

Benjamin Rensmann, Hans Weigand, Zheng Zhao, Virginia Dignum, Frank Dignum,
Marcel Hiel: Assessing the Value of Mediators in Collaborative Networks. Pro-VE'07,
Guimarães, September 2007

ASSESSING THE VALUE OF MEDIATORS IN COLLABORATIVE BUSINESS NETWORKS

Benjamin Rensmann¹, Hans Weigand¹, Zheng Zhao², Virginia Dignum²,
Frank Dignum² and Marcel Hiel¹

¹ Department Information Systems and Management, Tilburg University, The Netherlands
{b.rensmann, h.weigand, m.hiel}@uvt.nl

² Department of Information and Computing Sciences, Utrecht University, The Netherlands
{zheng, virginia, dignum}@cs.uu.nl

One of the basic mechanisms of collaborative business networks is mediation. A literature review is presented that identifies meanings and roles of mediators. Based on the literature a framework is developed that can be used to describe and distinguish different types of mediator services. Core concepts of the framework are the value activities that mediators offer and the functional level of these activities with regard to market transactions. The framework uses the e3-value modelling approach to illustrate the value-creating mediator activities in a business network.

1. INTRODUCTION

With growing complexity in the globalized business world of the 21st century companies increasingly have to depend on temporal or more stable networks of business partners, called by names such as Virtual Organizations, Value Constellations or Collaborative Business Networks (CN). New technologies such as web services are being developed as solutions for the support of such networks (Papazoglou & Ribbers, 2006). However, for the proper development and deployment of those technologies, a structured understanding of the basic principles and mechanisms of business collaborations is needed. One basic coordination mechanism is mediation. Although the relevance of mediators in CN is not disputed, these do still lack the rules and theories that would allow business parties to quickly and systematically assess the added value of involving a mediator in their network.

In this paper we describe a framework that helps demonstrating the values of mediators in networks of distributed business actors, especially in buyer-seller relationships. The elements of our framework are based on economical and organizational literature. It uses the notion of market transactions to distinguish two different levels of mediator support. We use value modeling to illustrate the values for the mediated parties that result of mediator activities.

The paper is structured as follows. Section 2 provides a short overview of roles and functions of mediators and of the e3-value modeling approach that we use for

modeling. Section 3 presents our framework. Section 4 gives concluding remarks and an outlook on future work to do.

2. LITERATURE REVIEW

The term “mediator” is used in different fields. Its primary use is in the field of law and dispute resolution, where mediators are independent parties that help to solve disputes of any kind between two parties (Boulle/Nesic, 2001). In computer science mediators are part of a middleware level, conducting tasks of data-information transformation, interface processing and workflow integration (Wiederhold, 1992; Papazoglou & Ribbers, 2006; Schulz & Orłowska, 2004). In the economical and organizational domain the term intermediary is used to describe entities that act as mediating instances between actors in business networks. For the sake of abstraction we will refer to intermediaries also as mediators in the remainder of the paper.

In economic terms mediators create and manage markets to help suppliers and buyers to conduct transactions, i.e. to sell and purchase goods (Spulber, 1996). They fulfill a bundle of tasks that address the failure of the perfect market assumed in classic economic theory (Datta, 2005). Next to price setting and market clearing mediators provide liquidity and immediacy through holding cash on hand and maintaining inventories of goods, doing matching and searching to coordinate the actions of buyers and sellers and providing guarantees and monitoring services to overcome asymmetric information on both sides of a potential transaction. In this view a mediator does not have to be a dedicated organization. Any company, as part of their other business can act as a mediator in a certain market.

Table 2.1 Market functions and the roles of mediators (from Giaglis/Klein/O’Keefe, 2002) .

<i>Market Function</i>	<i>Sub-Functions</i>	<i>The Role of Intermediaries</i>
Matching Buyers and Sellers	Determination of Product Offerings Searching Price Discovery	Monitoring, Alerting Reducing Search Costs Facilitating (but increasing price)
Facilitation of Transactions	Logistics Settlement Trust	Shipping, Distribution, Warehousing Facilitating, Monitoring Rating, Guaranteeing
Institutional Infrastructure	Legal Regulatory	Monitoring, Protecting Monitoring, Protecting

The rise of the Internet as an alternative business channel leads to new organizational forms of mediating entities and to new roles assigned to those entities. Although still occupying a mediating function in the economic sense, *electronic* mediators are confronted with new opportunities and threats due to the different ways of conducting business in the networked world. At an early stage of

the discussion the Internet was seen as a major threat to the existence of those mediators and their disappearance was forecasted (Malone/Yates/Benjamin, 1987). Those forecasts did not come true. Instead, new opportunities for mediators were identified and the comeback of traditional mediators that were formerly disintermediated was observed (Chircu/Kauffman, 2000). The extensive dialogue about the roles of electronic mediators that occurred in the context of the disintermediation/reintermediation discussion produced lots of useful insights regarding the added values of electronic mediators (Bailey/Bakos, 1997). According to (Bakos, 1998) markets (electronic and otherwise) fulfill three basic functions: Matching of buyers and sellers, facilitation of transactions and provision of the institutional infrastructure. Each of these functions consists of several sub-functions. Mediators typically provide services of the first two functions, but can also play a role in the third function. Table 2.1 gives a brief overview of the functions and sub-functions and the roles that mediators can play in fulfilling them.

2.1 Modelling value exchanges with e³-value

The e³-value modeling approach provides a tool for modeling value exchanges between collaborating entities in a CN and for profitability analysis, helping to determine the value flows for each of the actors (Gordijn/Akkermans, 2003). The core elements of e³-value models are value exchanges, which show the potential transfers of value objects from one actor to another. A value object is of some (economic) value for at least one of the actors. Typical examples for value objects are products, payments and services. Other concepts in e³-value are market segments, value interfaces, value ports and value activities. Market segments represent homogenous groups of actors. A value port is connected to an actor and indicates a potential value exchange connected to the actor. Value ports are grouped into value interfaces. Usually a value interface consists of an ingoing and an outgoing value port, representing the principle of economic reciprocity. Value activities symbolize bundles of operational activities that an actor performs and that create some profit or economic value for at least one of the actors.

3. A VALUE-BASED FRAMEWORK FOR MEDIATORS

The framework that we will present in this chapter is based on typical value activities that mediators carry out to support different phases of a market transaction between two or more actors in a CN. The notion of market transactions is used as a distinguishing feature to identify mediator value activities on two different levels. Furthermore the transfer of goods or services in exchange for a payment, that is usually the subject of a transaction, will be dismantled into its components to provide a better understanding of the involvement of a mediator. The elements of the framework will be expressed using e³-value models, which should serve as a basis for discussion and future development.

3.1 Different mediator levels in market transactions

We define a market transaction as the exchange of goods, services and money between actors in a CN (Lindemann/Schmid, 1999). Typically the following phases

describe the steps in conducting a market transaction: Information, Agreement and Settlement. Whereas the information and agreement phases somehow precede the actual transaction (i.e. the physical transfer of a good or service against a payment), thereby defining the terms of the transaction, the settlement covers the operational conduction of the transfers that are subject to a transaction. Mediators can support a subset of the transaction phases in one or the other way.

The phases of a market transaction represent different aspects that we will use to distinguish different levels of mediator value activities. One aspect is the processing of information to support a transaction; the other is the operational fulfillment of a transaction. Based on this distinction we propose two different levels of value activities that are typically carried out by mediators: Activities on the *informational level* and on the *operational level*. The information and agreement phases correspond to the informational level of mediation. They represent the matching function of (electronic) markets as stated in Table 2.1. On the operational level mediators play roles in the settlement phase of a transaction, i.e. the facilitation of a transaction as described in Table 2.1. In the remainder of this section we will explain the mediator value activities in detail and provide corresponding value models to clarify the value exchanges in a CN.

3.2 Mediator value activities on the informational level

The basic value model for the informational level is shown in Figure 3.1. On the left side the market segment of sellers is shown while the buyers are placed on the right side. The mediator actor in the middle contains three value activities, to which we will refer to as mediator value activities on the informational level (dark shaded boxes). The value exchanges that are shown at the bottom of the model indicate the mediated market transaction. The endpoints of the transaction lie in the selling and buying value activities of the seller and the buyer. These two activities usually create value for the respective actors, assuming that transactions are only conducted if some economic value is realized for both parties. The dashed boxes within sellers and buyers represent resources that are used by the actors to create value in a sustainable way. Conversely, the value of a certain activity for an actor can be determined by assessing the impact that this activity has on its resources.

The mediator value activities related to the information phase of a transaction are those of providing supply and demand publicity and supporting the determination of the terms and conditions of the transaction. Mediators provide supply publicity by aggregating supplier's offers and products in e.g. stores, product catalogues (electronic and otherwise), directories or other publishing media. They may gather the necessary knowledge about the supply side of the market through monitoring the product portfolios offered by suppliers, thereby eventually evaluating the products, services and the suppliers. Alternatively the publishing of supply can be interpreted as the provision of the necessary publishing facilities by the mediator.

The value of supply publishing for buyers lies in the reduction of search costs and in the market knowledge buyers obtain through the services of a mediator. However, the value analysis of an informative act is not complete when it considers the value of the information for the receiver only. There is also a return value given to the sender, as the receiver pays attention. How relevant this value is depends on the situation, but it is always there. By exposing supply information sellers receive

attention from the buy-side, i.e. from potential customers. The value of this attention is that it adds potential customers to their customer base, which is one of their key resources as being a seller. The potential customer base is an economic resource and should not be identified with a database where the names of these potential customers would be stored.

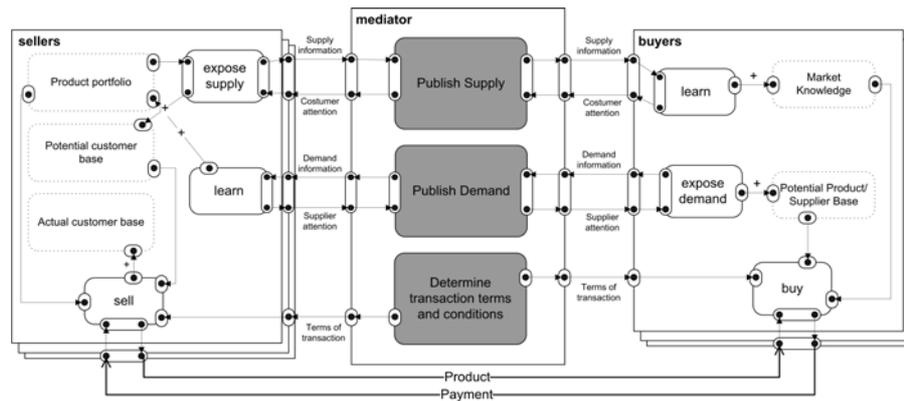


Figure 3.1 Value model of informational mediator value activities.

Mediators also provide relevant expertise about the demand side to suppliers, thus creating demand publicity. This can be done by active market research or through usage of operational data of the mediator (e.g. by analyzing the point-of-sale data of a retailer shop). Additionally mediators often offer facilities for buyers to communicate their demand. Examples are customer platforms like letsbuyit.com. Sellers can use this valuable demand information to design their product portfolio accordingly. By using the demand information in this way suppliers draw their attention towards potential customers. By means of offering products that fit the demand the supplier attention leads to extension of the potential product/ and supplier base of customers.

The third value activity in the model (Determine transaction terms and conditions) addresses the agreement phase of a market transaction. There are several mechanisms that are typically offered by mediators, enabling the participating parties to determine the terms and conditions of a transaction to come to an agreement. The simplest mechanisms discover just the price for a product that is part of a transaction. Among these are single-criteria auctions, negotiations and price fixing. More complex procedures are multiple-criteria auctions and negotiations.

The selling and buying value activities use the resources of the respective actor to prepare the actual transaction. For selling this means that a certain product out of the supplier's product portfolio is sold to a customer, and his potential customer becomes an actual customer. The actual customer base constitutes a resource as well as it provides valuable customer contacts for future transactions. The buying value activity uses the resources of market knowledge or potential products and suppliers. The first one contributes to the transaction if the buyer wants to buy something from a certain seller and requests the deal. In case of usage of the latter resource a supplier knows about a certain demand and makes an offer to initiate a deal.

3.3 Mediator value activities on the operational level

On the operational level mediators typically offer support for the actual transfer of the value objects that are subject of a deal, i.e. for the settlement of a transaction. According to (Andersson et al., 2006) a transfer can be viewed as consisting of three components:

- the right to use a certain resource (i.e. a good, a service or a payment)
- provision of custody of that resource (e.g. delivery of the physical good)
- an evidence document describing the transferred right (e.g. a contract)

The provision of custody is the most demanding activity and the other components are usually linked up to it. Mediator functions supporting the custody provision are the provision of financial and logistical services. Figure 3.2 shows the corresponding value model.

The value exchange at the top shows the transfer of rights between the actors in a transaction. It indicates the transfer of ownership of the product from seller to buyer and the transfer of ownership of the payment vice versa. The exchanges of ownership-rights are reflected in the transfers of the actual custody of the product and the payment (and eventually associated evidence documents). The latter transfer can be mediated by banks that offer money transfers from one account to another or by cash on delivery services provided by carriers. Also payment services such as PayPal support the settlement phase by providing custody of the payment.

The role of mediators in transfers of product custody is quite evident. Carriers like TNT and DHL ship and distribute goods, thus facilitating transactions by giving custody of the transferred products to buyers. Furthermore mediators provide stores, maintain warehouses and operate entire logistics chains to enable physical access to products. The delivery of services and digital goods through mediators via electronic networks can also be viewed as providing physical custody of those products.

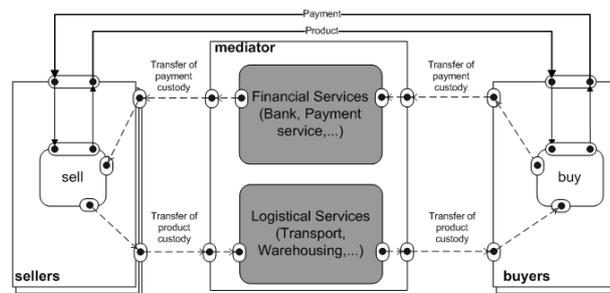


Figure 3.2 Value model of operational mediator value activities.

3.4 Application of the framework

Next to visualizing and categorizing the typical activities of mediators in certain value constellations, the proposed framework should serve as a basis for analyzing specific cases and highlight the role of mediators in real situations. Due to restricted space, a detailed case study to which the framework can be applied will be described in a subsequent work. However, the following example of eBay intends to indicate

the usability of the framework to describe typical value activities of a mediator on the informational level.

With a net revenue of 6 billion \$ in 2006 eBay is the most successful and probably the most famous online marketplace out there. eBay’s main business lies in the provision of an online platform for the sale of goods and services, both by individuals and SMEs. Due to the famous brand and the big customer base, eBay is a good way for sellers to publish their supply to a broad public. By maintaining the online catalogue eBay provides the supply publicity mentioned in the framework. Functionalities like product presentation facilities (adding pictures etc.), search facilities and cross-links to other products of the same seller all contribute to the supply publicity. People pay attention by visiting product pages and become potential customers. At the same time they learn about available products and sellers, which adds to their market knowledge. The publishing of demand is not that distinctive on eBay. The possibility for the seller to track the number of hits on his product-pages is a (rather rudimentary) way to estimate the interest in certain products. Also the possibility to send a comment or ask a question to the seller provides hints for sellers to learn about the buy-side. eBay prescribes the terms and conditions of a trade by way of its policies. The determination of the price as the most important element of these can be done by way of the auction mechanism of eBay and also via a fixed-price stated by the seller (“Buy-it-now” feature).

The actual transaction (i.e., the transfer of rights of ownership of the product and the payment) is executed directly between buyer and seller. Delivery of custody is done via other mediators, like banks and carriers. However, with PayPal eBay also offers a possibility to handle payments (although PayPal actually does not provide custody of the payment – this is still done via banks or credit card companies).

While the core business of eBay is on the provision of supply publicity and the determination of the price, other mediators focus on different aspects and specialize on certain value activities as described in the framework. Table 3.1 provides an overview of mediators with different aspects.

Table 3.1 Mediators specializing on different mediation levels.

Mediation Aspects	Informational	–Informational
Operational	+/+ classic retail stores (example: Wal Mart)	+/- payment companies, banks, carriers (examples: PayPal, DHL)
–Operational	-/+ e-Marketplaces, search engines, infomediaries (examples: eBay, google, bizrate.com)	-/- direct trades (example: transaction between well known partners)

4. CONCLUSIONS AND FUTURE WORK

In this paper we developed a value-based framework to describe the roles of mediators in collaborative business networks. The framework shows typical mediator value activities that support the three phases of a market transaction. As a

distinguishing feature we proposed two levels on which mediation takes place: The informational level and the operational level.

The framework contributes to a better understanding of the benefits of mediators for the respective actors in a collaborative business network. The value models, which illustrate the mediator value activities on the two levels, can serve as a basis for discussion and as a preparatory step to decide about the best use of a mediator in certain situations. The framework triggers business actors to think about the structure of their business environment (i.e. their CN) and the roles that the various actors take in it. This can lead to the discovery of new business opportunities, if e.g. actors realize that they could utilize their resources to offer a mediator value activity to the network, thus creating profit for themselves. On the other hand emerging threats and existing disadvantages may be identified, due to the observation that mediators handle information in a (for the respective actor) disadvantageous way or that mediators extract too much profit from the network.

The example of eBay indicates the applicability of the framework to specific cases. However, the framework can not only be applied to the e-commerce domain with its obvious and easily accessible scenarios, but is also intended to support analysis of other kinds of mediators, i.e. any kind of virtual enterprise that mediates between other enterprises. Our main goal for the future is thus to identify suitable and more detailed cases and apply our framework to those, in order to refine and extend it.

5. REFERENCES

1. Andersson, B., Bergholtz, M., Edirisuriya, A., Ilayperuma, T., Johannesson, P., Grégoire, B., Schmitt, M., Dubois, E., Abels, S., Hahn, A., Gordijn, J., Weigand, H., Wangler, B.: Towards a Reference Ontology for Business Models, In *Proceedings of the 25th International Conference on Conceptual Modeling (ER)*, Tucson, AZ, 2006.
2. Bailey, J.P., and Bakos, Y.: An Exploratory Study of the Emerging Role of Electronic Intermediaries, *International Journal of Electronic Commerce*, 1 (1997) 3, pp. 7 – 20.
3. Bakos, Y.: The Emerging Roles of Electronic Marketplaces on the Internet, *Communications of the ACM*, 41 (1998) 8, pp. 35 – 42.
4. Boulle, L. and Nestic, M.: *Mediation. Principles, Process, Practice*. London et al.: Butterworths, 2001.
5. Chircu, A.M. and Kauffman, R.J.: Reintermediation Strategies in Business-to-Business Electronic Commerce, *International Journal of Electronic Commerce*, 4 (2000) 4, pp. 7 – 42.
6. Datta, P.: Intermediaries as Value Moderators in Electronic Marketplaces. In: *Proceedings of the 13th European Conference on Information Systems (ECIS)*, Regensburg 2005.
7. Giaglis, G.M., Klein, S., O’Keefe, R.M.: The role of intermediaries in electronic marketplaces: developing a contingency model. *Information Systems Journal*, 12 (2002) 3, pp. 231 – 246.
8. Gordijn, J. and Akkermans, H.: Value Based Requirements Engineering: Exploring Innovative e-commerce Ideas. *Requirements Engineering Journal*, 8 (2003) 2, pp. 114 – 134.
9. Lindemann, M.A. and Schmid, B.: Framework for Specifying, Building and Operating Electronic Markets. *International Journal of Electronic Commerce*, 3 (1999) 2, pp.7 – 21.
10. Malone, T.W., Yates, J., Benjamin, R.I.: Electronic Markets and Electronic Hierarchies. *Communications of the ACM*, 30 (1987) 6, pp. 484 – 497.
11. Papazoglou, M.P. and Ribbers, P.M.A.: *e-Business. Organizational and Technical Foundations*. Chichester: John Wiley & Sons, 2006.
12. Schulz, K.A., Orłowska, M.E.: Facilitating Cross-Organizational Workflows with a Workflow View Approach. *Data & Knowledge Engineering*, 51 (2004) 1, pp. 109 – 147.
13. Spulber, D.F.: Market Microstructure and Intermediation. *Journal of Economic Perspectives*, 10 (1996) 3, pp. 135 – 152.
14. Wiederhold, G.: Mediators in the Architecture of Future Information Systems. *IEEE Computer*, 25 (1992) 3, pp. 38 – 49.