

Designing Contracts for Business Networks

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INTRODUCTION

Economic activities within and between networked organizations can be coordinated via hierarchies (internal coordination) or markets (external coordination). There are theories that explain both agency theory (Jensen & Meckling, 1976) and transaction cost economics (Williamson, 1985). It is assumed that networked organizations design their organization and network of trading partners such that the sum of internal and external coordination costs is minimized. The impact of information technology (IT) has been assessed in different ways. Malone, Yates, and Benjamin (1987) expected that IT will lower transaction costs and lead to increased market coordination. Clemons, Reddi, and Row (1993, p. 9) posited that organizations will “move to the middle”, that is, to “more outsourcing, but from a reduced set of stable partnerships” if non-contractible issues such as quality and trust play an important role. Empirical evidence (Holland & Lockett, 1997) shows that companies often mix aspects from both markets and hierarchies.

As a result networked organizations extend their internal hierarchy to cover their suppliers to some degree. They prefer to engage in close cooperation with few suppliers to exert more control over them and to ensure the tight coordination required for providing increasingly complex products and services. Such a relationship is rarely stable over a longer period of time, though, and new network partners are acquired from time to time via the market. Hence relationships of that type have a project character. The network is constantly transforming.

Extended use of hierarchy-like coordination means that the network partners have to integrate their business processes more closely. This requires an analysis of the interactions between the partners to determine the prerequisites for this integration and help with the design of an appropriate *contract*, a trading partner agreement or TPA. A contract designed in this way implies a reduction of the costs for writing and enforce-

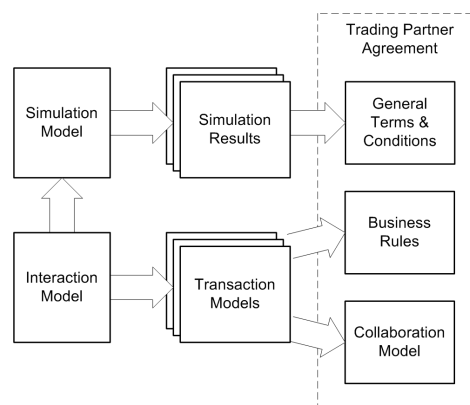
ing contracts and hence transaction costs (Gurbaxani & Whang, 1991). An appropriate language for analysis is introduced in the next section.

The result of this analysis is the *interaction model*. On the basis of it we develop the TPA (see Figure 1) applying a procedure each for the static and dynamic part (see respective section). The static part contains the general terms and conditions and is based on the results of running a *simulation* model derived from the interaction model. The dynamic part consists of *business rules* and the *collaboration model* and is also derived from the interaction model but via so-called transaction models. Figure 1 summarizes our approach.

All examples and figures used in this paper are excerpts from the real models we designed in the course of a consulting project where we tested the feasibility of our approach (see “A Case Study”). We conclude by summarizing the main arguments and identifying future trends.

The primary contribution of this paper consists in a structured method for developing a formalized *contract* for business interaction between partners in a business network based on a language-action model of this interaction.

Figure 1. The design of a trading partner agreement



BACKGROUND: A LANGUAGE-ACTION PERSPECTIVE ON ORGANIZATIONS

The language-action perspective is based on the Speech-Act Theory (Searle, 1969) and the Theory of Communicative Action (Habermas, 1984). It provides approaches to explain organizational behaviour such as the dynamic essential modelling of organizations (DEMO; Dietz, 1999) and Business Action Theory (Goldkuhl & Lind, 2004). Communication is especially relevant in interorganizational contexts where it is not bound by intra-organizational rules. These rules are instead provided by the TPA.

For our study we have chosen DEMO because it offers transactional patterns not only in the meta-language but also as concepts in the modeling language itself where they support the development of detailed models of collaboration by structuring the interaction. A *transaction* engages two roles pursuing a common purpose: *initiator* and *executor*. It follows a certain pattern that is divided into three phases: *order*, *execute*, and *result* (for details see “Transaction Models”).

The interaction model shows actors and transactions. Actors are roles enacted by a person, organizational unit, or organization. Figure 2 shows the interaction model of capacity reservation and order handling. The actors are the logistics provider (LogPro), headquarters, and the shop.

It starts when headquarters reserve capacity for a certain amount of goods in advance of the actual order (T4). LogPro allocates staff and space to provide for the

order. If customers ask for specific products the shop places a customer order (T1). Headquarters initiate a refill order when the shop's supply is running low (T2). They forward both orders to LogPro (T5). The delivery is performed (internal transaction T7) and the shop receives it (T3). Periodically headquarters ask for a stock update (T6) to align their warehouse system with that of LogPro.

Much of the detailed behaviour is hidden inside the transactions. For the TPA it has to be made explicit. A transaction is made up of speech acts and an objective action following a certain pattern. This pattern is not a rigid rule for all transactions but rather a template that helps with structuring the analysis and can be adapted to a particular situation.

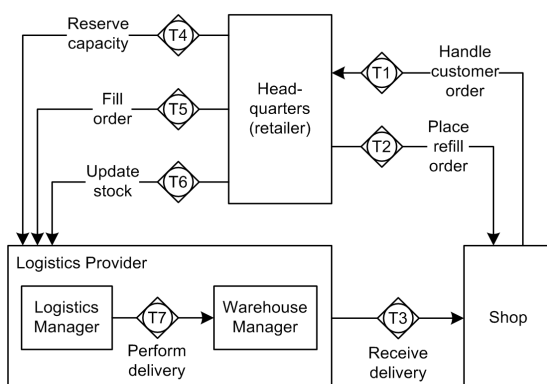
The pattern consists of the phases: order, execute, and result. The order phase has at least two elements: *request* and *promise* but longer negotiations (including failure) are possible. If an agreement is reached the objective action is executed (execute phase) and the result phase is entered. As a minimum it consists of the speech acts *state* and *accept*. This model is called transaction model.

THE STATIC PART OF A TPA

The static part of a TPA specifies general terms and conditions, static parameters controlling the interaction between trading partners such as pricing, terms of delivery, and payment, and so forth. Determining reasonable values for them is difficult because they depend on characteristics of the process. Take the pricing of a logistics service, for example, handling one unit of a product. This price depends on the costs to deliver this service, which in turn depends on the required time, the number of workers, resources, and so forth. One way to assess the complex interaction of these factors is simulation. Business process simulation was studied in Paul and Serrano (2004) and from an interorganizational perspective in Chandra, Smirnov, and Chilov (2000) and Giaglis, Paul, and Doukidis (1997).

If an appropriate abstraction is chosen the simulation will represent a fair approximation of the behaviour of the system. With its help we can determine the performance characteristics of the business process. This data can then be used to support the design of the terms and conditions of the TPA. We develop the

Figure 2. Interaction model



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