

Questioning two-role models or who bakes the pizza?

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Abstract

When developing information systems there is a need for business modelling in order to highlight essentials of businesses. Within the Language-Action community there are a number of approaches for business modelling. These approaches put focus upon interaction between two roles in order to emphasise agreements about actions to be performed and actions which have been performed. It has however been identified by several scholars that such two-role thinking has its limitations. Weigand & De Moor are such critics who claim that there is a need to both express horizontal co-ordination (customer relations) and vertical co-ordination (agency relations). They have therefore developed a multi-role model. Their model seems however to be incomplete. The purpose of this paper is to present an alternative multi-role model, based upon a critical analysis of Weigand's & De Moor's multi-role model. Through our multi-role model we acknowledge different kinds of assignments (role assignment, internal product assignment and external product assignment) and different roles taking part for establishing and fulfilling such assignments. These different kinds of assignments are needed for understanding internal and external horizontal co-ordination as well as vertical co-ordination. As an aid in our analysis we use a pizza-shop case from Weigand & De Moor.

1 Introduction

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

Within the language/action (LAP) community there are a number of approaches to be used for understanding organizations. Examples of such approaches are Dynamic Essential Modelling of Organizations (DEMO) (Dietz, 1999) and ActionWorkflow (AW) (Medina-Mora et al, 1992; Denning & Medina-Mora, 1995). These approaches have in common that they build upon speech-act theory (Austin, 1962; Searle, 1969; Habermas, 1984) and the conversation-for-action schema (Winograd & Flores, 1986). The language action perspective is based on the idea that communication is not just transfer of information. When you communicate you also act. Within the language/action community information systems are regarded as communication systems. LAP approaches have proven to be powerful for developing an understanding of the role of information systems in organizations. These approaches are also to prefer since they include a customer-orientation and emphasize agreements.

Agreements are to be regarded as the backbone of LAP-approaches. Both agreements for what to do and agreements of performed actions are accentuated. Such emphasis on agreements causes a division of the communication process into three or four phases. The communication process (workflow loop)

in ActionWorkflow is divided into the four phases (preparation, negotiation, performance and acceptance) and DEMO makes a corresponding division into three phases (order, execution and result).

Given the fact that agreements and communication are being modelled when using LAP-approaches an emphasis has been put upon communication between two roles. These roles have been called customer and performer (in AW) or initiator and executor (in DEMO). These approaches have thus a focus on two roles, i.e. they are oriented towards constructing two-role models in business modeling.

It has however been identified that such two-role thinking has its limitations (Weigand & De Moor, 2001; Goldkuhl & Röstlinger, 1999). Two-role models are merely oriented towards horizontal co-ordination. Weigand & De Moor (2001) identify a need to both express horizontal co-ordination (customer relations) and vertical co-ordination (agency relations). Goldkuhl & Röstlinger (1999) have done a similar identification of lacks in LAP-approaches.

Weigand & De Moor (2001) have taken an important and promising step to critically examine two-role models. In this paper we will continue such a critical analysis. We find their analysis incomplete and we will therefore extend it through a more thorough theoretical analysis.

Organizations exist through co-ordination. This is acknowledged in both classical organization theory (e.g. Mintzberg, 1979) and communication oriented organization theory (e.g. Taylor, 1993). The issue of how to conceive organizations as co-ordination systems is an important one. LAP approaches have contributed with important insights concerning horizontal co-ordination, but as Goldkuhl & Röstlinger (1999) state, there seem to be blind spots in the LAP approaches concerning vertical co-ordination. “The vertical and horizontal are two combined coordination forces for the work in organizations. A generic business model must be able to cope with these fundamental coordination forces as well as with other governing forces for work.” (ibid). The purpose of this paper is to continue a LAP oriented analysis of organizational co-ordination with focus on the combination of vertical and horizontal co-ordination. We will present a multi-role approach for modelling both vertical and horizontal co-ordination based upon critical analysis of two-role models. We will use Weigand’s & De Moor’s earlier analysis as a starting point for our study. We will use their illustrative example (a pizza delivery case) both in the analysis and critique of their model and for elaborating our alternative model. Our research approach can thus be seen as a combined one; both conceptual analysis and investigating a case (although a fictitious one). We have investigated certain “hypotheses” of other researchers (Weigand & De Moor) which they have tested in a case. We have through our in-depth investigation of their case come to other conclusions (than the referred researchers) and rejected parts of their hypotheses. We have developed partially other constructs (“hypotheses”) and used them in the same case. These other constructs have, according to our conclusions, been proven to be applicable in the case.

In the development of our conceptual framework for vertical and horizontal co-ordination we have used some fundamental principles from LAP. We have performed a communicative action analysis of vertical and horizontal assignments in order to understand their nature.

The following section includes a description of ActionWorkflow and DEMO as two-role model approaches. We conclude this section with identification of some problems with two-role models. Then in section 3, we will present a first step towards a multi-role model by examining the model proposed by Weigand & De Moor (2001). Further (section 4), we will present an alternative to their model, i.e. a second step towards a multi-role model. The paper will be completed by some conclusions. As mentioned above, both Weigand’s & De Moor’s model and our own model will be illustrated by using the pizza delivery case introduced by Weigand & De Moor (2001). We will show how the question “who bakes the pizza?” can be given different answers.

2 Two-role models

2.1 ActionWorkflow

One of the most well known approaches for modeling communication in organizations based on LAP is ActionWorkflow (Denning & Medina-Mora, 1995; Medina-Mora et al, 1992). Theoretically ActionWorkflow relies on the conversation-for-action (CFA) schema (Winograd & Flores, 1986). In this approach business processes are modeled as loops (see figure 1).

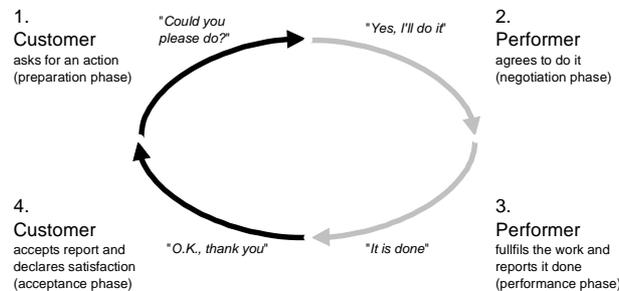


Figure 1: The ActionWorkflow loop (Medina-Mora et al, 1992)

The conversation flow in a workflow loop is divided into a sequence of speech acts that are uttered between customer and performer. This sequence of speech acts is divided into four phases: preparation, negotiation, performance, and acceptance. In the first two phases the aim is to establish a commitment of the performer to perform an action. The last two phases the aim is the establishment of the performed action.

Medina-Mora et al (1992) claim that the loop-model can be used for modeling inter-organizational as well as intra-organizational communication. "The simple workflow loop structure is both general and universal. It is general in that it occurs whenever there is coordination among people, regardless of what they are doing. The words 'customer' and 'performer' apply to people within a single organization as well as across boundaries." (ibid., pp. 283).

2.2 DEMO

DEMO (Dynamic Essential Modelling of Organizations) is a cross-disciplinary theory describing the communicational dynamics of organizations, as well as an analysis method based on this theory (Dietz, 1999; Reijswoud, 1996).

In DEMO, an organization is viewed from three levels: the documental, the informational and the essential. At the documental level, the organization is viewed as a system of actors that create, store, transport and destroy documents. At the informational level, the organization is viewed as a system of actors that send and receive information, and perform calculations on this information in order to create derived information. At the essential level, the organization is viewed as a system of actors that are engaged in the execution of business transactions. At the essential level organizations are considered as networks of business transactions, which are composed of inter-related communicative acts. Figure 2 displays the levels of abstraction.

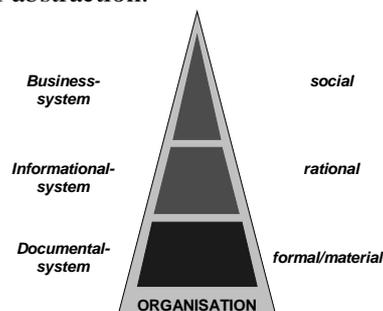


Figure 2: The three levels of abstraction in DEMO (Reijswoud et al, 1999)

The essential business transaction is a core concept in DEMO. A transaction is a pattern of activity that is performed by two actors. An actor is a role in an organization. These two actors are named Initiator and Executor. A transaction is composed of three phases; the Orders phase in which the two actors come to an agreement about the execution of some future action, the Execution phase in which the executor executes the negotiated action, and the Result phase in which the actors negotiate an agreement about the result as brought about in the execution phase. Two worlds are distinguished in DEMO; the Object World (the world of facts) and the Subject World (the world of communication). The first and the last phase are performed in the Subject World. A successful execution of a transaction in the Subject World results in a change in the Object World in which the actors exist. The basic pattern of transaction is depicted in figure 3.

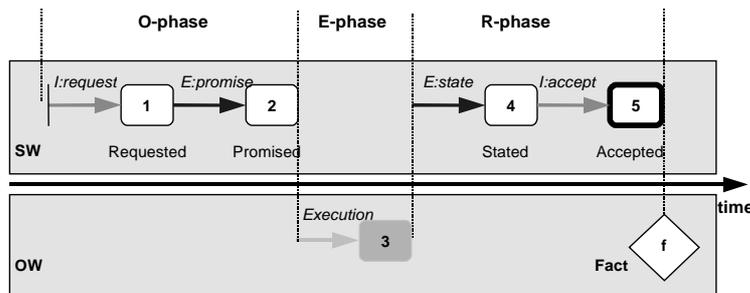


Figure 3: The basic pattern of the DEMO transaction (Reijswoud et al, 1999)

In the first phase (O-Phase) the actagenic conversation takes place. The actagenic conversation consist of two inter-related speech acts; a directive and a commissive. In the R-phase the factagenic conversation takes place. In this last phase the actors comes to an agreement of what has happened in the object world. A change in the object world is not valid before the actors accept the change. The factagenic conversation also consist of two inter-related speech acts; an assertive and a declarative.

The basic pattern of a DEMO transaction illustrated in the figure above consists of necessary set of actions for the successful completion of a transaction. In other words, it only displays the success-layer of transactional business communication. Reijswoud (1996) has further developed this basic pattern into more complicated patterns for arriving at such success. He claims that one will observe people in organizational settings asking each other clarification, or discussing the truth or legitimacy of a particular request. One may even observe people in an organization having meetings in which they discuss underlying assumptions of their actions in general. Reijswoud (1996) have therefore developed a so-called complete pattern of a DEMO business transaction including three different layers (success-layer, discussion-layer and discourse-layer) and relationships between these layers.

2.3 Some problems in two-role models

Both DEMO and ActionWorkflow are regarded as two-role models. In a two-role model interaction takes place between two roles (customer/initiator and performer/executor) with the purpose of emphasizing agreements, both concerning what to do and what has been done.

Criticism can however be raised towards two-role models. First, as identified by Weigand & De Moor (2001), there is a need to consider both customer relations and agency relations in order to chart complex organizational situations. Two-role models exclusively focus on relationships between two actors (roles). No hierarchical relationships exist between the roles identified by two-role models. A two-role model is however applicable when studying inter-organizational communication since the normal relationship between organization is a customer-performer relationship (and not a hierarchical relationship).

Second we mean that there is also a need to distinguish between the interaction performed within an organization and the interaction between organizations. DEMO and ActionWorkflow claim to cover inter- as well as intra-organizational communication. We find it adequate to regard inter-organizational communication from a two-role model perspective. It is however also necessary to acknowledge that intra-organizational communication means that communication takes place between several roles

acting on behalf of the organization. Studying intra-organizational communication means that the acts internally performed by the performer (or customer) will be studied. Interaction between organizations is on an organizational level and interaction within the organization is on a person-level. It is therefore a need for a mechanism that handles both the organization level and the person level when studying complex organizational situations. This means that there will be a need to distinguish between the workflow going on between the organization (as performer/executor) and its customer (the initiator) and the workflow going on within the organization to establish and fulfil commitments.

Weigand & De Moor (2001) have therefore developed a complimentary role-model, a multi-role model, in which both reciprocal relationships and delegation are taken into consideration.

3 A first step towards a multi-role model

3.1 Some principles

Weigand's & De Moor's development of their "multi-role model"¹ is based on underlying principles in Action Workflow (Denning & Medina-Mora, 1995) and DEMO (Dietz, 1999) as well as from characteristics of internal control theory (Bons, 1997; Chen, 1992).

Weigand & De Moor (2001) use the communication loop as a concept for both covering *workflow loops* and *control loops*. As we interpret it, the workflow loops handle the contractual relationships between customer (the beneficiary) and performer (the agent). The control loop covers control tasks, i.e. principal-agency relationships. A communication loop is constituted by three tasks (Initiation (I), Execution (X) and Evaluation (E)). These tasks are interconnected by conversations; the actagenic and the factagenic conversation.

The model takes the contractual relationship between two actors as its starting point, but add control roles into their model. Such expansion of a two-role model to a multi-role model is done in order to express principal-agency relationships. Weigand & De Moor claim that by focusing principal-agency relationships one can express the process of delegating execution to agents. The model uses the roles of initiator, executor and evaluator² for performing corresponding tasks (I/X/E). The extended workflow loop model (their multi-role model) is depicted in figure 4.

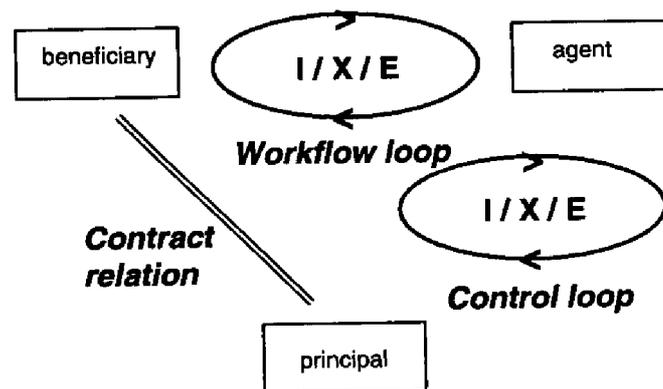


Figure 4: The extended workflow loop model (Weigand & De Moor, 2001)

¹ They call their framework themselves "normative analysis of workflow loops". We have here called it a multi-role model

² Note that Weigand & Moor (2001) have separated between the initiator (as the initiating actor) and evaluator (as the evaluating actor). These roles correspond to the actor *initiator* in DEMO. The initiator has both an initiating role and an evaluating role. We find these divisions made important for their and our continued analysis.

Weigand & De Moor themselves state that the interpretation of their model is that “there is an employee (agent) who performs some service to a customer (beneficiary) on behalf of the organization represented by a manager (principal). The beneficiary can be inside or outside of the organization. In some special cases, like a secretary performing jobs for the boss who hired him, the beneficiary and manager/principal are the same subject.” (pp. 43).

Further Weigand & De Moor distinguish between the operational (work) and control task. Two different subjects, the agent and principal, execute these two tasks respectively. If a work task exists, there should also be a corresponding initiating conversation. The task should follow the initiating conversation. The work task’s corresponding evaluation conversation should exist as well and should always follow the task.

If the task is a delegated one, the initiating conversation as well as the evaluation conversation must be backed by a contract or delegation relationship between principal and initiator. The principal should be both the initiator and the evaluator of the control loop. The beneficiary should be involved in the initiating conversation and the evaluation conversation.

Weigand & De Moor claim that their approach goes beyond the one-sided focus on customer satisfaction in ActionWorkflow. Such a one-sided focus entails risks that the agency relationship between manager and employee and the accompanying communication needs are ignored. Therefore, their model makes the delegation process explicit.

3.2 The pizza-case illustration I

To illustrate the use of the model Weigand & De Moor use a pizza delivery case as an example. We find this case very illustrative and useful. We will use it ourselves in the following. This example can be described as follows.

There is a pizza-shop that bakes and delivers pizzas. Involved roles are the customer, the baker, the daughter and the boy. The baker is the owner of the pizza-shop. The customer stating an order initiates the process. The baker receives the order. The baker then instructs his daughter to bake the pizza. After having the pizza baked she will instruct the boy to deliver the pizza. The boy delivering the pizza to the customer then concludes the commitment made by the baker.

Above we have described the “workflow” of producing a pizza to a customer. Weigand & De Moor also introduce principal-agency relationships between the baker (as principal) and the daughter and the boy (as agents). This leads to a more complicated structure of the pizza production work. Weigand’s & De Moor’s model of the pizza-delivery case is depicted in figure 5. The principal-agency relationships are indicated as dashed lines. The contractual relationship is indicated as a two-arrow double line. The I or E inside a communication loop means that there is only one conversation. Control loops are rendered with dotted lines.

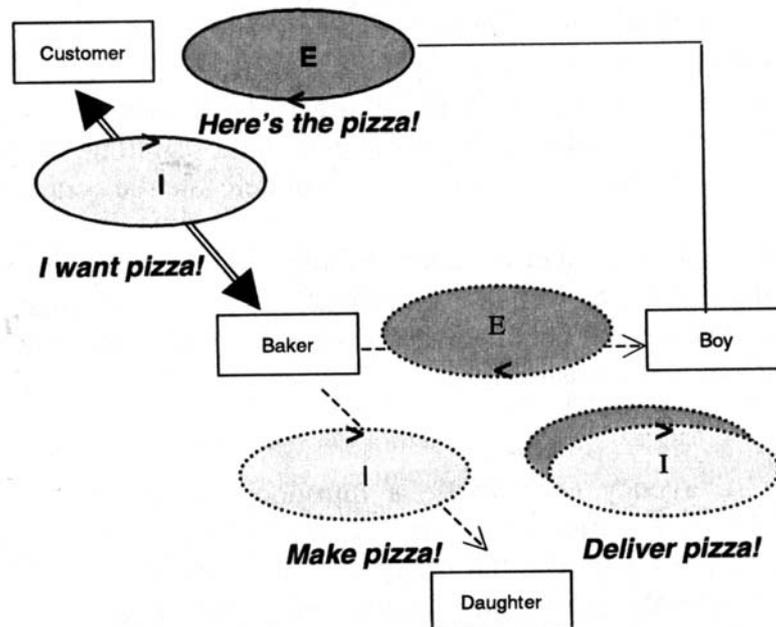


Figure 5: Complex agency in the pizza-delivery case (Weigand & De Moor, 2001)

We will describe the pizza case below as closely as possible to the analysis made by Weigand & de De Moor. We do not agree on all matters, which will be shown in section 3.3 and section 4 below, but here we will try to stick to their analysis.

The workflow loop between the customer and the baker is the initiation conversation (actagenic conversation) in which the baker agrees to bake and deliver a pizza. The control loop between the baker and the daughter is an initiation of delegation (actagenic conversation) in which the baker delegates to the daughter to bake a pizza. Then the daughter will tell the boy that the pizza is ready and instruct him to deliver the pizza to the customer. This instruction is according to Weigand & De Moor an initiation of delegation (a partial control loop in which the boy takes part). The conversation between the daughter and the boy is also an “evaluation” of the daughter’s performance (factagenic conversation), which closes the control loop initiated by the baker. As indicated in figure 5 there is a partial control loop between the baker and the boy. We interpret this as the factagenic conversation of the control loop initiated by the daughter and then closed by the baker. It then seems that the initiating conversation of the control loop between the baker and the boy has been delegated to the daughter and respectively the evaluation conversation of the control loop initiated by the baker directed to the daughter has been delegated to the boy. The boy’s delivery of the pizza to the customer is a conversation between the boy and the customer in which the customer evaluates the overall performance, i.e. the baked and delivered pizza. This factagenic conversation of the workflow loop initiated by the actagenic conversation between the customer and the baker closes the workflow loop.

3.3 Critical discussion

From the multi-role model presented by Weigand & De Moor (2001) it can be concluded that they have expanded the two-role models provided by the LAP-community. This multi-role model handles functional roles of customer (renamed as beneficiary) and performer (renamed as agent) as well as workflow control roles as the initiator, executor and evaluator. By looking upon the application of this model a number of critical issues can be raised. These critical issues are:

1. they do not acknowledge the organization as an actor, i.e. that the organization can make commitments and fulfil its commitments towards external parties, for example customers

2. based upon their example we see that everything that is done internally in the organization is reduced to be delegation tasks (control loops), i.e. they do not acknowledge the existence of internal workflow loops
3. they do not distinguish between one actor acting as a principal (in a control loop) and the same actor acting as a performer in a workflow loop
4. they do not distinguish between delegation tasks established through principal-agency relationships (control loops) and recurrent workflow-loops
5. they do not include the actual execution in their model
6. in their modelling technique there is no clear connection between the initiation part (I) and the evaluation part (E) of the communication loop
7. there seems to exist a control loop between an initiator and an executor, but without corresponding agency relationship
8. they seem to make a separation between control loops and corresponding delegation links
9. it seems to be possible to introduce a delegation link without a full control loop (both initiation and evaluation)
10. they seem to take it for granted that there must exist an evaluation task for each communication loop (in every step in the workflow)

Below we will expand these critical issues. 1) To start with we can from their example see that *Weigand & De Moor (2001) do not acknowledge the organization as an actor*. We claim that the customer establishes a contractual relation with the pizza-shop as an organization and not with the baker (as a person). The baker, the boy and the daughter act on behalf of the organization. Weigand & De Moor have based themselves on Taylor (1993) who claims that actors acts on behalf of someone and for (to the benefit) of someone. We fully agree. The dimension of acting on behalf of someone, as for example an organization, is however missed in their model.

2) Further we recognize that *everything that is done internally in the organization is reduced to be delegation tasks (control loops)*. We believe that there exist workflow loops both inside and between organizations, i.e. we would like to acknowledge both internal and external workflow loops. By looking upon the pizza-case model (see figure 5) we draw the conclusion that there only exist workflow loops when the customer (beneficiary) is involved. There are no workflow loops within the organization according to the model of Weigand & De Moor.

3) We also recognize that *they do not distinguish between one actor acting as a principal (in a control loop) and the same actor acting as a performer in a workflow loop*. In Weigand's & De Moor's first version of their description of the pizza-case they identify a workflow loop between the pizza baker (as performer) and the customer. In this simplified case the pizza baker bakes and delivers the pizza. Then the baker hires a boy to deliver the pizza. According to Weigand & De Moor the baker then plays the manager/principal role and the boy the employee/agent role. It seems from their example that the baker's role in the workflow loop is excluded, i.e. there is just a focus on the baker as manager/principal and not as an actor in the workflow loop (as an order recipient and as a baker).

4) Further, another layer of agency complexity is introduced when the baker not only delegates the delivery of the pizza but also the baking itself to his daughter. We can here raise a question whether there is a delegation for each contractual relationship with a customer. We find that Weigand & De Moor *do not distinguish between delegation tasks established through principal-agency relationships (control loops) and recurrent workflow-loops*. Is it not a question of making a delegation to the daughter such as "you are the pizza baker" and then she will bake many pizzas based on several customer orders? Of course there exist an agency-relationship between the baker (as principal) and the daughter (as agent). That they fail to make this distinction is probably a consequence of failing to distinguish between an actor acting as principal and performer (issue #3 above). There will be recurrent workflow-loops between the baker (as order recipient) and the daughter (as cook). As said above (issue #2 above) we think it is very important to distinguish between principle principal-agency relationships (control loops) and recurrent workflow-loops internally in the organization.

5) When we regard their pizza-model (figure 5) we find it tricky to understand who actually executes what and what that actor does. Weigand & De Moor *do not include the actual execution in their model*. The main actions in the pizza case are (according to our process view) receiving order, baking and delivery. Since there are no X:s in their model they have made an exaggeration of the communicative aspects and thereby lost the executing dimension. This is a criticism that can be directed towards several LAP-oriented approaches for business modelling (cf Goldkuhl & Röstliner, 1999; Lind & Goldkuhl, 2001).

6) In their model of the pizza-delivery case there are a number of different communication loops, which are divided into I and E parts. However, there is *no clear connection between the initiation part (I) and the evaluation part (E) of the communication loop*. We have problems in following which I-part that is corresponding to which E-part. In the pizza-case there are apparently two I-parts of control loops and two E-parts of control loops, but which ones are connected to each other? We have to make qualified guesses.

7) Between daughter and boy a control loop is introduced. The daughter instructs the boy to deliver the pizza. Weigand & De Moor claim that this is a control loop, but there is no corresponding agency relationship between the boy and the daughter. Apparently *there seems to exist a control loop between an initiator and an executor, but without corresponding agency relationships*. We find it strange that control loops can exist without a delegation between involved actors. 8) Further this leads us to the conclusion that Weigand & De Moor *seem to make a separation between control loops and corresponding delegation links*.

9) There exists an agency relationship between baker and daughter and between baker and boy. This agency relationship is supported by partial control loops. Therefore it *seems to be possible to introduce a delegation link without a full control loop (both initiation and evaluation)*. We are questioning whether it is possible to have such “partial” control loops between principals and agents. When we regard the extended workflow loop model (figure 4) we can not find that such a separation is possible.

10) When we then try to analyze the relationship between the daughter and the boy the analysis provided by Weigand & De Moor confuses us. The daughter’s act of saying, “the pizza is ready! You can go” to the boy, is an instruction to the boy to deliver the pizza. Weigand & De Moor further claim that this act also is a report from the daughter that the baking is finished. It is strange that such a report is directed towards the boy since it was not the boy who was the initiator. Such a report should rather be done directed to the baker as initiator of the workflow-loop. According to DEMO and ActionWorkflow a report is an answer to an earlier given request. Weigand & De Moor assume that evaluation of the execution needs to be done by an evaluator. We mean that one can question (in the case of internal workflow loops) the need for evaluation. Weigand & De Moor *seem to take it for granted that there must exist an evaluation task for each communication loop (in every step in the workflow)*. Of course there must be some quality control, but is that needed for each workflow initiation?

These critical issues that have been raised need to be taken into consideration when a second step is taken towards a multi-role model

4 A second step towards a multi-role model

4.1 Basic concepts: Assignments and roles

From the analysis made of Weigand & De Moor model and their application of the model we first would like to introduce a distinction between different kinds of assignments (different communicative acts). We distinguish between *role assignments*, *external product assignments* and *internal product assignments*.

There is also a link between assignment and role. A role assignment is made by a *principal* of the organization directed to an *agent* of the organization. An external product assignment is made by the *customer* and directed to the *organization*. An *agent* in the organization acting on behalf of the organization receives this order. An internal product assignment is the assignment made by one *agent* towards another *agent* in the organization according to defined roles³. This is to be seen as an *externally furnished* product assignment, which are *forwarded* in the organization by its agents.

By separating between these different kinds of assignments it is also possible to distinguish between the organization in itself and actors acting on behalf of the organization.

4.2 The pizza-case illustration II

We would now like to express these assignments explicitly. Therefore we use the same pizza-case illustration as used to illustrate the use of Weigand's & De Moor's model. We explicitly state examples of these assignments as communicative acts:

- Role assignments (role definitions):
 - R1. Baker (as principal) → Baker (as order recipient) “You should, on the Pizza-shop, receive orders from all customers and forward them to the daughter”
 - R2. Baker (as principal) → Daughter: “1) You should, on behalf of the Pizza-shop, bake pizzas for all customers.” “2) You should, on behalf of the Pizza-shop, hand over each baked pizza to the boy together with a request to him to deliver the pizza to the customer who ordered that pizza.”
 - R3. Baker (as principal) → Boy: “You should, on behalf of the Pizza-shop, deliver baked pizzas to customers.”
- External product assignment (customer order)
 - O1. Customer (John Smith) → Pizza-shop (Baker as order recipient): “ Please, bake a pizza Capriciosa for me, John Smith.”
- Internal product assignment (forwarded/transformed orders):
 - F1. Baker (as order recipient) → Daughter: “Bake a pizza Capriciosa for customer John Smith.”
 - F2. Daughter → Boy: “Deliver this pizza to customer John Smith.”

The baker is the owner of the pizza-shop, thus he is the principal in this case. At the pizza-shop there exist three agents of the organization; the baker (as order recipient), the daughter (as cook), and the boy (as deliverer). Please note that we have chosen to use the actor names daughter and boy as instances. In a more general way they should be called cook and deliverer. We have however used the actor names (daughter and boy) and not the roles (cook and deliverer) in order to be clear about the connection between our pizza-model and Weigand's & De Moor's pizza-model. Further we have identified one role definer (manager/principal), namely the baker. The baker then acts in two roles, both as role definer and as order recipient.

By making such a distinction between different kinds of assignments one can solve several of the issues raised in section 3.3. The acknowledgement of the organization as an actor (issue #1) and the distinction between external and internal workflow loops (issue #2) will be done through separating between internal and external product assignments. The distinction between the actor as principal and the actor as performer (issue #3) and the distinction between principal-agency relationships and recurrent workflow loops (issue #4) will be done through separating between role assignment and product assignment as well as separating between role definer and agents. The actual execution (issue #5) will be seen by expressing both the content of the role assignment as well as the pre-requisites for and results of acts performed by a role.

³ For our analysis we have used an organizational structure with rather well defined and strict roles in order to clarify the different types of assignments. Our point of departure has been Weigand's & De Moor's examples with corresponding roles. Our exemplification here should however not be seen as arguments for a certain organizational structure. There can be other, more team-oriented ways, to organize, but in all cases there is a need for role assignments.

In the figure below (figure 6) we have adopted such a distinction between different kinds of assignments on the pizza-case. To indicate different acts performed we have used the following symbols:

- O = order
- FO = forwarded order
- X = execution
- E = evaluation
- R = role definition (delegation)

As can be seen from our application of the pizza-case evaluation is something that is performed by the customer since he/she does the initiation part of that external workflow. There exist thus a connection between the initiation part and the evaluation part of the business transaction (confer issue #6 in section 3.3). As can be seen from the model illustrated in figure 6 below there does not exist any evaluation parts for actions performed within the organization (confer issue #10 in section 3.3). This is a consequence of regarding role assignments as principal and internal product assignments (forwarded orders) as recurrent. As stated before we believe that it is not needed to perform a formal evaluation of each execution, but of course there needs to be some kind of evaluating tasks within the organization in order to ensure quality assurance. How this quality assurance should be organized and performed is a question of organizational design, which we do not address in this paper. Issues concerning this matter are described in the vast literature on quality management, e.g. Rao et al (1996).

This also means that we have by the use of role assignment covering a number of recurrent tasks in the organization gone beyond a thinking of control loops (confer issue #7, #8 and #9 in section 3.3). The pizza-case according to our multi-role model is depicted in figure 6⁴.

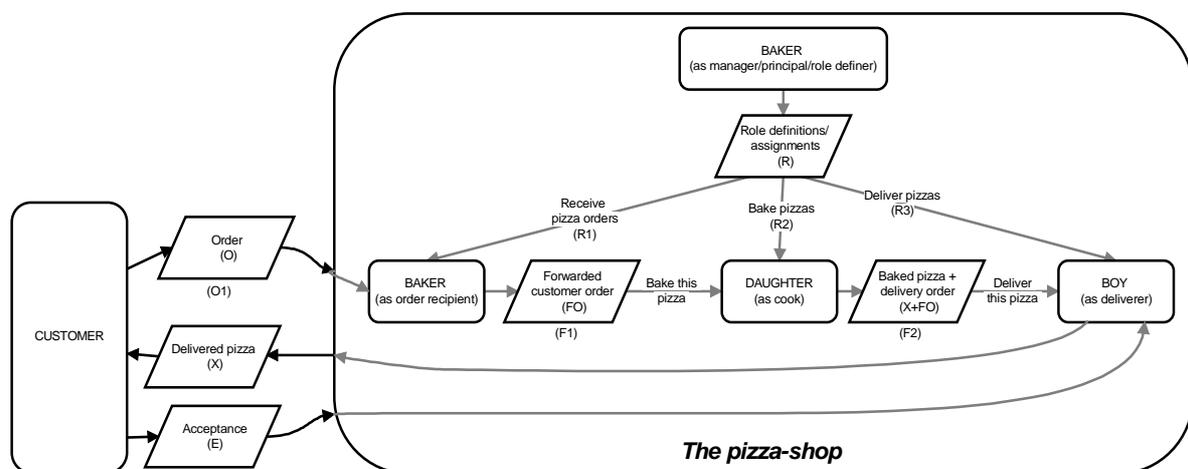


Figure 6: The pizza-case according to our multi-role model

The model of the pizza-shop in the figure above should be interpreted like the following. There is a customer that places an order (O). This order is directed to the organization (the pizza-shop) and received by the baker who acts on behalf of the organization. The customer order is then forwarded (FO) to the daughter (F1) who will bake the pizza. After having the pizza baked the daughter will forward the order (FO) to the boy (F2) to deliver the pizza. The pizza will then be delivered to the customer and the customer will evaluate the fulfillment performed by the pizza-shop. The different roles involved in the process of taking, forwarding and fulfilling customer orders are governed by role assignments (R1, R2, R3) issued by the baker (in the role of principal).

⁴ Note that the interaction between the customer and the pizza-shop also should include a payment from the customer (fulfillment of commitment), but the payment process is excluded in this illustration.

As can be seen from the figure above we make a distinction between different kinds of recipients. We distinguish between next recipient (daughter and boy) and the final recipient (the customer as the beneficiary). It can also be seen from the figure above that we distinguish between original orderer and forwarding orderer.

4.3 Conceptualization of assignments based on a communicative action analysis

We can look closer at these different *types of assignments*. What kind of communicative actions are they? They are all of directive type (cf classification of Searle, 1979). 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 favor 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* 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. In the pizza-shop they talk about their main product, which are pizzas of different kind. The different assignments are analyzed, i.e. classified according to these categories. This is shown in table 1.

Table 1: A communicative action analysis of different organisational assignments (The Pizza example)

Id	Type of assignment	Locutor	Addressee (proposed actor)	Proposed action	Beneficiary	Next recipient	Product (kind of action object referred to)
R1	Role assignment	Baker as principal	Baker	Recieve & forward cust. order (type level)	Customers (all possible)	Daughter	Pizzas (within the assortment)
R2	Role assignment	Baker as principal	Daughter	Bake & forward (type level)	Customers (all possible)	Boy	Pizzas (within the assortment)
R3	Role assignment	Baker as principal	Boy	Deliver (type level)	Customers (all possible)	Customer (who ordered pizza)	Pizzas (within the assortment)
O1	External product assignment (Customer order)	A customer	Pizza-shop (Baker as order recipient)	Bake & deliver (instance level)	Locutor (particular customer)	Locutor (particular customer)	A pizza of particular kind (ordered)
F1	Internal product assignment (Forwarded order)	Baker as order recipient	Daughter	Bake (instance level)	Particular customer	Boy	A pizza of particular kind (ordered)
F2	Internal product assignment (Forwarded order)	Daughter	Boy	Deliver (instance level)	Particular customer	Particular customer	A pizza of particular kind (ordered and produced)

As can be seen from the discussion above our multi-role model acknowledges three different types of assignment. What differences are there between our multi-role model and two-role models, such as

Action Workflow and DEMO? Action Workflow and DEMO do not distinguish between different types of assignments as:

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. We think that Action Workflow and DEMO take customer orders as prototypical relations and use them both for external acts/relations and internal acts/relations. There are however important differences between external and internal acts/relations. These differences are illustrated in table 2 below. There are also important differences between principal - agency relations and horizontal relations which also can be seen from table 2. Action Workflow and DEMO do not seem to acknowledge principal - agency relations at all.

We will clarify, with the aid of table 2, the differences between these types of assignments. 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 said above directives. However they also have a declarative force since they appoint actors to roles. Customer order and forwarded orders are on the other side 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 made 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. The next recipient will (often) not be the locutor. The next recipient will be the beneficiary when the product is delivered from the organisation, but not for pure internal acts. For such cases the next recipient will be an internal agent.

This analysis has lead us to an enhanced role repertoire in relation to DEMO and Action Workflow. These approaches work with only two roles initiator – executor or customer – performer. In our approach we distinguish between the following roles:

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

It is the special case of customer order relations where the roles of locutor, next recipient and beneficiary coincide. When describing internal forwarded order relations these three roles will not coincide in the same way. This leads us to the conclusion that it is not appropriate to use the two role model (of DEMO or Action Workflow) in analysis of internal workflows. In such cases an alternative model as described here are preferred. This model is summarized in table 2.

Table 2: Characterizations of different types of assignments

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

5 Conclusions

This paper is about what aspects that must be taken into consideration when modelling organizations. We have paid special attention to two-role models. In this paper we have come to the conclusion that two-role models for modelling organizations are not sufficient. We have paid special interest to ActionWorkflow and DEMO. These two-role models do not make any distinction between internal and external product assignments and no distinction between product and role assignment.

Two-role models are based on an understanding that a piece of work only has one type of assignment. We claim that a piece of work always is governed by vertical and horizontal assignments, i.e. there exist multiple co-ordinators for a piece of work. Process modelling often emphasizes horizontal co-ordination and this is one way to perform business modelling for achieving an understanding of the studied organization. We claim however that it is important to acknowledge both vertical and horizontal co-ordination in order to capture the essentials. Otherwise our understanding of the studied organization will be insufficient.

Weigand & De Moor (2001) have also observed the insufficiency of two-role models for modeling organizations. Weigand & De Moor have taken an important step, but we conceive their analysis to be insufficient. We have, by studying their model and an application of their model, identified a number of critical issues that need to be acknowledged in business analysis. The most important flaws in their model are that:

- They do not acknowledge the organization as an actor
- They do not acknowledge internal workflow loops
- They do not distinguish between principal-agency relationships and recurrent workflow-loops
- They have problems in handling control loops, principal-agency relationships and delegations
- They assume that there must exist an evaluation task (by the initiator) for each communication loop

We have therefore developed another model especially to acknowledge different kinds of assignments (role assignment, internal product assignment and external product assignment) together with appurtenant roles. By distinguishing between these different kinds of assignments one can acknowledge horizontal as well as vertical co-ordination. As a summary we have made a comparison between the traditional LAP-approaches (two-role models), Weigand's & De Moor's multi-role model and our own multi-role model based upon the models' acknowledgement of different kinds of assignments. This comparison is depicted in table 3.

Table 3: Different kinds of assignments in relation to two-role and multi-role models (X = recognized)

Type of assignment	Two-role models (ex. ActionWorkflow & DEMO)	Multi-Role model 1 (Weigand & De Moor)	Multi-Role model 2 (Lind & Goldkuhl)
Role assignment	- (not recognized)	X	X
External product assignment (Customer order)	X (not distinguished)	X	X
Internal product assignment (Forwarded order)		- (treated as role assignment)	X

An essential part of this paper has been to understand the question "who bakes the pizza?". We claim that there is a difference whether you regard the pizza-shop from the outside or from the inside. From the outside it is the pizza-shop who bakes the pizza and from the inside it is the daughter who bakes the pizza on behalf of the pizza-shop. This follows the perspective of organizational actions as dual actions, i.e. baking the pizza is something that is made both by the person and by the organization (cf Ahrne, 1994; Goldkuhl & Braf, 2002). When looking from the outside it is not interesting to recognize

the person performing the act of baking the pizza. Viewing it internally it is of course interesting to see who is doing it since someone must do it.

The focus in our paper has been on combined vertical and horizontal co-ordination. There are other governing forces in organizations as Goldkuhl & Röstlinger (1999) claim. Future research should investigate relations between assignments and other such governing forces (e.g. norms, artifacts, competencies).

Our analysis has been driven by the insufficiencies in two-role models and critique directed towards Weigand's & De Moor's multi-role model. Through the analysis performed of Weigand's & De Moor's multi-role model we have identified an issue for further research concerning how to internally handle evaluation of performed actions. There is also a need to go beyond LAP-oriented frameworks and relate our work to other kinds of framework.

Intentionally we have used a fictitious and rather simple case, the pizza-shop case. We strongly believe that simple cases can be a useful point of departure for conceptual analysis and development. Even this simple case has shown the limitations of two-role models. Based on this sole and fictitious case we have strived for analytic generalization (Yin, 1984). This effort has been enabled by a communicative action analysis revealing essentials in horizontal and vertical co-ordination. A natural next step is to test our framework in complicated and real life cases.

References

- Ahrne G. (1994) *Social Organizations. Interaction Inside, Outside and Between Organization*, Sage, London
- Austin J. L. (1962) *How to Do Things with Words*, Oxford University Press
- Bons R. (1997) *Trustworthy trade procedures*, PhD Thesis, Erasmus University, Rotterdam
- Chen K.T. (1992) *Schematic Evaluation of Internal Accounting Control Systems*, PhD Thesis, University of Texas at Austin
- Denning P.J., Medina-Mora R. (1995) *Completing the Loops, Interfaces*, Vol 25, No 3
- Dietz J. L. G. (1999) *Understanding and Modelling Business Processes with DEMO*, Proc. 18th International Conference on Conceptual Modeling (ER'99), Paris
- Goldkuhl G., Braf E. (2002) *Organisational Ability - constituents and congruencies*, in Coakes E, Willis D, Clarke S (eds, 2002) *Knowledge Management in the SocioTechnical World*, Springer, London
- Goldkuhl G., Röstlinger A. (1999) *Expanding the Scope – from Language Action to Generic Practice*, In: Goldkuhl G., Lind M., Seigerroth U., Ågerfalk P.J. (1999) *Proceedings of the Fourth International Workshop – The Language Action Perspective on Communication Modelling*. Jönköping International Business School
- Habermas J. (1984) *The Theory of Communicative Action 1, Reason and the Rationalization of Society*, Beacon Press
- Lind M., Goldkuhl G. (2001) *Generic Layered Patterns for Business Modelling*, In: Schoop M., Taylor J. (Eds.) *Proceedings of the Sixth International Workshop on the Language-Action Perspective on Communication Modelling (LAP 2001)*
- Medina-Mora R., Winograd T., Flores R., Flores F. (1992) *The Action Workflow Approach to Workflow Management Technology*, In: Turner J., Kraut R. (Eds.) *Proceedings of the Conference on Computer-Supported Cooperative Work, CSCW'92*, ACM Press, New York
- Mintzberg H. (1979) *The structuring of organizations*, Prentice-Hall, N.J.
- Rao A., Carr, L. P., Dambolena I., Kopp R. J., Martin J., Rafii F., Shlesinger P. F. (1996) *Total Quality Management: A cross functional perspective*, John Wiley, New York

- Reijswoud V. E. van (1996) *The Structure of Business Communication: Theory, Model and Application*, PhD Thesis, Delft University of Technology
- Reijswoud V.E. van, Mulder J. B. F., Dietz J. L. G. (1999) *Communication Action Based Business Process and Information Modelling with DEMO*. *The Information Systems Journal*, Vol. 9, No.2, 1999, pp. 117-138.
- Searle J. R. (1969) *Speech Acts. An Essay in the Philosophy of Language*, Cambridge University Press, London
- Searle J. R. (1979) *Expression and meaning. Studies in the theory of speech acts*, Cambridge University Press, London
- Taylor J. R. (1993) *Rethinking the Theory of Organizational Communication: How to Read an Organisation*, Ablex, Norwood
- Weigand H., De Moor A. (2001) *A Framework for the Normative Analysis of Workflow Loops*, In: Schoop M., Taylor J. (Eds.) *Proceedings of the Sixth International Workshop on the Language-Action Perspective on Communication Modelling (LAP 2001)*
- Winograd T. , Flores F. (1986) *Understanding Computers and Cognition: A New Foundation for Design*, Ablex, Norwood NJ
- Yin R. K. (1984) *Case Study Research. Design and Methods*, SAGE, Newbury Park