Technology (ICT) in organizations have on social cohesion in task-related entities within these organizations?**

As mentioned earlier, an organization can be considered a large entity, consisting of several smaller entities. It seems reasonable to assume that the results of measuring cohesion in a small work group, in which all members know each other, will differ greatly from the measurement results obtained for cohesion in a large organization, whose members may have never even met. The influence ICT use may have on cohesion in the organization might vary. In a small group, the use of a new technology may directly influence human interaction. At the organizational level, the indirect influence of ICT, such as a change in the formal structure, may be of more importance. It is important, therefore, to define the possible groups or entities in the organization and to make a distinction between larger and smaller entities.

### 1.2 Sub-questions and research model

To structure our exploration of our focal research question, we formulated several sub-questions. The first question concentrates on defining and gaining a thorough understanding of the central concept of this study: cohesion in organizational groups. We felt it useful in this regard to examine the importance of this concept in organizations more extensively as well as its relationship to other social concepts and processes. This information helps to further illuminate the relevance of this study. Moreover, as shown later in this dissertation, it helps to understand and interpret the implications of the assumed effect of ICT use in organizations. We also examined the factors that can help cohesion to develop within groups. As outlined briefly in the beginning of this chapter, ICT use is supposed to affect the way (people within) groups act. Knowledge of factors that are important to the development and maintenance of social cohesion is helpful in understanding how ICT use can affect social cohesion.

**Sub-question 1**

*How can social cohesion be defined and positioned in relation to other social concepts within an organizational context and what factors are important to the development and maintenance of social cohesion in task-related groups in organizations?*
Answering this first sub-question entails the following.

1) Defining social cohesion within task-related groups and positioning cohesion with respect to related social concepts within an organizational context.

2) Presenting a conceptual model, containing antecedents (factors or conditions important to the development of cohesion), and discussing the consequences of social cohesion.

As illustrated in Figure 1.1, ICT use is expected to influence social cohesion in two ways.
- Directly (by impacting the relationship between the technical structure and the organization’s social structure).
- Indirectly (by affecting the formal organization structure, which in turn, is related to the organization’s social structure).

Sub-questions 2 and 3 concern the indirect effect of ICT on social cohesion and can be formulated as follows:

Sub-question 2

*What trends and shifts with respect to the formal organizational structure can be perceived and predicted as the result of ICT use in organizations?*

Sub-question 3

*What effects do the changes or shifts in organizational structure referred to in sub-question 2 have on social cohesion in task-related groups in organizations?*

In answering sub-question two, we begin by describing “ICT use,” including the characteristics of ICT that may cause its assumed influence in organizations. We will then go on to explore the effect of these characteristics on the formal organizational structure, resulting in assumptions regarding shifts or changes in organizational structure.

The third sub-question concerns the second step of the indirect effect of ICT use on social cohesion. Structural characteristics resulting from or developing because of ICT use will be explored in relation to social cohesion. In other words, we will discuss the consequences of the shifts in organizational structure caused by ICT use for the antecedents of social cohesion. In answering this sub-question, we will present hypotheses regarding the indirect effect of ICT use, which will be empirically tested.

The fourth sub-question concerns the relationship between the social structure (organization as a social entity) and the technical structure described in Figure 1.1. This question thus, covers the expected direct effect of ICT use on cohesion in task-related groups. ICT involves a broad range of applications that support different processes in the organization. One of these processes is communication between organizational members. Studying cohesion entails studying the groups in which interaction takes place. In order to explore the direct relationship between ICT and cohesion, ICT applications that support communication processes will be
discussed in particular. Computer mediated communication (CMC) supports interaction patterns within the organization and can, therefore, be expected to influence social processes in groups. This influence is examined in sub-question four.

**Sub-question 4:**

"What effect does the use of computer mediated communication (CMC) by organizational members have on social cohesion in task-related groups in organizations?"

In answering this last sub-question, we will present and empirically test hypotheses concerning the effect of CMC use in organizational (task-related) groups on social cohesion within those groups.

The four sub-questions cover all the relationships presented in Figure 1.1. Using this figure, we constructed a general research model, illustrating all four sub-questions (Figure 1.2).

As can be seen in this model, the sub-questions address only one side of each reciprocal relationship. In discussing these relationships theoretically, however, we must take account of their reciprocity.
1.3 Outline of dissertation

This dissertation contains a theoretical discussion (chapters 2, 3, 4 and 5), followed by an empirical section (chapters 6, 7, 8, and 9). We will begin by addressing the four sub-questions theoretically, concluding with several assumptions and hypotheses regarding the relationship between ICT use and social cohesion in organizational groups. These assumptions and hypotheses are examined in our empirical research.

Chapter 2 discusses the first part of sub-question 1. A literature overview of cohesion is presented, also including theories regarding related social processes in organizations. “Cohesion” is subsequently defined and positioned within an organizational context. In addition, its importance for the smooth functioning of an organization is discussed in more depth. Thus, this chapter illustrates, once again, the relevance of this study. It also serves as an aid in interpreting our research results and understanding the implications for an organization of changes in social cohesion resulting from ICT use.

Chapter 3 presents a conceptual model of social cohesion in organizational groups. Antecedents preceding the development of cohesion are discussed as well as consequences, or behavioral aspects, of cohesive groups. This model is helpful in exploring how ICT use can influence social cohesion, as it contains factors that should be affected by ICT in order to accomplish changes in social cohesion. Since hypotheses regarding the effect of ICT use on social cohesion will also be empirically tested, this model should also be useful in determining what instrument to use for measuring cohesion in an organizational context.

Chapter 4 discusses the use of ICT in the organization. We will describe the characteristics of ICT. In addition, we will explore the potential impact of these characteristics on the formal organizational structure and social structures within the organization, focusing particularly on CMC. Chapter 4 also formulates several assumptions regarding the relationship between ICT use and the organizational structure, forming a provisional answer to sub-question 2. (Incidentally, these theoretical assumptions are examined empirically). Insight into the possible social impact of CMC is presented, providing the information needed to formulate hypotheses regarding the direct effect of ICT (CMC) use on cohesion in organizational groups.

Chapter 5 combines the answers to sub-questions 1 and 2, resulting in hypotheses regarding both the indirect (sub-question 3) and direct effects (sub-question 4) of ICT use on cohesion in organizational groups.

Chapter 6 describes the research design for the empirical section of this dissertation. (In this section, our hypotheses are empirically examined). Three separate studies were conducted; chapter 6 illustrates the design, sample and line of reasoning for the data analysis in each of these. The results of the three studies are reported in chapters 7, 8 and 9 respectively. The first of these studies, an explorative, qualitative study, examined the assumptions regarding the relationship between ICT use and organizational structure. The second study went on to test the reliability and validity of an instrument (developed especially
for our research) to measure social cohesion in organizational groups. Finally, the third study examined the hypotheses regarding the effect of ICT on cohesion in organizational groups.

Chapter 10 presents the final conclusions to our research. Empirical findings are compared to theoretical assumptions and hypotheses, resulting in an understanding of how ICT can affect social cohesion in organizational groups. Chapter 10 also discusses various theoretical implications and examines the implications of these effects for the organization, referring in this discussion to Chapter 2.