E-mail and Direct Participation in Decision Making: A Literature Review

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Abstract

This paper reviews the literature on the effects of the use of e-mail on direct participation in decision making (PDM) in organisations. After a brief review of the organisational literature on participation the paper distinguishes e-mail theories on direct participation in three different theoretical perspectives. Then the paper focuses the attention on the role of e-mail in affecting task type, vertical and horizontal communication and their consequences for PDM. Finally the paper presents indications and open questions for future research.

Introduction

It's widely recognised that Information and Communication Technology (ICT) has changed the way organisations are structured and work. The main cause of change is the ability of ICT to interconnect what is divided through its networking proprierties. Electronic mail (e-mail) is a computer-mediated communication (CMC) technology that play a leading role in this process of change, due to its wide diffusion. E-mail, thanks to its characteristics (asynchrony, rapid transmission and replay, text based communication, dyadic and multiple connections, Garton and Wellman, 1993), has been associated with an increase of democracy in organisations. According to several scholars e-mail communication is supposed to enhance the opportunities for employees to directly participate in decision making processes. However this approach has been criticised due to the little role that it assigns to the social context in influencing actual participation. In order to assess this debate it is necessary to summarise the organisational and CMC literature on participation in decision making.

A. Participation in decision making in organisations: an overview

A.1. Definition and rationale.

Participation in decision making (PDM) is a central topic in organisational studies: "It is difficult to specify the attributes of organisations without asking who makes what kind of decisions, and what procedures are used to make them" (Dachler and Wilpert, 1978: 2).

The field is quite broad and the perspectives quite different. Locke and Schweiger (1979), in their literature review on the topic, found that there is little consensus on its exact meaning: PDM has been defined an active ego involvement, a specific managerial style, a legally mandated mechanism for employees to influence organisational decisions, group involvement or group decision making, equalisation of influence or power sharing, empowerment; finally some writers see PDM as including delegation while others do not.

The Locke and Schweiger's (1979) definition of PDM (to which we refer) is "joint decision making": this definition is enough general to include all levels of participation (between one supervisor and one subordinate or between group members) and enough specific to exclude delegation, which "is not a «sharing in common» with others, but rather an explicit division of labour which is determined hierarchically" (p. 274).

All these different perspectives have a clear element in common: the refuse of the tayloristic-fordist paradigm of work organisation according to which organisations are command-and-control hierarchies where authorities and responsibilities are well-defined and decisions and executions are separated. "Taylor did not advocate PDM because he believed that the average untrained workman of his time did not know as much about the best way to do his job as a trained expert" (Locke and Schweiger, 1979: 318).

Actually the *rationales* of PDM, that is the justifications for the introduction of PDM in organisations, are basically two (Black and Gregersen, 1997) and consistent with anti or post-fordist theories:

- The first rationale assumes that *egalitarianism* is a moral ideal. Individuals should have the right and the ability to participate in decisions that affect their lives. According to Democratic Theory self-determination is seen as a moral value that should occur in all social, economic and political organisations, including workplace. From a socialistic perspective the high degree of specialisation and division of labour – seen as a basic feature of the capitalistic production system – has the result of powerlessness and apathy of the producers: so people should "become economically liberated by participating actively and creatively in the production process, and ultimately controlling it" (Dachler and Wilpert, 1978: 6).

- The second rationale, which could be labelled as the *pragmatic* or *human relation* rationale, assumes that PDM is considered a means to achieve higher productivity, efficiency and profits (Black and Gregersen, 1997). PDM is expected to increase effectiveness because it is assumed to increase satisfaction, motivation, commitment, group cohesion, identification (Magjuca, 1989). Furthermore by involving who actually performs the basic transformational processes of the organisation it is assumed that PDM allows the acquisition of more accurate information, together with a consequent increase in decision quality (Purser and Cabana, 1998). From a cybernetic perspective (Biggiero, 1999b) the increasing environmental complexity that organisations nowadays have to face forces organisations to adopt forms of participation and self-organisation to achieve the requisite flexibility (variety, in Ashby terms, 1956) to survive. Most of the literature and research on PDM deals with the correlation between PDM and organisational efficiency and effectiveness.

The examination of the different perspectives on the justification of PDM is not a inherent goal of this literature review but it should be taken into account that different perceptions of PDM can affect the structure and the deployment of PDM (IDE, 1979; Stohl, 1993; Regalia and Gill, 1995).

A.2. Dimensions of PDM

The PDM literature (Cotton et al., 1988; Dachler and Wilpert, 1978; Locke and Schweiger, 1979; Wagner and Gooding, 1987, Black and Gregersen, 1997) has indicated six dimensions of PDM

a. Formal-informal PDM

The legitimisation to participate in decision making can be formal, that is based on a system of rules or agreements imposed or granted to the organisation (Dachler and Wilpert, 1978), and informal, that is emerging from the interactions of members.

Formal structures of PDM derive from different legitimisation bases (IDE, 1979):

    (1) legal bases, that is Country or regional laws, Government orders

    (2) contractual bases, that is collective bargaining agreements

    (3) management policies, that is the regulations about the involvement of groups and individuals in decisions

Formal PDM lead to the creation of recognised decision making or bargaining unit such as unions, committees, councils, boards, quality circles. Informal PDM deals with the personal relationships between employees, and between each supervisor and each subordinate.

European Countries (excluding UK), in contrast with Anglo-Saxon Countries, have traditionally given a greater emphasis on formal structures of PDM due to the greater diffusion of the first kind of rationale (the egalitarian one) and the vision of the relationship between workers and firms as a political struggle (Dachler and Wilpert, 1978)

b. Direct-indirect PDM

Direct forms of PDM allows members of the organisation to be involved without mediation in decision process by presenting their preferences, information, opinions to the other members involved in the decision. It is considered by the literature as the ideal form of participation as it represents the ideal of pure democracy. Otherwise indirect participation, that is a mediated involvement through some form of representation, is seen as an expression of compromise (Dachler and Wilpert, 1978) or a way to co-opt (Selznick) opposition.

c. Access to PDM

According to the literature, PDM is not a binary phenomenon but a continuum between no participation and full participation.

Typically the degrees of participation are conceived as follows:

(1) no advance information concerning a decision is given to employees: there is no possibility for the employee to influence the decision process or outcome

(2) employees are informed in advance of the decision to be made

(3) employees can express their opinion about the decision to be made

(4) employees opinion are taken in consideration in making the decision

(5) employees can veto a decision: a new party emerges and collective or individual bargaining and negotiation becomes necessary

(6) there is no distinction between managers and subordinates in making a decision: it is the case of complete power equalisation

d. Decision Issues of PDM

According to a part of the literature (Black and Gregersen, 1997) the decision issues are another dimension of PDM. These issues are typically ordered by importance: (1) work and task design (2) working condition (3) strategy issues (4) capital distribution and investment issues.

Locke and Schweiger (1979), even admitting that in many studies the specific content of the decisions is not specified in much details, consider the first two categories as the most involved in direct, voluntary and informal PDM while consider the others generally as object of formal and indirect PDM.

e. Decision Process
Even if it is the less examined dimension (Black and Gregersen, 1997) the degree of PDM can actually be influenced by the specific involvement in the decision process. The decision process is typically divided in the following phases: (1) identification of the problem (2) generation of the alternatives (3) selection of an alternative (4) plan of the implementation (5) evaluation of the results.
Margulies and Black (1987) have proposed an integration of the access and decision process dimensions. They actually underline that each phase can range from full participation to none: it is important to distinguish this, in order to examine the real differences of involvement in each decision process.

f. Duration
Cotton et al. (1988) include a final dimension: the duration of PDM examined. They note that several studies report results of short-term PDM experiments involving persons for a few hours or for a single meeting or a few days. It is reasonable to presume that participants in short-terms PDM may have less commitment than in long-term PDM. The literature on the correlation between PDM and effectiveness seems to agree that short-term PDM has zero or low effect on performance (Cotton et al. 1988)

A.3 Contextual factors of PDM

The adoption and effectiveness of PDM depends on several contextual factors that can be divided between individual and organisational factors (Locke and Schweiger, 1979)

a. Individual factors
Knowledge. PDM is considered to be more effective when participants have the noteworthy knowledge to contribute to the specific decision process. If only one member, the leader, has the necessary knowledge to make the decision, PDM could be a waste of time and dangerous for the decision quality. De Vries *et al.* (1998) indicate the short tenure, the lack of expertise and skills as variables that influence the *need for supervision* of the subordinates.
Motivation. Not all employees want PDM: that is "PDM may not satisfy or conversely, directive leadership may not dissatisfy, employees who do not want or expect PDM, who lack independence and want to be told what to do" (Locke and Schweiger, 1979). Among these employees, literature distinguishes those who are not used to PDM (but the repeated experience may reverse this situation) and those with low commitment to organisational goals, low job involvement. Finally motivation and current beliefs on PDM are affected by past behaviour and past outcomes of PDM (Magjuka, 1989). Thus, motivation (or de-motivation) in PDM seems to follow a positive feedback logic, that is the more successful PDM is experienced the more there is motivation in PDM.

b. Organisational factors

Task attributes. Complex unstructured tasks are generally associated with a higher need for PDM because of the increased knowledge requirements. Those who perform routine tasks however could become more committed with the introduction of PDM, while who performs complex tasks can be intrinsically motivated.

Group characteristics. Locke and Schweiger (1979) find two possible dangers in group participation: an increase of conflict (personality clashes) and group pressures to conform (groupthink). "Groups can be just autocratic as supervisors" (p. 321). Dachler and Wilpert (1978) add that group participation can involve changes in the degree of risk taking. These group characteristics can lead to delays and poor decision quality. Group characteristics then can affect individual perception of PDM. According to Salancik and Pfeffer (1978) and their Social Information Processing model, needs and attitudes are socially constructed explanations of behaviour: thus, organisational context, collective beliefs about PDM, collective experiences and interpretations of it shape the attitudes, needs and beliefs of members about PDM (Magjuka, 1989).

Leader attributes. The importance of leader's role in both formal and informal PDM has been widely recognised. Formal structures of PDM need, for their success, the support of all levels of management. Leadership styles, ranging from autocratic to democratic) are obviously important in the practice of informal PDM too.

Other organisational factors. Organisational or group size is considered a constraint for PDM. An increase in the number of participants leads to an exponential increase of the number of interactions: this slows the decision process and increases the problems of co-ordination.

Pressure for an immediate decision is negatively correlated with PDM because it is generally considered a time consuming decision process.

Finally PDM can be useful for organisational change because it reduces resistance to change and involves different expertise. Traditional recognised losses of PDM in the design of change are the waste of time and the compromises among efficiency goals and stakeholders interests.

A.4. PDM and communication: organisational perspectives

Participation and communication are correlated concepts in organisational theories: the more the communication (amount, social range, double directionality, freedom of speech, supervisor's openness) the more the participation. This view is consistent with the statements of two institutional economists, the firsts to began to integrate language in Economics: Hirschman's *Exit-Voice-Loyalty* model (1970) individuates three main behavioural patterns: *exit* is the option that economic agents choose when they want to give up a relationship (for example when consumers change products, firms change suppliers, workers change firm); *voice*, otherwise is the expression of the complain, the engagement of a discourse with others to better the situation, while *loyalty* is the behavioural pattern facilitating voice. In other words communication and freedom of speech means participation. Similarly Boulding (1974) states that "communication can only take place among equals", that is, communication is a process of mutual acknowledgement of the other.

In next paragraphs (following the trace of Euske and Roberts, 1987) we highlight the main communicational aspects that influence PDM in the major organisational theoretical frameworks.

a. Classical Organisation Theories

Scott (1992: 22-25) articulates three major definitions of organisation, each of that corresponds to a different theoretical framework. Classical theories (including Taylor's scientific management, Weber's bureaucracy and Fayol's principles of administration) see organisations as "collectivities oriented to the pursuit of relatively specific goals and exhibiting relatively highly formalised social structures".

The need for communication in such organisations is the need for control and for the rational management of resources. The only legitimate patterns of communications are the formal ones and behaviour must research a strict adherence to formal control systems such as rules, work standardisation, supervision.

The direction of communication is mostly vertical: downward communication transmits orders, instructions, sanctions and rewards (consistently with the hierarchical principles of formal authority and separation of decision and action); upward communication has the function to report the situation to higher levels, to notify gaps between the plans and the actual situation and to ask for the intervention of the boss in situations that goes beyond the formal authority assigned to the communicator. Only Fayol allows the design of lateral patterns of communication in the case it is necessary to raise the efficiency of communications with staff units.

The patterns of communication are steady and designed to reach the efficiency.

PDM in such organisations seems to have no (or very little) space.

b. Human Relations approach

Following the work of Scott (1992) Human Relations theories adopt a natural system approach and a consequent different definition of organisations: "Organisations are collectivities whose participants share a common interest in the survival of the system and who engage in collective activities, informally structured, to secure this end". These theories (including works of Mayo, Roethlisberger and Dickinson, Maslow, Argyris, Likert, Herzberg, McGregor) focus the attention on human relationships in organisations because, according to them, it's the informal structure of roles and relationships that emerge among individuals and groups that shape organisational activities and goals.

The attention is shifted from formal to informal communication both vertical and horizontal. The effort of these theories is to legitimise a human-centred work organisation in which management has the role to emphasise the independence, responsibility and growth of individuals through open, trustful and supportive communication. PDM is therefore one of the goal that communication in natural systems is conceived to research (Euske and Roberts, 1987).

c. Behavioural Decision Theories

Behavioural Decision theories are based on the hypothesis that individual and group decision making is not so rational as supposed in neo-classical theory of Economics. The main representatives of this approach (Simon, March, Cyert) argue that decision is a complex process and not a simple choice between given alternatives and preferences. Individuals and groups, facing a decision to make, are unable to obtain all the available

alternatives, not either the prediction of the consequences of each alternative. Furthermore, preferences and criteria are not well defined and steady. The rationality of agents is therefore bounded and not absolute. Rather than optimal solutions decision-makers are satisfied by reaching for satisfactory solutions.

Organisation structures, through the definition of roles, goals, sub-goals, procedures, communication channels, are seen as means to reduce the range of available options in order to simplifying the decision making process. Members, while processing it, regard information according to their view of (or attention to) the organisational goals; hence what they transmit to others are not simply information but their inferences. These processes, while simplifying decisions and reducing uncertainty, however lead to the generation of incomplete information that affects decision making.

Psychological studies on communication in decision making (Euske and Roberts, 1987) focus on the cognitive aspects of information processing, like perceptions and information overload.

d. Systemic approaches

The third definition of organisation that Scott (1992) identify is that of the open system perspective:

"Organisations are systems of interdependent activities linking shifting coalitions of participants; the systems are embedded in – dependent on continuing exchanges with and constituted by – the environment in which they operate".

We distinguish two systemic approach in the field of PDM: Contingency Theories and Socio-Technical Systems (STS) approach.

According to Contingency Theories organisation structures and behaviours are dependent on the characteristics of the contingencies in which they operate. For example stable and simple environments allow the survival of mechanistic structures like the organisations theorised in the classical approach. Uncertain, complex environments, otherwise, lead to the structuration of *organic* (Burns and Stalker, 1961), complex and flexible organisations. In the same way the adoption of routine technologies lead to standardisation of activities and rigid hierarchical structures, while non-routine technologies rely more frequently on informal communication networks and decentralised decision making. In substance, there is no best way to organise work (as in classical theories) but a best solution in each contingent situation. Organisations' information processing ability must fit with the variety of the contingencies, as stated by the law of requisite variety (Ashby, 1956).

Mechanic organisations have hierarchical communication patterns with a top-down decision structure: managers restrict behaviour, decision making and freedom of expression of lower participants. This communication structure reflects the existence of a stable environment and a consequent lower need to adaptive behaviours. Otherwise in organic organisations "centers of control, authority and communication are problem-specific and contingent upon where the expertise resides to solve a problem" (Courtright et al., 1989).

Also the Socio-Technical Systems approach starts with the assumption that organisations are open systems and that there is no one best way to organise work. Like in System Theory organisations possess the property of *equifinality* that is they may achieve a result (equilibrium) from different initial conditions and in differing ways (Emery and Trist, 1960). In other perspectives technology is a "given" assumption while for STS there exists an element of choice in designing a work organisation:

technology and social system must be left free to mutually influence each other in order to reach an equilibrium: the self-organising and self-management structures – according to this theory – show a superiority over the conventional coercive structures. "A sociotechnical theory of the efficacy of autonomous work groups is based on the cybernetic concept of self-regulation. The more the key variances can be controlled by the group, the better the results and the higher the member satisfaction" (Trist, 1981).

In self-management teams, team members have decisional autonomy, accountability for results and control of activities traditionally reserved to managers. The design principle of self-management is that "the responsibility for control and coordination is located at the level where the work is actually done" (Purser and Cabana, 1998). Managers adopt consultative communication forms and all knowledgeable members participate in decision making.

e. Network perspective

Organisations, according to this approach, can be seen as a set of inter-related nodes. The key issue of Social Network Analysis (SNA) is that "rather than focusing on attributes of autonomous individual units, the associations among these attributes, or the usefulness of one or more attribute for predicting the level of another attribute, the social network perspective views characteristics of the social units as arising out of structural or relational processes or focuses on properties of the relational systems themselves" (Wasserman and Faust, 1994).

Applying SNA it is possible to identify the communication network of an organisation. The more this network is dense (and the more nodes are interconnected) the more the organisational communication bypasses the formal hierarchical structure of communication and the more the organisation is considered democratic. Actually participative networks are expected to build patterns of communication that are alternative to the network of reporting relationships.

Structural equivalence could also be a useful measure for analysing the constrains to PDM. For example Rice and Aydin (1991), adopting a Social Information Processing approach (Salancik and Pfeffer, 1978), consider structural equivalence a form of group pressure: "Two individuals may have similar attitudes, not necessarily because they are linked with each other but because they are linked to similar others" (p. 225)

Krackhardt (1994) proposes a measure of graph (network) hierarchy based on the mutual reachability (or reciprocality) of the nodes. The more the network is hierarchical the less it will include symmetric relationships. "An outtree (such as the organizational chart) is perfectly hierarchical. At the other extreme, if there is no status, then no graph hierarchy is likely to emerge in the informal relations" (p.97).

B. Participation in decision making in the CMC literature

Markus and Robey (1988) in reviewing the literature on the effects on Information Technology on organisational change propose a taxonomy of theories based on the nature and direction of causality. Markus (1994) applied this taxonomy to the social effects of CMC. They found three perspectives of structural causality:

(1) The Technological Imperative: Technology is an exogenous variable that forces or strongly constrains the behaviours of individuals and organisations (technology causes behaviour)

(2) The Organisational Imperative: Information processing needs of organisations, and managers' choices to satisfy them, determine the information technology adoption and use (that is actors rationally choice technologies that fit with their needs)

(3) The Emergent Perspective: the consequences of information technology emerge from complex social interactions (technology and behaviours are mutually affected)

In this review of the effects of e-mail on PDM we can adopt these categories. Specifically we concentrate our focus on direct and informal PDM.

B.1. Technological Imperative

a. Social Presence Model (SPM)

SPM is one of the earlier approaches at focusing the attention on the psychological effects of telecommunication. It was developed by Short, Williams and Christie (1976) and although it was originally intended to explain the advantages and disadvantages of videoconferencing systems, SPM has been widely applied in the CMC field.

The main assumption is that communication media can be ranked accordingly to the criterion of social presence transmitted. Social Presence has been defined as the feeling a person has that other people are involved in a communication exchange. Media with high social presence allow users to experience interpersonal warmth, friendliness, and satisfaction with the interaction.

Since e-mail doesn't support non-verbal codes such as facial expressions, dresses etc. it is expected to be low in the social presence: senders are not fully aware of the presence of an auditory. Thus the technology bandwidth has direct effects on behaviours: according to Short et al. (1976) lower social presence results in greater social influence. Later research (Reduced Social Cues Theory) however associated the low social presence of a medium with the low capacity to influence others, undermining what Short et al. (1976) had hypothesised (Spears et al., 2000).

b. Reduce Social Cues Theory (RSC)

This theory, developed in the mid '80 (Sproull and Kiesler, 1986; 1991; Dubrovsky et al. 1991; Hinds and Kiesler, 1995) and consistent with SPM, assumes that CMC strongly constrains the behaviour of the participants. The main assumption is that e-mail (and text based CMC) reduce the perception of the social context of the communicators due to its limited bandwidth. E-mail attenuates dynamic social context cues (non-verbal behaviour such as nodding or frowning for displeasure) and static social context cues (people and communication setting appearance). For

example, messages from unknown senders don't show cues about their geographical location, organisational department, hierarchical position, sex, age etc.

The hypothesis of RSC is that such a reduction of social cues provided by e-mail communication (in respect to face-to-face settings) has three main effects concerning PDM (Sproull and Kiesler, 1986; 1991; Dubrovsky et al., 1991):

(1) *people are relatively self-absorbed*. The relative anonymity provided by e-mail tends to produce self-centred behaviour (i.e. overestimation of own contributions and underestimation of others' messages). Thus the attention paid by the parties to social relationships and to supportive interactions is reduced (interactions are most task-oriented)

(2) *people's behaviour tends to become uninhibited and non-conforming*. People behave irresponsibly more in e-mail than in face-to-face (flaming)

(3) *perceptions of status differences are reduced*. Messages from superiors look the same as messages from subordinates; upward communication increases; differences between high-status group members and low-status group members in first advocacy are reduced.

(4) *The opportunities for new connection among people are increased*. E-mail offers equal chances to the networked individuals to access and be accessible to and by other individuals. A large part of information people exchange by e-mail is *new* information (it wouldn't be exchanged without e-mail)

An interesting study by Tan et al. (1998) tested the RSC findings adding the examination of status effects in different cultures (USA and Singapore). They found results consistent with RSC (CMC reduced status differences) and with Hofstede (1980) model of national cultures. Cultures with high power distance (the extent to which lower-status individuals of organisations in a country accept that power is distributed unequally) and with high degree of collectivism (the extent to which in that country the maintenance of harmony and relationships tend to prevail on the individualistic mentality) seem to have high status influence. CMC reduced status effects both in Singapore and in USA.

In the same set of experiments Tan et al. (1998b) tested the other form of authority that undermine full PDM: group pressure. In the RSC majority influence can be alleviated by CMC in two ways: reducing the ability of the majority to influence minority (verbal and visual cues can exert conformance pressures) and raising the ability of the minority to challenge majority thinking (Tan et al., 1998b: 1265-1266): for example the lack of verbal and visual cues can reduce the stress by evaluation. Like in the other article the research tested the role of national culture in PDM: the results confirm that CMC raises PDM mostly in the individualistic culture. Majority influence therefore is strongly affected by national culture.

B.2. Organisational Imperative

a. Media Richness Theory (MRT)
This theory is similar to SPM but has its roots in the Contingency Theory perspective. As seen above, for this view organisations must adapt to their environment. In other words they must understand their environment through information processing activities. The more information is equivocal or uncertain, (due to the variety and variability of the environment), the more organisations must

develop information-processing capabilities, and in order to do this, they must adopt complex structures of communication.

In the same way the members of the organisations must research the fitness between their information requirements and communication channels (Daft and Lengel, 1984). The more the complexity (variety) of the information needed, the more capable the medium used. Member, rationally, adopt the technology that fit with their task. Each medium differs in feedback ability, communication channel capability, source and language. These features determine the media richness. Media Richness Theory says that richer media have high feedback capability, support the transmission of several cues, the source of the message is human and the language used has high variety (can express a wide range of ideas). Daft and Lengel (1984) ranked each medium accordingly with these criteria. From the richest to the lowest they individuated: FtF, telephone, written personal papers, written formal documents and finally numeric formula. E-mail is expected to be a poor medium because allows slow feedback capability and transmit only text-based cues. Thus for MRT, organisational members use richer media to face complex situations, reduce equivocality of information and increase co-ordination and task performance.

From a hierarchical point of view, middle and top managers have to face increasingly levels of equivocality and uncertainty. As we raise the hierarchical ranks we meet roles that are more and more in contact with the environment (the "source" of uncertainty and equivocality). Lower-level participants otherwise face with more routine tasks and defined goals and technologies. For MRT these members therefore are expected to use poorer communication media.

However it is questionable if an increase in the amount of cues and language complexity leads to a reduction of equivocality and uncertainty of information and thus to better decisions.

B.3. Emergent Imperative

In this category we include all the theories that view the effects of technology as emerging unpredictably from complex social interactions (Markus and Robey, 1988). According to this view "[organisational] members influence and help shape each other's perceptions and use of media" (Contractor et al., 1996). Thus media, in this perspective, are not inherently rich or poor, with high or low social presence, democratic or not. I have found five main theoretical approaches in this category.

a. Walther's Social Information Processing Theory (SIPW)
The label Social Information Processing (SIP) had already been utilised by Salancik and Pfeffer (1978) to name their model of group pressures. Fulk (1993), accordingly with this approach, proposed that media choice depends on the socially constructed perceptions of utility of the medium. Walther (1992; 1995) doesn't follow this stream but builds its own (the label SIPW has been created in order to underline the difference with the SIP model).
SIPW's main hypothesis is that, in contrast with previous theories "the difference between FtF and CMC is a question of rate, not capability" (Walther, 1992). The problem with the experiments assessing the effects of CMC is that they involve for a short time zero-history, virtual groups, with no anticipated future interaction. The

underlying social processes in FtF and CMC settings are the same, but the limited bandwidth of CMC retards the relational development.

"Given sufficient time and message exchanges for interpersonal impression formation and relational development to accrue, and all other things being equal, relational (communication) in later periods of CMC and face-to-face communication will be the same" (Walther, 1992).

All the social relationships that, for RSC researchers, CMC tends to reduce, in the SIPW perspective develop as the time goes by. Sensations such as immediacy, affection, similarity, attitude likeness, interest in deeper relationship, composure, informality grows along with message exchange. Only longitudinal studies can witness this phenomenon.

PDM is conceptualised by Walther (1995) as co-operation and mutual respect. As the other social factors, PDM, given an appropriate period of message exchanges, is expected to be the same in CMC and FtF settings. The experiment presented (1995) confirmed this hypothesis and individuated more initial dominance (in period 1) in the CMC setting.

b. Social Identity Model of De-Individuation Effects (SIDE)

SIDE (Spears and Lea, 1994; Postmes et al., 1998; Spears et al., 2000; Rogers, 2001) is a model derived from Social Identity Theory that directly criticises the main assumptions of RSC. SIDE refuses the idea that e-mail communication is in some ways less social than FtF communication. Spears et al. (2000) distinguish two different social cues: interpersonal (that identify and individuate communicators) and cues to social features (such as group identity and category membership). While the firsts in some extent can be filtered out by e-mail systems, the latter types of cues, "that are communicated relatively independently of bandwidth considerations, are thereby given more opportunity to influence interaction, and the definition of the self and situation". Thus, factors such as the relative anonymity (due to the reduction of interpersonal cues) of e-mail communication, group immersion and computer interaction (the factors traditionally causing de-individuation) are not a source of unregulated behaviour, polarisation or status equalisation. De-individuation factors "can actually reinforce group salience and conformity to group norms, and thereby strengthen the impact of a variety of social boundaries" (Postmes et al. 1998: 697). As Rogers summaries: "the relative anonymity provided by text based CMC can actually increase attention to the salient social identity and norms". E-mail use and PDM therefore are not deterministically resulting from e-mail characteristics but are socially defined in the context. Normative influence is effective only if a social identity prevails the personal identity of each group member. In this case anonymity enhances the salience of group identity through de-individuation. In the other case, group norms are not socially accepted and anonymity offers the opportunity to resist to these norms. The behaviour emerges from the social context.

The same results have been achieved in a research by Weisband et al. (1995). After three differents experiments the authors found that high-status members participated more in the decision process than low-status members in every situation (CMC or FtF, majority or minority). The explanation is that people, even in computer-mediated settings, are able to categorise others as members of different status groups (high or low). This categorisation creates bias in favor of in-group members and against out-group members. The relative de-individuation of the members of the out-

group (e.g. low status members) facilitated the development of negative evaluations by high status members: "If group status differences are strong and salient, as they are in some organizations, status differences will persist or even be magnified, and unique personal information about people will be made less salient, when communication is computer-mediated" (Weisband et al., 1995: 1147).

c. Adaptive Structuration Theory (AST)
DeSanctis and Poole's AST (1994) is an approach consistent with Giddens' Structuration Theory. The authors' goal is to integrate the rationalist assumption of the task-technology fit (as in MRT) with the institutional and social constructivist view of the relationships between social practices and technology. "AST provides a detailed account of both the structure of advanced technologies as well as the unfolding of social interaction as these technology are used" (p. 125).
Advanced technologies (and CMC technologies) have structural features (rules, capabilities, variety of possible implementations) and a "spirit" (a concept derived from Gidden's "legitimation": the normative frame, the designed use, "the official line which the technology presents to people regarding how to act when using the system"- p. 126). Structural features and spirit are the structural potential of the technology, which structuration designers intended to produce. Other sources of structure are the organisational environment, the task and other contingencies. The actual structuration of the technology, that is the degree and the way of appropriation of it, is not a deterministic result but an emergence of the course of social interaction. Thus, if the spirit and structural features of e-mail could be intended as facilitating democratic processes (thanks to the potential increase in reachability, information exchange, openness) the social context of the organisation can undermine this potential kind of appropriation.
Zack and McKenney (1995) merged the AST perspective with SNA studying two newspapers organisations with different cultures and structures: one was flexible and with an organisational climate that supported open and frank communication, the other was more rooted in its formal hierarchy and less open to the sharing of information. The authors compared the structures of FtF and e-mail communication for similar tasks in the two organisations: the results show that there are no differences among the electronic communication network and the FtF network in each organisation. The democratic organisation showed higher network density than the other organisation. The less participative organisation otherwise showed no real differences with the introduction of the e-mail system. Even if establishing new communication links via e-mail was perceived easier or more convenient, members of the organisation refused to increase the interaction due to political, personal or normative reasons: "E-mail provides the ability but the social context provides the willingness" (p. 417).
Contractor et al. (1996) examined in which ways individuals influence others' perceptions of media use. The experiments involved 30 Group Decision Support System (GDSS) groups and 25 non-GDSS groups over a three weeks period. The result is that social influence is a better predictor of individual perceptions rather the individual or media attributes. PDM in this study can be reconnected, is some way, to the measure of the post-meeting perception of the extent in "hesitating presenting ideas". While gender, age, computer and typing skills showed no significant correlation, the perceptions of the structures-in-use was affected by other members'

perceptions of the structure-in-use. Members using GDSS didn't influence each other more than members without GDSS.

d. Social Network Analysis (SNA)

As seen in paragraph A.4.f, SNA is an effective means for the study of organisations. Eveland (1993) complains that SNA is not so much adopted as needed, especially in the field of Computer Supported Co-operative Work: "Network analysis would seem to be an obvious tool in understanding systems in which the communication/cooperation dimension is by definition a major part of the emphasis. Unfortunately, network analysis remains a rather arcane discipline, rather than making its way into the general tool repertoire of social analysts."

Garton et al. (1997) underline that research shouldn't concentrate on the study of technical attributes of communication media (as in the deterministic theories of CMC). SNA, focusing on the relationships between actors, is a powerful instrument for emergent perspectives: SNA has been adopted for the integration of several social influence theories: Social Information Processing (Fulk, 1993; Rice and Aydin, 1991), critical mass, AST (Zack and McKenney, 1995).

One of the first studies dedicated to CMC adopting the SNA perspective is offered by Eveland and Bikson (1989). They compared four groups in two conditions (CMC and FtF) for a yearlong project. Their findings are that the CMC network has higher density than FtF network, but that e-mail doesn't substitute other media: on the contrary e-mail increases the use of traditional media. Participation is higher in CMC settings than FtF and leadership roles (measured by the centrality formula) emerge flexibly in electronic networks: in FtF networks leaders are more stable. Recognition, reciprocal acknowledgement and communication increase over time in electronic networks.

Freeman (1997) provides another application of SNA to e-mail networks. Traditional measures of the degree of hierarchy of networks are based on the asymmetry of the interactions. If node A has a directed tie to node B and not vice-versa then there is a hierarchy from node A to B. Freeman, analysing a communication network in a mailing list (thus calculating the exact amount of messages exchanged and in which directions), integrates the asymmetry measures (resulting from a n x n matrix) with the *canonical analysis of asymmetry*. The result is a vertical projection of the order of the nodes' power.

Burkhardt and Brass (1990) applied SNA to study the effects of a change in technology (a new computer system) on the centrality on individuals. They found that early adopters of the technology acquired the necessary expertise to cope with the change and therefore they gained more centrality and power. In conclusion the authors argue that change in technology provide the occasion for new communication structure (in this case the network became more interconnected). The diffusion of the technology occurred coherently with the structural patterns of interactions and structural equivalence measures.

e. Systemic approaches

In reviewing systemic literature about e-mail I found three main approaches: one of this is the above mentioned (B.2.a.) Media Richness Theory (MRT) which *is* a systemic theory because its fundamental hypothesis (the necessary fitness between medium and task) is rooted in the Contingency Theory (Galbraith, 1987) and in the

first-order Cybernetic Theory (Ashby, 1956). However, as seen, this theory belongs to a rationalist (and deterministic) perspective because states that human actors rationally select the technology appropriate to the situation.

The second is the Socio-Technical Systems approach (highlighted in A.4.d.) which essentially is a participative method for designing technology according to the social system. Social and technical systems actually mutually influence each other to reach an equilibrium. However, in the e-mail field, I haven't found more than the recommendation to explicitly direct the social design rather than accepting the implicit social design caused by a change in the communication system (Kling and Jewett 1994).

Finally the third systemic theory is *Complexity Theory*. This theory can be clearly considered as belonging to the emergence perspective.

More and more organisational scholars recognise that organisations can be interpreted as complex adaptive systems. This trend mostly derives from the acknowledgement that several organisational phenomena "appear the result from a multitude of factors that are highly interconnected, often via complex, non-linear, dynamic relationships" (Contractor et al., 2000). For Complexity Theory these complex interactions lead to the creation of coherent and unexpected collective phenomena, the so-called emergent properties of the system. These properties, as in a holistic perspective, can be described only at higher levels than that of the individual units: the whole is more than the sum of its components.

Emergence occurs in complex systems through the self-organisation of their parts. That is, the overall structure, its proprieties and behaviour are built from the bottom-up rather than hierarchically. This is the same point of view of SNA scholars that are aware that "contemporary organizations are increasingly constructed out of emergent communication linkages, linkages that are ephemeral in that they are formed, maintained, broken, and reformed with considerable ease" (Monge and Contractor, 2000). The self-organisation of complex adaptive systems can be considered a proxy for organisational participation.

One author that applied these concepts is Kuwabara (2000) in his study on the Linux project. Linux is an open-source Operating System (OS), that is a free software whose source code is freely accessible to developers. The first Linux "kernel" (the basic structure) was created in 1991 by the 21 years old Linus Torvald, a student of the University of Helsinki. Torvald belonged to a mailing list for Minix (another OS) users and developpers. In the August 1991 he announced his work in the list and invited the developers' community to join him in the creation of a free open-source Unix-based OS. The community responded enthusiastically (and this can be understood only with the hacker philosophy against ownership rights) at rates increasing exponentially over time. According to some estimate the project involved over 40.000 persons from about 90 countries and all of them co-ordinating via e-mails and without a centralised authority. "In the case of Linux there has never existed centralized organization to mediate communication between Torvalds and the thousands of contributors, nor are there project teams with prescribed tasks and responsibilities, to which individual contributors are specifically assigned. Instead, from the beginning, it has been left to each person to decide what to work on at the moment, even at the potential risk of coordination difficulties" (Kuwabara, 2000).

The processes that created the order, an order self-imposed from the bottom up, were the spontaneous creation of teams on specific task, the modularity of the tasks and the self-selection:

"If there is something that needs to be done, one of us simply steps forward and does it. Given the entire community, he might not be the absolute best person to do the task technically, but if we see that he is doing the job well, we continue to send him patches and assure him credit for his efforts because we know that he is a volunteer like the rest of us." (Anonymous interview, Kuwabara, 2000)

Nobody could know where the system was going to. Torvald had only one power over the others: to accept or not to insert a new code in the kernel. But all the rest was self-organising.

"Well, I've put in a lot of work, and that's really what the thing has been all about: everybody puts in effort into making Linux better, and everybody gets everybody else's effort back. And that's what makes Linux so good: you put in something, and that effort *multiplies*. Essentially, in game theory terms it's not a "zero-sum game" at all: it's a positive feedback cycle. (Linus Torvald, FirstMonday, 1998)

The results are surprising: despite the complexity of the structure, the size of the project and the rate of development (more than 90 versions in three years) the project yielded a software that experts judge, in many aspects, better than other commercial operating systems. Worldwide users were about three millions in 2000.

In the Linux case PDM was allowed by the e-mail but, differently from structured development projects, emerged from the social relationships of the hackers community (in which there were no formal status differences – only differences in expertise and efforts- and the participation in the project was intrinsically motivating).

However scholars complain that often system theory is used as a metaphor than an instrument of analysis. Simulation models attempt to solve this problem. In Complex Theory simulations are artificial systems based on some rules in which decision units operate autonomously. By observing the evolution of the systems we can analyse the emergence. Contractor et al. (2000) applied Complex Theory to build a simulation of the self-organising processes that shape the emergence of communication networks in organisations. They describe their study as "an early and tentative first step in response to the call by complexity theorists to move from an era of hand-waving about the virtues of complexity theory to actually attempting a field study that upholds many of the unique features that characterize complexity theory: multiple theoretical mechanisms, non-linear dynamic relationships and sensitivity to initial conditions" Contractor and colleagues individuated seven exogenous mechanisms that influence the emergence of communication networks: supervisor-subordinate relationships, peer relationships, spatial proximity, adoption of e-mail, workflow, friendship and common activities foci. The three endogenous mechanisms are: transitivity, group cohesion and structural holes. The authors individuated the effects of each of these mechanisms on communication network and operationalised them. Then collected data from a Public organisation in a longitudinal study. Finally introduced the initial data (at time zero) in the simulation software and compared the actual and simulated evolution of the communication network. The results indicate that two exogenous mechanisms (superior-subordinate relationships and spatial proximity) and two endogenous ones (transitivity and group cohesion) were found to significantly influence the emergence of the communication network. The adoption of e-mail however (whose effect was considered to be an increase in communication thanks to the new opportunities for cross-boundary and

asynchronous communication) not significantly contributed to the emergence of the communication network.

Table 1 – PDM in CMC: operationalisations and results

Study	Degree of PDM operationalisations	Sample	Duration	Task	Methods	CMC=+PDM?
Sproull and Kiesler (1986)	*Absorption effects*: length of message salutations and closing; difference between estimates and actual message volume *Status equalisation effects*: by asking what medium individuals would choose to communicate with the boss in particular tasks. *Uninhibited behaviour*: text analysis, how much flaming experienced	96 Professionals, technical, clerical and managerial individuals from a Fortune 500 firm	Analysis of e-mails in the 3 days prior to interview	Preference tasks	Questionnaire Text analysis interviews	YES
Dubrovski et al. (1991)	*Uninhibited behaviour* = n° socially deviant remarks *Participation rate = % total remarks* *Advocacy* = n° explicit decision proposals *First advocacy:* n° of first advocates per discussion *Influence of first advocacy:* if the first advocacy actually influenced the decision *Choice shifts* = difference between pre-discussion preferences and group decisions *Attitude polarisation* = difference between average pre-discussion preferences and average post-discussion preferences	24 MBA students vs. 72 college freshmen	15 min. for each decision one shot sessions	Choice dilemmas with no correct solution (preference tasks)	Experiment	YES
Tan et al. (1998a)	*Perceived influence*: average of results from questions concerning opinions on who mostly influenced decisions *Sustained influence* (status influence without the presence of high-status members): difference between the post-meeting decision of low-status individuals and the decision during the meeting. *Status influence*: differences between initial and final decisions and role of high status members	Undergraduates and confederate undergraduates 48 groups in Singapore and 45 in USA (each group 5 persons)	One shot sessions	Both intellective and preference tasks	Experiment, questionnaire	YES
Tan et al. (1998b)	*Majority influence(1)* : n° of rounds to reach consensus (that is the majority decision) *Majority influence (2)*: n° of challenges to the majority position	Undergraduates and confederate undergraduates	One shot sessions	Both intellective and preference tasks	Experiment, questionnaire	YES
Walther (1995)	*Dominating messages* = ?	96 Undergraduate students	5 weeks	Preference tasks	Experiment in three periods	NO (in periods 2-3 PDM was equal in CMC and FtF)
Zack and McKenney (1995)	*Openness of communication* = self report measures from questionnaire *Information sharing* = self report measures from questionnaire	Managers and employees of two daily newspapers (one group 14, the other 15 members)	Several observations if daily news editing process	News editing tasks (both preference and intellective tasks; high task interdependence)	Case study with Questionnaire, interviews, tests	NO (in democratic and hierarchical organisations maintain same patterns of comm. in CMC and FtF)

Freeman (1997)	*Asymmetry in communication*: binary n x n matrices and Grower's canonical analysis of asymmetry	7 scholars	18 months	No specific task (mailing list)	Analysis amount of e-mails	-
Weisband, Schneider, Connolly (1995)	*Participation* = n° individual remarks / n° group total remarks; Gini coefficient *Group influence* = choice shifts (the absolute difference between the pre-group preferences of individuals and their group decision) *perceived goup influence*: self-report (questionnaire)	41 MBA students, 18 undergraduates	1 hour sessions conducted over 2 weeks	Ethical decision tasks (preference tasks)	Experiments, questionnaire	NO
Lea and Spears (1991)	*Polarisation*: associated with amount of word exchanged, length of messages and number of remarks *Equality of participation*: deviation of the n° of words sent by participants and the average relative standard deviation of subjects' participation rates	48 first year psychology students	10 minutes for each discussion	Social dilemmas (preference tasks)	Experiments Pre and post-meeting questionnaire	NO (more polarisation and inequality in de-individuated groups)
Eveland and Bikson (1989)	*Leadership* = a function of integrativeness and betweenness indices	40 Retired and 39 not yet retired managers and professionals	1 year	project	Network analysis, Questionnaire	YES
Hinds and Kiesler (1995)	Measures of vertical and lateral communication through different media	33 technical and 55 administrative employees	2 days of observation	Technical empl.: complex tasks; administrative employees: routine tasks	Brief survey Diary of all communications, post-diary interview	YES (CMC enhanced cross-departmental communication)
Ahuja and Carley (1999)	*Degree of hierarchy*: see Krackhardt (1994) *Centralisation*: the extent to which a network is organised around its most central point *Hierarchical levels*: see this article	11 faculty, 25 students, 8 staff, 18 researchers, 4 others	3 months	Design; resource management; group maintenance	Analysis of e-mails and questionnaire	? Virtual org. with hierarchical communication patterns
Hedlun et al. (1998)	*Participation*: n° of messages (?) *Team informity*: level of information on the problem compared to the whole information needed *Staff validity*: staff recommendations compared to the right solution *Hierarchical sensitivity*: leader's ability to weight the opinions of staff members *Team accuracy*: difference between actual and correct decisions	256 undergraduates; 4 members each group; 32 CMC and 32 FtF	2,5 hours	Intellective task	Experiment	YES (in CM groups members had more equality, leaders had more hierarchical sensitivity)
Bishop and Levine (1999)	No operationalisation. The case study's aim was to analyse the impact of the online bulletin board system (BBS) on the relationships between management and employees and among employees. The main research question is: is CMC effective voice?	17 interviews, analysis of hundreds of e-mails from uncounted employees	3 years	No specific task	Case study: Interviews, data from online e-mail archive and BBS, internal and public docs.	YES and NO (collective bargaining power increased but management openness is judged apparent)

C. CMC, PDM and Task

Task attributes and PDM, from a contingency point of view, are strictly related: "The fundamental idea is that the more uncertain the task, the more information must be transmitted among the people who are performing it. […] As organizations perform more uncertain tasks, they need either to increase their capacities to process information or to eliminate the need to process information by making subtasks more independent." (Galbraith, 1987: 346). From a network perspective the more complex the task the more dense the network of communication among members involved. Complex tasks thus would require all-channel structures (in which every node is linked to all the others) while simple or routine task may deploy the formal structure of communications.

Task complexity is therefore an attribute correlated with dimensions such as task variety, task interdependence, task uncertainty, task analysability. Furthermore more complex tasks are difficult to control by the supervisor (due to the less analysability and the diverse skills required) and this enhances decentralisation.

Ahuia and Carley (1999) applied SNA to test the supposed fitness between task and structure in the Soar Group, an organisation devoted to research and design in the field of Artificial Intelligence. Soar Group has been defined a virtual organisation because it has not a single shared physical setting, it involves researchers and developers from several universities and corporations in different geographic areas, and its members interact mostly electronically. The authors identified three main categories of tasks in the organisation: design, group maintenance and resource management. Then they analysed about one thousand of e-mail messages and assigned each message to each task category (many messages resulted to belong to more than one category); they calculated three SNA measures: centralisation, degree of hierarchy (Krackhardt, 1994) and a measure of hierarchical levels. Finally they collected (through a questionnaire) the members routiness perceptions as well as performances of different tasks. The routiness was mostly associated with the resource management task, while design was indicated as the least routine task. However all the SNA measures indicate that members in all the three categories of task adopted hierarchical patterns of communication. These results seem to undermine much of the contingency model but authors have another explication: Soar Group is composed of a small number of specialists and experts, then the inquires of participants are all directed to these individuals: "once certain people has been identified as possessing specific types of information or knowledge, the group members had the tendency to direct suitable inquires to those individuals directly". And "our results suggests that virtual organizations may well be non-hierarchical and decentralized from an authority standpoint; however, from a communication standpoint they may still be hierarchical and somewhat centralized" (Ahuia and Carley, 1999).

Another study analysed the role of task attributes in CMC, that of Tan et al. (1998a; 1998b). They follow the McGrath (1984) classification of task. McGrath individuates group tasks accordingly with four activities:

(1) To generate: planning tasks (generating plans for action) and creativity tasks (generating ideas)

(2) To choose: intellective tasks (solving problems with a correct answer or guidelines to proceed) and decision-making tasks (the group task is to select a preferred alternative, there is no correct answer)

(3) To negotiate: cognitive conflict tasks (resolving policy conflict) and mixed-motive tasks (negotiation, bargaining and coalition formation tasks)

(4) To execute: this category deals with physical behaviour: contests tasks (tasks for which a group is in competition with an opponent) and performance tasks (tasks that do not involve competition but involve striving to meet standards of excellence)

Tan et al. (1998a; 1998b) focused their attention to intellective and decision-making (or preference) tasks in an experiment of group decision-making in CMC settings. The underlying assumption is that preference tasks (the decision task with no correct answer but only the preferences of the participants) in CMC settings are more likely than intellective tasks to enhance status or group influence. "Status influence is normally applied by exchanging normative information (e.g., personal preferences of higher status individuals) rather than factual information. Hence, when groups exchange factual information to solve intellective tasks, higher-status individuals may have greater difficulty in exercising status influence. But when groups exchange normative information to solve preference tasks, higher-status individuals may have ample opportunities to exercise status influence" (Tan et al., 1998a). Results supported this hypotheses and revealed that e-mail exercised relevant influence in reducing status effects (calculated as status influence, perceived influence and sustained influence – see Tab. 1) especially in the national culture which Hofstede (1980) classify as collectivistic and with high power distance.

Tan et al. (1998b) applied the same method to analyse the relationship between task type and majority influence. However this study found no significant correlation.

I've tried to make some comparisons with the other experiments found in the literature (see Tab. 1). The results are not conclusive. For instance Walther (1995) in his experiment used tasks such as choosing faculty-hiring strategies (preference task) or using a writing-assistance software for college papers (intellective task). The results are: higher dominance in CMC than FtF at period 1; equality of participation in CMC and FtF at periods 2 and 3. However Walther himself states that: "A multivariate analysis of variance showed no significant effect of tasks on relational communication variables [and among them dominance]" (1995: 194).

Zack and McKenney (1995) reported several task types (planning, idea generation, negotiation etc., those involved in the creation of the first page of a newspaper), among them preference and intellective tasks but there are no much details to make comparisons.

Hedlun et al. (1998) used intellective tasks in order to assess the team accuracy of decisions. They found that the leader's ability to discern valid from non valid members' recommendations is affected by the communication mode (e-mail enhanced this *hierarchical sensitivity* due to the reduction of social cues – see next paragraph and Tab. 1). Thus e-mail in intellective tasks would reduces the range of possible alternatives of the leader (because the leader increases his ability to weight more the members' valid opinions). However the acknowledgement of the validity of an option over another doesn't impede to a leader, in exercising the authority, to choose a less valid option in accordance with his/her preferences.

Sproull and Kiesler (1986), Dubrovski et al. (1991) (both studies belonging to RSC) applied preference tasks and found positive effects of e-mail on status equalisation. Lea and Spears (1991) and Weisband et al. (1995) (both studies belonging to the identity/categorisation framework) and Walther (1995) applied preference tasks in their experiments but found no or negative effects of e-mail on status equalisation or participation.

The other studies presented in Tab. 1 don't make more light on this argument because they do not specify the task types.

D. CMC, PDM and superior-subordinate relationships

As seen in A.2 PDM has several dimensions; one of this is the access to PDM. That is there are different levels of PDM accordingly to the degree of information given employees and the role of employees in the decision. Much of the degree of PDM thus is a consequence of the supervisor-subordinate relationship. Literature on leadership (Barrow, 1977; Stewart and Manz, 1995) individuates several types of leadership practices in the continuum ranging from entirely autocratic to purely democratic. Stewart and Manz (1995) crossed this dimension (autocratic-democratic) with the degree of leader involvement (highly involved or laissez faire). The result is the identification of four main leadership types: overpowering leadership (autocratic and active); powerless leadership (autocratic and passive); power building leadership (democratic and active); empowered leadership (democratic and passive). While passive but democratic leaders can lead to truly empowered teams (because the supervisory functions are carried out by team members themselves) the passive and autocratic leader is the opposite (Stewart and Manz, 1995). The lack of leader activity, leader's feedback, can increase status/cognitive distance, equivocality and a sense of powerlessness in the team: "A «hands-off» approach fails to cultivate skills required to team self-management. These skills include self-reinforcement, self-criticism, self-goal-setting, self-observation, self-expectation and rehearsal" (Manz and Sims, 1987).

One of the main aspects of the relationship between supervisor and subordinate for PDM is therefore openness. Openness can be seen from two points of view (Dansereau and Markham, 1987): openness in message-sending and openness in message-receiving. As Japlin (1979: 1204) states: "in an open communication relationship between superior and subordinate, both parties perceive the other interactant as a willing and receptive listener and refrain from rensponses that might be perceived as providing negative relational or disconfirming feedback".

Most of e-mail literature on openness deals with that in message sending from the lower-level participants (that is the supposed positive effects of e-mail on upward communication). We have seen that for RSC subordinates are more willing to participate in decision making because CMC suppresses the social cues regarding the status differences. Sproull and Kiesler (1986), for example, found that employees, when asked to choose among different media to accomplish different communication tasks, preferred e-mail for upward communication.

Less research has been employed to investigate the openness from the supervisor point of view, both in sending and receiving communication.

Mantovani (1994) for example critics the RSC perspective doubting that e-mail messages coming from lower participants would be considered more by supervisors than in FtF. In general it's the existing social contest (participative or autocratic) that shape communication relationships. "So, in CMC, freedom to enter the network is not necessarily equal to the possibility of gaining a real audience" (Mantovani, 1994: 53).

Hedlund et al. (1998) tested the decision accuracy of hierarchical teams (teams in which the final decision is made by the sole leader). According to their model the accuracy of the decision is affected by three variables: team informity, staff validity and hierarchical sensitivity (as seen in the precedent paragraph). Hierarchical sensitivity is the ability of the leader to recognise valid from invalid members' judgements. Thus it is a measure of how the leader takes into account some members over others. The authors argue that e-mail, reducing the social cues and the frequency of interactions, increases the relative number of task-oriented messages and the possibility to concentrate the attention on the validity of the members' recommendations. So the openness (in receiving communication) of the leader is intended as a function of the perceived validity of the messages of the subordinates. However this is a quite rationalist perspective.

Bishop and Levine (1999) present a case study on the consequences of a Bulletin Board System on employee voice. Employee voice essentially contains two elements (McCabe and Lewin, 1992): the expression by employees to management of their complaints in a work-related context and the PDM to change the situation. Thanks to the BBS (as we will see in the next paragraph) the expressions of complaints (upward communication) increased: in the Hirschman's model (1970) employees chose the option "voice" (that is the complaints, with the hope to change the situation) rather than "exit" (leaving the organisation). The results were controversial: while in some cases the complaints were so wide that management couldn't oppose anything, in other cases the voice remained unlistened and the employees council didn't participate in decision making. The authors suggest that management's aim, creating the online BBS, was to create the illusion of voice.

Thus the pre-existing social system can undermine the supposed democratic features of CMC. Another factor that has the same role is information overload. From a systemic perspective information overload results from the inability of the system to process excessive amounts of information in the given time. For the Behavioural Decision Theory (A.4.c.) "information overload may result from the interaction of high information loads, high task complexity and the limitations of the human information processor" (Grise, 1999/2000). The main effects in a electronic context (Hiltz and Turoff, 1985) might be: individuals fail to respond to certain inputs; respond less accurately than they would otherwise; respond incorrectly; store inputs and respond to them as time permitted; systematically ignore (filter) some features of the input; reduce the inputs in a more compact or effective form; quit (in extreme cases). Thus information overload can affect negatively the openness in receiving messages and consequently PDM.

Sproull and Kiesler (1991) in their example of the BBS of Tandem Corporation reported the increased ability, for members, to cross organisational boundaries to reach the right person with the necessary knowledge. However they reported also the "down side" of this new opportunity: among the 10.000 members of the BBS only 15 had, on average, an answer to the questions addressed to the BBS. The other 9.985, for whom the question was insignificant, had to read or manage 16 more messages. This example let us understand the role of CMC in improving information overload.

Mantovani (1994) suggests that managers, submerged by "electronic junk mail", use software filters in order to exclude e-mails "e.g. from a level below that of vice

president". However managers, especially when not used to computers, can actually adopt another and more traditional filter: the secretary.

For Hiltz and Turoff (1985) however the problem should be solved at the source. Systems are often designed to give the sender too much control of the communication process, and the receiver too little control. Some researchers suggest to create e-mail systems more database-oriented (with enhanced abilities to store, filter and manage the messages). Hiltz and Turoff add that CMC "should also be designed to foster the emergence of cohesive groups that can exert social control over members' behavior. In addition to active software roles, there are active human roles that can be played" (p.681). Actually "no automated routine can simultaneously filter out all useless and irrelevant communications for addresses, and at the same time assure their receipt of all communications that may be of value to them" (p. 683).

In other words it should be necessary to create a culture against the waste of bandwidth and against the diffusion of useless messages. In the past some author, exaggerating, suggested to limit the access to e-mails in organisations. However this point of view shows us how important is the problem of balancing the value of openness in communication and information overload.

Finally, experience could reduce the bad effects of overload: experienced users seem to develop effective ways for coping with the overload (p. 683).

E. CMC, PDM and Lateral Communication

From a structural point of view a large part of PDM is based on informal patterns of communication. The difference between the formal and emergent structure of communication has been interpreted as a proxy of the degree of hierarchy in organisations (network perspective). The more the density of the network (redundancy in a cybernetic term) the more individuals are not dependent on their boss for having information. Therefore the existence of weak ties (Granovetter, 1973), that is the less frequent and less deep linkages with nodes of the out-group, and in particular of electronic weak ties (Papakyriazis and Boudourides, 2001), increases the possibility for an individual to reach a wider variety of information in respect to that circulating in his group. These forms of lateral communication can influence the power relationships among organisational members. The underlying assumption is that "greater lateral communication [means] less hierarchy, a more broad-based, generally trained labor force, and a greater capacity to respond flexibly to changing market conditions" (Piore cited in Fulk and DeSanctis, 1995: 340).

Lateral forms of communication, that is the communication between peer level or "diagonal" (Hinds and Kiesler 1995) units or individuals within organisations, are increasing in nowadays organisations and the role of CMC in enhancing this phenomenon has been widely recognised (Monge and Contractor, 2000; DeSanctis and Monge, 1998; Fulk and DeSanctis, 1995).

The diffusion of concepts such as *Business Process Reengineering* (Hammer and Champy, 1993), *flat organisation*, *horizontal corporation*, and in general the adoption of a *process view* of organisations, has focused the attention of the practitioners on the horizontal linkages in order to increase the fluid flow of information among units. The democratic nature of these changes is however criticised (Purser and Cabana, 1998) because their implementation is often led in an

autocratic style. What is remarkable, in any case, is that these changes have promoted a *system* view of organisations: organisations are built of a bundle of processes that transform inputs in outputs and in which each part is inter-related with the others. Organising around processes means creating units accountable of entire processes by linking, often electronically, members from different functional units (those units involved in the process). The role of Information and Communication Technology in allowing this is indubitable.

As seen in paragraph B.1.b., RSC considers e-mail a great opportunity for individuals to reach access to new information and informants, even across units boundaries. In other words the filtering-out of social cues increases not only vertical communication (and thus the PDM of lower-level members) but also the lateral communication because it weakens the organisational and social boundaries that exist between units. While in the past "informal networks were viewed as emergent ad hoc linkages formed because of physical proximity, a history of prior personal relationships and demographic similarity […] today a more deliberate network organization is in the offing" (Hinds and Kiesler, 1995: 388).

In the study of Tandem Corporation Sproull and Kiesler (1991) noticed, in a mailing list linking employees from different departments, the presence of messages which began with the refrain "Does anybody know…?". These questions (and the answers) had a high frequency every day and linked people that didn't know each other. This increase of collaborative behaviours has been explicated with the reduction of social cues such as gender, race, charisma etc. and the consequent equalisation of interactants.

Consistently with the Technology Imperative (Markus and Robey, 1988) another characteristic of e-mail is prominent in the change of social behaviours: e-mail systems actually allow easy, cost-less and fast multi-addressability (e-mail can be addressed to many recipients or to mailing lists, forums to which several participants are affiliated). As Kling (1996) comments: "Lower level staff can communicate more readily to upper managers. People in branch offices or the field can communicate more readily with others in the home office and other branch offices. They [RSC theorists] argue that these electronic connections helps democratize organizations by giving more visibility to people who are often out of sigh t or ignored by people in more central or powerful positions"

Hinds and Kiesler (1995) have analysed the role of e-mail in the directionality of communications of technical and administrative employees of an organisation. Following RSC and MRT they suggest that lateral communication is likely to be more collaborative than vertical communication. Thus the media used for lateral communication should be richer (telephone rather than e-mail) than those used for vertical communication. Similarly they hypothesise that cross-departmental communication, and in general the communication outside the chain of command, maintaining weak ties, should necessitate richer media with a bandwidth able to offer more probability to build the necessary trust. The first hypothesis has not been confirmed (the correlation wasn't significant) while for the other there is strong support for both the categories of employees. In general however the study supported the belief that e-mail enhances boundary-crossing communication among different units of organisations.

These findings are not confirmed by other researchers (Mantovani, 1994): a study of an IBM R&D unit revealed that most (93%) of electronic messages were found to be addressed to a receiver one job level either above or below that of the sender, while in

another study concerning the interactions between employees in the East and West coasts found that spatial distance is negatively associated with the use of e-mail. The explanation of this is that "electronic links [as the emergent imperative states] primarily enhance existing patterns rather than creating new ones".

From a political perspective other aspects of lateral communication are the enhancement of employees' voice and the building of interest groups within organisations. Bishop and Levine (1999) reports a case in which non-unionised employees used CMC to resist to unwanted management policies. Is this still a form of PDM? Certainly from a human relation perspective employees' voice (and complaints) are a means for the creation of supportive relationships with management. The role of employee voice (as in Hirschman, 1970) is to improve workers condition and satisfaction and hence to better the organisational climate and performance. In this view "voice" is a form of PDM that is activated from the bottom and welcomed by management. From a socialist perspective however employee voice is a form of struggle in the permanent war against employer. The relationship among employees and the firm, in this view, is a zero-sum game where there is a winner and a loser. Thus the form of PDM that voice allows, in this view, has mainly political implications (the research of a compromise between two divergent interests).

The firm, TekCo, had a wide-company electronic Bulletin Board System (BBS) where employees could discuss a variety of topics, such as TekCo policies on retirements planning, hiring minorities etc. The purpose of the management was to have a constant pulse on the concerns of the workforce and increase upward and downward communication.

There were formal rules to respect while using the BBS: "the bulletin board policy prohibited personal attacks, rumours, divulging of proprietary information, comments that might create grounds for lawsuits and it stated that all postings must be from individual employees not groups.". Anonymity was allowed, even if the system operator could recognise the senders. The BBS was a moderated system: the employees had to send their electronic messages to a system operator who reviewed the messages and controlled if they respected the rules, otherwise the message was rejected and returned to the sender with an explanation.

When the company decided to reduce profit sharing rates the BBS was submerged by messages of complaints. The protest was so wide that management was obliged to retire the new policy. The case brought to the creation of a group of employees, One TekCo, that joined together in order to protect their interests as in the occurred crisis. Not only the BBS was used to raise memberships and inform other employees, but also a private mailing list was built in order to share information without the virtual presence of management. This group was later institutionalised as Employees Council whose goal was to enhance direct communication with the top management.

The BBS finally was essential in the formation, maintenance and development of interest groups such as that of black engineers, gays and lesbians, parents etc.

CMC was so a means to increase the collective bargaining power of employees, despite the restrictions ruled by the bulletin board policy (which didn't accept messages from groups). Management's purpose of increasing upward and downward communication has been judged by the authors as a means to create only the appearance of voice. Actually not all the requests presented on the BBS were satisfied or taken into account, and the decision making process was not decentralised. The unexpected effect of CMC

was the increase in lateral communication (FtF too) and the formation of interests groups.

F. Conclusions

As seen before, most of the literature regarding the effects of CMC (in particular RSC, SIDE, AST, and SNA) deals with informal, direct, short-term and work related PDM.
The degree of PDM has been operationalised in different ways (see Tab. 1) in order to assess two types of influences: status and group influences.
We can classify the studies examined in terms of duration of the experiment/case study (short or long-term PDM) and in terms in which influence has been analysed (Tab. 2)

Table 3 – A classification of studies on e-mail and PDM

	Short-term PDM	Long-term PDM
PDM and status influence	❷ Sproull and Kiesler (1986) Dubrovski et al. (1991) Tan et al. (1998a) Weisband et al. (1995)	❶ Eveland and Bikson (1989)
PDM and group /organisat ional influence	❸ Tan et al. (1998b) Lea and Spears (1991) Weisband et al. (1995) Hedlun et al. (1998) Contractor et al. (1996)	❹ Walther (1995) Zack and McKenney (1995)

❶ In this cell we find long-term studies of the effects of e-mail on status influence: Eveland and Bikson (1989) noticed, in their one year long observation, that in electronic groups leadership roles were less stable than in FtF (authority in the electronic group influenced less than in the FtF group);

❷ Here there are the short-term studies on status influence. All these studies deal with the effects of e-mail on the perception of status differences and the effects on PDM. Weisband et al. (1995) show that the process of categorisation of the group can influence status differences and PDM

❸ Here there are the short-term studies on the effects of e-mail on group/majority influence on PDM. Hedlun et al. (1998) found that CMC could reduce group influence on leader's decisions because CMC enhances leader's ability to distinguish among valid and non-valid members' recommendations. Lea and Spears (1991) found that in de-individuated conditions, the salience of group identity emerges and leads to polarisation in the direction of group norm, smaller proportion of remarks and unequal participation; Contractor et al. (1996) found that the group

influences individual behaviour and PDM in every communication mode (with and without GDSS). Weisband et al. (1995), even if they belong to the previous category they explicate the existence of status differences in the same way of Lea and Spears (1991: 1147): "when group status differences are strong and salient […] status differences will persist or even be magnified" in e-mail communication.

❹ Here there are the long-term studies on the effects of e-mail on group or organisational influence. Walther (1995) states that participation increases with time due to the increase of group cohesiveness and solidarity.
Zack and McKenney (1995) made repeated observations of the daily process of two newspapers and found that the organisational climate (not only the group) influenced the centralisation or the PDM more than communication mode.

Indications and questions for future research
As we can notice in Tab. 3 there are fewer long-term studies and more short-terms ones. Most of the research is actually based on one-shot experiments with "equal and limited time periods among FtF and CMC groups […]. The time spent by e-mail users to type their messages "reduces the number of messages they are able to transmit" (Walther, 1995). The limitation of time (few minutes or hours) may force participants to act as using a synchronous medium, like a chat, rather than an asynchronous one, like e-mail. Furthermore, the expectation of no more future interactions among participants cannot be a realistic proxy of what occurs in organisations. Actually in organisations the communication networks usually have an history and an evolution. Emergent Imperative theories recognise that the existing network of relationships is important for PDM because the experience of interactions can influence: the ability to participate, the ability to acknowledge who has relevant information, the trust on participants, the identification with the group. Thus, future research on e-mail participation should concentrate efforts on studying more stable goups or on developing long-term experiments.

Most of research on PDM through e-mail has focused the attention on the *openness in e-mail-sending*, that is, at which extent actors feel free to send information, suggestions, preferences to other actors (supervisor, peers) via e-mail. In other words, this type of openness deals with the extent they feel free to disagree with others, via e-mail. As we have seen, RSC states that actors participate actively because status and group influences are reduced by e-mail, while Emergent Imperative theories say that it depends on the mutual adjustment between social context and technology system. Less attention has been addresses on the study of *openness in e-mail-receiving*. This type of openness deals with the extent at which actors (supervisors, peers) takes into account e-mails received by others (subordinates, peers) in the decision making process. Mantovani (1994) says that CMC can reduce this openness because it is more simple to ignore unwanted information carried by e-mail than by FtF. SNA argues that the analysis of reciprocality of communication can be useful in assessing this. However reciprocality can be inexpressed, that is it can exist but without a communication feedback. As the Palo Alto school (Watzlawick) states, every behaviour can be communication, even no communication. Otherwise asymmetry of decision authority can co-exist with a communication feedback. So, how can this issue be measured?

Another underestimated issue is the *role of national culture* (for example the collective beliefs on status differences) on PDM in e-mail networks. Can e-mail influence the effects of cultural beliefs in PDM? Is RSC right when it states that e-mail can reduce perceived status differences even in less democratic cultures? What is the influence of culture on PDM in computer-mediated international teams? That is, what happens when different cultures – regarding beliefs on democracy – face each other in computer-mediated settings?

Another central issue to assess the degree of PDM is the actual possibility to gain *access to the electronic network:* more and more individuals nowadays have an e-mail address, especially in organisations. However the abstract possibility to reach an individual by e-mail is not equal to the actual communication with him/her. To what extent an individual in a organisation is able to individuate and contact by e-mail whoever he/she thinks to be useful to contact? This problem deals with: computer/messaging skills; number of computers per employee in the organisation; existence of a list of e-mails; how e-mail (and CMC) affect the individual ability to find the right person (existence of mailing lists, BBS etc.).

Traditionally an high *density of the communication network* (in which each node is connected almost to all the others) has been interpreted as a proxy of organisational democracy (because it overcomes the formal patterns of communication constructed on authority ranks). Then density and participation has been correlated with task complexity and interdependence. Is this view still exact? Ahujia and Carley (1999) reported the case of a virtual organisation with hierarchical communication patterns (and consequent low density of the network) for both routine and non-routine tasks. The paradox (a democratic organisation with hierarchical patterns of communication) again should be explicated with the evolution of the networks: the degree of democracy depends on the imposition versus self-imposition of these patterns of communication. But how, in electronic settings, this self-imposition can be operationalised?

Finally AST offers a new point of view in studying the effects of e-mail on PDM: *the way of appropriation*. Actually e-mail systems include several elements each of them has a variety of attributes and structures that can be activated. The way an organisation and its members appropriate this technology affect social behaviours such as PDM.
At the organisational level: which hardware and software has been adopted, e-mail policies, training, e-mail procedures, degree of control of e-mails etc.
At the group level: the simplicity to active a mailing list. The lenght of the process of authorisation for their creation. The mediated or non-mediated nature of mailing lists, BBS, newsgroups, and other asynchronous group computer-mediated systems.
At the individual level: on average, the degree of activation of personalised filters. The use of visible or unvisible e-mail receipt returns. The ways to store old e-mails.

As we can see, even if e-mail systems have been used for more than thirty years, investigations on e-mail effects in organisations are still strongly needed.

G. References

Ahuja Manju K. and Carley Kathleen (1999) Network Structure in Virtual Organizations. *Organization Science*, vol. 10. N° 6, November-Dicember, pp. 741-757

Ashby Ross W. (1956) *An Introduction to Cybernetics*. London: Chapman & Hall. Available online at: http://pespmc1.vub.ac.be/ASHBBOOK.html

Barrow Jeffrey C. (1977) The variables of Leadership: a review and conceptual framework. *Academy of Management Review*, vol. 2, n° 2, pp.231

Biggiero Lucio (1999a) Organizational consequences of e-mail adoption and diffusion. *Paper* available at: http://hyperion.math.upatras.gr/commorg/proj/COMMORG2.html

Biggiero Lucio (1999b) The Need for Participation in the Post-fordist Age. In S. Schruijer (ed.) *Multi-organizational Partnerships and Cooperative Strategy*. (pp. 75-80). Dutch UP.

Bishop Libby and Levine David (1999) Computer-mediated-communication as employee voice: a case study. *Industrial & Labor Relations Review*, vol. 52, issue 2, pp. 213-233

Black Stewart J. And Gregersen Hal B. (1997) Participative Decision-Making: An Integration of Multiple Dimensions. *Human Relations*, vol. 50, n° 7, pp. 859-878

Boulding Kenneth E. (1974) Communication and Legitimacy. *In* Boulding Kenneth E. (Ed.) *Toward a General Social Science*. Vol. 4 of the "Collected Papers". Boulder: Colorado Associated University Press

Burkhardt Marlene E. and Brass Daniel J (1990) Changing Patterns or Patterns of Change: The Effects of a Change in Technology on Social Network Structure and Power. *Administrative Science Quarterly*, vol. 35, March, pp. 104-127

Burns T. and Stalker G.m. (1961) *The management of innovation*. London: Tavistock

Contractor Nohir, Whitbred Robert, Fonti Fabio, Hyatt Andrew, O'Keefe Barbara, Jones Patricia (2000) Structuration Theory and the Evolution of Networks. *Paper presented at the 2000 Winter Organizational Science Conference*, Keystone, CO.

Contractor Nohir, Whitbred Robert, Fonti Fabio, Hyatt Andrew, O'Keefe Barbara, Jones Patricia (2000) Self-organizing communication networks in organizations: validation of a computational model using exogenous and endogenous theoretical mechanisms. *Manuscript*

Contractor Noshir S., Seibold David R. and Heller Mark A. (1996) Interactional Influence in the Structuring of Media Use in Groups. Influence in Members' Perceptions of Group Decision Support System Use. *Human Communication Research*, vol. 22, n°4, pp. 451-481

Cotton John, Vollrath David A., Froggatt Kirk L., Lengnick-Hall Marl L. and Jennings Kenneth R. (1988) Employees Participation: Diverse Forms and Different Outcomes. *Academy of Management Review*, vol. 13, n° 1, pp. 8-22

Courtright John A., Fairhurst Gail T. and Rogers Edna L. (1989) Interaction patterns in organic and mechanistic systems. *Academy of Management Journal*, vol. 32, n° 4, pp. 773-802

Dachler Peter H. and Wilpert Bernhard (1978) Conceptual Dimensions and Boundaries of Participation in Organizations: a Critical Evaluation. *Administrative Science Quarterly*, vol. 23, pp. 1-39

Daft Richard L. and Lengel Robert H. (1984) Information Richness: a new approach to managerial behavior and organizational design. *Research in Organizational Behavior*, vol. 6, pp. 191-233

Daft Richard L. and Macintosh Norman B. (1981) A tentative exploration into the amount and equivocality of information processing in organizational units. *Administrative Science Quarterly*, vol. 26, pp. 207-224

Dansereau Fred and Markham Steven E. (1987) Superior-Subordinate Communication: Multiple Levels of Analysis. *In* Jablin F.M., Putnam L.L., Roberts K.H. and Porter L.W. (Eds.) *Handbook of Organizational Communication: An Interdisciplinary Perspective*. Sage

De Vries Reinout E., Roe Robert A. and Taillieu Tharsi C.B. (1998) Need for supervision: its impact on leadership effectiveness. *The Journal of Applied Behavioral Science*, vol. 34, issue 4, pp. 486-501

DeSanctis Gerardine and Monge Peter (1998) Communication Processes for Virtual Organizations. *Jornal of Computer-Mediated Communication*, vol. 3, n° 4, June. Available online at: http://www.ascusc.org/jcmc/vol13/issue4/desanctis.html

DeSanctis Gerardine and Poole Marshall Scott (1994) Capturing the Complexity in Advanced Technology Use: Adaptive Structuration Theory. *Organization Science*, vol. 5, n° 2, pp. 121-147

Dubrovsky Vitaly J., Kiesler Sara, Sethna Beheruz N. (1991) The equalization phenomenon: status effects in computer-mediated and face-to-face decision-making groups. *Human-Computer Interaction*, vol. 6, pp. 119-146

Emery F.E. and Trist E.L. (1960) Socio-Technical Systems. *In* Churchman West C. and Verhulst M. (Eds) *Management Science Models and Techniques*. Pergamon Press

Euske Nancy A. and Roberts Karlene H. (1987) Evolving Perspectives in Organization Theory: Communication Implications. *In* Jablin Fredric M., Putnam Linda L., Roberts Karlene H. Porter Lyman W. (Eds.) *Handbook of Organizational Communication. An Interdisciplinary Perspective.* Sage Publications

Eveland J.D. (1993) Uses and limitations of communication network analysis in the evaluation of cscw applications. *Presented to the Invited Workshop on CSCW Evaluation, Third European Conference on Computer-Supported Cooperative Work,* Milan Italy Sept. Available online at: http://www.jdeveland.com/

Eveland J.D. and Bikson T.K. (1989) Work Group Structures and Computer Support: A Field Experiment *ACM Transactions on Office Information Systems*, vol. 6, n°4, pp.354-379. Available online at: http://www.jdeveland.com/

Freeman Linton C. (1997) Uncovering Organizational Hierarchies. *Computational & mathematical Organization Theory*, vol. 3, n° 1, pp. 5-18

Fulk Janet (1993) Social construction of communication technology. *Academy of Management Journal*, vol. 36, n° 5, 921-950

Fulk Janet and DeSanctis Gerardine (1995) Electronic Communication and Changing Organizational Forms. *Organization Science*, vol.6, n°4, pp. 337-349

Galbraith Jay R. (1987) Organizational Design. *In* Lorsch Jay W. (Ed.) *Handbook of Organizational Behavior*. Englewood Cliffs, NJ: Prentice-Hall

Garton Laura and Wellman Barry (1993) Social Impacts Of Electronic Mail In Organizations: A Review Of The Research Literature. *In* B. Burleson (Ed.) Communication Yearbook, 1995, 18, pp. 434-453.

Garton Laura, Haythornthwaite Caroline and Wellman Barry (1997) Studying online social networks. Journal of Computer-Mediated Communication, vol. 3 n°1, available online at: http://www.ascusc.org/jcmc/vol3/issue1/garton.html

Granovetter (1973) The strength of weak ties. *American Journal of Sociology*, vol. 78, pp. 1360-1380

Grise Mary-Liz, and Gallupe Brent R. (1999/2000) Information Overload: Addressing the productivity paradox in face-to-face electronic meetings. *Journal of Management Information Systems*, vol. 16, issue 3, pp. 157-185

Hammer and Champy (1993) *Reengineering the Corporation: A Manifesto for Business Revolution*. Harperbusiness

Hedlund Jennifer, Ilgen Daniel R. and Hollenbecj John R. (1998) Decision Accuracy in Computer-Mediated versus Face-to-Face Decision-Making Teams. *Organizational Behavior and Human Decision Processes*, vol. 76, n° 1, pp. 30-47

Hiltz Starr Roxanne and Turoff Murray (1985) Structuring computer-mediated communication systems to avoid information overload. *Communications of the ACM*, vol. 28, n° 7, July, pp. 680-689

Hinds Pamela and Kiesler Sara (1995) Communication across boundaries: work, structure, and use of communication technologies in a large organization. *Organization Science*, vol. 6, n° 4, July-August

Hirschman Albert O. (1970) Exit, Voice, and Loyalty: Responses to Decline in Firms, Organizations and States. Cambridge, Mass., and London: Harvard University Press

Hofstede, G. (1980). *Culture's consequences: International differences in work-related values*. Newbury Park, CA: Sage

IDE (Industrial Democracy in Europe International Research Group) (1979) Participation: Formal rules, influence and involvement. *Industrial Relations*, vol. 18, pp. 273-294

Jablin F.M (1979) Superior-subordinate communication: The state of the art. *Psychological Bulletin*, vol. 86, 1201-1222

Kling Rob (1996) Social Relationships in Electronic Forums: Hangouts, Salons, Workplaces and Communities. In Kling Rob (Ed) *Computerization and Controversity: Value Conflicts and Social Choices* (2nd ed.) San Diego,

Academic Press. Available online at: http://www.slis.indiana.edu/kling/cc/5-FORUM4.html

Kling Rob and Jewett Tom (1994) The Social Design of Worklife with Computers and Networks: An Open Natural Systems Perspective. *Working Paper* #AIM-047, Center for research on Information Technology and Organizations (CRITO) University of California, Irvine. Available online at: http://www.crito.uci.edu/research-archives/pdf/aim-047.pdf

Krackhardt D. (1994) Graph theoretical dimensions of informal organizations. In Carley K. And Prietula M. (Eds.) *Computational Organization Theory*. Hillsdale, NJ: Lawrence Erlbaum Associates

Kuwabara Ko (2000) Linux: A Bazaar at the Edge of Chaos. *Firts Monday*, vol. 5, n° 3, available online at: http://firstmonday.org/issues/issue5_3/kuwabara/index.html

Lea Martin and Spears Russell (1991) Computer-mediated-communication, de-individuation and group-decision-making. *International Journal of Man-Machine Studies*, 34, pp. 283-302

Lea Martin, O'shea Tim and Fung Pat (1995) Constructing the networked organization: content and context in the development of electronic communications. *Organization Science*, vol. 6, n° 4, July-August, pp. 462-478

Locke Edwin A. and Schweiger David M. (1979) Participation in Decision-Making: one more look. *Research in Organizational Behavior*, vol. 1, pp. 265-339

Magjuka Richard J. (1989) Participative Systems: toward a technology of design. *Research in the Sociology of Organizations*, vol. 7, pp. 79-115

Mantovani Giuseppe (1994) Is Computer-Mediated-Communication Intrinsically Apt to Enhance Democracy in Organizations? *Human Relations*, vol. 47, n° 1 pp. 45-62

Manz Charles C. and Sims Henry P. Jr. (1987) Leading Workers to Lead Themselves: The External Leadership of Self-Managing Work Teams. *Administrative Science Quarterly*, vol. 32, pp. 106-128

Margulies N. and Black J.S. Perspectives on the implementation of participative programs. *Human Resource Management Journal*, vol. 16, pp. 385-412

Markus M. Lynne (1994) Finding a Happy Medium: Explaining the Negative Effects of Electronic Communication on Social Life at Work. *ACM Transactions on Information Systems*, vol. 12, n° 2, April, pp. 119-149

Markus M. Lynne and Robey Daniel (1988) Information Technology and Organizational Change: Causal Structurin Theory and Research. *Management Science*, vol. 34, n° 5, pp. 583-598

McCabe Douglas and Lewin David (1992) Employee Voice: A Human Resurce Management Perspective. *California Management Review*, vol. 34, issue 3

McGrath J.E. (1984) *Groups: interaction and performance*. Englewood Cliffs, NJ: Prentice Hall

Monge Peter and Contractor Noshir S. (2000) Emergence of Communication Networks. In Jablin F.M. and Putnam L.L. (Eds) *Handbook of Organizational Communication* (2nd Ed.). Thousand Oaks, CA: Sage

Papakyriazis Natalia V. and Boudourides Moses A. (2001) Electronic Weak Ties in Network Organisations. *Paper presented at the 4ᵗʰ GOR Conference*, Goettingen, Germany, May 17-18

Postmes Tom and Lea Martin (1999) Out of sight, out of mind? A reappraisal of anonymity effects in group decision support systems. *Working Paper*

Postmes Tom, Spears Russell and Lea Martin (1998) Breaching or Building Social Boundaries?: SIDE-Effects of Computer-Mediated-Communication. *Communication Research*, vol. 25, n° 6, December, pp. 689-715

Purser Ronald E. and Cabana Steven (1998) *The Self Managing Organization: how leading companies are transforming the work of teams for real impact*. NY: The Free Press

Regalia Ida and Gill Colin (Eds.) (1995) The position of the social partners in Europe on direct participation. Country studies. *Working Paper* n° WP/95/35/EN Dublin: European Foundation for the Improvement of the Living and Working Conditions

Rice Ronald and Aydin Carolin (1991) Attitudes toward new organizational technology: network proximity as a mechanism for social information processing. *Administrative Science Quarterly*, vol. 36, pp. 219-244

Rogers Paul (2001) Group decision making via CMC. *Paper presented at the second Commorg Workshop*, Santorini, September, 4-7. Commorg deliverable 2.1.1.

Salancik Gerald R. and Pfeffer Jeffrey (1978) A Social Information Processing Approach to Job Attitudes and Task Design. *Administrative Science Quarterly*, vol. 23, pp. 224-253

Scott Richard W. (1992) *Organizations: Rational, Natural, Open Systems*. Englewood Cliffs NJ: Prentice-Hall

Short J., Williams E. and Christie B. (1976) *The Social Psychology of Telecommunication*. London: Wiley

Spears Russell and Lea Martin (1994) Panacea or Panopticon? The hidden power in computer-mediated communication. Communication Research, n. 21, pp. 427-459.

Spears Russell, Lea Martin and Postmes Tom (2000) Social psychological theories of computer-mediated communication: social pain or social gain? *In* Robinson P. and Giles H. (Eds.) *Handbook of language and Social Psychology* (second edition) @@Publishers

Sproull Lee and Kiesler Sara (1986) Reducing social context cues: electronic mail in organizational communication. *Management Science*, vol. 32, n° 11, pp. 1492-1512

Sproull Lee and Kiesler Sara (1991) *Connections: New Ways of Working in the Networked Organization*. Cambridge, CA, MIT Press

Stewart Greg L. and Manz Charles C. (1995) Leadership for Self-Managing Work teams: A Typology and Integrative Model. *Human Relations*, vol. 48, n° 7, pp. 747-771

Sthol Cynthia (1993) European managers' interpretations of participation. A semantic network analysis. *Human Communication Research*, vol. 20, n°1, pp. 97-117

Tan Bernard C.Y., Wei Kwok-Kee, Watson Richard and Walczuch Rita M. (1998a) Reducing status effects with computer-mediated communication:

evidence from two distinct national cultures. *Journal of Management Information Systems*, vol. 15, issue n°1, pp. 119-141

Tan Bernard C.Y., Wei Kwok-Kee, Watson Richard, Clapper Danial L. and McLean Ephraim R. (1998b) Computer-Mediated Communication and Majority Influence: Assessing the Impact in an Individualistic and a Collectivistic Culture. *Management Science,* vol. 44, n° 9, pp. 1263-1278

Trist Eric L. (1981) The evolution of Sociotechnical Systems as a Conceptual Framework and as an Action Research Program. *In* Van de Ven Andrew H. and Joyce William F. (Eds.) *Perspectives on Organization Design and Behavior*. NY: John Wiley & Sons

Wagner John A. III and Gooding Richard Z. (1987) Effects of Societal Trends on Participation Research. *Administrative Science Quarterly*, vol. 32, pp. 241-262

Walther Joseph B. (1992) Interpersonal Effects in Computer-Mediated Interaction: a Relational Perspective. *Communication Research*, 19, pp. 52-90

Walther Joseph B. (1995) Relational Aspects of Computer-Mediated-Communication: Experimental Observations over Time. *Organization Science*, vol. 6, n° 2, March-April, pp. 186-203

Wasserman Stanley and Faust Katherine (1994) *Social Network Analysis: Methods and Applications*. Cambridge University Press

Weisband Suzanne P, Schneider Sherry K. and Connolly Terry (1995) Computer-mediated-communication and social information: status salience and status differences. *Academy of Management Journal*, vol. 38, issue 4, august

Zack Michael H. and McKenney James L. (1995) Social Context and Interaction in Ongoing Computer-supported Management Groups. *Organization Science*, vol. 6, n° 4, July-August, pp. 394-422

Zucker L.G. (1983) Organizations as institutions. *In* Bacharach S.B. (Ed*.) Research in the sociology of organizations* Vol. 2. JAI Press.