

Coordination through Communication

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Abstract

Characteristic of the LAP approach is that communication is considered as a way of coordinating behavior. However, little has been said so far about how communication supports coordination, and how it relates to other coordination mechanisms. The objective of this paper is to clarify the relationship between coordination and communication. It contains an overview of the literature on coordination and describes how communication as it is conceived in LAP relates to the “standard” coordination and integration mechanisms. We conclude that this relation is becoming very tight in modern organizations and also indicate what this could mean for LAP.

1. Introduction

In the Dark Ages, the first thing that monasteries did when they started to pull what was later to become western civilization out of the "bog" of the Dark Ages was to build a bell tower, put a bell in it, and ring it on at least the canonical hours. It is said that by giving order to the day, that ringing of the bell pulled off western

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civilization. A few centuries later, the chronometer developed by John Harrison caused a breakthrough in the problem of navigation on the sea, and in this way contributed greatly to the slow but massive process of globalization. The clockwork became the prime metaphor of a mechanical worldview that has also influenced the modern thinking of organizations. The modern world is first of all a highly complex world that demands an extreme level of coordination. The old bell towers do not suffice anymore, but new bell towers were erected, such as the Internet. The communication needs of modern society seem to be ever growing [Levine et al, 2000].

The Language/Action Perspective is a way of thinking about communication that looks at communication in terms of what people DO with words: requesting, declaring, promising etc. Such acts are traditionally called *speech acts*, or communicative acts. These acts do not directly change the (physical) world, as production acts do. Nevertheless, they do have effects, e.g. of creating an obligation, and these are more than a cognitive effect in the mind of the parties involved. They do have an effect on the *social* world in which we live: the norms and expectations that we consider to be in place at some point in time. Because of this effect on the social world, communication can be considered a *coordination* device. For that reason, Dietz [2002] even equates communication acts with *coordination acts*. This intimate connection between communication and coordination seems to be in line with Habermas' theory of communicative action. Communicative action is usually defined as actions towards mutual understanding (*Verständigung*) whose goal is the coordination of the actions of the participants.

In the LAP literature, much has been written about communication, but surprisingly little about coordination as such. Coordination is a central term in organization theory. Economists talk about the market and the hierarchy as alternative coordination devices [Coase, 1937]. Mintzberg [1979, 1989] has developed a typology of organizational configurations that is based on a particular view on coordination mechanisms. Based on his survey of the organizational literature, Mintzberg distinguished six coordination mechanisms, ways in which work is coordinated within organizations. These include direct supervision and standardization of skills, for example, (in Section 2, we will examine Mintzberg in more detail). The question that arises is: do LAP and organization theory use the word coordination for the same thing? If communication can be equated with coordination, how is it possible that LAP never talks about the coordination devices or coordination mechanisms that are discussed in the organizational literature? Apparently, communication is not completely identical to coordination. But if so, how do they relate? When is coordination achieved by communication? When does communication have a coordination goal?

It is worth noting that not all LAP researchers completely agree with Dietz's use of the concept of coordination act. According to [Goldkuhl and Lind, 2002], material production acts can also have a coordinating force. For example, the delivery of physical goods from a supplier to a customer is a multifunctional act. It not only causes the goods to be present at the customer's premises, but also informs that customer that the supplier has fulfilled his obligation to deliver. Goldkuhl and Lind refer to Mintzberg's coordination mechanism of "mutual adaptation", and they claim that this can be exerted without explicit communication. So they conclude that the communicative act (immaterial by definition) cannot be equated with coordinative act: coordination can also be achieved by other means than communicative acts (material acts).

[Weigand and Dignum, 1997] observed that Habermas's definition of communicative action consists of two elements that do not necessarily go together: communicative action *consists* of action towards mutual understanding, and *aims* at coordination. Sometimes, there is an exchange of messages oriented on mutual understanding, but without an identifiable coordination goal. This type of communication is called *conversational* action. The opposite also occurs: that the coordination objective is clear, but there is little or no explicit action towards mutual understanding, typically because the situation definition has been established already before. This type of communication is called *consensual* action. On the basis of this distinction, Weigand and Dignum define a coordination spectrum, from conversational action on the one side to consensual action on the other side.

The objective of this paper is to clarify the relationship between communication and coordination. To this end, we first provide a short tour through the organizational literature on coordination (Section 2). With this background, we address the question how communication works and how it can achieve coordination (Section 3). In Section 4, we discuss the relationship between communication and coordination in more detail, and in Section 5, we draw some conclusions and provide directions for further research.

2. Coordination theory

Coordination is a classical problem in organization theory. It is a key factor in e-commerce, where it is considered to be one of the 5 C's: coordination, commerce, community, content, and communication [Afuah and Tucci, 2001:p.32]. Malone and Crowston [1994] were the first to propose an interdisciplinary science of coordination, as coordination problems are also addressed, for example, in Computer Science. Table 1 contains a number of definitions of coordination.

Without going into elaborate definition discussions, we make two observations: (a) the rationale behind coordination is the existence of *dependencies* between activities or entities, and (b) the goal of coordination is to manage these dependencies in such a way that the activities become parts of a purposeful whole (using the words of [Holt, 1988]). Both points deserve more attention.

The need for coordination arises from the existence of dependencies. If there is no interdependence, there is nothing to coordinate [Malone & Crowston, 1994]. As Galbraith [1994] noted, one can reduce the need for coordination by reducing the interdependence. However, this can be done only to some extent. Interdependencies are a fact of human life, although it is not so obvious where they come from. Economists typically refer to the need for division of labor [Douma & Schreuder, 1992]. Division of labor increases efficiency (because of specialization), and creates, or at least increases, the need for coordination. Efficiency is not necessarily the only reason. The existence of interdependencies between humans can also be explained from their social orientation. Taking part in collaborative practices contributes to the meaningfulness of life. Yet another reason for the existence of dependencies can be drawn from Simon's theory of bounded rationality [Simon,1976]. Complex organizations simply cannot be handled by a single man's perspective, and therefore a completely centralized control is simply infeasible [Hayek, 1945]. From this it follows that organizations have multiple loci of control and multiple stakeholders, who are relatively autonomous in the goals they pursue but still interdependent.

Coordination is structuring and facilitating transactions between interdependent components [Chandler, 1962]
Coordination consists of the protocols, tasks and decision-making mechanisms designed to achieve concerted actions between interdependent units [Thompson, 1967]
Coordination describes the integrative devices for interconnecting differentiated sub-units [Lawrence & Lorsch, 1969]
The joint efforts of independent communicating actors towards mutually defined goals (NSF, 1989)
Networks of human action and commitments that are enabled by computer communications technologies [NSF 1989]
Composing purposeful actions into larger purposeful wholes [Holt, 1988]
Actions and decisions of individual actors within an organization which need to be timely attuned for the organization as a whole to realize its aim [Koningsveld and Mertens, 1992]
The integration and harmonious adjustment of individual work efforts towards the accomplishment of a larger goal [Singh,1992]
Coordination is the act of managing interdependencies between activities performed to achieve a goal [Malone & Crowston, 1994]
Establishing attunement between tasks with the purpose of accomplishing that the execution of separate tasks is timely, in the right order and of the right quantity [Reezigt, 1995]

Table 1: Some definitions of coordination

Given the unavoidable existence of dependencies, coordination is the effort to manage these dependencies, ideally in such a way that the activities become parts of a purposeful whole. This does not imply that the actors involved are necessarily cooperative; a competitive game can be a purposeful whole as well. Coordination can be said to be successful when the actors involved are satisfied. However, Malone and Crowston [1994] note that: “good coordination is nearly invisible, and we sometimes notice coordination most clearly when it is lacking”.

Given that coordination is about dependencies, the next question is what kind of dependencies are we talking about. Coordination theory provides a small typology as shown in the table 2.

<i>Dependency</i>	<i>Examples of coordination processes</i>
<ul style="list-style-type: none"> • Shared resources 	“first come first serve”, priority order, budgets, managerial decisions (hierarchy), market-like bidding (markets)
<ul style="list-style-type: none"> • Task assignments 	
<ul style="list-style-type: none"> • Producer / consumer relationships 	
<ul style="list-style-type: none"> • Prerequisite constraints 	Notification, sequencing, tracking
<ul style="list-style-type: none"> • Transfer 	Inventory management (e.g. “just in time”, “economic order quantity”)
<ul style="list-style-type: none"> • Usability 	Standardization, ask users, participatory design
<ul style="list-style-type: none"> • Design for manufacturability 	Concurrent engineering
<ul style="list-style-type: none"> • Simultaneity constraints 	Scheduling, synchronization
<ul style="list-style-type: none"> • Task / subtask dependencies 	Goal selection, task decomposition

Table 2: The most important kinds of dependencies, [Malone & Crowston,1994]

Note that some dependencies are symmetric, for example, the dependency on shared resources and simultaneity constraints, whereas other are asymmetric, such as the producer/consumer relationships.

2.1 Managing dependencies

According to Malone and Crowston [1994], coordination is the act of managing interdependencies between activities performed to achieve a goal. What seems to be underestimated in this definition and in their broad overview is that coordination is not only “making things fit”. The problem of coordination is aggravated by several factors, such as the information asymmetry that usually exists between the actors. This problem has been studied extensively in the agency theory literature [Eisenhard, 1989]: if I hire an agent to do a certain job, how can I make sure that he also will perform his job in the best way (best for me),

given the reasonable assumption that he will optimize his efforts so as to maximize his own utility. What is the optimal reward structure? If we take into account that people behave opportunistically, and any realistic approach should take that into account, then coordination is more than “making things fit”. Central in Mintzberg’s [Mintzberg, 1989] organizational pentagon model are the conflicting forces of cooperation and competition. From that perspective, coordination means coping with these forces: how to counteract the “pulling apart” force of competition and the dysfunctional influence of politics?

A second problem that seems to be overlooked by Malone and Crowston is the indeterminacy of communication. Coordination is usually achieved with some kind of communication or information exchange. However, as Taylor [Taylor,1993:209] notes, every communicative exchange is generative of indeterminacy. This is because communication involves the wording of intentions that must be interpreted by the receiver. This indeterminacy is related to what Weick [1969] has called the equivocality (“ambiguity”, “confusion”, “conflict”, “lack of shared understanding”) that organizations have to face.

To deal with coordination problems micro-economic theory proposes the use of market transactions to reduce coordination costs. When all the necessary information is available to both parties, price is a sufficient coordination mechanism to coordinate the transaction. But in reality people are only rational within bounds [March and Simon, 1958]. To overcome the costs of coordination due to information problems, we can turn to the use of organizations (“hierarchy”). Organization theorists such as March and Simon (ibid) and Mintzberg (ibid) have devised a number of coordination mechanisms within organizations. Table 3 shows these mechanisms and their corresponding descriptions.

Coordination mechanism	Definition
Mutual adjustment	Achieves coordination by the simple process of informal communication
Direct supervision	Achieves coordination by having one person issue orders or instructions to several others whose work interrelates
Standardization of plan	Achieves coordination through the establishment of schedules by which the activities in organizations are performed
Standardization of work processes	Achieves coordination by specifying the work processes of people carrying out interrelated tasks
Standardization of output	Achieves coordination by specifying the results of the work
Standardization of skills and knowledge	Achieves coordination of work by virtue of the related training the workers have received
Standardization of norms	Achieves coordination by controlling the norms infusing the tasks, usually for the entire organization, so that everyone functions according to the same set of beliefs

Table 3: Coordination mechanisms in organizations [Mintzberg, 1979]

These coordination mechanisms are traditionally divided into three groups: *standardization* (in its various forms), *hierarchy* or direct supervision (typically supplementary to the standard procedures, to solve infrequent situations for which standardized programs have no solution), and *mutual adjustment*, which again supplements standardization and the hierarchy. It is interesting to see that standardization typically means control of the agent *behavior* and minimization of communication. In this way, the equivocality associated with communication can be reduced, but the other side of the coin is of course that the organization risks rigidity, lack of contact with the enacted environment and stereotyped thinking [Taylor, 1993:141].

In general, it is assumed that when organizations evolve, so do the coordination mechanisms that they employ. For example, the shift to e-commerce involves among other things that organizations are confronted with new forms of information technology. On the one hand, this technology reduces uncertainty by creating the opportunity of a shorter time span of definite feedback and by increasing the clarity of information. ICT may even reduce the degree of information asymmetry, by disclosing relevant information on time to the relevant actors. However, the rate at which information is being exchanged is much higher than in traditional non e-commerce settings. Currently, the information systems within large organizations are not able to support this higher exchange rate. This can lead among other things to information overload, with confusion as the result. That again can cause conflict and a lack of shared understanding. To deal with these equivocality organizations are evolving towards networked organization structures. Mutual adjustment or horizontal coordination – also referred to as internal networks or lateral relationships [Galbraith, 1994] – are the most significant contemporary development in organization design [Daft,1998; Mintzberg, 1989], cf. Figure 1.

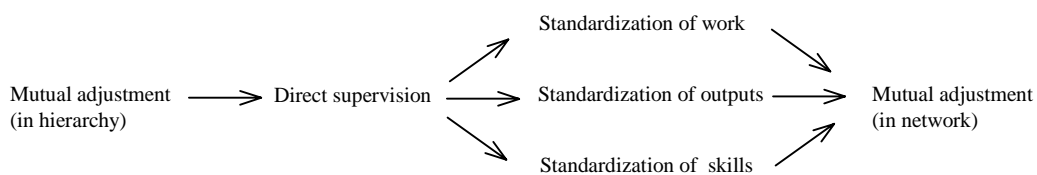


Figure 1: The evolution of coordination mechanisms, adapted from [Mintzberg, 1979]

2.3 Mutual adjustment

Mutual adjustment is usually associated with “horizontal coordination” and “lateral relationships” and is said to be realized by “simple, informal” communication processes. However, [Peterson, 2002] argues that mutual adjustment is not simple, nor is it developed automatically. Under conditions of uncertainty and equivocality, organizations must purposefully design lateral coordination. Mutual adjustment is also described as *integration* [Lawrence and Lorch, 1967]. Three levels of integration can be distinguished:

- *Structural integration* (e.g. a liaison role, but also job rotation or email infrastructure)
- *Process integration* (e.g., one decision process is performed after the other)
- *Collaborative integration* (socialization, joint decision-making, shared understanding)

According to [Galbraith,1994], these levels depict a cumulative hierarchy, in which process integration builds on structural connections, and collaboration builds on process integration. Structural integration reduces uncertainty, process integration reduces equivocality, and collaborative integration creates mutual understanding.

Collaborative integration comes the closest to what LAP theory calls communicative action aimed at shared understanding. On the account so far the following definition can be given [Gray, 1991]:

“Collaborative integration is the *voluntary participation* in the process of joint decision-making among *interdependent* parties, involving *joint ownership* of decisions and *collective responsibility* for the outcomes”

According to Gray and others, collaborative integration is characterized by its participative and shared nature. This is also the basis for the collective responsibility for the outcomes. This definition stresses that the parties are interdependent. They want to reduce uncertainty and equivocality to make better decisions. Joint ownership means that the different stakeholders are sharing a “*mutual commitment*” amongst one another. As the term ownership can be replaced by the term partnership, this mutual commitment is also a *long-term commitment*. During participation, influence is exercised and shared among the stakeholders regardless of their formal position or hierarchical structure. The essential element here is building a basis of “shared understanding” and or “mutual

commitment”. Peterson (ibid) notes that this shared understanding is inherently dynamic and is structured more as webs of meaning, than as linear ordered graphs. Note that the term has many different synonyms like for example “shared mental models”, “shared thought worlds”, “shared frames”, “shared knowledge” and “collective minds”.

It is important to realize that at this point of collaborative integration, the limitations of coordination theory become apparent. Crowston and Kammerer [1998] phrase it as follows in their study on software development:

“After our initial analysis of data from two sites, it seemed that coordination theory did illuminate some of the problems of requirements analysis on large projects, but it provided only one approach to the problem of software development. Better ways for analysts to coordinate were certainly important, but it seemed equally necessary for group members to develop shared understanding of customers’ needs and to anticipate what actions would contribute to the process. The key to the successful coordination of the requirements analysis seemed to be that the analysts mostly “just knew” which features were needed, whom they had to consult for advice on which features to pick, and whom to ask to write a specification or check for dependency. The question then became, “How did they know that?” – a question that coordination theory was not designed to answer”.

2.4 Summary

We summarize the preceding discussion as follows. Coordination is a process aimed at managing dependencies. Within a traditional organization, the hierarchy is the backbone of coordination, but additional coordination mechanisms are standardization of work practices and mutual adjustment. Mutual adjustment, also called horizontal integration, involves structural arrangements and process integration, but in the end it is based on mutual understanding. So we can conclude that when communicative action is aimed at mutual understanding, it is an integration mechanism indeed, and thus also a coordination mechanism. So it makes sense to assess the value of the communication processes from a coordination perspective. Do they provide an *efficient* coordination mechanism? What are the alternatives? These questions will be addressed in section 4. We have also observed that coordination theory does not have much to say about *how* communication works and how it is to be supported. This question is addressed in Section 3.

3. Communication theory

This section will discuss how the language action perspective (LAP) as a theory of communication deals with the process of creating a “shared understanding”. We will argue that the presence of a “shared background” or “common ground”¹ as Clark [1996] calls it, is an essential part in creating a “shared understanding” of the situation at hand. To explain the various LAP views we follow the theory of communicative action as described by Habermas, Searle’s theory of speech acts and Clark’s account on using language.

According to Clark [1996], the main coordination problem is what actions participants expect each other to take given the current situation. Note that this characterization takes the viewpoint of the participants themselves, and seems to be more restricted than the management viewpoint expressed in the previous section. Is it not possible for actors to have a coordination problem without being aware of it? This is a relevant question that we will discuss below. According to [Habermas, 1984], coordination becomes an issue only if all participants acknowledge that they are dependent on one another to act in the current situation. Here to act means to (try to) control a situation that is deemed problematic, by performing some action plan. There is always a certain level of uncertainty in performing actions. When the action is an *instrumental* action, that is, an action oriented at some object in which some state is transformed into a desired state, the action may be successful or not, depending on physical circumstances. Another level of uncertainty is introduced when the actor has to deal with different actors who have their own action plans. Trying to manage this kind of uncertainty is called *strategic* action by Habermas. This problem has been explored in depth by game theory; an important difference with the uncertainty of instrumental action is that the other actor’s behavior is not determined in advance but will depend on the actions of the actor himself. A third level of uncertainty is introduced when the actors use communicative action: this is the problem of equivocality mentioned earlier.

We will now first elaborate on the notion of “shared background” and then discuss the different kinds of communicative acts. The former has to do with the communication *state* and the latter with the communication *process*.

3.1 Shared background

In interpretations of Habermas’s theory of communicative action, communicative action is often conceived of as a deliberate, cooperative attempt of agents to reach an agreement or consensus that coordinates their actions. Though not wrong, this conception is misleading because of its incompleteness [Vromen,1996]. It is misleading because it suggests that every agreement reached is achieved by

¹In our view these terms attend to the same meaning, so we will use these them interchangeably.

“starting from scratch”. It ignores that in Habermas’s view, communicating agents are most of the time provided with tacit or implicit agreements by their life world (Lebenswelt). Whereas Winograd and Flores [1986], in the line of Searle, emphasized the power of commitments (as can be seen very clearly in the design of the Coordinator), for Habermas the commitments themselves are less important than the shared background in which the legitimacy of these commitments is grounded.

The notion of shared background has been worked out under the name “common ground” by Clark [1996]. In trying to solve a coordination problem, the participants will fall back on their common ground. For example, they may make use of conventions, precedents, and implicit and explicit agreements. The acknowledgement of mutual dependence consists, according to Habermas, of an interpretation of the situation at hand based on the participants’s shared background. This process of interpretation is also called creating a “shared understanding” or “shared basis”. Common ground can be represented as follows²:

Proposition p is (shared) common ground for members of community C if and only if:

- every member of C has information that basis *b* holds;
- *b* indicates to every member of C that every member of C has information that *b* holds;
- *b* indicates to members of C that *p*.

Here basis *b* represents the obtained “shared understanding” of the current situation. Other instances of *b* can be “shared belief”, “shared knowledge”, “shared assumptions” and “shared awareness”. [Habermas, 1984] describes *b* in terms of obtaining a “shared understanding” of the system world (or object dimension) and the life world (or subject and social dimensions). This means that participants not only share knowledge about the objects (like standard procedures) they are interacting with, but also share experiences about their subjective feelings, wishes and social relationships. Clark [1996] goes on by stating the principle of *joint salience*, which says that coordination problems will be addressed by taking the most salient, prominent or conspicuous elements from the participants’ common ground.

Clark makes a further distinction between *communal* common ground and *personal* common ground. The first denotes things like nationality, profession, hobbies, language, religion, or politics. Cultural communities, including organizations, differ on facts (basics of history, geography, etc.), conventions and norms (driving on the right, eating three meals a day, etc.) and procedures or routine actions (shaking hands, offering thanks, etc.). The second type, personal

² [Clark, 1996] gives 2 more representation of common-ground called CG-reflexive and CG-iterated. For our purpose CG-shared will do.

common ground, is the common knowledge based on personal experiences like having nicknames, expressing affection, etc.

Important in the creation of “shared understanding” are the concepts of inside and outside information of a community. Outside information refers to *types* of information that outsiders of a community *assume* is inside information of that same community. Whereas inside information pertains to the *particular* information that members of a community mutually *assume* to be possessed by all of them. For example in the establishment of a “shared understanding” on the basis of personal common ground we can divide participants into friends (insiders) and strangers (outsiders). From the management literature it is known that one of the most important steps in human resource management is to ensure that when people enter the organization, they become insiders and do not consider themselves as outsiders.

Habermas’s notion of the life world is derived from Wittgenstein’s phrase “form of life”, but there are also differences [Vromen, 1996]. According to Wittgenstein, we are all players in many different language games. Being a competent player means knowing the rules of the game, that is, knowing what kind of behavior is appropriate in that game (for oneself and for the other players). For Wittgenstein to have a shared understanding of a situation means that all agents identify the situation as the same game. And knowing in which game you are, determines what is appropriate behavior. Habermas’s life world (note the singular) is much broader: the life world is all the implicit background knowledge, not just the knowledge of which game you are in at some moment. In our opinion, both Habermas and Wittgenstein are useful. There is coordination because of shared background knowledge and because of the shared recognition of the game at hand (behavioral pattern) and its accompanying norms.

3.2 Communicative acts

Now that we have explained the common ground on which people base their “shared understanding” we go on by further clarifying the process of *creating* this “shared basis”. Here we base our account on Searle’s classification of speech acts and Habermas’ theory of communicative action. We will supplement these views with Clark’s view on joint actions, which stresses that both the speaker and the addressee should be taken into account when performing communicative acts.

Communicative acts are enabled by the social process of exchanging “language messages” or signals (body language, signs) between participants. The aim is twofold, namely commitment to some future action [Searle, 1969], and creation of a “shared understanding” against a shared background [Habermas, 1984; Clark, 1996]. A rather precise definition of communicative action by Habermas (adapted from [Koningsveld and Mertens, 1992]) is:

Communicative action consists of:

- A level of *Verständigung* (shared background) on the basis of which the actors create a “shared understanding”(interpret the situation at hand) by means of conversation (formal or informal);
- An operational level that rests on the basis of this “shared understanding” and deals with dependencies and problems related to instrumental action; this operational level consists of the use of regulative “language acts”.

Corresponding to these levels, two kinds of communicative acts can be distinguished: *conversational* acts that work on the level of *Verständigung*, and *consensual* acts that work on the operational level.

Conversational acts or conversation are often described as informal communicative acts. They occur without the aim for commitment to a specific future action³. Dealing with interdependencies means interpreting the current situation against the shared background, so the conversation can be seen as an “informal” exercise in interpretation [Koningsveld and Mertens, 1992]. This type of action is useful for keeping the common-ground up to date. The use of what Habermas calls the constative language act is as central to conversations as regulative language acts are to the coordination of instrumental actions. Asking questions is also a practical way of stimulating the conversation. Within an organization we can state that conversations start around the coffee-machine, or during lunch-breaks, or in hallways, etc. As the purpose of this paper is to clarify the relation between LAP theories and standard coordination mechanisms, one might be tempted to say that this informal process is an indication of mutual adjustment in its purest form. However, conversations need not be limited to this informal case; conversations can also be organized, for example, by planning meetings.

Consensual acts are typified by Koningsveld and Mertens [1992] as a short-cut version of communicative acts, where the interpretation of the situation (“shared understanding”) is given beforehand. So the “shared understanding” is already present or being created implicitly. An example here might be a surgeon who operates on a patient in coordination with nurses assisting him. Because of the vast amount of standard operating procedures (standardization of work, skills and norms) that are present in this situation, the needed “shared understanding” of the situation at hand is assumed to be implicit. This action type directly relates to the second part of Habermas’s definition of communicative action, namely that its main focus is coordinating problems of instrumental actions with the use of regulative language acts.

³ Conversations can be goal-oriented, for example the conversations for specifications in which communities define their socio-technical system [De Moor, 2002].

The distinction between the level of *Verständigung* and the operational level is important: the two levels can be intertwined, but this is not always the case, especially in professional organizations. Hence, to enable communication for coordination, we must be more specific about how to enable the conversational acts and how to enable consensual acts, or how to enable them both in the same process.

4. Coordination through communication?

Having clarified the notion of communicative action and the role of shared understanding in coordinating behavior, we are now in a position to come back to our main question: what is the role of communication in coordination. As we have seen in Section 2, mutual adjustment is considered the most basic coordination mechanism in the typology of Mintzberg. Mutual adjustment is where organizations start, and mutual adjustment is also the most prominent mechanism in organizations that support sophisticated innovation.

Innovative organizations gain their effectiveness (innovation) at the price of efficiency. According to [Mintzberg, 1989:218], the real root of inefficiency is the high cost of communication. People talk a lot in these organizations; that is how they combine their knowledge to develop new ideas. There is no easy solution to this inefficiency problem. The considerations in the previous section suggest that some gains can be made by paying careful attention to the shared background. Mutual adjustment is very costly when the agents have to start from scratch. The larger the shared background, either in terms of shared knowledge of the situation or, more specifically, in terms of behavioral patterns, the more efficient will be the communication processes. From there, we can explain that for these innovative organizations, organizational *learning* and knowledge management are very important. Not only because they need to innovate, and not only for not preventing the loss of individual expertise, but because these mechanisms can be used to optimize the shared background of the organization members.

Mutual adjustment is least prominent in the machine bureaucracy. The bureaucracy is an attempt to rationalize by standardization of work processes, due to an overriding need for routine efficiency. Standardization of work processes usually means that the coordination between actors at the operating core is not the responsibility of these actors themselves, but of the administrative center that also has to solve any operational problems that occur. The operational actions, including the communicative acts that are exchanged between the workers, serve coordination between their processes and can be legitimized by a situation definition, but this situation definition is under the control of the administrative center rather than the workers themselves. Hence, a machine bureaucracy cannot exist without a strong managerial hierarchy. However, this creates a new coordination problem between the operational core and the management. Taylor

[ibid, 1993:141] remarks: “I have been several times astonished by the inability of people separated by only one layer of supervision to sustain even a minimally meaningful conversation with each other, so different is their lived experience and their communicative matrix”. At this point, we can come back to the different views on coordination that we found in management theory versus communication theory (Section 3). The latter conceives the coordination problem from the perspective of the participants. When the tasks of two workers are interdependent, management theory views this as a coordination problem, even if the workers themselves are not aware of their interdependence and just execute the instructions given to them by the administrative center. According to Clark, the main coordination problem is what actions participants expect each other to take given the current situation. In this situation, the workers have no expectations of each other, so there would not be a coordination problem. This looks counterintuitive. However, there is a trick here, and this is caused by the fact we (following management theory) tend to ignore the role of the planner/manager. The participants have no coordination problem, as they have no other goal or expectation than to do their job as prescribed. The real coordination problem in this situation is therefore the coordination between the manager and the workers. The relationship between manager and workers is an agency relationship. Standardization is a way in which the manager tries to reduce uncertainty. Indeed, *she* has certain expectations, and so do the workers. So what has happened is that the bureaucratic standardization has eliminated a horizontal coordination problem between the workers by creating a vertical coordination problem.

In Habermas’s distinction between life world and system world, the machine bureaucracy is typical for the system world. However, in our opinion the distinction between life world and system world is not absolute. The life world contains behavioral patterns as well, rituals, customs, conventions, that have a normative load (cf. Wittgenstein), even if they have never been written down. Standardization means “freezing” certain behavioral patterns. Coordination efficiency is increased, but adaptation becomes more difficult. The solution for modern organizations must be sought in “flexible standardization”, where standards can be implemented and dismissed overnight. Information technology can play an enabling role here: where in the past it used to make rigid procedures even more rigid by freezing them in hard code, in the future, when it supports quick adaptability and extensibility, it can contribute to more flexibility. Adaptability is a strong research objective in software engineering, and is pursued nowadays for example by means of web service technology [Yang and Papazoglou, 2002].

Standardization of outputs is the prime coordination mechanism in *diversified* organizations. In this case, the attention is not focused on the work processes, but on performance targets or specifications that outline characteristics of a product to be produced. Although this regime may seem more “enlightened” than the

machine bureaucracy, the communication between head quarters and divisions on the basis of performance targets only is very thin. Mintzberg describes this type of organization as being “one step away from disintegration”. From a communication point of view, we argue that this danger can only be forestalled by adding “thick” communication lines and in this way supporting a sustainable (shared) life world. If this is not done, the organization could better dissolve itself.

The *professional* organization is based on standardization of skills and knowledge. In this case, the organization relies on the professional standards that an actor learns and maintains as part of a professional community. Skill is another name for appropriate behavioral pattern. Whereas behavioral patterns are prescribed by the administrative center in the machine bureaucracy, they are now prescribed by the protocols and codes of conduct of the professional community. In a dynamic environment, it is important that the professionals can keep their skills up to date, for example, by means of being a member of a community of practice. These communities often cross organizational boundaries and are also virtual communities, regularly being supported by Internet technology nowadays. A severe coordination problem may occur, however, if the skills of different professionals in the organizations do not match. According to Mintzberg, standardization of skills is a “loose coordination mechanism at best”. Hence it is very important that the professional actors do not only have the technical skills to perform the instrumental acts on an adequate level, but also the communicative skills – and means - to relate to other professionals.

5. Conclusion

Dependencies in organizations cannot be managed without communication – either horizontal communication in the form of mutual adjustment or vertical communication in the form of standardization or direct supervision. As organizational action is doubly embedded in a (horizontal) customer relationship and a (vertical) agency relationship [Weigand and De Moor, 2003], both approaches are possible and can complement each other, but a choice for one typically goes at the expense of the other. Traditionally, the Language/Action Perspective has focused on horizontal integration (producer/consumer dependencies, customer-orientation), but this is not the complete picture:

“In a case study at a large financial institution a communicative diagnosis revealed problems in the communication between local branches and the regional service center. The communication could be improved by “closing the loop” for each request coming from the branch to the service center. Interestingly, the problem was *caused* by the fact that procedures were not communicated in the same way to the local branches and to the service center. In other words, the real problem was not so much a breakdown in the mutual

adjustment between two operational units, but a breakdown in the communication of standards from the administrative center (including the IT management group) to the operational units. Therefore, our recommendations addressed both the customer loop at the operational level and the vertical communication within the organization” [Poll et al., 2002].

A second point that we want to make is related to the first one and is about the attention given to the shared background knowledge. Communication processes like the ones modeled in DEMO and other LAP approaches, model which actors interact and how, but they do not model the underlying background and how it is maintained. Not that it is possible to describe this background exhaustively in formal models, but this is also not needed. A diagnostic approach [Poll et al, 2002], would start with identifying breakdowns and communication inefficiencies, and from there go on to identify the most salient part of the actual and desirable shared background (cf. Clark’s principle of salience). This point deserves more future research.

A third related point is that in LAP the communication processes have primarily been viewed in terms of *customer* relationships that are coordinated by means of “mutual adjustment”. However, we must realize that mutual adjustment is not synonymous with customer orientation. An example is mutual adjustment in the process of business/IT alignment in large companies. The interesting question is then to sort out which elements of LAP are specific to customer relationships and which elements apply to all kinds of mutual adjustment. We hypothesize that the notion of *agreement* on the basis of communicative action is very general, but the contents of the agreement differs from one situation to another. In a customer relationship, agreement on the service to be performed and agreement on the satisfactory fulfilment of the service are very important. But what kinds of agreements are needed in other situations, for example, the above-mentioned business/IT alignment? This is an interesting and very practically relevant area for future research.

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