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Designing business process variants

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Abstract. When designing business processes there is a need to identify and delimit different processes. There exist, however, unclear criteria for delimiting business processes. Business process analysts apply usually a sequential view of business processes. Besides process sequences, there is a need to acknowledge different process variants. Founded in a combined transformative and co-coordinative view on business processes, instruments for describing business process variants are put forward in this paper. Two instruments (matrices) are proposed. One business process division matrix, for distinguishing process variants in relation to each other. The other matrix, a business phase matrix, is to be used to reveal the content of each phase of the business interaction constituting each process variant.

1 Introduction

Many contemporary approaches for business and IT development emphasise a process oriented perspective of what is being done. A process oriented perspective on organisational work means that this work is divided into several "process components" in order to place the customer in focus. Several different methods for process modelling exist. It is important to have adequate method support when reconstructing current processes and redesigning new ones. The different methods are however based on different conceptual frameworks and thus different process notions.

Davenport (1993) has identified a problem about process determination. According to Davenport (ibid.) there can be many different ways of determining an organisation's or several collaborating organisations' business processes.

> *"Considerable controversy resolves around the number of processes appropriate to a given organization. The difficulty derives from the fact that processes are almost infinitely divisible; the activities involved in taking and fulfilling a customer order, for example, can be viewed as one process or hundreds. The 'appropriate' number of processes has been pegged out from two to more than one hundred" (ibid, pp. 27-28).*

Unclear criteria for process division and delimitation can give rise to varying amount of processes when describing an organisation (ibid.).

A process perspective puts the customer in focus. It is an impetus to analyse and design organisational work towards customer value. Since the beginning of the nine-

ties there has however been intensive debate of how to understand business processes. The two main trends are either to comprehend business processes as transformation or to comprehend business processes as co-ordination (e.g. Keen & Knapp, 1996; Lind, 2002). The transformative dimension is about focusing the transformation of input (raw material) to output (the finished product to be utilised by the customer). The coordinative dimension is about focusing the creation, fulfilment and assessment of agreements between and within organisations. The latter dimension concerns patterns of interaction within and between organisations; how orders/assignments are given, accepted and forwarded. Communicative aspects are thus stressed in the coordinative perspective. Recent research has shown a potential in managing this task by including both transformative as well as coordinative dimensions of business processes (Lind, 2002).

A business process perspective emphasises usually a sequential view. One main process is divided into sequential sub processes. These sequential sub processes are often of different types (cf. Davenport, 1993). A variant view has been claimed as a complement to a sequential view (cf. Lind & Goldkuhl, 1997; Lind, 2002). This means that there will be alternative business processes in an organisation, i.e. there are different ways for performing business missions. An organisation usually performs different kinds of missions and this implies different types of business relationships between customer and supplier.

Unclear criteria for process division and process determination concern both criteria for distinguishing different types as well as different variants of business processes. In this paper we focus criteria for distinguishing process variants. For criteria concerning the distinction of different process types confer Lind (2003).

In order to perform an adequate renewal and redesign of business processes it is important to distinguish different process variants. The purpose of this paper is to provide theoretical foundation as well as tools for determining such variants.

This paper is arranged as follows. In the next section theoretical foundations for understanding business interaction is presented. This section is followed by an empirical illustration in which process variants, i.e. several ways of performing business, were identified. These variants will be conceptualised in a business phase matrix. Before concluding the paper some implications for business process design will be discussed.

2 The different phases of business interaction

Many organisations have alternatives for establishing and fulfilling agreements with customers. A focus, as emphasised in business process theories, on customer value implies an understanding of interaction patterns between supplier and customer. In this section we will therefore introduce some frameworks for understanding business interaction followed by choosing one of them as a basis for introducing an analytic tool to determine process variants. This tool will thus be founded in the supplier's alternative ways of interacting with its customers.

2.1 Different frameworks for understanding business interaction

Frameworks for business interaction have been proposed by a number of scholars; confer e.g. Ahlström (2000) for an overview of some frameworks. A well-known reference model for electronic markets has been presented by Schmidt & Lindemann (1998) and Lechner & Schmidt (2000). Within the language/action (L/A) tradition there are several business interaction frameworks, see for example Dietz (1999), Goldkuhl & Lind (2004), Weigand & van den Heuvel (1998), and Medina-Mora et al (1992); all building on the speech act insights from Searle (1969). These L/A approaches are important since they emphasize actions, communication and interactions in the relations between customer and supplier.

The L/A-tradition puts strong emphasis on analyzing patterns of inter-related business acts. Such thinking emanates from the Conversation-for-Action (CFA) schema (Winograd & Flores, 1986). It is also emphasized by all mentioned frameworks discussed above that business interaction can be divided into several phases; from offering and commitment to fulfillment and assessment. Goldkuhl & Lind (2004) has used this thinking of pattern as a foundation for their Business interAction & Transaction (BAT) framework covering business interaction patterns between two parties; the supplier and the customer.

It is common that a supplier have *different* kinds of actor relationships with its customers. Usually, the supplier offers, specifies, produces and delivers *different* kinds of products to its customers (Lind, 2002). These differences give rise to process variants. Examples of different kinds of actor relationships are separate orders and frame contracting (cf. Goldkuhl & Lind, 2004). Examples of different kinds of products are standardised vs. customised, transfer vs. letting out something, and moving vs. treating a client (cf. Goldkuhl & Röstlinger, 2000). Dependent on the actor relationship and the product handled, the interaction between the business and the specific customer will vary. A unique combination of a certain kind of actor relationship and a certain kind of product determines a process variant. Each process variant includes and supports a particular interaction logic between the supplier and the customer.

To identify different logics of business interaction, i.e. different process variants, it is therefore necessary to use a business interaction theory that covers different patterns of interaction dependent on the actor relationship. In order to arrive at a thorough understanding of such patterns it is necessary that a distinction is made between different types of business acts and how these are inter-related. A suitable framework for revealing the dimensions needed for determining process variants is the BAT-framework.

The BAT framework (sometimes an abbreviation for Business Action Theory) was originally presented by Goldkuhl (1996). It has later been refined several times; in Goldkuhl (1998) and Goldkuhl & Lind (2004). These revisions have been based on extensive empirical studies where the BAT framework has been applied in different settings (e.g Lind & Goldkuhl, 1997; Melin & Goldkuhl 1999; Axelsson et al, 2000; Goldkuhl & Melin, 2001; Axelsson & Segerkvist, 2001; Lind et al, 2003; Melin & Axelsson, 2004; Johansson & Axelsson, 2004; 2005; Haraldsson & Lind, 2005). The BAT framework has been compared with other frameworks; with Action Workflow of Medina-Mora et al (1992) in Goldkuhl (1996) and Verharen (1997); with DEMO

of Dietz (1999) in Reijswoud & Lind (1998) and Verharen (1997); with 'meta-patterns for electronic commerce' of Weigand & van den Heuvel (1998) in Lind & Goldkuhl (2003); with the MRM framework of Lechner & Schmidt (2000) in Petersson & Lind (2005).

2.2 The Business interAction & Transaction framework

Different types of exchanges between business parties (customer and supplier) form the core of the BAT framework. First of all there is a distinction between interactions on a market level vs interactions on a dyadic level. On a market level a supplier interacts in relation to potential customers and vice versa. This interaction is called knowledge/contact search and exposure. On this market level the supplier directs its efforts towards potential customers, often many. When a contact is reached between a supplier and a customer this interaction may proceed to the dyadic interaction.

On the dyadic level there is a distinction made between frame contracting and business transactions. Frame contract means a contract concerning several subsequent business transactions that can be different sub deliveries. The frame contract level as well as the business transaction level consists of different type of exchanges between a *particular* supplier and a *particular* customer. The frame contract concerns establishment of long-term agreements. These agreements govern recurrent business transactions in which the frame contract is gradually fulfilled. A business transaction is exchanges concerning agreements and fulfilment of these agreements. On the frame contracting level there is no exchange of value (products vs money). This occurs on the business transaction level.

Frame contracting cover exchanges of proposals, commitments, exchanges in the embedded business transactions, and assessments. A frame contract is a long-term agreement. Such an agreement is established through exchange of proposals and commitments.

Besides frame contracting the other level of business interaction on the dyadic level is the business transaction. Many times business transactions are instead governed by separate (single) transaction orders and no frame contracts exist. A business transaction comprises the establishment, fulfillment and assessment of a business agreement in order to satisfy one or several related product needs of the customer. This means exchanges of proposals, commitments, fulfillments and assessments (see figure 1).

Founded in the BAT framework the phases of interaction that can be distinguished are depicted in the table below (figure 2). These phases will form the basis for the model that will be used for distinguishing process variants (cf. section 3 & 4 below).

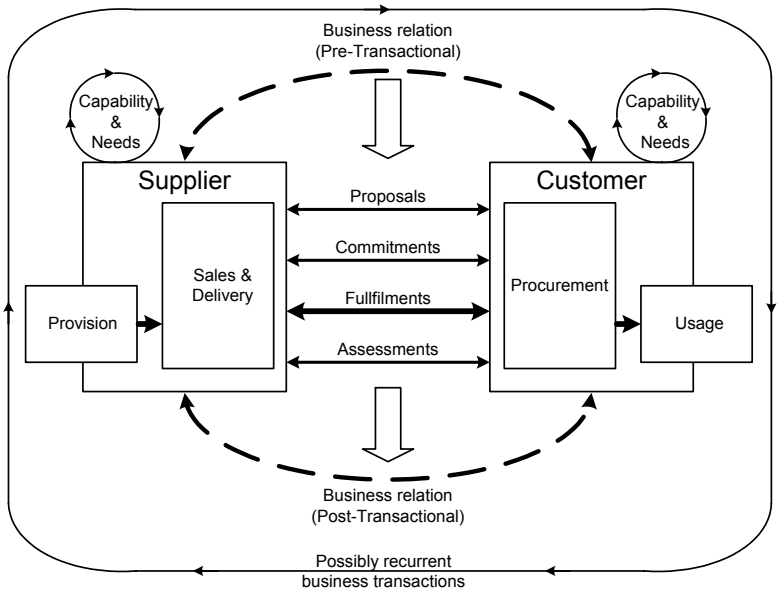

Figure 1: The constituents of the business transaction (BAT business transaction model) (Goldkuhl & Lind , 2004)

Level	***Type of exchange***
Market	Knowledge, contacts and business interests
Dyadic: Frame contracting	Proposals, Commitment, Assessments
Dyadic: Business transaction	Proposals, Commitment, Fulfillments, Assessments

Figure 2: Different phases of interaction

3 Process variants in practice

How shall process variants be delineated in relation to each other and how shall they be described? We will address these issues by the use of a simple example. The example is based on an action-research oriented case study performed at a steel company, here named Steelco.

Steelco is a manufacturing company, which mainly transforms steel into pipes for hydraulic cylinders. Steelco has different ways of performing business, i.e. the company takes part in different business interactions. The strategy that Steelco enacts is to have a variety of interaction ways with their customers. One goal is to build long-term relationships with its customers.

In the case study several of Steelco's business processes were identified. These business processes coexisted and can therefore be addressed as process variants. The coexisting process variants were called:

- *Separate order – tailor made products (PV1)*, which consists of activities to produce and sell tailor-made products.
- *Separate order – standard products (PV2),* which consists of activities that are performed when Steelco is selling standard products from the standard stock.
- *Frame contract – standard products (PV3),* which consists of sales and production activities that are performed based on a customer prognosis of future orders covering several recurrent business transactions.
- *Separate order - traded products (PV4),* which consists of activities that are performed when subcontractors of Steelco deliver products directly to Steelco´s customers. Steelco is not able to manufacture those products itself.

Figure 3 (a business process division matrix) shows the delimitation of the business processes in the case study. Four process variants; i.e. different principle ways for Steelco to perform its business, were identified. By using the two dimensions "Actor relationship" and "Product characteristics", it was possible to identify and classify the four process variants. This way of identifying and classifying business processes, by using these two dimensions, has been proven to be successful in different settings (c.f. Lind, 2002; 2003). Based on extensive empirical evidence (summarised in Lind, 2002) these two dimensions has been found to be decisive for process variant determination. There are however other characteristics that determine the structure and functions of different business processes such as e.g. transformation logic, cash flow logic, the normative context and characteristics of the infrastructure (Goldkhul & Röstlinger, 2003).

Product char. **Actor relationship**	**Tailor-made products**	**Standard products**	**Traded products**
Separate order	PV1	PV2	PV4
Frame contract	---	PV3	---

Figure 3: Business process division matrix:
The different processes variants at Steelco

From the matrix (figure 3) it can be noted that there are two slots that do not have any content (frame contract - tailor-made products and frame contract – traded products). These empty slots gave rise to discussions concerning the potential of establishing new business opportunities. It turned out, however, that frame contracting on a basis of selling and delivering tailor-made products was unnatural. Steelco did however acknowledge the potential in adopting frame contracting for traded products. It was a question of using already established routines for frame contracting as well as the relationships established towards sub contractors. The business process division matrix can thus be seen as an instrument used for enhancing business development.

Each process variant can be characterised according to the different phases of business interaction identified in section 2.2. This characterisation is put forward in a

business phase matrix (figure 4). Note that the process variant 'separate order – traded products' have not been included in the matrix for reasons of space.

Process variant Capability/Phase	Separate order – tailor-made products	Separate order – standard products	Frame contract – standard products
Action Capability	Flexible production equipment, design competence.	Own production of standardised products. Stock.	Own production of standardised products. Stock. Planning capability
	Frame contracting		
Proposal	---	---	Proposal for long-term agreement
Commitment	---	---	Frame contract regulating both parties commitments
Assessment	---	---	Mutual assessment of the realisation of the frame contract
	Business transaction		
Proposal	Products are designed based on customer needs. Prices are negotiated.	Offers of standard products. General and customer particular price lists as a basis for negotiation.	
Commitment	Customer order based on offer including product specification.	Customer order based on an offer or a price list	Sub order based on agreed frame contract
Fulfillment	Production based on order from the specific customer. No stock handling, only delivery.	Production for potential customers. Picking from stock and delivery is done based on the specific customer order	Production for potential customers. Picking from stock and delivery is done based on the specific sub order
Assessment	Potential claims are handled by Steelco.	Potential claims are handled by Steelco.	Potential claims are handled by Steelco.

Figure 4: Business phase matrix

From the business phase matrix it can be seen that different process variants are dependent on the actor relationship and the product characteristics. The content of the different phases might vary or be similar between the different process variants even if one of the dimensions is the same. Taking for example the two process variants of separate order handling, i.e. the same actor relationship, it can be noted that it is important for the tailor-made product process to establish design competence and in the case of standard product process there is a need for a standard stock.

Further it can be noted that the frame contracting process includes activities for being more long-term oriented and thereby the business transactions covering sub-ordering processes become more efficient than the business transactions covering the separate order processes

It is also to be noted that the phases are inter-dependent for each process variant. This means that conditions for earlier phases must have been established for the success of the performance of the latter ones. The business phase matrix is therefore to be seen as a check list for covering all necessary aspects for realising one process variant. It is however as important to ensure that the process variants work together.

4 Implications for business process design

Many times an organisation can be described by several process variants. In a business context this means that organisations have different ways of performing business. Process variants *co-exist* and they *co-utilise* limited resources. An organisation's process variants are thus superposed. This also means that the one and same sub process can be utilised in several process variants, but for different purposes. Such a situation makes delivery promises complex since several product needs must be fulfilled by the same sub process.

During business process renewal and redesign it is therefore important to acknowledge the different co-existing process variants. This is important in order to manage the contextualisation, i.e. identifying the role that a certain sub process has in the work performed, of the parts of the process variants. The determination of such process variants should be made based on both the characteristics of the different products offered and supplied to customers and the actor relationship enhanced in the company. A certain process variant is delineated by actor relationship, i.e. frame contracting or separate order, and the product characteristics.

Founded in these two dimensions the content of the different phases of business interaction constituting a process variant can be determined. A business interaction is constituted by patterns of business acts covering a number of exchanges used for establishing, fulfilling and assessing agreements. During business process design it is essential to conceive organisational work based on these dimensions in order to arrive at a proper solution.

In this paper two instruments for identifying and designing process variants are proposed; the business process division matrix and the business phase matrix. By using existing or desired types of actor relationships and existing or desired types of products the business process division matrix should be used for delineating process variants. For each process variant the business phase matrix should be used for characterising the content of the phases constituting the process variants.

This way of working means that the point of departure is the business processes that directly involve the customer (cf. customer-facing processes according to Davenport (1993)). Such point of departure stresses the question of "What actor relationships do we want to have and manage?" as well as "what products do we want to deliver and manage?". Identification of other business process, such as e.g. internal business processes, should be founded in the identification of these process variants.

5 Conclusions

An unresolved task during business process design is criteria for determining one business process in relation to another. In this paper we have put forward the notion of business process variants, as a complement to the dominating sequential view of business processes, as well as instruments to be used for renewal and redesign of such business processes. This notion takes as its starting point that process variants co-exist in organisations and co-utilise the limited resources of organisations. Further,

this notion acknowledges coordinative as well as transformative dimensions of business processes. Instruments to be used during business process design are the business process division matrix and the business phase matrix. The business process division matrix put attention towards essential characteristics of business interaction. The business phase matrix put attention towards the content of the different phases of the business interaction patterns that constitute the process variants.

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