

Electronic B2B Marketplaces - Impact on B2B Transactions and Relationships?

Work-in-Progress Paper

January 2001

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Abstract

The last two years have seen a rapid development of the use of the Internet in doing economic transactions (E-Commerce). Now that the euphoria has subsided, it is necessary to closely examine which E-Commerce applications will remain and why. Our paper will focus on Electronic B2B Marketplaces. We first define and classify this category of e-commerce and present the value generating models deployed. Drawing on transaction cost and information economics, the paper examines which kind of B2B transactions so far benefit from being conducted over Electronic B2B Marketplaces and why. We hypothesize that the prevalent business models employed by current Electronic B2B Marketplaces support transactions that are governed in market structures, exploiting the electronic brokerage effect. Thus, Electronic B2B Marketplaces have not had any significant impact on existing B2B relationships. In fact, our theoretical analysis suggests that transactions done within strong existing relationships have not been very likely to move to Electronic B2B Marketplaces. Electronic B2B Marketplaces will need to provide further value generating services to attract these transactions. Such services include providing relevant and qualified information to reduce uncertainty in transactions, especially for goods and services with mainly experience or credence qualities. Other services may include providing new business applications for collaboration.

1. Introduction

Making purchases more convenient for business customers by providing one-click-shopping as well as new pricing mechanisms was the initial goal of Electronic B2B Marketplaces. Now that the euphoria about E-Business has subsided, (potential) users take a close look at how E-Business applications can provide value.

Our paper will focus on Electronic B2B Marketplaces. We will first define and classify this category of e-commerce and present the value generating models deployed. In the second paragraph, we will give a short overview on B2B transactions and relationships. The last section will link Electronic B2B Marketplaces and B2B transactions. It will examine which kind of transaction so far have benefited from being conducted over Electronic B2B Marketplaces and why. We will further analyze what Electronic B2B Marketplaces have to do to provide value to B2B relationships.

2. Classification of Electronic B2B Marketplaces

2.1 Definition of Electronic B2B Marketplaces

In classical economics, a market is described as a virtual place where supply meets demand (Siebert 1992). Electronic markets fulfill the same purpose. Their distinctive feature is that they do so by employing information and communication technology (Merz 1999). Bakos (1991, p. 296) defines an electronic market system as "an interorganizational information system that allows the participating buyers and sellers to exchange information about prices and product offerings". However, before the public accessibility of the Internet, the use of electronic market mechanisms was mainly limited to specialized exchanges e.g. in financial markets or to the exchange of information between large companies and their supplier (called electronic data interchange, EDI). In this paper we want to focus on electronic marketplaces that make use of the *Internet* as a means of information transportation. We will further focus our research on electronic markets that handle *business to business* (B2B) transactions. The problems these electronic marketplaces have to address differ greatly from those of business to consumer transactions in terms of volume, participants, technology requirements, etc. (Klein/Williams 1995, Wirtz 2000). In total, systems and applications that support B2B transactions are referred to as B2B *electronic commerce* (Timmers 1999). Within e-commerce applications, depending on the relation of buyers to sellers, electronic shops and electronic marketplaces are discriminated. If the relationship of sellers to buyers (or vice versa) is one to many, the e-commerce application is considered an *e-shop*. E-Shops represent a further development of the early single-source sales channels (Benjamin/Wigand 1995, Malone/Yates/Benjamin 1989). *Electronic Marketplaces* are characterized by a many to many relation of buyers to sellers (see figure 1), i.e. they include offerings from competing suppliers and are used by a number of buyers (Malone/Yates/Benjamin 1989).

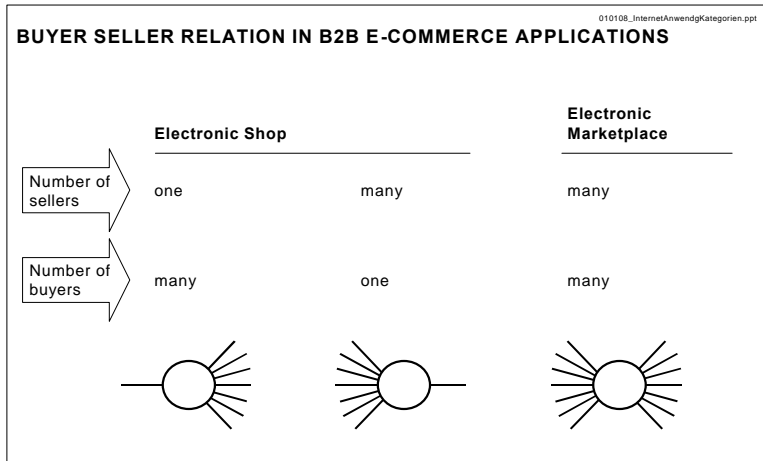


Figure 1: Electronic Shops and Electronic Marketplaces

Thus, in this paper we want to refer to *Electronic B2B Marketplaces* as IT systems that bring together several business buyers and several business suppliers and facilitate the transaction process by using the Internet.

2.2 Types of Electronic B2B Marketplaces

Electronic B2B Marketplaces have been classified in recent literature by using different criteria, such as: Product offerings, focus, openness and services provided.

Concerning **products offerings** on an Electronic B2B Marketplace, Kaplan/Sawhney (2000) use a general distinction in *manufacturing* and *operating inputs*. McKinsey/CAPS (2000) also use these two categories, calling them *direct* and *indirect goods*, but add two more categories: *services* and *capital goods*. Manufacturing inputs tend to be industry-specific and thus usually traded on industry-specific Electronic B2B Marketplaces, called *vertical marketplaces*. Operating inputs, on the other hand, are needed in numerous industries and therefore can be found on *horizontal marketplaces*, which are not geared to a specific industry but rather to fulfilling a specific function in an enterprise (Stearns Sgarioto 2000, Wichmann/Weitzel 1999).

Most authors agree on a distinction concerning the **focus** of an Electronic B2B Marketplace. The three categories that Electronic B2B Marketplaces fall into are *buyer-biased*, *seller-biased* or *neutral* marketplaces (Berryman et al. 1998, Kaplan/Sawhney 2000, Phillips/Meeker 2000, Schneider/Schnetkamp 2000). Neutral marketplaces are usually operated by third parties and neither favor buyers nor sellers. Biased marketplaces either favor buyers or sellers depending on who gains the most value by using the Electronic B2B Marketplace.

We also consider a distinction concerning the **openness** of Electronic B2B Marketplaces also useful. We wish to distinguish between *public* and *private* marketplaces. Public marketplaces are marked by openness towards all users that wish to perform a transaction on it, whereas private marketplaces hold the right to assign or refuse admission to their system. Private marketplaces are usually set up by large enterprises or industry consortia. They are typically biased towards the side that set it up.

The last dimension by which Electronic B2B Marketplaces are differentiated are the **services** they offer to their users. Here, due to the variety of possible services, the number of applicable distinction

criteria is very large. The three phases of a transaction, however, provide a useful frame for categorizing the criteria (Krähenmann 1994). It seems appropriate to add a phase, the *design phase*, during which the product as well as the sourcing strategy is defined (McKinsey/CAPS 2000) (see figure 2).

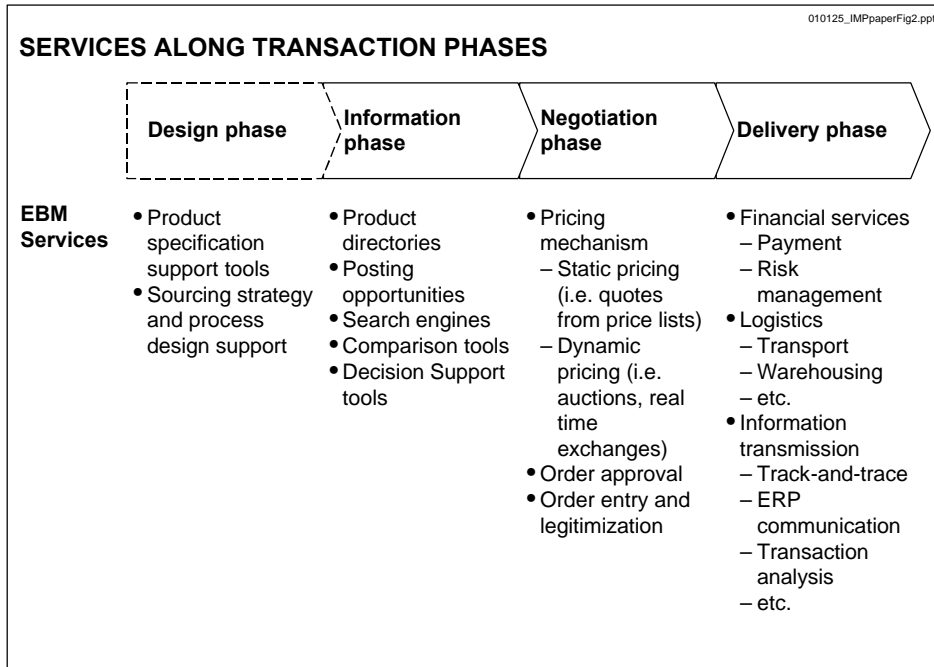


Figure 2: Services provided by Electronic B2B Marketplaces

2.3 Functions and value creation by Electronic B2B Marketplaces

Electronic B2B Marketplaces are best examined by their functioning and the value they provide to their users. The second part of this paper will show how these value creating mechanisms correspond to purchasing strategies and buyer-supplier-relationships.

If we look at the value of using Electronic B2B Marketplaces for buyers, it lies in reducing purchasing costs. Purchasing costs comprise of the actual purchasing price plus transaction costs, defined by Williamson (1985) as "frictions" between the systems doing transactions (Williamson 1985). Malone/Yates/Benjamin (1989, p.166) find that electronic markets have an impact on transaction costs by "reducing the costs of negotiating and consummating deals and by helping buyers find the best supplier" additionally to eliminating "paper handling and clerical work associated with making a purchase". They may thus help to find a more qualified supplier in a shorter time leading to cost and possibly strategic advantages for the user (e.g. in product development). A study by Strader/Shaw (2000, p.87) also shows that "prices in electronic markets are generally lower than in traditional markets" which they attribute to the availability of better information.

A number of business models for Electronic B2B Marketplaces using different *value generating mechanisms* are discussed in recent literature. We suggest to distinguish four prevalent models for value generation: Catalogue (or supply) consolidation, aggregation, marketing making and integration. *Catalogue consolidation* provides value to the buyer by enabling one-stop shopping through the combination of catalogues from various suppliers (Kaplan/Sawhney 2000, Phillips/ Meeker 2000 and Zimmermann/Lenz 2001 use the term "aggregation" here). *Aggregation* - in the sense that we want to

use - means that the marketplace combines demand within and across enterprises to leverage buying power and reduce prices, i.e. building or supporting buying consortia (Kaplan/Sawhney 2000, McKinsey/CAPS 2000, Phillips/Meeker 2000). *Market making* models provide buyers and sellers with platforms to trade products, usually with real time pricing mechanisms. Such platforms help to smooth supply and demand volatility (Kaplan/Sawhney 2000) thus improving overall industry utilization (McKinsey/CAPS 2000, Phillips/Meeker 2000). Electronic B2B Marketplaces provide *integration* services by linking users' back-end systems through data clearing (Kerrigan et al. 2001, Kluge/Pohl 2000). Electronic B2B Marketplaces can offer just one of the described value generation mechanisms or a combination of them.

It is obvious that the value actually generated by each of the presented models depends on the situation a buyer or seller is in.

3. B2B Transactions and Relationships

In this paragraph, we will look at different buyer-supplier transactions and relationships and examine which models of Electronic B2B Marketplaces will be of use. Transactions occur when goods or services are transferred across a "technologically separable inter-face" (Williamson 1985, p.1). The activities of buying and selling products that are the focus of this paper are therefore transactions. Depending on the characteristics of the transaction, buyers and sellers choose an appropriate strategy for executing it. The strategies vary in the intensity of the relationships into which the transacting partners enter. A relationship can be defined as a sequence of transactions between one supplier and one buyer which does not happen by chance (Plinke 1997) but is in fact intended to continue for a longer time (Gemünden 1990). Williamson (1985) has characterized the two extreme ends of B2B relationships as *market* and *hierarchy* (or vertical integration). Several disciplines explain the link between the characteristics of a transaction and the associated buyer-supplier relationship.

Williamson's *transaction cost analysis* states that the higher the government costs of a transaction, the more likely companies are to engage in closer relationships. Transaction costs are determined by degree of uncertainty, frequency of the transaction and asset specificity (Williamson 1985). Thus, the following transaction characteristics favor closer relationships: high complexity or degree of customization of the product due to possible switching costs (Heydebreck 1996) or quality uncertainty (Oppermann 1998). Frequency of transaction will lead to decreased transaction costs in presence of transaction-specific assets (Plinke 1997). Building on Williamson's work, Plinke (1997) distinguishes *transaction* and *relationship buying*. He concludes that companies engage in transaction buying for standardized products, but revert to relationship buying in the presence of specific investments, high frequency or uncertainty (Plinke 1997).

The empirical work from the IMP group and others shows that certain environmental preconditions support the evolvement of B2B relationships. They are closely linked to the conditions under which transaction costs are high. First, *uncertainty*, defined as "unanticipated changes in circumstances surrounding an exchange" (Noordewier/John/Nevin 1990, p.82), encourages business relationships as several researchers found (Heide/John 1990, Achrol/Stern 1988, Norris/McNeilly 1995). *Frequency of exchange* and contact between businesses, even if not intended, is another environmental factor that

leads to more relational exchanges (Doney/Cannon 1997, Norris/McNeilly 1995). *Transaction-specific investments*, as long as they are a requirement for the transaction and not goodwill by one of the exchange partners, also favor relationships. Such investments would be lost and result in "relationship termination costs" if the relationship was discontinued (Morgan/Hunt 1994, p.24).

The strategic concepts of *supply management* provide action-oriented recommendations on supplier relationships. A number of concepts use portfolio theory to combine different transaction characteristics for formulating recommendations. The concepts generally suggest intensified cooperation with suppliers in difficult purchasing situations and high importance of the purchase (Olsen/Ellram 1997). Such situations are characterized by product complexity, supply market risks or complexity and high relevance to the own company's result (Hubmann/Barth 1990, Matthyssens/Van den Bulte 1994, Mittner 1991).

If we sum up the findings of these approaches, we can state that the more complex the purchasing situation (in terms of product specification, supplier market, relevance and frequency of purchase), the higher the risk associated with it and the more likely that buyers revert to more relational exchanges.

4. Electronic B2B Marketplaces and B2B Relationships

We will now look at the link between Electronic B2B Marketplaces and buyer-supplier relationships. We show that the value generating models presented above work best in purchasing situations where the market governance model has been preferred. We hypothesize further that Electronic B2B Marketplaces so far have not been able to attract business usually conducted in a more relational manner for several reasons.

In 1987, talking about inter-organizational electronic networks (the WWW did not exist yet), Malone/Yates/Benjamin concluded that these networks would have two effects on the coordination of transactions: The *electronic brokerage effect*, making existing market systems more efficient, and the *electronic integration effect*, tightening relationships between buyers and suppliers (Steinfield/Kraut/Plummer 1995).

4.1 Suitability of current Electronic B2B Marketplaces for Transactions and Relationships

If we look at the presented value generation models of Electronic B2B Marketplaces using the Internet we note that they tend to favor situations in which companies would revert to market mechanisms for coordinating their transactions. The reason for this lies in the fact that buyers doing transactions via the Electronic B2B Marketplace need to be able to purchase the product without seeing it. This involves higher risk for the buyer, which he will only take for products that are easy to describe or standardized and have low asset specificity (Benjamin/Wigand 1995) or for which his uncertainty about product quality is low. In information economics, such goods are called search goods. They are characterized by the fact that the decision of their purchase can be based on search qualities that can be completely evaluated before the transaction (Adler 1996). Considering these attributes, we find that they describe transactions, which are marked by low transaction costs and thus favor market coordination anyhow. Koppelman/Brodersen/Volkman (2001) also find that cheap and norm products lend themselves more to electronic procurement than innovative or specialized products. Electronic B2B Marketplaces thus provide an "electronic brokerage effect". A good example here is

the German online energy exchange LPX. Participants trade highly standardized contracts and don't even want to know who they are buying from.

If, on the other hand, we look at transactions with high transaction costs and thus coordinated in a more hierarchical manner, we find that the value generating mechanisms only address these marginally. Drawing on Williamson's (1985) transaction cost analysis, high transaction costs may result from high uncertainty, high specificity and/or low frequency. Low frequency is the only circumstance in which the current models (especially catalogue consolidation) can generate value by providing a large information base on suppliers, products, etc. If used rarely, such a catalogue would be too costly to maintain for a single firm, but can realize economies of scale with many firms using it. Low frequency by itself, though increasing transaction costs, will not lead to more relational exchanges if the purchased products are pure search goods. Figure 3 summarizes the relationship between product qualities, transaction governance and Electronic B2B Marketplaces.

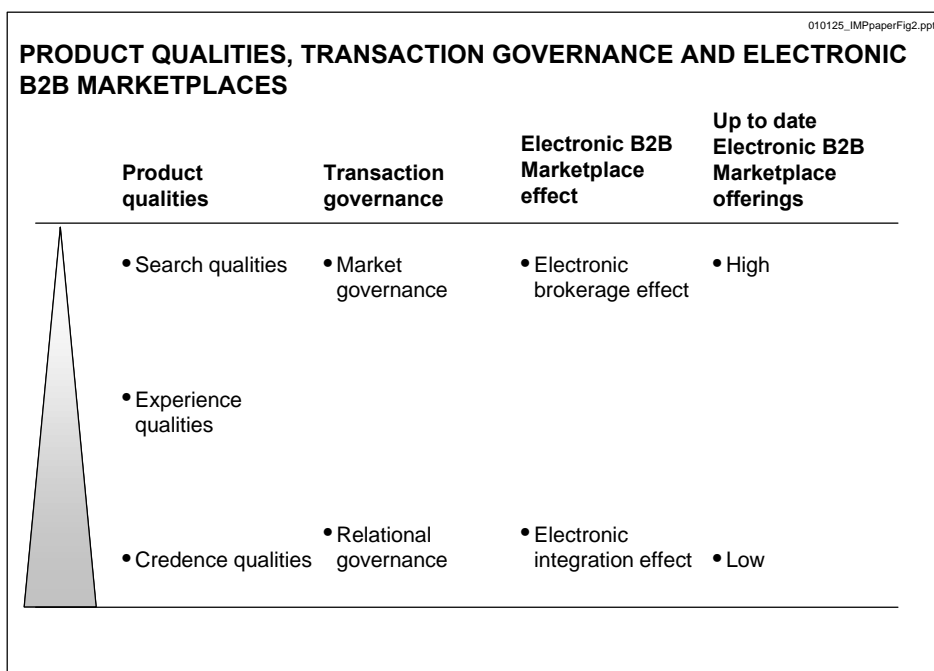


Figure 3: Relationship between product qualities, transaction governance and Electronic B2B Marketplaces

Not providing value to its participants is one of two reasons why Electronic B2B Marketplaces have not been able to succeed to attract relational exchanges. The other lies in the fact that a lot of companies have made specific IT investments into relationships with large suppliers, so called electronic data interchange (EDI) networks (Benjamin/Wigand 1995, Steinfield/Kraut/Plummer 1995). These private networks allow them to integrate their suppliers into their value chain. Existing EDI networks make Electronic B2B Marketplaces unattractive to buyers and sellers.

4.2 Future value generation of Electronic B2B Marketplaces in B2B Relationships

In order to succeed in situations characterized by relational exchanges, Electronic B2B Marketplaces have two options. The first option is to provide additional services that help reduce transaction costs and thus shift relationships towards a more market-like coordination in which current value generation models then again will be applicable. These additional services need to be designed to reduce

uncertainty and specificity. Measures that have been taken by Electronic B2B Marketplaces to reduce specificity comprise standardization efforts especially for data exchange.

Information economics analyze ways in which business partners try to reduce uncertainty. Three types of uncertainty are distinguished: Price, quality and behavioral uncertainty (Kaas 1995). Price uncertainty can be reduced by price comparisons. Here, Electronic B2B Marketplaces, especially those using the catalogue consolidation or market making model, can significantly reduce search costs. However, not price uncertainty by itself but rather quality and behavioral uncertainty lead to the formation of relationships. In order to reduce the latter, buyers try to get information on the product or service. Depending on the type of product, there may be quality characteristics that can only be evaluated after having used the product (so called experience qualities) or even not at all (so called credence qualities) (Darby/Karni 1973). To gain information about these qualities, buyers use information substitutes (Gizycki 1999). These may include information on product inputs, production technologies and general performance of the supplier. The information may be provided by the supplier himself, by other buyers or by independent parties (such as journals or institutes). Here, Electronic B2B Marketplaces have the chance of providing value to buyers by offering necessary information to reduce uncertainty. Electronic B2B Marketplaces are well positioned to do so for two reasons: First, they have access to a large number of buyers and transactions. And second, if unbiased they may have the necessary credibility. Relevant information may include participants' certification, performance ratings of participants, etc. These measures may decrease switching costs but they will not offset investments, both tangible and intangible, made into the relationship. Since investments are usually an indicator for more intense relationships (Heide/ John1990, Norris/McNeilly 1995), we hypothesize that Electronic B2B Marketplaces will not influence these relationships.

The second option is to actively support existing relationships. As we have mentioned it might be hard to compete against existing (and paid-for) EDI networks but Electronic B2B Marketplaces certainly provide an opportunity to establish EDI-like relationships with a lot more and smaller firms using public communication channels such as the Internet (Steinfeld/Kraut/Plummer 1995). The integration models can generate value here by linking buyers' and sellers' back-end systems providing them with all the advantages of EDI networks but at lower cost. They will also be able to extend electronic connections not only to the immediate customer or supplier but to all companies in the supply chain. Thus, Electronic B2B Marketplace are highly entities joining the network (Borders/Johnston/Rigdon 2001). In fact, Electronic B2B Marketplaces profit from adding another user to the system, providing *network effects* to their users (Hagel/Armstrong 1997).

Electronic B2B Marketplaces intensify existing relationships by improving communications between the parties involved (communication is an important success factor for relationships, see e.g. Gemünden/Walter/Helfert 1996, Mohr/Fisher/Nevin 1996). Another opportunity for Electronic B2B Marketplaces is to provide hard- and software that will facilitate collaboration between companies, such as for joint product development, testing, product customization etc (Dudenhöffer 2001). Again, if Electronic B2B Marketplaces can realize economies of scale by providing these services to several companies - while maintaining the highest standard of confidentiality - they may have an advantage over private applications.

5. Conclusion

We can conclude that the prevalent business models employed by current Electronic B2B Marketplaces support their use in transactions that are governed in market structures, exploiting the electronic brokerage effect as described by Malone/Yates/Benjamin (1987).

Thus, Electronic B2B Marketplaces have not had any significant impact on existing B2B relationships. In fact, our analysis suggests that transactions done within strong existing relationships have not been very likely to move to Electronic B2B Marketplaces. Electronic B2B Marketplaces will need to provide further value generating services to attract these transactions. Such services include providing relevant and qualified information to reduce uncertainty in transactions, especially for goods and services with mainly experience or credence qualities. Other services may include providing new business applications for collaboration. Furthermore, they should be more successful in pulling transactions done between smaller firms.

6. Further Research

Since we have only presented hypotheses here, it is obvious that there is a need for empirical validation. We will attempt such in two studies that will vary both in their industry focus and their approach. One study will be conducted in the chemical industry, examining the link between sourcing strategies and Electronic B2B Marketplaces employed. Depending on different purchase situations the Electronic B2B Marketplaces need to be appropriately adapted, leading to the assumption that the fit between purchase situation and the Electronic B2B Marketplace is key for a successful implementation of the new purchasing environment. The second study will analyze the requirements for Electronic B2B Marketplaces to be accepted by buyers in the health care industry and their effects on buyer-supplier relationships. Table 1 summarizes the hypotheses and further research planned to be conducted by the authors.

	Hypothesis	Further Research
1	Today's Electronic B2B Marketplaces favor transactions for search goods that are conducted under market governance.	Study of usage of Electronic B2B Marketplaces for procurement in hospitals (<i>Kerstin Oppel, Philipps-University Marburg</i>)
2	Today's Electronic B2B Marketplaces have had little effect on existing buyer-supplier relationships.	Study of establishment of Electronic B2B Marketplace in procurement in the chemical industry (<i>Evi Hartmann, Technical University Berlin</i>)
3	Even with additional services provided (e.g. for reducing uncertainty, see above), Electronic B2B Marketplaces will not have an effect on strong existing relationships.	Study of the effect of Electronic B2B Marketplaces on supplier relationships in hospitals (<i>Kerstin Oppel, Philipps-University Marburg</i>)
4	Only the appropriate fit between purchase situation and B2B electronic marketplace guarantees high relationship success.	Study of establishment of electronic B2B marketplaces in procurement in the Chemical industry (<i>Evi Hartmann, Technical University Berlin</i>)

Table 1: Hypotheses and further research

It would also be insightful to examine the value generation models of existing Electronic B2B Marketplaces and link them to their own economic performance. The problem with this analysis

however may be that most Electronic B2B Marketplaces have only existed for a short time so that no statement can be made concerning the long-term viability of their business model.

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