

Balancing Horizontal and Vertical Co-ordination in Business Transactions - Towards a Clarification of the Role of IT-systems in an E-commerce Setting

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Abstract

Organisations need to be co-ordinated in order to ensure solid foundations for the establishment of commitment as well as fulfilment of commitments according to expectations. Fulfilled expectations are drivers for customer satisfaction. Two types of co-ordination, based on communicative foundations, are distinguished in this paper as essential for a success in realising business transactions. These are horizontal and vertical co-ordination. Horizontal co-ordination (issued product assignments) deals with the particular customer order and is both internal and external. Vertical co-ordination (issued role assignments) deals with typical customer orders and is internal. In order to arrive at an efficient and successful realisation of business transactions there is a need to balance between the horizontal and vertical co-ordination. This paper deals with how such a balance can be achieved. Based on an analysis of the co-ordination in an e-commerce company we have come to the conclusion that there is a need to emphasise the horizontal co-ordination in the propositional content of the role assignment. Otherwise made commitments might be violated. Implications on IT-systems in order to facilitate such co-ordination there is a need to regard the IT-system as an agent with an action potential and action memory.

Keywords: Co-ordination, Business transaction, e-commerce, conversational analysis

1 Introduction

When developing information systems, there is a need to ensure that such systems give good support to the organisation. Critical issues when developing such systems are what aspects to take into consideration. There is a need to understand different aspects of the organisation and how the information systems can be supportive and integrated parts of the organisation.

Information system development can be dealt with from different perspectives. One such is the language/action perspective (Austin, 1962; Searle, 1969; Habermas, 1984). The language action perspective is based on the idea that communication is not just transfer of information. When you speak, you also act (Austin, 1962, Searle, 1969). Within the language/action community information systems are regarded as communication and action systems. LAP approaches have been proven to be powerful for developing and understanding the role of information systems in organisations, c.f. e.g. Action Workflow (Medina-Mora et al, 1992) and DEMO (Dietz, 1999). These approaches are also to prefer since they include a customer orientation and emphasise commitments made by different parties.

Customer orientation means that the ones that the organisation produces value for is in focus. In order to ensure such value creation it is essential that such actions are performed with quality. Since organisations normally consist of several producers the actions performed by the producers need to be co-ordinated (Mintzberg, 1993). Co-ordination is many times done through communication. Information systems can support such co-ordinative actions. In order to ensure high quality in organisations (meeting the customers expectations) there is a need to focus on the product produced for the customer and how this is produced (transformative

aspects). As a mean to reach this focus it is important to acknowledge the communication within the organisation as well as the interaction between the organisation and the customer (communicative and co-ordinative aspects).

A successful process of establishing commitments and fulfilling these commitments determines communication quality. In order to arrive at communication quality there is a need to distinguish between the organisation as an actor and the agents within the organisation acting on behalf of the organisation (Ahrne, 1994; Taylor, 1993). Different types of assignments govern organisations with its agents (Lind & Goldkuhl, 2001).

An “internal” action is governed by several assignments, i.e. an “internal” action is a multi-functional response. Actions are co-ordinated both vertically and horizontally, i.e. there exists both vertical and horizontal assignments. Vertical co-ordination is what often is depicted in the organisational chart in which hierarchical and role relationships are indicated. Such relationships are governed by the tasks that the role should perform and be responsible for (on type level) in the organisational setting. Horizontal assignments are concerned with the particular (e.g. the fulfilment of a customer order for a particular customer). The process flow encloses the horizontal co-ordination. Fulfilling a customer order involves several performances by different roles that are vertically co-ordinated. Horizontal as well as vertical co-ordination is always present during organisational actions. Both these dimensions of co-ordination need to be acknowledged in order to perform business with quality. In later research concerning business management as well as information systems development there has been a tendency to rather acknowledge the horizontal co-ordination than the vertical co-ordination.

In this paper we will use a case study performed at an e-commerce company. E-commerce is transaction intensive, i.e. many customer orders are handled. In order to perform the business in an efficient way, there is a need to establish all role relationships before the particular customer order arrives. This company is rather newly founded and has a very rapid growth rate. What can be noticed from this setting is that most work performed for the particular customer is governed by vertical co-ordination rather than horizontal co-ordination. This have the effect of that it is rather the task itself that govern the establishment and fulfilment of commitments than the actual product assignment forwarded in the organisation. Effects that we have acknowledged are that the company needs to split orders and/or replace some products within the customer order after the commitment to the customer has been made by the company.

By this paper, the importance of acknowledging vertical as well as horizontal co-ordination when designing information systems in organisations will be put forward. The purpose of the paper is to identify effects of an unbalanced relationship between horizontal and vertical co-ordination and to come up with recommendations concerning co-ordination supported by information systems.

This paper will be organized as follows. First we will discuss the theoretical background to the different concept used in the paper (section two). Then, in section three, we give an introduction to the case used followed in section four by the analysis. The paper will be summarized by some concluding remarks in section five.

The data used in the analysis of this paper have been derived from an action-research project. The empirical basis for this paper is a business modelling project performed in an e-commerce setting.

2 Co-ordination in business transactions

In this section, concepts such as social action, business transaction, conversation and co-ordination are introduced. Since the notion of social action is the basis for understanding the other concepts this notion is introduced first. This is followed by a discussion of the constituents of a business transaction, which is followed by a discussion of co-ordination in business transactions. This section is concluded by a discussion concerning conversational analysis as an instrument for analysing co-ordination in business transactions.

2.1 Social action

The basic unit of analysis in this paper is the notion of social action (Goldkuhl & Röstlinger, 2002). The basic concept of social action is action. An action is a purposeful and meaningful behaviour of a human being. A human intervenes in the world in order to create some differences. An important distinction is made between the action result and the effects of the action (von Wright, 1971). The action result lies within the range of the actor and the action effects may arise as consequences outside the control of the actor. An action is performed in the present based on a history and aims at the future (Goldkuhl & Röstlinger, 2002). A social action is an action oriented towards other persons (Weber, 1978). The action can be a communicative act, e.g. someone saying something to another person, or a material act. Material actions count as social actions if they are directed to other persons (Goldkuhl, 2001; Goldkuhl & Röstlinger, 2002). Actor relationships between the intervening actor and the recipient are established through social actions (Habermas, 1984).

An organisation consists of human beings, artefacts and other resources, and actions performed. Humans (often supported by artefacts) perform actions in the name of the organisation (Ahrne, 1994; Taylor, 1993). Actions are performed within the organisation – internal acts - and there are also external acts towards other organisations (e.g. customers or suppliers). Humans act in order to achieve ends (Goldkuhl & Röstlinger, 2002; von Wright, 1971). Human action often aims at making material changes. Humans do however not only act in the material world – they also act communicatively towards other humans. Austin (1962) and Searle (1969) say that to communicate is also to act. Human action is about making a difference, where such difference can have impact in the social world as well as in the material world.

Goldkuhl (2001) and Goldkuhl & Röstlinger (2002) present a generic model of social action including both communicative and material acts. E.g. an order from a customer to a supplier is a communicative act. The delivery of goods from the supplier to the customer is a material act. Both actions are performed by one business party (the "interventionist") and directed to the other party (the recipient). Since these actions are directed from one actor towards another actor they must both be considered as social actions. Language is not the only medium for interacting with other people. The delivery of a product to a customer is not only to be seen as a change of place of some material stuff. In this context it must also be considered as a fulfilment of a request and a promise made earlier.

The generic model of social action makes a clear distinction between *result* and *effects* of an action (Goldkuhl & Röstlinger, 2002; von Wright, 1971). Results are action objects created by the intervening actor and within his range and control. A stated order (as an utterance) is the

result of a communicative act. The delivered product is the result of the material deliverance act. Effects are consequences which may arise after the action object has been presented to the world. A communicative act (like an order) may give rise to so-called perlocutionary effects; e.g. responses from the supplier like an order confirmation and later a delivery of products. The action object of a delivered product may lead to usage of this product by the recipient (customer); this should also be seen as an action effect.

Performing social actions – either communicative or material – introduces relationships between the actors. The performance of a communicative action (like a business order) introduces clearly certain relationship between sender and recipient (Habermas, 1984). It introduces a request relationship from customer to supplier, which are accompanied by expectations. The delivery of goods also affects the relationships between customer and supplier. It is a fulfilment of the request and in this sense it terminates the established request relationship. The delivery can also introduce new relationships, like e.g. an attitude of gratitude from customer towards supplier.

Actions are often multi-functional. One example of multi-functionality is that the order both represents a *request* to the supplier to deliver something and a *commitment* of paying for the delivery corresponding to the order. Another example of multi-functionality is that a delivery of a product can both be a change of place of some material stuff and a fulfilment of a request and a promise.

Actions are often dual. The performer of an act (in an organisational context) both acts on behalf of himself and on behalf of the organisation that the performer represents (Ahrne, 1994). Further, acts are multi-consequential. This means that a certain act can trigger several acts. Since there exists a duality of acts and since these are multi-consequential one can distinguish between inter-organisational acts, i.e. directed towards a party in another organisation, and intra-organisational acts. It is common that an inter-organisational act triggers acts within the organisation. This means that an order from the customer, for example, might both trigger an act, such as order confirmation, directed towards the customer as a response and consequentially an act initiating a fulfilment of the customer order.

2.2 Business transactions

There is certain logic of interaction between the supplier and customer when doing business. The interaction is all business acts performed by both business parties, which are related to a specific contracted delivery. The different actions cannot be seen as isolated actions, they get there meaning from the business context (Goldkuhl, 1996). The business transaction consists of social actions; both material and communicative actions. Important aspects of the business transaction are the exchange of proposals and commitments as well as the fulfilment of these commitments. The business transaction includes a number of different exchanges, where each of these exchanges constitutes different phases of the business transaction (Lind & Goldkuhl, 2001). The different phases are:

- Exchange of interest, which involves the customer's and supplier's searching for contact. They expose their interest for making business
- Exchange of proposals, which involves the customer's and supplier's bidding and counter bidding
- Exchange of commitments, which involves the customer's and supplier's agreement upon future actions, i.e. making a business deal
- Exchange of value, which includes the supplier's delivery of a product and the customer's making a payment

- Exchange of assessments, which involves the customer's and supplier's making claim or stating acceptance

These exchanges are to be performed by each organisation, i.e. on the level of supplier and customer. In order to be able to do these exchanges the agents within each organisation, acting on behalf of the organisation, have to interact with each other.

2.3 Co-ordination within and between organisations

Co-ordination is a necessity in all social systems (Alter & Hage, 1993) and organisations exist through co-ordination. This is acknowledged in both classical organisational theory (e.g. Mintzberg, 1979) and communication oriented organisational theory (e.g. Taylor, 1993). In this paper we adopt a communicative perspective on co-ordination. Co-ordination is performed through communication. The backbone of co-ordination is different *types of assignments*. Lind & Goldkuhl (2001) have identified three types of assignments for analysing vertical and horizontal co-ordination; role assignment, external product assignment and internal product assignment. These types of assignments are agreed upon and constituted through social actions. They are all of directive type (cf classification of Searle, 1969). The *locutor* wants the *addressee* to perform some action, which is the main characteristic of a directive. But more can be said about these different assignments. The utterances are addressed to someone. This addressee is also the one proposed to take action. The *proposed action* is specified (or at least mentioned). When describing the action some other important features are also described. The *beneficiary* of the action is mentioned, i.e. for whom something will be made or to state it otherwise who is in favour of the action. The actions specified also involve a reference to whom the actor shall address his/her action, i.e. the recipient of the action result. This role category is called *next recipient* (to be compared with next-speaker selection) and it must be distinguished from the beneficiary. In some cases of course the next recipient and the beneficiary will coincide. The description of the action also involves the kind of action object, which is referred to, i.e. in this case, the *product* to handle. For a deeper communicative action analysis of different organizational assignments, confer Lind & Goldkuhl (2002).

Three different types of assignments need to be acknowledged in order to direct attendance towards vertical and horizontal as well as internal and external co-ordination. These are:

1. Role assignments (principal - agency relations)
2. Customer orders (customer – supplier relations)
3. Forwarded/transformed orders within an organization (internal process relations)

The first and third assignments are performed within an organization. The first can be seen as a vertical relation and the second and third can be seen as horizontal relations. There are however important differences between external and internal acts/relations. Customer order and forwarded orders are concerned with the particular; a particular customer and a particular product. There are important differences between a customer order (i.e. external to the organization) and forwarded/transformed internal orders (or requests) that are issued within the organization. The beneficiaries of these different assignment types are, however, always the same, i.e. the customer. One important difference is that in the customer order case the customer is locutor, next recipient as well as beneficiary. This will not be the case with forwarded orders. The locutor will be an internal agent (actor). The next recipient will (often) not be the locutor. The next recipient will be the beneficiary when the product is delivered by the organisation, but not for pure internal acts. For such cases the next recipient will be an internal agent (actor).

There are also important differences between principal - agency relations and horizontal relations. Role assignments are internal acts (i.e. made within the organization) and are concerned with the typical (all possible customers and products). Role assignments are, as mentioned above directives. However they also have a declarative force since they appoint actors to roles. The differences between the different types of assignments are illustrated in table 1 below.

In order to handle this view of co-ordination there is a need to distinguish between different types of assignments as well as between different types of roles (c.f. Lind & Goldkuhl, 2002). There is a need to distinguish between several roles, which goes beyond the traditional role repertoire in speech-act based modelling approaches (such as DEMO and Action Workflow). The roles distinguished by Lind & Goldkuhl (ibid) are:

- Requester (locutor)
- Performer (producer)
- Next recipient
- Beneficiary

Table 1: Characterizations of different types of assignments (Lind & Goldkuhl, 2002)

| Type of assignment | Communication place | Organizational dimension | Degree of specificity | Communication roles |
|---|---------------------|--------------------------|--|------------------------------------|
| Role assignment | Internal | Vertical | Typical products and customers (type level) | Organization (principal) → Agent |
| External product assignment (Customer order) | External | Horizontal | Particular products and customers (instance level) | Customer → Organization (supplier) |
| Internal product assignment (Forwarded order) | Internal | Horizontal | Particular products and customers (instance level) | Agent → Agent |

Assignments are agreed upon and established through interactions. There are thus interactions concerning the vertical co-ordination going on between the principal and agent(s) in order to establish role assignments (see figure 1). These interactions are, as mentioned above, concerned with the typical. There are also interactions between agents within the organisation as well as between agents within the organisation and the beneficiary of the organisation. These interactions concern internal and external horizontal co-ordination, i.e. establishing and fulfilling product assignments.

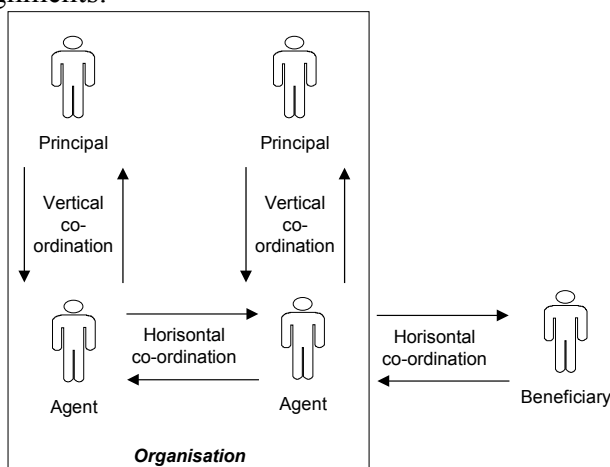


Figure 1 Horizontal versus vertical co-ordination

The propositional content of the vertical co-ordination, what each agent should do, is about the horizontal co-ordination. The sum of all role assignment should thus reflect the total horizontal co-ordination for establishing and fulfilling agreements with the beneficiary of the organisation.

2.4 Conversational analysis

In order to understand the patterns of actions constituting a business transaction we will use conversational analysis. Conversation analysis (CA) originates from the sociologist Harvey Sacks who had an interest in how people, through some kind of procedural rules, engaged and succeed in conversations. The most natural rule is that a conversation is characterized by turn-taking. One participant, A, talks, stops another, B, starts, talks, stops and so on. When attention is paid to this phenomenon, there are different kinds of disturbances. To solve these disturbances other constructs such as next-speaker selection and transition-relevance places are used (Sacks, 1992; Levinson, 1983). This means that part of the conversation is about selecting the next-speaker in order to facilitate turn-taking.

Another concept that is used for the understanding of the conversation is the concept of adjacency pairs. An adjacency pair is an ordered pair of utterances (a first and a second) produced by different speakers. Examples of adjacency pairs are; question – answer, greeting – greeting, offer – acceptance, request – acceptance, complaint – excuse. The adjacency pairs got different functions. They are used for starting and closing conversations, for moves in conversations and for remedial exchanges. Adjacency pairs can be separated due to different reasons for example for clarifying obscurities. This is done with so-called inserted sequences. This means that adjacency pairs can be embedded in adjacency pairs (Sacks, 1992).

The concept of adjacency pairs has been further used and developed in dialogue theory (Linell, 1998; Schiffrin, 1994). The first utterance is categorised as initiative and the second as a response, however most utterances can be classified both as initiative and response. This is called the principle of double contextuality. Utterances are linked action. An utterance is linked to the prior one as being a possible response and is linked to the succeeding one as a possible initiative to what might be said. An utterance is made in present, but with (implicit or explicit) references to the history and to the projected future.

The patterns of actions in business transaction can thus be studied as business interaction patterns constituted by inter-related social actions (Goldkuhl 2003). Goldkuhl (ibid) proposes the use of action analysis as means for revealing constituents of several actions (precondition, performer, action, result and addressees) related to each other in adjacency pairs.

3 E-commerce – The case

The information about the e-commerce company has been collected through several process modelling seminars. These seminars have been video-taped. The company's way of working has been modelled in detail. The documentation consists of cooperation diagram (Lind et al, 2003), interaction diagrams (Lind, 2001), process models (Lind, 2003) and several action diagrams (Goldkuhl, 1992). As empirical data there are also log books consisting of reflections made by involved researchers during the action-research project. The empirical data together reveal a thorough picture of the e-commerce company action logic at present state. The empirical data do however not consist of the historical development of the e-commerce company.

3.1 Performing business at the e-commerce company

The e-commerce company, at which our analysis has been performed, is rather newly founded and has a very rapid expansion rate. In order to perform businesses, i.e. to receive and fulfil customer orders, there is a need for exposing the product repertoire. The exposure is done mainly through the e-commerce site. The product repertoire is continuously developed, and it consists of products from well known labels as well as labels developed by the e-commerce company.

The company's information system is constituted by two different parts, the e-commerce site and the ERP-system. The two different parts of the system share data through a batched update on the stock-level from the ERP-system to the e-commerce site and through manually initiated transfers of customer orders.

3.2 Sales and delivery at the e-commerce company

During the process modelling a number of different business models were created. In Figure 2 the sales and delivery at the e-commerce company is depicted. This figure is a delimited part of the cooperation diagram generated during the process modelling. In the figure, the agents, the horizontal co-ordination flow (including product assignments) as well as the role assignments are indicated.

The customer gets product offers through the e-commerce site. The product offer consists of information about the product in text as well as in picture. Product information includes a description of the product with technical details and information about price and stock level. When the customer has placed the order in the e-commerce site, an e-mail is automatically generated and sent to the customer. The e-mail informs the customer that the mail-order company has received the order, that the order will be processed and that the company will be back with an order confirmation.

Each morning the customer service checks whether there are customer-orders in the database (of web-based customer orders). Several people in customer service treat these customer-orders. The stack of customer orders is divided among several people and each person handles approximately 50 customer orders. The stock-level of the products is manually checked in the ERP-system for each customer order resulting in an order confirmation / denial to the customer. An order confirmation consists of a commitment of what products to deliver at a particular time. As a basis for the order confirmation the customer service also has information about when products from the suppliers are expected to arrive. When all 50 customer orders are checked the orders are transferred to the ERP-system. This transferring means that the products are reserved for the customers, i.e. the order confirmation is made before the reservation.

The reservation of products according to the customer order has its basis, among other things, in expected deliveries from suppliers. Since this information is uncertain it happens that the products do not arrive as expected (and told by the procurement department). This uncertainty means that it will occur that the products sometimes cannot be delivered as promised. Each day the customer service requests a list of non-deliverable customer orders (as a batch from the ERP-system) in order to check potential violations to made commitments. This list is then used as a basis for splitting customer orders (consisting of several products to deliver) or substituting certain products in the customer order.

Twice a day the warehouse personnel request a picking and packing list (by a batch in the ERP-system) of deliverable customer orders. Deliverable customer orders are decided upon based on the availability of products in stock, the confirmed date and whether all products (in the same order) can be delivered. This picking and packing list is used for the warehouse personnel to go out in the warehouse and collect the products as well as packing the products for delivery.

Each day at 5 pm the warehouse personnel send an email to the customers they have picked and packed for that the package is on its way.

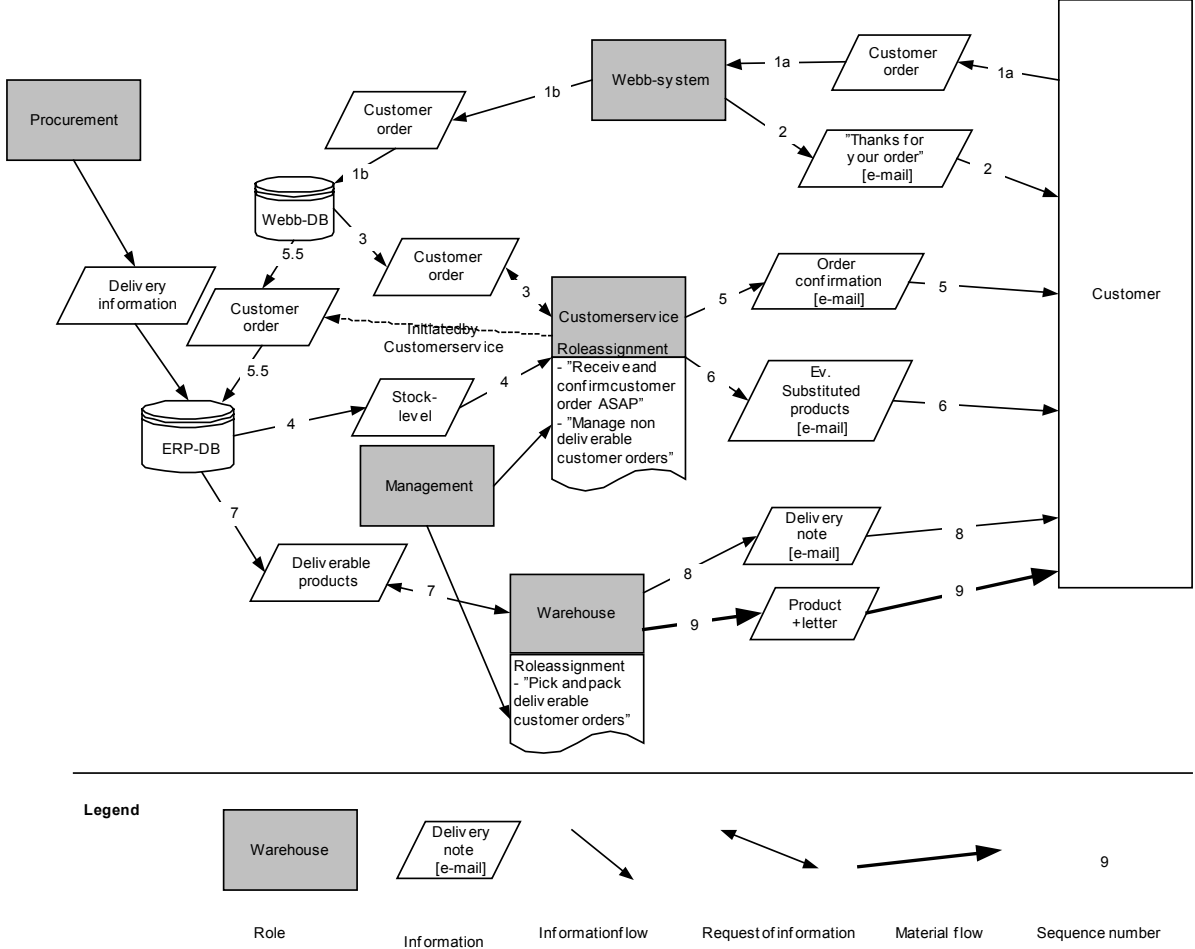


Figure 2 Sales and delivery at the e-commerce company

4 Analysis

4.1 Co-ordination at the e-commerce company

The customer places an order in the web-system. As a result of this act the customer automatically gets back a message saying “thanks for your order!”. This message is to interpret as a receipt of that the order has been registered in the database of web-based customer orders.

Since the reservation of the products is done after the order confirmation, several customers can get order confirmation concerning the same physical product. Since each person handles his/her 50 orders independently of others, the possibility of confirming the same physical product to several customers is rather high. If the order confirmation concerns products that

there are many of in stock, then this situation might not create so much of a problem. But, if we are dealing with products that are a few of in stock, the e-commerce company will make commitments about products that they do not have in stock.

The work at the customer service is mainly governed by the role assignment (“Receive and confirm all customer orders as soon as possible”). This results in that the commitment towards the customer becomes subordinated. Fulfilling the role assignment issued by the management primarily drives the personnel in the customer service.

When the personnel in the warehouse are picking the products, it occurs that some are missing which might result in that products are substituted. The reason for the missing products has its foundation in that the ERP-database does not reflect the physical stock-level. A note put into the package informs the customer about substitutions. The warehouse personnel are driven by the role assignment “Pick and pack deliverable customer orders”.

The deliverance note sent to the customer does not contain information about substituted products.

An act of splitting the customer order or substitution of products in the customer order is done by the customer service and results in an email to the customer saying that the act has been done. Sometimes there exists a negotiation about this matter with the customer (especially in the case of substitution). The role assignment governing the customer service in this matter is “manage non-deliverable customer orders”.

Customer service acts on behalf of the e-commerce company. It is therefore very important that the customer service has information of high quality from other departments in order to make valid commitments. This information is communicated via the ERP-database. It is therefore important that actors in other departments understand the necessity of supplying with accurate information. Examples of such information are stock-level as well as expected deliveries. If for example the physical stock-level do not harmonise with the stock-level in the ERP-system two problems will occur:

1. There might be more physical products in stock than indicated in the ERP-system. This might result in that the products are not sold which harm the cost efficiency
2. There might be less physical products in stock than indicated in the ERP-system. This might result in that the commitment made to the customer must be violated

The procurement department also has an essential role in making and fulfilling commitments to the customer. First of all the procurement department needs to supply with information about when products are expected to arrive at the e-commerce company. This information needs to be handled with care since there exists uncertainties of the supplier’s fulfilment of the commitment. Further the procurement department needs to make accurate procurements. These procurements need to be based in expected sales of products. If the ERP-system do not reflect the physical stock level in a good way this might result in that wrong products are bought.

4.2 Managing multiple business transactions

There are several transactions going on between the customers and the customer service that are related to each other. Several customers can be interested in the same product or in the same kind of products. It is therefore very important that the information in the information

system is of high quality and reflects the effects (for example stock level and reservations) of the transactions with the customer and the commitments made.

Another problematic area in managing multiple business transactions is how to transfer the commitment made to the customer regarding delivery of the products, as well as the handling of the internal product assignment. Since the e-commerce company is transaction intensive there is a need to group actions and perform them for several customers at the same time. Actions performed for particular customers might be performed for several particular customers at the same time (Figure 3). This can be seen in the e-commerce company:

1. The customer service collects **all** customer orders from the web-system and split the orders among the customer service’s personnel.
2. The warehouse personnel collect a list with all the orders ready for delivery, and pick them without taking the specific customer order in consideration e.g. picking **all** products of one kind before packing them into addressed packages.

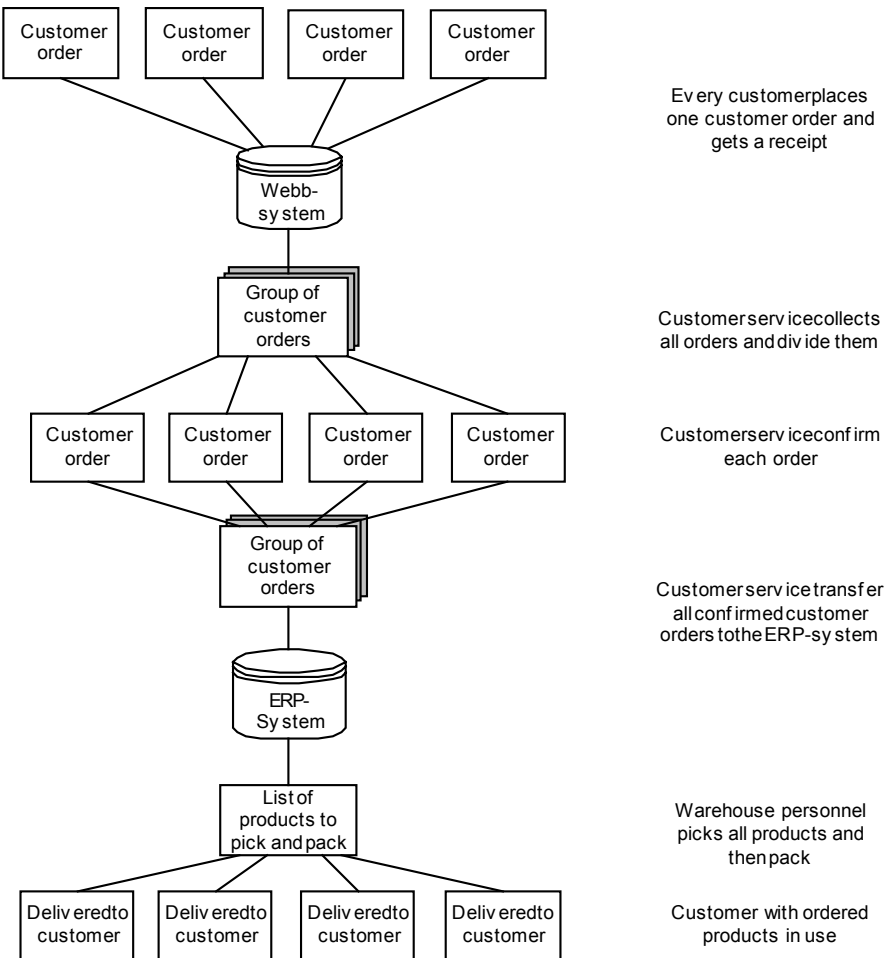


Figure 3 Managing multiple transactions in the e-commerce company

When the business transaction is managed in this particular way, it become essential that the routines and information system has support for this kind of management. The customer service in the e-commerce company checks the web-system every morning for customer orders. They split them among each other, each person handles approximately 50 customer orders. They check every order against the stock level in the ERP-system and send an order confirmation / denial to the customer. When all 50 are checked and confirmed they transfer

these 50 orders from the web-system to the ERP-system and the products get reserved. Here it is of high risk that several customers get order confirmation about the same physical product.

In the cases where several particular customers are handled at the same time, the information needed from the information system is “pulled” from the system rather than “pushed” through the system. This is not coherent with the “normal” communication theory on information systems. In a communicative action perspective the information is rather pushed through the organisation, e.g. the actions are initiated by the forwarded customer order. In this case the initiation of the activities is determined by the role assignment (“Check for deliverable orders twice a day”). The e-commerce company is transaction intensive and therefore it is necessary to control and join several internal product assignments to have an effective organisation, but to avoid violation of the commitment made to the customer it is important to acknowledge the horizontal co-ordination.

4.3 Effects of an unbalanced co-ordination

Agents in an organisation act on behalf of the organisation. It is important for the e-commerce company to acknowledge the actual meaning of an order confirmation. The order confirmation is to be seen as a commitment made by the e-commerce company. Different agents in the organisation handle this commitment in order to get it fulfilled. From the description above, it can however be seen that not all commitments are valid. Some commitments made to the customer cannot be fulfilled and therefore need to be altered. The customer service manages the potential violations by splitting customer orders as well as substituting products in the customer orders. Shall this be possible? The accurate answer on this question is that such a violation only should be exceptions, which means that there is a need to make commitments on such valid foundations that there will be no need to alter the commitment. Today the e-commerce company have developed an institutionalised behaviour to handle a lot of exceptions. The effect of this institutionalised behaviour is that the original commitment made to the customer is not fulfilled according to expectations. The mismatch between the customers’ expectations and what the e-commerce company deliver results in badwill for the company!

The interplay between the different departments is not driven by the forwarded customer order (the internal product assignment). It is driven by the fulfilment of the role assignment (perform an activity, e.g. taking care of the customer order or place the customer order in the database). When the focus in the organisation is vertical – on the role assignment – the conversation between the agents becomes invisible. ***The agents focus on deliver result to, and receive bases from the system as a part of fulfilling the role assignment.*** When there are problems the agents rather fulfils the role assignment than the product assignment. Thereby the customer might not become satisfied.

4.4 Analysis of the multi-functional co-ordination

In order to understand the function of co-ordination in the e-commerce case we analysed the actions regarding fulfilment of the commitment to the customer. The analysis is presented in Table 2 is inspired by the action analysis done by Goldkuhl (2003) and conversational analysis (see section 2.4). In this table each row is a description of an action, e.g. an initiative, response or both, the rows are parts of the business transaction.

An organisational action is multi-functional in the respect that it is governed by several assignments. In the e-commerce case there is a need to distinguish between role assignment, as the vertical co-ordination, and the product assignment, as the horizontal co-ordination. These assignments are *preconditions* to the organisational action. The actions are *performed*

by an agent, which can be either human or an artefact (e.g. the information system). The actions analyzed in the e-commerce case are actions concerning fulfilment of the commitment to the customer. In the case there are two ways to handle this commitment; the action relate to one customer order or to several customer orders. Actions are performed in order to make a difference in the world, there got to be some result from the action. And the actions are addressed towards an agent (the performer of the action or another agent).

Table 2 Action analysis of the e-commerce company

| | <i>Precondition</i> | <i>Performer: Action</i> | <i>Addressees</i> | <i>Results</i> | <i>Initiative / Response</i> |
|----|--|---|---|--|----------------------------------|
| 1. | A product repertoire | Customer: Place order in web-system | The e-Commerce company, web-system, | 1. Customer order in web-system | Initiative |
| 2. | A customer order in web-system | Web-system: Send receipt on received order | Customer | 2. Receipt on received order | Response to 1 |
| 3. | Role assignment: "Receive and confirm all customer orders as soon as possible" Product assignment: Customer orders in web-system | Customer service: Collect customer orders and divide them among personnel | Personnel in the customer service | 1. Customer orders in web-system divided among personnel in the customer service | Initiative |
| 4. | Role assignment: "Receive and confirm all customer orders as soon as possible" Customer orders in web-system divided among personnel in the customer service | Personnel in customer service: Stock level check for each customer order. Order confirmation / order denial | Customer Personnel in the customer service | 1. Order confirmation 2. Checked customer orders | Response to 3 Initiative to 5 |
| 5. | Role assignment: "Receive and confirm all customer orders as soon as possible" Checked customer orders | Personnel in customer service: Reservation of all customer orders | Information system | 1. Customer orders in ERP-system | Response to 4 |
| 6. | Role assignment: "Manage non-deliverable customer orders" | Personnel in the customer order | Information system | 1. Customer orders in the ERP-system | |
| 7. | Role assignment: "Pick and pack deliverable customer orders" Customer orders in ERP-system | Personnel in warehouse: check deliverable orders | Personnel in the warehouse | 1. List of products to pick and pack | Initiative |
| 8. | Role assignment: "Pick and pack deliverable customer orders" List of products to pick | Personnel in warehouse: pick products | Personnel in the warehouse | 1. Products to pack 2. List of products to pack | Response to 7 Initiative to 9 |
| 9. | Role assignment: "Pick and pack deliverable customer orders" List of products to pack Products to pack | Personnel in warehouse: pack and deliver products | Customer | 1. Customer with products in use | Response to 8 |

When we are analysing the initiatives and responses in the actions performed it is clear that the business transaction is divided in three distinctive parts. These parts are a number of grouped actions (actions 1-2, 3-5 and 7-9 in table 2). Action #6 (c.f. table 2) can occur in parallel. These parts are distinguished by new initiatives (c.f. action 1, 3 and 7 in table 2). The customer order (action 1 in table 2) initiates the business process. The collection of customer orders from the web-system is initiated by the role assignment and not by an earlier action (action 3 in table 2). It is the same for the check for deliverable orders, done by the warehouse personnel (action 7 in table 2).

In order for the agents to initiate new actions (c.f. action 3 and 7 in table 2) the earlier actions must be fulfilled. These new actions are dependent of, but not initiated by, earlier actions; they handle the same subject, the customer order. The initiation of the new actions is a request of the result of the preceding actions.

5 Conclusions

In this paper the need for a balance between role and product assignment are put forward. In the case study we have seen a dominance of vertical co-ordination rather than the horizontal co-ordination. What does this than mean?

Actor relationships are established by dealing with assignments. This concerns role assignments in conversations between the principal and the agent, product assignments between agents within organisations as well as the product assignments between the organisation and its beneficiary. Through communication, actor and action relationships (relational aspects) are created based on the content (propositional aspects) of the assignment. What can be acknowledged from the analysis of the e-commerce case is that the vertical co-ordination is more dominant than the horizontal co-ordination. This is an effect of that the horizontal co-ordination is not made clear enough in the proposition of the role assignments. This concerns both human agents as well as the IT-system as an agent. In the latter case the role assignment should be built into the IT-system through its action potential (Ågerfalk, 2003). *One important conclusion is therefore that in order to balance the horizontal co-ordination and the vertical co-ordination there is a need to emphasise the horizontal co-ordination in the propositional content of the role assignment.*

The sum of the propositional content in all role assignment in an organisation should reflect the total chain of horizontal co-ordination (from an external product assignment to a fulfilled assignment via a number of inter-related internal product assignments). The consequences of not distinguishing the horizontal co-ordination explicit enough in the role assignments might lead to that the established expectations of the customer (the beneficiary) are not fulfilled.

What implications do this have on the design of IT-systems? One obvious answer is that there is a need to think both vertically and horizontally when designing the IT-systems. In transaction intensive businesses it is especially important to make the business transaction explicit in order to ensure a resource efficient realisation of the transactions. It is thus important that the IT-system is transparent concerning product assignment relationships as well as communicating the commitment made towards the customer. One fundamental condition is of course that the data in the system corresponds to the reality (e.g. made commitments, stock level, etc.).

In the transaction-intensive company there is a need for using the information system as an action memory (Ågerfalk, 2003), e.g. using the information system for storing intermediate results of the business transaction. These results are used as input to a new interaction, within the same customer commitment (e.g. business transaction).

In this paper we have identified the need to take into consideration several ongoing interactions in order to manage a particular business transaction with quality (e.g. to meet the customers expectations). It is for example important to know which commitments that are made in other interactions in order to make valid commitments in the particular interaction. The possibility to investigate capacity and make reservations is important to manage several ongoing interactions. An issue of further research is to investigate how other parts of business transactions such as frame contracting and offering are considered when making commitments with high quality.

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