

# Interorganizational communication and ICT in construction projects: a review using metatriangulation

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**Abstract:** Although communication is of vital importance in construction projects, the construction industry is confronted with great communication difficulties and an ineffective use of information and communication technology (ICT) systems. In this study, the objective is to analyse obstacles and preconditions for an effective use of ICT by focusing on characteristics of interorganizational communication in construction projects.

Interorganizational communication and ICT are studied by elaborating on these phenomena from the perspective of two paradigms – the traditional functionalist and the radical humanist – and theories representative for these paradigms – the agency theory and Habermas' critical social theory. By using the method of metatriangulation, it is shown that in addition to the functionalist perspective, the critical social theory of Habermas is an appropriate theory for analysing obstacles and preconditions for an effective interorganizational communication and use of ICT. Based on this analysis, a critical research agenda on communication and ICT in construction is formulated. It is concluded that this type of research will lead to a more articulated view on the alignment between ICT applications and communication in construction projects and will show new directions for ICT development in the future.

**Key words:** construction; information technology; interorganizational communication; metatriangulation

## Introduction

In construction projects, many participants from different organizations have to work together. One result is that a huge amount of information has to be communicated (Dawood *et al.*, 2002; Cornelius and Wamelink, 1998; Pietroforte, 1997). Although communication is of vital importance in construction projects (e.g., Dawood *et al.*, 2002; Mohamed and Stewart, 2003; Thorpe and Mead, 2001), the construction industry is confronted with great communication difficulties. Therefore, there is a need for improved communications between participating organizations in construction projects (e.g., Ahmad *et al.*, 1995; Baldwin *et al.*, 1999; Tserng and Lin, 2003).

Rapid evolution of information and communication technologies (ICT) offers opportunities to enhance communication between participants in construction projects and to enable more effective and efficient communication (Egbu *et al.*, 2001). The use of such systems in construction projects, however, is relatively limited and ineffective when compared to other

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sectors such as the automotive and aerospace industries (Anumba and Ruikar, 2002). The effectiveness of utilizing ICT in construction projects may be hindered by the inability to share electronic data between organizations (Hassan and McCaffer, 2002; Mohamed and Stewart, 2003).

When a technology is developed by one organization and then used by other organizations, the developing organization plays an influential role in shaping the social practices of the organizations that use the technology (Orlikowski, 1992). When ICT is not used as intended, the objectives of the technology's designers may be undermined. Literature indicates that ICT vendors face difficulties in identifying the construction industry's ICT needs and requirements (Hassan and McCaffer, 2002). Before ICT is implemented to support communication, attention has to be devoted to the actual communication processes in construction projects. Understanding of the nature of the communication between organizations is an essential prerequisite for analysing and designing ICT in an effective way.

In this study, the focus is on characteristics of interorganizational communication in construction projects. The objective is to analyse obstacles and preconditions for an effective use of ICT. We define communication as: 'behavioural situations in which a source transmits a message to a receiver(s) with conscious intent to affect the latter's behaviour' (Miller, 1976, p. 92). We analyse interorganizational communication and ICT by adopting the method of metatriangulation. This method explores complex phenomena from different paradigms (Lewis and Grimes, 1999). In this study, we elaborate on two paradigms – the traditional functionalist and the radical humanist – and theories representative for each paradigm. The agency theory is adopted for analysing communication and ICT in construction from the traditional functionalist perspective. Habermas' critical social theory on social actions is used for analysing communication and ICT from the radical humanist perspective. Based on this analysis, a research agenda for analysing communication and use of interorganizational ICT will be formulated.

Both theories, the agency theory and Habermas' critical social theory on social action are adopted to analyse three major factors influencing interorganizational communication in the construction phase of construction projects: the *contract*, the *frames of reference* of the parties involved and the *interests* of the parties involved (together with a lack of trust) (Adriaanse *et al.*, 2002). The *contract* determines the flow of information (i.e., what information has to be communicated to whom, in what form and at which moment) between client and contractor. The intensity of the information flow between parties is influenced by the complexity of the project. At times, the interpretation of information can be problematic because of differences in *frames of reference*. The level of co-operation depends on the extent of conflicting *interests*, and each party's perception of the other's behaviour. With conflicting interests and the lack of trust, the parties do not communicate openly.

The study is organized as follows. In the first section, the method of metatriangulation and the typology of paradigms of Burrell and Morgan (1979) are introduced. In section two, the agency theory is presented as a theory for analysing interorganizational communication and use of ICT from the functionalist perspective. In section three, the radical humanist perspective is introduced as a new paradigm for the analysis of interorganizational communication and use of ICT. Habermas' critical social theory is introduced in part four as a representative of the radical humanist paradigm. In section five, the functionalist paradigm is applied to construction by analysing factors influencing interorganizational communication in construction projects from an agency perspective. Finally, these factors are also analysed from

the perspective of Habermas' critical social theory and the first step is taken in formulating a critical research agenda for analysing interorganizational communication and use of ICT in construction projects.

## Multiparadigm understanding

Metatriangulation is a method used for exploring complex phenomena from different theoretical perspectives (Lewis and Grimes, 1999). A multiparadigm perspective on theory building fosters greater insight and creativity than a single paradigm perspective (Gioia and Pitre, 1990). Metatriangulation is particularly appropriate for studying multifaceted phenomena such as communication (Gioia and Pitre, 1990). In this paper, metatriangulation is used to investigate interorganizational communication and ICT in construction projects. Starting point is the theory building process proposed by Lewis and Grimes (1999). Within their process they distinguish three main steps: groundwork, data analysis and theory building (see Table 1).

In this study, we focus on the three components of the first step of this theory building process. We will focus on the following activities:

- defining the phenomenon of interest: interorganizational communication and use of ICT in construction and factors affecting this communication and use of ICT;
- investigating interorganizational communication and ICT from two paradigms and related theories;
- formulating a critical research agenda for analysing interorganizational communication and use of ICT.

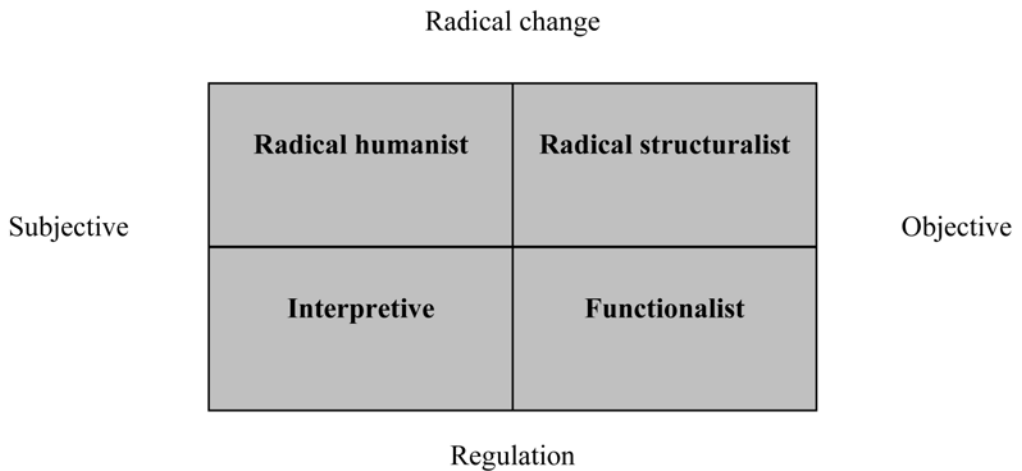
Two paradigms in this study are used in order to gain multiparadigm understanding of communication: the traditional functionalist and the radical humanist. We relate these two paradigms to Burrell and Morgan's (1979) well-known typology for the analysis of social theory. This typology is based on two key dimensions. The first dimension contains

**Table 1** Theory-building process of metatriangulation (based on Lewis and Grimes, 1999: 677)

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Activity
Step 1: Groundwork
(a) Define phenomenon of interest
(b) Focus paradigm lenses
(c) Collect metatheoretical sample (data interpretable from multiple lenses)
Step 2: Data analysis
(a) Plan paradigm itinerary (ordered use of lenses)
(b) Conduct multiparadigm coding
(c) Write paradigm accounts
Step 3: Theory building
(a) Explore metaconjectures
(b) Attain a metaparadigm perspective
(c) Articulate critical self-reflection

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**Figure 1** Paradigms for the analysis of social theory (based on Burrell and Morgan, 1979: 22)

assumptions about the nature of social science and is called the ‘subjective–objective’ dimension. The position on this dimension is determined by

- ontology, ‘assumptions which concern the very essence of the phenomena under investigation’ (ibid.: 1),
- epistemology, ‘assumptions about the grounds of knowledge’ (ibid.: 1),
- human nature, ‘relationship between human beings and their environment’ (ibid.: 2), and
- methodology, ‘the way in which one attempts to investigate and obtain “knowledge” about the world’ (ibid.: 2).

The second dimension comprises assumptions about the nature of society and is called the ‘regulation–radical change’ dimension. The sociology of regulation is concerned with 1) status quo, 2) social order, 3) consensus, 4) social integration and cohesion, 5) solidarity, 6) need satisfaction, and 7) actuality. The sociology of radical change on the other hand is concerned with 1) radical change, 2) structural conflict, 3) modes of domination, 4) contradiction, 5) emancipation, 6) deprivation, and 7) potentiality (ibid.: 18).

The dimensions define four distinct paradigms:<sup>1</sup> functionalist, interpretivist, radical humanist and radical structuralist (see Figure 1).

Goles and Hirschheim (2000) advocate the use of different paradigms in different situations. Gioia and Pitre (1990) share this thought. They mention that paradigmatic approaches ‘are relevant when issues are defined according to their basic assumptions’ (ibid.: 587). So, a theoretical perspective needs to be consistent with the topic of study.

<sup>1</sup>Burrell and Morgan (1979) define a paradigm as ‘the commonality of perspective which binds the work of a group of theorists together in such a way that they can be usefully regarded as approaching social theory within the bounds of the same problematic’ (p. 23). Theorists within a paradigm share the underlying metatheoretical ‘taken for granted’ assumptions. Intellectual journeys between paradigms are rare, but possible (e.g., see Marx (from radical humanism to radical structuralist) and Silverman (from functionalist to interpretive) (ibid.).

## **Functionalist approach**

The field of communication and ICT research can be related to different paradigms. In this field of ICT the functionalism paradigm has dominated research (Alavi *et al.*, 1989; Orlikowski and Baroudi, 1991; Walsham, 1995; Hirschheim *et al.*, 1996; Nandhakumar and Jones, 1997; see Goles and Hirschheim, 2000 for an overview). From the functionalist (positivistic, 'scientific') perspective ICT is a neutral provider of input for decision making (Varey *et al.*, 2002). In this view communication is no more than distribution of information. The agency theory is a theoretical perspective that investigates communication from this traditional functionalist point. The agency theory assumes an objective nature of social science (e.g., objective ontology and epistemology).

Agency theory, in its simplest form, discusses the relationship between a principal and an agent who makes decisions on behalf of that principal (Douma and Schreuder, 1998). The agent in turn receives some kind of payment or reward from the principal. Economic relationships between these actors are analysed from the viewpoint of one of the actors involved, i.e., the principal. Frequently used terms such as moral hazard and adverse selection hint at this normative point of view. The relationship between principal and agent can be characterized by the presence of two agency specific conditions (Neelen, 1993):

- 1) Conflict of interests. The decisions of the agent affect both his own welfare and that of the principal. There is a conflict of interests when the agent's action or decisions, which are preferred by the principal (e.g., more effort), yield disutilities to the agent.
- 2) Asymmetric information. The principal is faced with a situation of imperfect monitoring as he cannot observe all the actions and decisions of the agent. Hence the agent has some opportunity for discretionary behaviour. The principal cannot check what contributed more to a good result: the effort by the agent or external conditions.

In addition to these agency specific conditions, the following axioms, derived from neo-institutional economics, apply to the principal-agent relationship:

- 3) The relationship between principal and agent is governed by a contract specifying what the agent should do and what the principal must do in return. This axiom refers to the contractual paradigm of neo-institutional economics. In neo-institutional economics organizations are seen as a nexus of contracts.
- 4) Actors maximize their utility functions subject to (institutional) constraints. Principals and agents have different utility functions. This axiom refers to the rational choice model underlying neo-institutional economics.
- 5) Transaction costs are positive. Neo-institutional economics tries to generalize neoclassical economics by relaxing the neoclassical assumption of full information and costless exchange. There is no costless exchange of information because transaction costs exist.

As just mentioned, the agency approach assumes information-asymmetry and opportunistic behaviour within a contractual relationship. In combination with opportunism, information asymmetry can create problems in monitoring performance, thereby leading to performance shirking by one party at the expense of the other. Such a risk is much higher where performance measurements are ambiguous (Ouchi, 1980). In order to deal with this risk and to achieve incentive compatibility between principal and agent the principal tries to design an efficient incentive structure (Moe, 1984). Ways of inducing the agent to act in the interest of

the principal are control by incentive, control by persuasion and control by directive or authority. A principal who controls by incentive tries to establish a contractual relationship in which the interests of principal and agent overlap to some degree. Alternative contractual relationships with different incentive structures, i.e., various types of payment schemes, are examined. Control by persuasion or by information means that the principal influences the agent by information the agent has about the various alternative decisions. When controlling by directive or authority, the principal attempts to change the total set of alternatives for the agent by imposing specific rules.

Application of one or more control mechanisms in a principal–agent relationship implies positive transaction and information costs. In agency literature, these costs are usually specified as agency costs. Agency costs are costs associated with self-interested actions by members of an organization, plus the costs associated with monitoring and metering the performance of those agents to limit such actions (Jensen and Meckling, 1976). Williamson (1985) suggests that firm hierarchies can reduce measurement costs, relative to market contracting, by allowing better access to information, such as input quality, that is relevant to the production of inputs. Jensen and Meckling (1976) elaborated on the concept of agency costs and defined them as the sum of:

- 1) Monitoring costs. Monitoring costs are all expenditures the principal makes to limit those activities of the agent that diverge from the principal's interests. It includes all efforts of the principal to 'control' the behaviour of the agent through budget restrictions, operating rules, and so on.
- 2) Bonding costs. Bonding costs are all expenditures the agent makes 'to guarantee that he will not take certain actions which would harm the principal or to ensure that the principal will be compensated if he does take such action' (Jensen and Meckling, 1976: 308). Bonding means that the agent takes the initiative to bind himself and to be monitored; monitoring means that the principal takes the initiative.
- 3) Residual loss. The residual loss is the net income foregone by the principal due to the divergence between the agent's decisions and those decisions that would maximize the net income of the principal. This is equal to what Alchian and Demsetz (1972) designate as shirking.

There is a trade-off between monitoring and bonding costs on the one hand and the residual loss on the other hand. In an equilibrium it is not economic to control the agent any further because the additional monitoring and/or bonding costs will set the reduction of residual loss aside.

### **Radical humanist approach**

Each paradigm has its own strengths and weaknesses in different situations (Varey *et al.*, 2002). Gioia and Pitre (1990: 586–87) point out that the functionalist view 'becomes problematic when subjective views of social and organisational phenomena are adopted' (see the first dimension of the typology of Burrell and Morgan) 'or when there is a concern with transformational change' (see the second dimension of this typology). They argue that, for example, 'phenomena such as sensemaking, meaning construction, power and conflict become very awkward to handle using any immutable objectivist framework' (*ibid.*: 587).

Recently, several Communication and ICT scholars have taken a position alternative to the functionalism paradigm. They use the critical social theory<sup>2</sup> (CST) for analysing development (e.g., Myers and Young, 1997; Hirschheim *et al.*, 1996; Hirschheim and Klein, 1994) and use (e.g., Ngwenyama and Lee, 1997) of information systems as well as the social impact of ICT (e.g., O'Donnel and Henriksen, 2002). The critical social theory is a theory that embraces the assumptions of radical humanism<sup>3</sup> (Burrell and Morgan, 1979). Critical social theory is a combination of objectivist ontology with subjectivist epistemology.

Two principle types of critical studies can be identified: ideological critique, and communicative action (Alvesson and Deetz, 2000). In this study we follow the second type. The communicative action type of critical research has concentrated on building a systematic philosophy in which theory and communicative action are of fundamental. Although this type of critical study shares some ideas of ideological critique, it envisages procedural ideas rather than substantial critique. According to Lyytinen (1992) this stream of critical social theory can be used for criticizing the existing 'technology-driven' information systems development methods, for exploration of alternative approaches to information systems development and for analysis of information systems use.

From the critical social perspective, information systems have to be analysed in an organizational context. An organization is seen as a social system. Social action is embedded in the organizational context. The organizational context defines 'the possibilities and potential for social action' and 'serves as a reference schema that enables actors to act and to interpret the actions of others' (Ngwenyama and Lee, 1997: 152). The organizational context 'provides the actors with a background meaning context of their actions' (Ngwenyama and Lyytinen, 1997: 75).

## **Habermas' critical social theory**

In this study parts of Habermas' (1984, 1987) critical social theory and especially his typology of social actions will be used. Reasons for using Habermas' critical social theory are the greater impact of his work on the information systems discipline than any other critical social theory school of thought (Ngwenyama and Lee, 1997; Hirschheim and Klein, 1994), the existence of a theory about communication within his work (Ngwenyama and Lee, 1997), and the scope and depth of his treatment of social action and social change (Hirschheim *et al.*, 1996). Habermas' concepts of validity claims, world relations, and models of action will be discussed below.

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<sup>2</sup>Critical social theory has its origin in the Institute of Social Research at the University of Frankfurt, established in 1923. This institute is often referred to as the Frankfurt school. The school has attacked functionalism for its inability to handle social change and for its narrow focus on instrumental reason.

<sup>3</sup>However, there are also critiques on Burrell and Morgan's classification of critical social theory (Deetz, 1996). Deetz (1996) points out that 'the many critical theorists with strong suspicions of humanist philosophies suddenly found themselves either conceptualised as radical humanists or invisible (lost in some paradigmatic space)' (p. 192). Critical social theory bridges the paradigm boundaries to some extent (Gioia and Pitre, 1990). Critical social theory also has a foot in both the functionalist (empirical knowledge) and interpretivist (hermeneutic knowledge) paradigm (Goles and Hirschheim, 2000; Hirschheim and Klein, 1989).

**Table 2** Forms of argumentation and validity claims (based on Habermas, 1984: 23)

Forms of argumentation	Controversial validity claims <sup>4</sup>
Theoretical discourse	<ul style="list-style-type: none"> <li>● Truth of propositions</li> <li>● Efficacy of teleological actions</li> </ul>
Practical discourse	<ul style="list-style-type: none"> <li>● Rightness of norms of action</li> </ul>
Aesthetic criticism	<ul style="list-style-type: none"> <li>● Adequacy of standards of value<sup>5</sup></li> </ul>
Therapeutic critique	<ul style="list-style-type: none"> <li>● Truthfulness or sincerity of expressions</li> </ul>
Explicative discourse	<ul style="list-style-type: none"> <li>● Comprehensibility or well-formedness of symbolic constructs</li> </ul>

### Validity claims

Habermas' (1984, 1987) *The Theory of Communicative Action* is rooted in the view that communication is a rational enterprise. This means that a communicatively achieved agreement must be based in the end on reason (Habermas, 1984: 17). In Habermas' (1984) view 'rationality is understood to be a disposition of speaking and acting subjects that is expressed in modes of behaviour for which there are good reasons or grounds' (p. 22). This points in the direction of the concept of the universal validity claims. In order to act rational acts must rest upon criticizable validity claims.

'A validity claim is equivalent to the assertion that the conditions for the validity of an utterance are fulfilled' (ibid.: 38). The term argumentation is used for that type of speech in which participants thematize contested validity claims and attempt to vindicate or criticize them through arguments (ibid.: 18). 'The "strength" of an argument is measured in a given context by the soundness of the reasons' (ibid.: 18). 'The forms of argument are differentiated according to universal validity claims, which are often recognisable only in connection with the context of an utterance, but which are not first constituted by contexts and domains of action' (ibid.: 38). Several forms of argumentation with corresponding validity claims are distinguished (see Table 2).

In uttering a sentence the speaker raises a validity claim implicitly or explicitly. The hearer has only the choice of accepting or rejecting the validity claim (taking a 'yes' or 'no' position) or leaving it undecided for the time being (abstaining). Taking a position on the validity claim 'means that the hearer agrees or does not agree with a criticisable expression and does so *in light of reasons or grounds*' (ibid.: 38).

<sup>4</sup>According to Habermas, (1984) only truth, rightness and comprehensibility or well formedness are universal validity claims that can be tested in discourse. In these cases 'a rational agreement could in principle be achieved, whereby the phrase "in principle" expresses the idealizing proviso: if only the argumentation could be openly enough and continued long enough' (ibid.: 42). In the two other cases (i.e., adequacy, truthfulness or sincerity) Habermas (1984) uses the term 'critique' or 'criticism' instead of 'discourse'. These validity claims cannot be tested in discourse. For example, the sincerity of expressions cannot be tested discursively, but only shown. According to Habermas (1984) 'insincerity can be revealed by the lack of consistency between an utterance and the past or future actions internally connected with it' (ibid.: 41).

<sup>5</sup>According to Habermas (1984: 42) this type of expression is 'not invested with a clear-cut validity claim'. This validity claim is sometimes called a claim to authenticity or appropriateness.



## World relations

The validity claims discussed above bring us to the concept of the world relations. In raising a validity claim an actor takes up a relation to a world. Habermas (1984) renounces the ontology of one world. He distinguishes three worlds to which speakers relate: the objective world, the subjective world, and the social world. He defines these worlds as follows (ibid.: 52):

- Objective world: ‘the totality of facts, where “fact” signifies that a statement about the existence of a corresponding state of affairs, *p*, can count as true’.
- Social world: ‘the totality of all interpersonal relations that are recognized by members as legitimate’.
- Subjective world: ‘the totality of experiences to which, in each instance, only one individual has privileged access’.

Within theoretical discourse (i.e., validity claims: truth, efficacy) an actor refers to something in the objective world, within practical discourse (i.e., validity claim: rightness) an actor relates to something in the social world, and within aesthetic criticism and therapeutic critique (i.e., validity claims: adequacy, truthfulness or sincerity) an actor refers to something in the subjective world.

## Models of social action

Within Habermas’ (1984) critical social theory four models of social action with increasingly complex aspects of rationality are distinguished:<sup>6</sup> teleological action, normatively regulated action dramaturgical action and his own communicative action. Habermas (1984) ‘uses the term “action” only for those symbolic expressions with which the actor takes up a relation to at least one world’ (p. 96). These actions are ‘called “social” which in its meaning as intended by the actor or actors, takes account of the behavior of others and is thereby oriented in its course’ (Weber, 1978: 4).

Within the model of *teleological action* an actor tries to realise an end<sup>7</sup> by choosing between alternative courses of action. The actor selects appropriate means to realize his end. This type of action is ‘guided by maxims, and based on an interpretation of a situation’ (ibid.: 85). The agency theory is primarily based on the assumption of teleological action. The model of teleological action presupposes a relation between the actor and the objective world, either presently existing or producible through actions. Teleological action can be divided into instrumental action and strategic action. *Instrumental action* is directed toward achieving

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<sup>6</sup>Habermas’ presentation of the different models of action has been criticized by Joas (1991). According to Joas (1991) Habermas does not give ‘a comprehensive typology of a general theory of action, but rather a classification that aims from the start at Habermas’ distinction – admittedly a convincing one – of various kinds of possible relations to the world’ (p. 101). In a reply to this critique Habermas (1991) states that he is ‘concerned with an explanation for social action, not with constructing an anthropology of action as a whole’ (p. 249). It was, however, never Habermas’ (1984) intention to give a detailed interpretation of existing social action models. He is concerned with the rationality implications of the concepts (ibid.: 86).

<sup>7</sup>Note that all models of action presuppose a teleological structure of action. Speakers want to realize some ends. However, within communicative action the relation between language and reaching understanding ‘is not one of means and ends’ (Habermas, 1991: 241). Although, for example, within strategic action and communicative action actors have a different attitude, both models of action also differ in their structural characteristics (ibid.).

personal goals in a nonsocial way. An actor is following technical rules of action and tries to manipulate objects in ways that will serve his self-interest. Within *strategic action* an actor tries to achieve one's goals by influencing decisions of other actors. Each of the other actors 'is oriented to his own success and behaves co-operatively only to the degree that this fits his own egocentric calculus of utility' (ibid.: 88). Within strategic action 'the degree of conflict and co-operation varies with the given interest positions' (ibid.: 101). An actor tries to find the best strategy to pursue his self-interest. When people co-operate because this is the only way to achieve their goals, they use communicative action (Weigand *et al.*, 2003: 11). In this view communicative action can still be controlled by interests.

Within teleological action two types of argumentation can be distinguished:

- *Truth* of proposition is judged according to 'whether the actor has succeeded in bringing his perceptions and beliefs into agreement with what is the case in the world' (ibid.: 87);
- *Efficacy* of teleological actions is judged according to whether the actor 'succeeds in bringing what is the case in the world into agreement with his desires and intentions' (ibid.: 87).

Within the model of *normatively regulated action* the intention of the parties involved is to fulfil generalized expectations of behaviour by conforming their behaviour to shared norms and values. In this case social norms may override self-interests or personal goals. This type of action presupposes not only an objective world but also a social world. All members of a social group that share a social world (i.e., the normative context is recognized as valid) may expect the others to behave in certain situations in a certain way. When actors do not recognize the normative context as valid, this context becomes another feature of the objective world (White, 1988: 37). According to White (1988: 21) this model 'offers a necessary explanatory supplement' to the strategic model of action (see also Ngwenyama and Lee, 1997).

Within normatively regulated action two types of argumentation are possible:

- *Rightness* of actions is judged 'according to whether they are in accord with or deviate from an existing normative context, that is, whether or not they are right with respect to a normative context recognized as legitimate' (Habermas, 1984: 89);
- *Legitimacy* of norms is judged 'according to whether they can be justified, that is, whether they deserve to be recognized as legitimate' (ibid.: 89).

Within the model of *dramaturgical action* social actors consider themselves as a visible public for each other, before which a view of themselves is presented.<sup>8</sup> With this self-presentation before others the actor is trying to evoke 'a certain image, an impression of himself, by more or less purposefully disclosing his subjectivity' (ibid.: 86). In doing so an actor is 'styling the expression of one's own experiences with a view to the audience' (ibid.: 86). The dramaturgical model of action presupposes two worlds, the internal world (subjective world) and the external world (objective world and social world). The external world can be defined as 'being shared with others' (ibid.: 52).

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<sup>8</sup>Dramaturgical action seems to be related to strategic action. Habermas (1984) states that only when the self-presentation is judged 'according to the criteria of success by the audience as well, it no longer falls under the description of dramaturgical action' (p. 94).

Within dramaturgical action one type of argumentation is possible:

- In case of beliefs and intentions (cognitive acts) *truthfulness* or *sincerity* of self-presentation is judged according to ‘whether at the proper moment the actor is expressing the experience he has, whether he means what he says, or whether he is merely feigning the experience he expresses’ (Habermas, 1984: 93). With desires and feelings ‘it is sometimes difficult to separate questions of sincerity from those of *authenticity*’ (ibid.: 93). Authenticity of self-presentation is judged according to ‘whether the feeling or need expressed is what one really feels or needs’ (White, 1988: 39).

Within the model of *communicative action* ‘actors seek to reach an understanding about the action situation and their plans of action in order to co-ordinate their actions by way of agreement’ (Habermas, 1984: 86). This requires ‘a co-operative process of interpretation aiming at situation definitions that are intersubjectively recognized’ (ibid.: 70). Also within communicative action participants can pursue their individual goals. They assume, however, ‘that they can harmonize their plans of action on the basis of common situation definitions’ (ibid.: 286).

The validity claims an actor must raise with his utterance are (ibid.: 99):

- Truth: ‘[t]hat the statement made is true (or that the existential presuppositions of the propositional content mentioned are in fact satisfied)’.
- Rightness: ‘[t]hat the speech act is right with respect to the existing normative context (or that the normative context that it is supposed to satisfy is itself legitimate)’.
- Truthfulness: ‘[t]hat the manifest intention of the speaker is meant as it is expressed’.

A presupposition for the recognition of the three claims mentioned above is that the well-formedness of the symbolic expressions employed can be criticized. So, In order to communicate successfully a listener must both comprehend (validity claim: comprehensibility or well-formedness) and accept (validity claims: truth, rightness or justice, and truthfulness or sincerity) the speech act.

We have now introduced two paradigms and related theories. In the next sections, the agency theory and Habermas’ critical theory on social actions are adopted for analysing communication and ICT.

## Communication in construction: the functionalist perspective

The *contract*, the *frames of reference* of the parties involved and the *interests* of the parties involved (together with a lack of trust) are three major factors influencing interorganizational communication (i.e., communication between client and contractor) in the construction phase of construction projects (Adriaanse *et al.*, 2002). In this section, these three factors influencing interorganizational communication are analysed from the functionalist perspective of the agency theory.

In terms of the agency theory, the *contract* governs the principal–agent relationship between client (the principal) and contractor (the agent). The contract specifies what the contractor should do and what the client must do in return. In the quality plan, the contractor describes how he secures the quality. The contractor has to follow the quality plan and is responsible for showing that the quality of the product delivered meets the specifications in

the contract. Because of the complexity of construction projects, and the resulting uncertainties and changes in the contract, a huge amount of information has to be exchanged between participating organizations. In order to limit self-interested behaviour by the contractor, the client can monitor the contractor. Ideally spoken, monitoring costs are minimized by giving the contractor the responsibility for securing his own quality. The contractor may only proceed with the execution once he has proven that the previous stage is finished according to the requirements of the specifications. Because of information asymmetry, however, the contractor's information and actions need to be checked. Such monitoring is difficult: concealed actions are a major problem in this agency–principal relationship. Organizations follow the contract, but when they think this jeopardises their own interests they try to offload their responsibilities onto the other party.

In construction projects, intricately interdependent activities have to be carried out by distinct organizations with a diverse range of, often conflicting, *interests* (Cheng *et al.*, 2001; Kornelius and Wamelink, 1998; Loosemore, 1999). The main interests of the contractor (the agent) are its reputation and optimizing the financial results (i.e., gaining the maximum from extra work and finishing the project as soon as possible). The contractor tries to fulfil the requirements as soon as possible at the lowest possible cost. The overriding interest of the client (the principal) is the construction of a good product (i.e., satisfying the specifications in the contract) within time and budget restrictions. Conflicts of interests increase the value of information as a source of power in negotiations and make people more secretive about divulging it. Parties can manipulate information for their own benefit (Loosemore, 1999; Pietroforte, 1997). This can result in a lack of open communications, or the sending of unclear or uninformative messages. The client and the contractor have conflicting interests. Neither party sees any benefits from communicating more than that prescribed in the contract, and both use information as a source of power.

The sending of unclear messages is also caused by the fact that the client and the contractor often speak a different language. These differences are seen as the result of different ways of thinking and working or *frames of reference*. Time and money specify the contractor's frame of reference. He wants to complete the project as soon as possible, and wants to earn as much money as possible through extra work. The client wants the agreements on quality to be met within the constraints of time and budget. Given these differences in the *frames of reference* (i.e., differences in their ways of working and thinking) there is a lot of misunderstanding and misinterpretation (see also Pietroforte, 1997). These differences in frames of reference may be related to differences in interests. In that view these differences can be explained by the agency theory. However, different frames of reference may also be the result of the various professional backgrounds of the parties involved (Cheng *et al.*, 2001; Moore and Dainty, 2001). Subjective understandings of information, situations and actions of others cannot be explained by the agency theory. This theory is only concerned with the observable behaviour of a principal and an agent. As a result, from the agency theory perspective it is possible to completely miss the significance of situations to the people involved and therefore it is impossible to predict with any accuracy their reactions (see e.g., Silverman, 1970: 127–30).

One can conclude that from the agency theory perspective interpretation and communication problems with the contract are the result of conflicting interests and different frames of reference. However, there are also drawbacks of the agency theory. The agency theory seems to be too restricting in only assuming opportunistic behaviour. Trust is an important factor influencing the level of interorganizational co-operation in construction projects. The

importance of trust is also supported by literature on partnering (Black *et al.*, 2000; Ng *et al.*, 2002). Also differences in interpretation and meaning of e.g., information and situations are difficult to understand from an objectivistic epistemology.

## Towards a critical research agenda

It seems that in addition to the strict economic perspective there is a need for another perspective. Many researchers have argued for closer attention to the socio-political aspects of interorganizational ICT (e.g., Bensaou, 1997; Bensaou and Venkatraman, 1994; Kumar and Van Dissel, 1996; Reekers and Smithson, 1996). Therefore, several scholars in this field of research have taken a position alternative to the functionalism paradigm. The critical social perspective is one of such positions.

In this section, the critical social perspective of Habermas' theory on social action is adopted to analyse interorganizational communication and ICT in construction (i.e., the factors: contract, interests, frames of reference). Communication in construction can be related to the models of action and the validity claims incorporated in these models.

### Models of action

The tendency of actors to conform their behaviour to what is formulated in the *contract* can be interpreted as *normatively regulated action*. Actors fulfil reciprocal expectations by conforming their behaviour to the contract. The messages organisations communicate depend basically on what is agreed in the contract. In normatively regulated action the juridical aspect plays a major role (Basden, 2002: 260). Because of the contract actors expect others to behave in a certain situation in a certain way.

Organizations in construction projects can use information as a source of power (i.e., factor *interests*). This can result in actors sending unclear and uninformative messages and manipulate information in order to influence other actors to achieve one's goals. Using information as a source of power is a result of *strategic action*. Actors try to achieve their goals by influencing decisions of other actors. Neither party sees any benefits from communicating more than that is prescribed in the contract. Actors try to defend their own interests. Differences in contract interpretation can be the result of conflicting interests. This is consistent with Habermas' strategic action. The degree of cooperation and conflict varies with the given interest positions.

Communication between organizations is made difficult by differences in their *frames of reference* (i.e., different ways of working and thinking). This results in a lot of misunderstanding and misinterpretation of information. The contract appears to be the only shared frame of reference. The client judges the correctness of the contractor's behaviour by relating actions to the contract. However, information in the contract, such as about time (when are activities delayed?), money (which activities are part of the contract, and which activities are extra work?) and quality (what are the exact specifications?), is also open to different interpretations. It seems that in both normatively regulated action and strategic action misunderstanding and misinterpretation may occur because of differences in the frames of reference of different participants.

Habermas' models of action can be used to analyse the use of ICT. A well-known example of this type of research is Ngwenyama and Lyytinen (1997). These authors use the types of

action as ideal types<sup>9</sup> to analyse groupware technologies. Within each model of action different rules (e.g., behavioural, such as rules of grammar, organizational policies, explicit norms and protocols; technical such as systemic procedures and guidelines) and resources (e.g., communicative media, tools) are required in order to support everyday activity in an organizational context. Groupware technologies serve as sets of rules and resources. However, these applications can enable and constrain group activity. There needs to be a fit between groupware and groupwork. Ngwenyama and Lyytinen (1997) critically analyse the espoused or implicit assumptions of groupwork embedded in groupware technologies, and their potential (or limitations) to support different models of action. The match between groupware and groupwork is important in order to avoid user rejection or failure of well-designed applications.

Adriaanse *et al.* (2004) showed that Habermas' models of action can be related to ICT developed for construction projects. Based on a discussion of several ICT applications (Tserng and Lin, 2003; Weippert *et al.*, 2002; Dawood *et al.*, 2002; Thorpe and Mead, 2001; Tam, 1999; Deng *et al.*, 2001) they concluded that the dominant model of action that can be supported by ICT is *communicative action*. With the use of ICT applications actors try to reach an understanding about action situations and their plans of action in order to coordinate their actions. For example with the use of e-AMPS (Tserng and Lin, 2003) participants communicate automatically real-time scheduling information in order to make appropriate decisions in regard to project control. All other applications discussed by Adriaanse *et al.* (2004) share the same characteristics. They all try to improve coordination, distribution and storage of as well as access to project information.

Adriaanse *et al.* (2004), however, argued that *normatively regulated* action can be also supported by the developed ICT applications. When participants make arrangements about their communicative behaviour and the use of ICT, appropriate use of applications is the result of the conformation of behaviour to fulfil reciprocal expectations. These arrangements must be based on the coordination of actions. In that case, appropriate use of ICT applications is not the result of behaviour based on cooperation but behaviour based on the fulfilment of reciprocal expectations. So, action types that can be supported by the developed ICT applications in a project management context are communicative action and normatively regulated action.

One can conclude that specific ICT tools support specific types of action. It seems that normatively regulated action and strategic action are dominant in construction projects and that communicative action and normatively regulated action can be supported by available

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<sup>9</sup>In real-world communications these ideal types can only be approximated (Ngwenyama and Lee, 1997: 153). Ngwenyama and Lyytinen (1997) do recognize the fact that groupwork forms a web of social action. In complex situations all social action types are present. Groupware can also support several types of action and there are interdependencies among action types. They suggest, however, that '[a] specific action type will take the foreground depending on the type of group process involved and its institutional properties' (ibid.: 79). Note that Ngwenyama and Lyytinen (1997) distinguish instrumental action, strategic action, communicative action and discursive action in their framework. According to Lyytinen (1992) these four action types are prominent in information systems. Although Habermas does not distinguish discursive action, it could easily be added into his analysis (ibid.). Actors use discursive action when an agreement between a group of actors about a shared background can no longer be taken for granted (Hirschheim *et al.*, 1996; Lyytinen, 1992; Ngwenyama and Lee, 1997; Ngwenyama and Lyytinen, 1997). Within this action type actors try to discover or weight the arguments proposed for or against a message. In our research we follow Habermas' original classification.

ICT applications. The use of ICT can have different consequences for construction projects. Standardisation of communication results in greater transparency and clearer structure of communication. In that case, the possibilities for strategic action and the differences in the frames of reference will decrease. However, this might not be beneficial to all the parties involved. These parties might act strategically by trying to avoid or sabotage ICT. When, for example, a document is not stored directly it will not be available for other participants. Therefore, from the perspective of the models of action there is a need for an alignment between communication and ICT.

When Habermas' models of action are used to analyse the use of ICT in construction projects the following questions emerge for the critical research agenda:

- Questions related to existing communication processes in construction projects:
  - What are the social action characteristics (i.e., communication characteristics)?
  - Which rules and resources are needed by actors to perform their actions within the project context?
  - Which models of social action need to be supported by ICT?
- Questions related to developed ICT applications for construction projects:
  - What are the underlying/implicit assumptions embedded in ICT?
  - Which rules and resources are embedded in ICT?
  - Which models of social action can be supported by ICT?
- Questions related to the actual use of ICT in construction projects:
  - What is the potential of ICT for alternative uses from different models of action (risks and challenges)?
  - How do actors use ICT in different action situations (models of social action)?

### **Validity claims**

The validity claims incorporated in the models of social action can be used in order to analyse interorganizational communication conducted via ICT in construction. Ngwenyama and Lee (1997) use Habermas' validity claim concept in order to analyse communication richness. According to Ngwenyama and Lee (1997), communication richness is the result of the testing of validity claims associated with the action type enacted by the speaker or writer. According to Ngwenyama and Lee (1997): 'In testing the claims, the actor draws upon his knowledge of the organisational context (norms of interaction, power, status differences, etc.), the particular action situation itself, and the orientation of the other person whose action is being contested. By critically reflecting in this manner, the actor can free himself not only from false unwarranted beliefs and assumptions about the other person or her action, but also from constraints to enacting coherent meaning of the situation and taking appropriate counteraction' (p. 153). In different models of action different validity claims must be defended. The results of the validity claims testing enable the listener or reader to detect and analyse distorted communication and to emancipate him from distorted communication (Ngwenyama and Lee, 1997). Ngwenyama and Lee (1997) show the usefulness of this approach in empirical research.

Several scholars also use Habermas' critical social theory in order to analyse trust when using information systems (Van der Smagt, 2000; Weigand and Van den Heuvel, 2001). Weigand and Van den Heuvel (2001) define trust 'to be (the level of) grounded expectation that the other agent is acting communicatively' (p. 10). Van der Smagt (2000) discusses two types of organizations: bureaucratic and post-bureaucratic organizations. According to Van

der Smagt (2000) in bureaucratic organizations only the validity claim of appropriateness is thematized. This may be the result of a lack of motivation to act co-operatively in bureaucratic organizations. Workers are only responsible for the success of their own contribution and do not worry about the overall success. In postbureaucratic organizations not only the appropriateness, but also the truthfulness, completeness and sincerity are thematized. According to Van der Smagt (2000), only when these validity claims are tested, trust is established. Weigand *et al.* (2003: 11) translate the concept of trust to business relations. They argue that trust strongly urges for the use of communicative action.

The validity claims incorporated in the models of action can be used for analysing interorganizational use of ICT in construction projects. Standardization of communication results in greater transparency and clearer structure of communication decreasing the differences in frames of reference. This might enable the actors to better criticize the validity claims. However, the exact consequences of the use of ICT in criticizing the validity claims in construction projects are unclear. There is a need for empirical research in order to find out the consequences. The following questions for the critical research agenda emerge:

- What are the barriers that prevent people from raising validity claims?
- How do actors criticise the validity claims in different action situations (models of action)?
- Do actors detect communication distortions while criticising validity claims?

## Conclusions

In the introduction, it was commented that an understanding of the nature of interorganizational communication is an essential prerequisite for effective an analysis and design of ICT. Therefore, the focus of this study has been on characteristics of interorganizational communication in the construction phase of construction projects in order to analyse obstacles and preconditions for an effective use of ICT.

In this study, it is shown that in addition to the functionalist perspective, the critical social theory is an appropriate theory for analysing interorganizational communication and use of interorganizational ICT. The concepts of the models of action and validity claims have been used to formulate a research agenda for the use of interorganizational communication and ICT. It has been shown that communication in construction projects has the characteristics of several models of action. ICT developed for construction projects can support specific models action. From the perspective of the models of action there is a need for an alignment between communication and ICT. The validity claims incorporated in these models of action can also be used in order to analyse organizational communication conducted via ICT. The results of the testing of validity claims enable the listener or the reader to detect and analyse distorted communication and to emancipate him from distorted communication. It can be concluded that the development of a critical research agenda on communication and ICT research in construction will lead to a more articulated view on the alignment between ICT applications and communication in construction projects and will show new directions for ICT development in the future.

Yet, the critical social theory has had only a small impact on information systems research (Lyytinen, 1992). According to Lyytinen (1992) in order to make the critical social theory a viable research approach 'the research should step from elevated critique into the practical



research mode' (p. 171). There is a need for 'problem-focused studies of the implications of Critical Theory for IS' (ibid.: 171). The formulated research agenda is the first step towards more empirical research into interorganizational use of ICT in construction projects from the critical social perspective.

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