

Generic Layered Patterns for Business Modelling

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Abstract

When developing information systems business modelling is needed in order to highlight the essentials of businesses. Patterns of inter-related speech acts are the basis for identifying essentials in Language/Action-oriented approaches for business modelling. Weigand et al. has made an attempt to conceptualise the notion of patterns in a layered architecture founded in such approaches. In this paper we present a framework of generic layered patterns for business interaction inspired by a critical examination of Weigand's meta-pattern framework. Through our framework of interdependent layers of generic patterns based on solid foundations that transcends the notion of speech acts we are able to describe and understand short-termed and long-termed business interaction. The five layers of generic patterns are *business act* as the basic unit of analysis, *action pair*, *exchange*, *business transaction*, and *transaction group*. Each layer, except for the first one, is derived from lower layers.

1 Introduction

When developing information systems it is necessary to understand such systems contextually, i.e. the role they play in giving support to their business context. To reach such an understanding there is a need to create business models. Different methods for business modelling emphasise different aspects of a business. A business model is a simplified description of a business. Such simplifications depend on both choices of those persons performing the modelling and of the constraining rules of the modelling method.

Many approaches for business modelling do not build on any distinct logic of how to construct such models. As a reaction against such approaches the Language Action (L/A) Community has emphasised the need for analysing business patterns. The language action perspective is based on the idea that communication is not just transformation of information. When you communicate you also act. The business patterns, e.g. the CFA-scheme (Conversation-for-action) (Winograd & Flores, 1986), are built on inter-related speech-acts. L/A-oriented approaches for business modelling emphasise the need for identifying patterns as the essentials in the business.

Inspired by such L/A-oriented approaches Weigand et al. (1998ab) propose meta-patterns for electronic commerce in a framework consisting of five layers; from speech act as the basic unit of analysis on the first layer to scenario on the fifth layer. The meta-patterns rely on the idea that the speech act is the basic unit of analysis that should be used. The five layers are built on L/A-oriented approaches, such as DEMO (Dietz, 1994; Reijswoud, 1996), Action Workflow (Medina-Mora, 1992) and BAT (Goldkuhl 1996; 1998), for business modelling.

The meta-patterns proposed by Weigand et al. (1998ab) can be interpreted as an attempt to integrate these different approaches into a coherent wholeness.

Weigand et al. (1998ab) are dealing with an important and relevant problem; to arrive at a coherent model concerning different areas to focus when performing business modelling on different levels of abstraction. A collection of business models covering the same case need to be coherent and consistent. It is therefore a need to ensure that higher layers can be derived from lower layers.

The purpose of this paper is to present an alternative framework for business modelling consisting of five layers of generic patterns. This alternative framework is inspired from a critical analysis of Weigand's meta-pattern framework.

The paper starts by discussing the usage of patterns in speech-act-based business modelling approaches. Weigand's meta-pattern framework is then described and critically analysed. Both the foundation and the meta-patterns are being analysed by regarding dependencies between different layers as well as the content of each layer. The alternative framework is then presented in section four.

2 Speech-act based modelling – usage of patterns

An action view on language and communication is emphasised when businesses are being studied from a language action perspective (L/A). L/A emphasises what people do when communicating. An important theoretical foundation for the language/action community is the Speech Act Theory (Austin, 1962; Searle, 1969; Habermas, 1984). The main characteristic of the Speech Act Theory is that it considers the use of language to be a form of rule-governed behaviour. Uttering a sentence is the performance of a purposeful act, a so-called speech act. L/A emphasises the need for regarding the performance of business in patterns constituted by inter-related speech acts.

The Speech Act Theory has been the foundation for a number of theories and modelling approaches in the area of information systems (Reijswoud & Lind, 1998). Such approaches (as well as the theoretical orientation) consider the utterance of speech acts to be the backbone of business processes and consequently their modelling effort focuses on speech acts. The speech acts more or less make up the essentials of businesses according to these approaches.

The initial impetus to a speech-act based conceptualisation of businesses has been the work by Flores and Ludlow (Flores & Ludlow, 1980) who propose to perceive businesses as networks of inter-related commitments created by directives, commissives, assertives and declaratives. Winograd & Flores (1986) built on to this idea and introduced a conversation-for-action schema (CFA), which regards the essentials of the business as patterns of inter-related speech-acts for arriving at successful conversations. A successful conversation covers a number of state changes; someone (A) states a request, someone else (B) makes a promise and then reports completion, which in the end A declares completed. Examples of approaches for business modelling that emanate from the idea of relating speech-acts to patterns are Action Workflow, Dynamic Essential Modelling (DEMO), and Business Action Theory (BAT).

Action Workflow (Medina-Mora et al., 1992) regards the conversation flow in an action workflow loop. The basic sequence of actions in the action workflow loop bears on the idea that we always have an identified customer and performer, and the loop deals with a particular action that the performer agrees to complete to the satisfaction of the customer. The action workflow loop is divided into four phases; proposal, agreement, performance and satisfaction.

In DEMO (Dietz, 1994; Reijswoud, 1996) the core concept is the transaction. A transaction is a pattern of activity performed by two actors; the initiator and the executor. A transaction is composed of three phases: the Order phase in which two actors come to an agreement about

the execution of some future action; the Execution phase, in which the negotiated action is executed; and the Result phase in which the actors negotiate an agreement about the result as brought about in the execution phase.

BAT (Goldkuhl, 1996; 1998; Lind & Goldkuhl, 1997) is a six-phase model describing generic business interaction logic. The model describes interaction between a supplier and a customer. It starts with business prerequisites of customer and supplier and goes through business communication (with e.g. offers, inquiries, negotiation and contract) to fulfilment (through delivery and payment) and ends with the satisfied usage or discontent and possible claims. The phases are 1) business prerequisites phase, 2) exposure and contact search phase, 3) contact establishment and proposal phase 4) contractual phase, 5) fulfilment phase, and 6) completion phase.

3 Weigand’s framework of layered patterns

Hans Weigand and his colleagues propose a framework consisting of different "meta-patterns" ordered in a layered architecture. The meta-patterns are intended for modelling and reusability. The framework and its meta-patterns are described in Weigand et al. (1998ab).

Weigand et al. apply the notion of patterns to electronic commerce. They apply their *layered pattern architecture* consisting of five layers of meta-patterns to electronic commerce transactions. They distinguish between five layers of meta-patterns; from low-level speech acts to high-level scenarios. “*Transactions* are units composed of speech acts, for example, a request/commit. Transaction can be grouped in *workflow loops*. A *contract* represents a reciprocal relationship and typically consists of two workflow loops. Finally, a set of related contracts is called a *scenario*, an instance of a use case” (Weigand & van den Heuvel, 1998a, pp. 263). The layered pattern architecture is shown in figure 1 below.

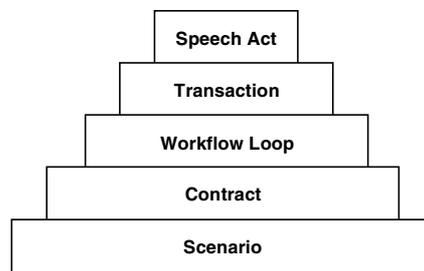


Figure 1: The layered pattern architecture (Weigand et al., 1998b)

The notion of patterns are defined as “a group of concepts that represents a common construction in business modelling” (Weigand & van den Heuvel, 1998a, pp. 262). The term meta-pattern is used in Weigand & van den Heuvel (1998a) to denote general communication patterns, which are domain-independent. The architecture shown in figure 1 is therefore highly influenced by different L/A-oriented approaches for business modelling.

Weigand et al. apply the architecture to the domain of electronic commerce transactions. We do not see that their architecture needs to be restricted to this domain. We interpret it as a generic model for electronic *and other kinds* of business interactions, i.e. we would like to widen the scope of their framework. Weigand et al. build their framework on different L/A-oriented approaches, such as Action Workflow (Medina-Mora et al., 1992), DEMO (Dietz, 1994; Reijswoud, 1996) and BAT (Goldkuhl 1996; 1998), and integrate different constructs (of those approaches) into a coherent wholeness. Weigand et al. has taken an important step by 1) trying to relate different L/A-oriented approaches for business modelling, and by 2) presenting an architecture of layered meta-patterns where higher layers are based on lower layers. The architecture has thus certain merits, but can be criticised on several points. In the

following sections we will present and critically review each layer as well as the dependency between different layers. The section is concluded by some overall critical comments of the architecture, which will be used in the following section where we present an alternative framework constituted by layered patterns.

3.1 First layer: Speech Act

The first layer, which also is regarded as the basic unit of analysis, is the speech act. The speech act is the basis for all abstractions made in the architecture. Weigand et al. base themselves on Searles framework (Searle, 1969) in which speech acts are constituted of three parts; the propositional content, the illocutionary context and the illocutionary force. The propositional content describes what the speech act is about. The illocutionary context represents the relevant background information of the speech act and the illocutionary force indicates the intended effect of the communication. The main illocutionary force is the illocutionary point, which describes the intention of the communication. Searle (ibid.) distinguishes between five different illocutionary points, which are assertives, directives, commissives, expressives, and declaratives.

Weigand et al. claim that when modelling electronic commerce processes the most important part to be included from speech act is the illocutionary point. “It indicates the intended effect of the speech act and therefore gives the purpose of this action. The purpose of the action is what is important on the essential level of modelling processes” (Weigand et al., 1998b, pp. 51).

We think it is a very good idea to start from a basic unit of analysis possible to use as a component when constructing layers of higher order. However, we claim that speech act can not be used as *the* basic unit of analysis, since business interaction cannot be reduced to only speech acts. Business interaction needs to also include material acts since for example treatment and delivery of physical goods are essential in business interaction.

3.2 Second layer: Transaction

The second layer is called transaction. Speech acts go in pairs as claimed by Weigand & van den Heuvel (1998a). A transaction is defined by Weigand et al. (1998b, pp. 51) as “the smallest possible sequence of actions (speech acts) that leads to a certain deontic state, in other words an obligation or an authorisation, or an accomplishment”. A deontic state change has an effect in the social world of the participants. An example of such action pair is by combining a request of the customer to deliver a product and a promise of the supplier to actually deliver it. Such combination constitutes a deontic effect, i.e. an obligation to the supplier to deliver the product.

The notion of transaction is built upon DEMO (Dietz, 1994; Reijswoud, 1996), which distinguishes between actagenic and factagenic conversations. The purpose of actagenic conversations is to create a commitment, or obligation, for the executor to perform something in favour of the customer. The purpose of factagenic conversations is to lead to an acceptance by the customer/initiator of the supplier/executor performance. Weigand et al. mean that particular kinds of transactions are the factagenic and the actagenic conversation, each constituted of at least two speech acts¹. They emphasise however, that the actagenic and factagenic conversations are special meta-patterns of communication. They also emphasise

¹ Important to note is that the notion of transaction in DEMO is not equivalent to the notion of transaction presented by Weigand et al. The notion of transaction presented by Weigand et al. is related to one conversation type (actagenic or factagenic) according to DEMO.

that there are other conversation types that can be derived from relating at least two speech acts.

The transaction layer can be criticised on several points. The notion of transaction gives rise to a terminological and conceptual confusion since transaction is the core concept in DEMO with a different meaning than in the architecture. We also question why Weigand et al. make a delimitation to speech act combinations leading to deontic state changes. There are communicative acts in business communication that do not lead to deontic changes. Examples of such business communications are showing interest and giving proposals. We question why Weigand et al. exclude speech acts which do not lead to any deontic changes.

3.3 Third layer: Workflow loop

The third layer is called workflow loop. “A workflow is a set of related transactions aimed at some goal” (Weigand et al., 1998b, pp. 51). The workflow loop follows the model of the basic conversation for action (Winograd & Flores, 1986) and is comparable to the transaction concept of DEMO (Dietz, 1994; Reijswoud, 1996).

According to Weigand & van den Heuvel (1998a) the workflow loop starts with a proposal, a request from the customer (or initiator) or an offer from the performer (or executor). In the second phase, the customer and the performer come to an agreement. After the performer has executed the promised action, (s)he states/declares that (s)he is finished to the customer. In the last phase, the satisfaction phase, the customer can declare that the transaction was (un)successful. “The reason for introducing a workflow level is to create patterns that are closed towards a certain goal” (Weigand et al., 1998b, pp. 51). The pattern on this layer expresses that actions always are executed for someone and that they need assessment to establish their accomplishment.

This layer also gives rise to some critical reflection. We question the need for constructing a layer that builds upon the asymmetry between the two parties involved in the conversation. The genuine business character of business interaction is exchange, where the different parties and their exchange actions are dependent on each other (e.g. Glynn & Lehtinen, 1995). By constructing this third layer Weigand et al. misses the genuine exchange characteristic of business interaction.

3.4 Fourth layer: Contract

The fourth layer is called contract. By this layer Weigand et al. cross the limitation for the analyst to choose the viewpoint of the initiator (customer) or the executor (supplier) of the transaction. They build upon the BAT framework (Goldkuhl, 1996; 1998), which emphasises the need for interpreting the business transaction as an exchange process between a supplier and a customer and that it involves the creation and sustainment of business relationships. They further build upon Taylor (1993) who mean that all conversations have as their background a pattern of exchange. In commercial transactions, one object is usually a product and the exchange object consists of money. Taylor (ibid.) calls such pattern of exchange a symmetrical type of exchange.

The basis for the contract is two interleaving workflow loops, where transaction patterns are coupled by means of an agreement on the terms of exchange. Weigand & van den Heuvel (1998a) use the term contract in a wider sense since they relate to BAT, which emphasise exchange in different phases of the business transaction. This is done by identifying that different phases in BAT correspond to other types of conversations, such as conversation for possibilities, conversation for orientation and conversation for clarification.

As the other layers have given rise to some critical reflections this layer also does. We question the terminology, the use of the term ‘contract’ as covering a whole business

transaction. Contracts are an essential part, but only *one part* of the business transaction. We also question whether it is possible to derive this layer from lower layers since Weigand et al. have excluded all transactions that leads to deontic state changes. Other conversation types that are related to BAT do not lead to deontic state changes. A business transaction according to BAT is constituted by several exchanges. We find it strange how these different exchanges can be derived from lower layers.

3.5 Fifth layer: Scenario

The fifth layer is called scenario. This final layer describes the interaction between several contracts that run concurrent between several parties. Weigand et al. (1998b) claim that in electronic commerce, it is not unusual that more than 20 parties are involved in an international business transaction. This layer is related to the need for understanding interactions in a wider context. The notion of scenario is however not fully conceptually developed yet. Weigand et al. (1998b) admit that “The exact definition of scenario is for us still a matter of ongoing research”.

For this layer some critical reflections also can be raised. We believe Weigand et al. identify a very important aspect of business performance by considering relationships to other parties. However, we also believe that this layer is not a construct of lower layers. It rather seems like a *horizontal expansion* than a *vertical abstraction*. We have problems in understanding how lower layers involving two parties can constitute a layer involving several parties. By the notion of scenario, the domain of application becomes wider and thereby the scenario layer can not be an aggregate of lower layers.

3.6 Need for further conceptual development

The layered pattern architecture presented by Weigand et al. is an important step towards relating different L/A-oriented approaches for business modelling. They have taken a pioneering step. We claim however to have found some anomalies in their architecture. It is a commendable purpose to try to integrate different L/A approaches. The different approaches build, however, upon different assumptions and use different conceptual constructs, which means that the approaches and their constructs are not always compatible and thus possible to integrate. There are conceptual conflicts between the approaches that need to be handled. In the layered pattern architecture there are a number of conceptual problems, which is the result of this "harmonious" integration of several L/A approaches. The following conceptual problems have been identified:

- A strict use of speech act as the basic unit of analysis
- The constitution of transaction based upon deontic state change
- The lack of identifying different exchange types as the genuine character of business interaction
- The inconsistency of deriving higher layered patterns from lower layers when introducing new parts not used on lower layers

These conceptual problems have inspired us to develop and propose an alternative to Weigand's layered pattern architecture.

4 A new framework: Generic Layered Patterns

Based on strengths and weaknesses of the model by Weigand et al. we hereby present another framework that both builds upon, but also transcends their framework. We think that the basic approach of Weigand et al. is very promising; i.e. to construct a model of patterns and arrange such patterns in a layered model, where higher layers build on lower layers. We propose here an alternative framework, but the core idea is the same: To have a model of generic layered patterns. We define pattern in the following way as a basis for our framework: A pattern is objects related to each other in a certain way dependent on its action logic and given the delimitation of the patterned objects. The delimitation of each pattern is dependent on the chosen scope of each layer. Objects on each layer are taken from the layer below. This means that the model is built in an hierarchical way.

Layers of generic patterns thus constitute our framework. It consists of five layers. The framework is based upon business act as the basic unit of analysis. As said above each layer in the framework is based upon phenomena (objects) existing on lower layers. The layers used in our framework are business act, action pair, exchange, business transaction and transaction group. The framework is depicted in the figure below. As can be seen from the figure our layer model is turned the other way around than Weigand's model. The first layer (the business act) is in the bottom of the model. We think it is more adequate to show the layers in this way - the lowest at the bottom and the highest at the top.

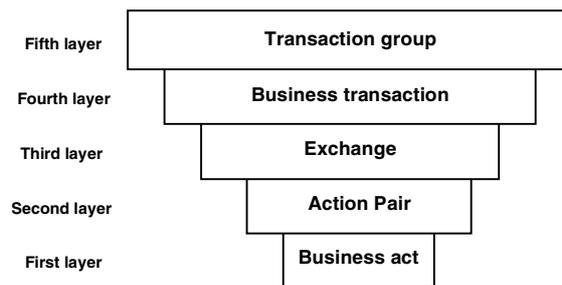


Figure 2: Layers of generic patterns for business modelling

This section consists of a description of what aspects that constitutes each layer as well as links between the different layers.

4.1 First layer: Business act

Instead of speech act (as in Weigand's model) we use the notion of a business act in our model. There are important material acts (like e.g. delivery of goods) in business interaction, which must be possible to describe and evaluate. A business act can be a speech act (communicative act) or a material act.

The notion of business acts builds upon the notion of social action. An organisation consists of humans, artefacts and other resources, and actions performed. Humans (often supported by artefacts) perform action in the name of the organisation (Ahrne, 1994; Goldkuhl & Nilsson, 2000). 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 (von Wright, 1971; Goldkuhl & Ågerfalk, 2000). 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) mean 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 & Ågerfalk (2000) present a generic model of social action (see figure below) including both communicative and material acts. E.g. an order from a customer to a supplier is a communicative business act. The delivery of goods from the supplier to the customer is a material business act. These both actions are performed by one business party (an "interventionist") addressed to the other party (the recipient). Since they are actions 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.

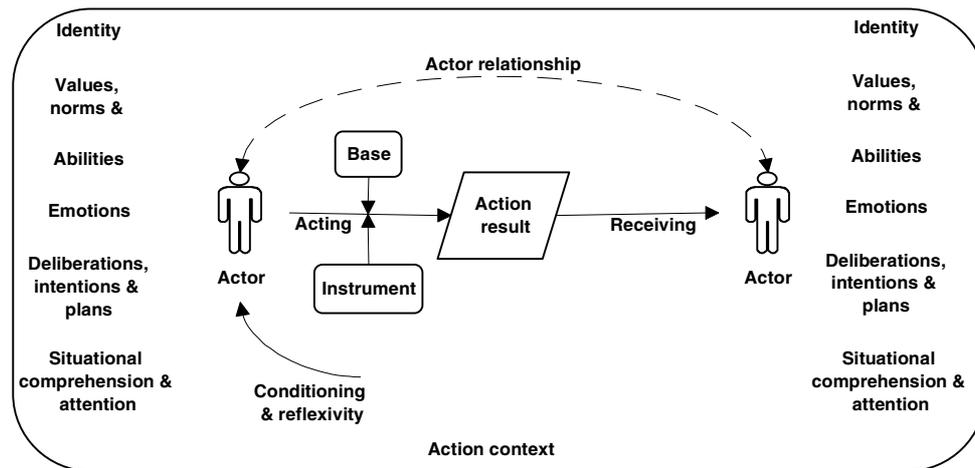


Figure 3: A generic model of social action (Goldkuhl & Ågerfalk, 2000)

The generic model of social action makes a clear distinction between *result* and *effects* of an action (von Wright, 1971; Goldkuhl & Ågerfalk, 2000). 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 the above mentioned communicative act. The delivered product is the result from the material deliverance act. Effects are consequences which may arise after the action object has been presented to the world. A communicative act (like a business ordering) 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); which also should be seen as action effects.

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 and with this accompanying 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.

As depicted in the figure above there exist within the scope of social action a number of action-related concepts. Based upon this generic model of social action we define a business act as *performance of a communicative and/or material act by someone aimed towards someone else*. An order from a customer to a supplier is an example of a communicative business act (see figure 4). The delivery of goods from the supplier to the customer is an example of a material business act. Business acts 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.

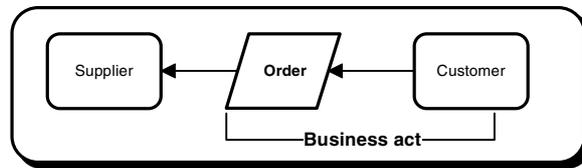


Figure 4: Example of a business act – a customer placing an order to the supplier

4.2 The second layer: Action pair

On the second layer two business acts are grouped into an action pair. We use a more general concept - action pair - than the transaction concept from Weigand’s model. We do not restrict action pairs to be grouped together dependent on deontic state changes as in the framework of Weigand.

The basis for grouping business acts into an action pair is that one business act functions as a trigger for another act, which will have the function of a response. Action pairs are patterns of triggers and responses. In the example below (see figure below) two business acts are related to each other; an order as the trigger and an order confirmation as the response. By issuing an order the interventionist (i.e. the customer) expect the recipient (i.e. the supplier) to respond in a certain way; by confirming the order, by negotiating or by turning the order away. Action relationships between the actors are created through such an interaction.

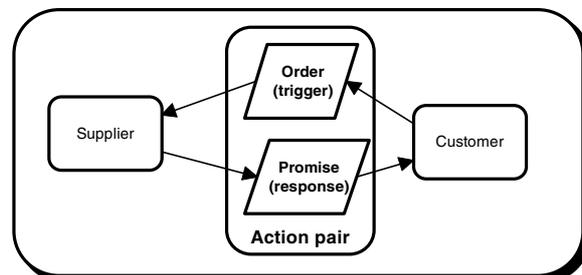


Figure 5: Example of action pairs - order and order confirmation

4.3 The third layer: Exchange

One or several action pairs, i.e. patterns of action pairs, can constitute exchanges between actors. An exchange means that *one actor gives something in return for something given by another actor*. Exchanges are however not only related to exchange of value (such as physical goods in return for money) – exchange is related to different kinds of communicative business acts. In the example below (see figure below) we have put forward exchange of proposals between the customer and supplier.

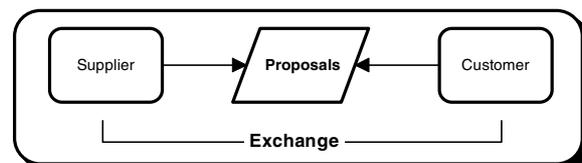


Figure 6: Example of exchange - proposal given by each actor

The business acts (of an action pair) that constitute exchanges need to be of the same exchange type. The business parties are interacting concerning the same topic, i.e. in principal similar types of action goes in both directions. In business interaction there are business acts concerning different matters (topics). Some business acts are about giving proposals, some business acts are about exchanging value etc. These business acts are parts of different types of exchanges. Different business exchange types are listed in section 4.4 below.

In our model we have a clear exchange perspective. We mean that exchanges constitute the core of business. There are reciprocal actions performed by the two different parties (supplier and customer). This must be fully acknowledged. Asymmetrical frameworks - like a workflow loop with one performer satisfying one customer and nothing is contributed in return - are seen as a partial models (cf critique in Goldkuhl, 1996). This is avoided in our framework for business interaction. In Weigand's model the third layer consists of such an asymmetrical workflow loop.

4.4 The fourth layer: Business transaction

A business transaction is a pattern on a higher layer built from different types of exchanges related to each other. There is certain logic of interaction between the supplier and customer when doing business. This logic is the pattern covered by the business transaction². A business transaction has different *states* (in the social and material world) where the initial state is that the customer has a need and the supplier has a corresponding ability. By going through a number of *phases* consisting of exchanges the goal is to arrive at a state where both supplier and customer have satisfied (parts of) their needs.

The business transaction includes a number of different exchanges, where each of these exchanges constitutes the business transaction's different phases. The exchanges occurring in the business transaction are:

- Exchange of interests, 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 involves the supplier's delivery of a product and the customer's making a payment
- Exchange of assessments, which involves the supplier's and customer's making claim or stating acceptance

Our fourth layer (business transaction) corresponds rather well to Weigand's fourth layer (contract). As can be seen there is a terminological difference. Weigand et al. use the term 'transaction' for a much smaller unit of analysis, i.e. a special kind of speech act pair. We conceive a *business* transaction to be something much larger. It consists of all business acts performed by both business parties, which are related to a specific contracted delivery. The contracting itself (i.e. the commitment exchange phase) is of course part of the business transaction, but also exchange phases prior to this (exchanges of interests and proposals) and exchange phases after this (exchanges of value and assessments).

Action pairs consist of business acts that are related to each other by triggers and responses. In order to constitute an exchange the business acts need to be of the same exchange type. As discussed above the exchanges are related to each other in a pattern, i.e. a

² Our reasoning here is based on Business Action Theory and its conceptualisation of business acts and phases of exchanges (Goldkuhl, 1996, 1998; Axelsson et al., 2000).

business transaction. In order to be able to relate different exchanges to each other, there is a need to see that a business act can be part of different action pairs. There must be action pairs for exchanges and action pairs for relating exchanges to each other. In the latter case the business acts (of the action pair) need to be of different exchange types. This action pair will glue the different phases together. In the figure below three action pairs are depicted. The first and the third are action pairs within exchanges. The second action pair is relating the two exchanges to each other. An example to illustrate this: A request for offer from the customer is regarded as the first business act. This business act is a trigger for the second business act, i.e. the offer from the supplier, which is a response to the request. This offer is a trigger for the next business act, an order from the customer, who is accepting the conditions in the offer. This is a response to the offer and also a trigger for the next business act in the business interaction: The order confirmation from supplier, which is a response to the order. We here describe four different business acts, which are related to each other in a generic business logic through triggers and responses. The two first business acts (which form an action pair) belong to the exchange type of business proposals. The last two business acts (which form an action pair) belong to the exchange type of business commitments. The second business act (the offer) and the third business act (the order) form an action pair, but belonging to different exchange types. It is this kind of action pair (belonging to different exchanges) that relates different exchanges to each other.

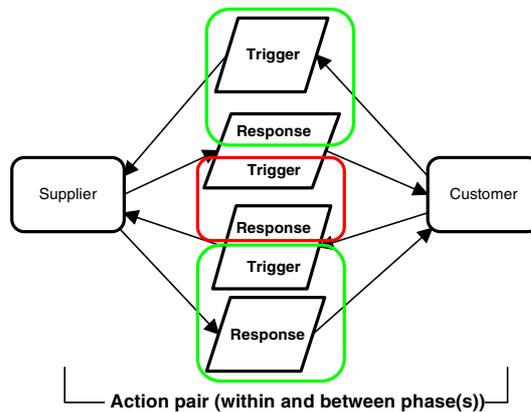


Figure 7: Action pairs for exchanges and relating phases in the business transaction

Business acts are also multi-consequential. This means that a certain business act can trigger several business acts. In the figure above we have identified action pairs for inter-organisational interaction. It is however common that a business act also is a trigger for business acts within the organisation, which means that an inter-organisational act can give rise to several intra-organisational acts.

4.5 The fifth layer: Transaction group

Many times when doing business the same supplier and the same customer interact with each other through a number of business transactions over time. Through long-term based business interactions, actor relationships are established, sustained and developed. One key issue for many businesses of today is to stay competitive through developing powerful relationships to suppliers and customers.

It is therefore sometimes useful to formulate long-term agreements that cover a number of business transactions, i.e. a transaction group. The recurrent business transactions need to be framed within a wider agreement. It is therefore a need for a phase of relationship management, which consist of exchanges concerning negotiations on a long-term basis forming long-term contracts as well as evaluation of the long-term contracts. The pattern on

this layer, i.e. the transaction group, is the pattern of business transactions related to each other and the preceding relationship management within a transaction group. Relationship management can be seen as an extension of the original BAT model. It is described by Axelsson et al. (2000) and Goldkuhl & Melin (2001). Relationship management consists of exchanges of proposals and commitments on long-term basis, possibly preceded by exchange of business interests.

There is a clear difference between our fifth layer (transaction group) and Weigand's fifth layer (scenario). We remain within business interactions between two parties (supplier and customer). A transaction group is an aggregate of business transactions (from the fourth layer) with a relationship management, which consists of exchanges (from third layer). This means that our fifth layer is built from lower layers. In Weigand's model the fifth layer rather represents a horizontal expansion to other business parties and thus to other business interactions.

4.6 Relations between different layers

One main idea behind our framework is to have a layered model where each layer consists of objects from lower layers. The main objects from each layer are depicted in figure 6. We have also shown how the different layers relate to each other.

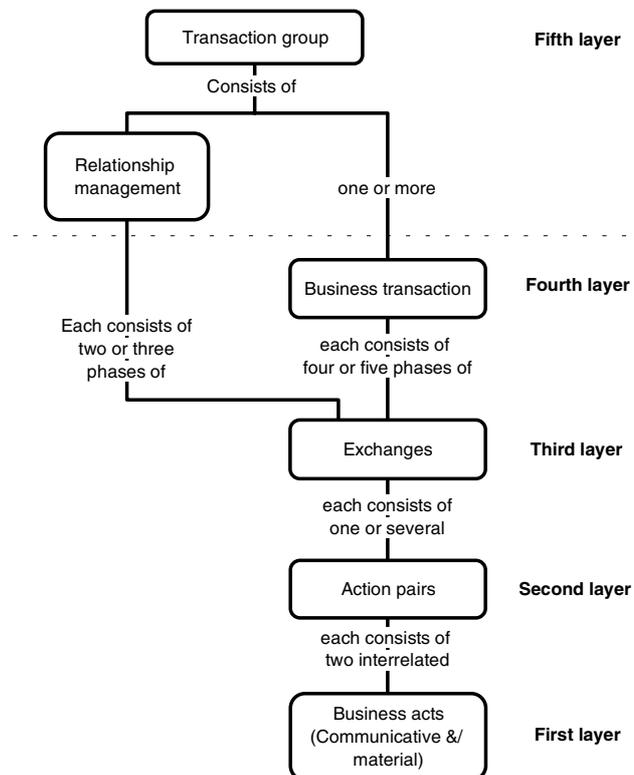


Figure 8: Conceptual relations between different generic layers

We summarise our framework by starting from bottom, the first layer. This layer is constituted by a business act. A business act can be a communicative act or a material act. A business act is an act performed by one business party and addressed to the other business party. An action pair constitutes the second layer. An action pair is two interrelated business acts. These two acts are related by being a trigger and a corresponding response. The third layer is constituted by exchanges. An exchange is one or more action pairs dealing with the same exchange topic. The fourth layer is constituted by a business transaction. A business transaction consists of four or five distinct types of exchanges. A transaction group constitutes

the fifth layer. A transaction group consists of one or (often) more business transactions preceded by a business interaction of relationship management (a long term contracting). Relationship management consists of exchanges of two or three distinct types of exchanges.

5 Conclusions and further research

This paper has dealt with patterns for business modelling. We have been inspired from the idea of layered patterns presented by Weigand et al. (1998ab). Weigand's model builds on a basic unit of analysis as the basis for constituting layered patterns on higher levels. These layered patterns can be used in order to move between different levels of abstraction when performing business modelling and thus understand details in context. Weigand's model is highly influenced by several L/A-oriented approaches.

Through a critical analysis of Weigand's model we have developed an alternative layered framework. Our framework, *generic layered patterns for business modelling*, has the following characteristics:

- It is based upon L/A-oriented assumptions, but transcends the foundations that strict L/A-oriented approaches for business modelling are based on
- It uses business act, which can be either a communicative and/or a material act, as the basic unit of analysis on the first layer
- It is a model with five layers, where each layer (two to five) is constituted by patterns existing on lower layers. The layers are (in order) business act, action pair, exchange, business transaction and transaction group
- It recognises the need for genuine business interaction constituted by several exchanges between two actors; the supplier and the customer
- It emphasises patterns used to constitute business transactions and transaction groups
- It recognises relationship management in order to formulate and evaluate long-term agreements that covers a series of recurrent business transactions
- It identifies essentials to focus on different levels of abstraction concerning business interaction

Our framework of generic layered patterns can be used to select and evaluate business modelling methods for modelling business interaction. Many methods for business modelling often use different types of models to highlight patterns on different levels of detail. Through our framework one can increase the degree of awareness concerning what patterns that are focused on different levels of abstraction and how these patterns are constituted. We believe that there is a need for domain-independent patterns that are layered and based on solid and coherent foundations in order to facilitate efficient business modelling session for different situations. This concerns both the process of performing business modelling as well as the result of business modelling sessions.

When performing business modelling it is important that the modeller is aware of what categories that influence the questions to ask and what categories to focus when documenting the answers to the questions. Different categories are focused on different layers according to our framework. Business modelling is about shifting between details and wholeness. Through our layered framework built explicitly upon solid foundations, concerning both the basic unit of analysis and the dependencies between the different layers, the need to shift between details and wholeness can be facilitated in a grounded way.

The layered framework presented in this paper can thus be used for evaluation and selection of business modelling methods and as a conceptual support to performing business modelling. One important question concerning business modelling is how to divide a business into different processes (Lind, 2001). The layered framework can for this task give support for understanding business interaction as a basis to determine different business processes.

Business processes exist in variants, where different types of business interaction patterns can determine such variants. Two types of business interaction patterns have been identified through the layered framework (the transaction and the transaction group) and have proven to be essential for process determination (ibid.).

Our framework is not built up by a number of integrated modelling approaches, which is the case for Weigand's model. Our model is instead built up by concepts starting with a basic unit of analysis, which is used as a base for deriving higher layers. The purpose of our framework has not been to integrate a number of different L/A-oriented modelling approaches since we believe that they are not always compatible. An interesting area for further research would therefore be to explicitly relate different L/A-oriented approaches, such as DEMO, Action Workflow and BAT, to our framework in order to position these approaches in relation to the layered patterns. Hopefully this will show similarities and differences between the L/A approaches and above all identify 'blind spots' in the approaches, i.e. aspects not covered by the L/A-oriented approaches, which will encourage further development of the approaches.

Weigand's model also encourage further research concerning business transactions involving several actors, i.e. scenarios as concurrent running contracts between several parties. Business interaction involving several parties has been left out in our framework since we delimit ourselves to focus on symmetric business interaction between two parties; the supplier and the customer. Another interesting area for further research would therefore be to relate several business transactions to each other in order to facilitate a wider domain of application. A hypothesis is that our framework can be used as a base for such further research. This hypothesis is based on the idea that business acts are multi-consequential, which makes horizontal expansion possible.

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