Electronic B2B Marketplaces - Will They Have an Impact on Buyer-Seller-Relationships? - An Empirical Investigation in the German Hospital Sector

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Kerstin Oppel
Institute of Marketing and Retail Management
Philipps-University Marburg
Universitaetsstr. 24, 35032 Marburg
Tel: +49 30 42 08 78 45
Fax: +49 30 88 45 28 41
Mobile: +49 177 487 28 40
Email: kerstin_oppel@alumni.uni-karlsruhe.de

Michael Lingenfelder
Institute of Marketing and Retail Management
Philipps-University Marburg
Universitaetsstr. 24, 35032 Marburg
Tel: +49 6421 28 23 763
Fax: +49 6421 28 26 598
Email: lingenfe@wiwi.uni-marburg.de

Hans Georg Gemuenden
Institute of Technology and Innovation Management
Technical University of Berlin
Hardenbergstr. 4 – 5, HAD 29, 10623 Berlin
Tel: +49 30 314 26087
Mobile: +49 173 240 74 58
Fax: +49 30 314 26089
Email: hans.gemuenden@tim.tu-berlin.de

KERSTIN OPPEL, a doctoral student at the Institute of Marketing and Retail Management at the Philipps-University in Marburg, Germany.

MICHAEL LINGENFELDER, professor, chair of the Institute of Marketing and Retail Management at the Philipps-University in Marburg, Germany.

HANS GEORG GEMUENDEN, professor, chair of the Institute of Technology and Innovation Management at the Technical University of Berlin, Germany.

Abstract

The use of information technology in business-to-business transactions (commonly referred to as B2B E-Commerce) has gained a lot of attention throughout the last years. Even though the euphoria about the possibilities of using electronic media has subsided, IT has subtly altered the way companies do transactions. B2B E-Commerce can take many different forms (EDI, E-Shops, etc.). In this research, we focus on **Electronic B2B Marketplaces**. Electronic B2B Marketplaces are information systems that bring together several business buyers and business sellers and facilitate their transactions by using electronic communication.

Electronic markets have for some time been the object of study of research. Drawing on New Institutionalism, scholars like *Thomas Malone* argued that electronic markets would encourage a shift towards more market-like **coordination of transactions** (cf. Malone/Yates/Benjamin 1987). Following their line of arguments would imply concluding that closeness in existing buyer-supplier-relationships should be reduced. Empirical verification of these hypotheses has been limited so far. The question whether the use of Electronic B2B Marketplaces has any **effect on existing buyer-supplier-relationships** still needs to be investigated. This paper tries to contribute to understanding these effects.

During the last two years, a number of Electronic B2B Marketplaces for hospital supplies have emerged in the German market. In an empirical study, 115 **hospitals** were asked to evaluated the likelihood that they would use Electronic B2B Marketplaces for specific products and their expectations on how this would alter the relationship with their current supplier. We selected communication, cooperation, long-term orientation and the intention to expand business with the supplier as **aspects relating to the interaction process and the relationship atmosphere** probably being influenced by the use of Electronic B2B Marketplaces. We hypothesize that the use of Electronic B2B Marketplaces for information purposes would rather decrease, whereas the use for transaction purposes would increase relationship closeness.

The study reveals that the use of Electronic B2B Marketplaces for information purposes has a tendentiously negative but insignificant effect on most constructs of relationship closeness. On the contrary, the use of Electronic B2B Marketplaces for processing transactions has a significantly **positive effect on** all factors of **relationship closeness** under consideration but general-purpose communication.

Limitations of the study (e.g. the slow adoption of Electronic B2B Marketplaces by hospitals and suppliers) have to be considered when deducting implications for management from these research results.

1. Introduction

Electronic markets and especially those that use the Internet as means of information transportation seem to promise buyers easy access to more information on suppliers and thus smoothing the switch from one supplier to the next. Better-informed buyers would make better decisions, i.e. rely more on performance-price comparisons rather than existing business relationships (cf. Bakos 1991). Early research on electronic markets led to the hypothesis that electronic markets would induce a shift in B2B transactions towards more market-like coordination (Malone/Yates/Benjamin 1987, 1989). Empirical evidence on how Electronic B2B Marketplaces have affected B2B relationships so far is small. Some research suggests that inter-organizational networks (though not necessarily markets as defined below) are more often introduced in hierarchical relationships (Steinfield/Kraut/Plummer 1995) and lead to tighter relationships (Stump/Sriram 1997). Holland (1997) points out that issues of quality and strategic choice play an important role in selecting a supplier which need not be affected by the use of an Electronic B2B Marketplace. The question on whether Internet-based Electronic B2B Marketplaces have an impact on B2B relationship therefore remains open. This paper examines how Electronic B2B Marketplaces affect B2B relationships using constructs from the IMP interaction model to capture a possible impact on relationship closeness.

2. Electronic B2B Marketplaces - Definition and Characteristics

In this paper, we focus on a certain type of business-to-business (B2B) E-Commerce application: Electronic B2B Marketplaces. Even though the term "electronic market" has been used in literature for some years, so far no uniform definition has evolved (Krähenmann 1994, Heil 1999). Most authors agree on two fundamental characteristics of Electronic B2B Marketplaces (e.g. Bakos 1991, Eggenberger 1996):

- They are used to support transactions in the broadest sense, and
- they make use of information and telecommunication networks.

In order to distinguish Electronic B2B Marketplaces from other E-Commerce applications, one characteristic is essential: On an Electronic B2B Marketplace, several (i.e. more than one) business buyers meets several business sellers (Malone/Yates/Benjamin 1989, Choudhury/Konsynski 1998, Eggenberger 1996). Figure 1 illustrates this relation.

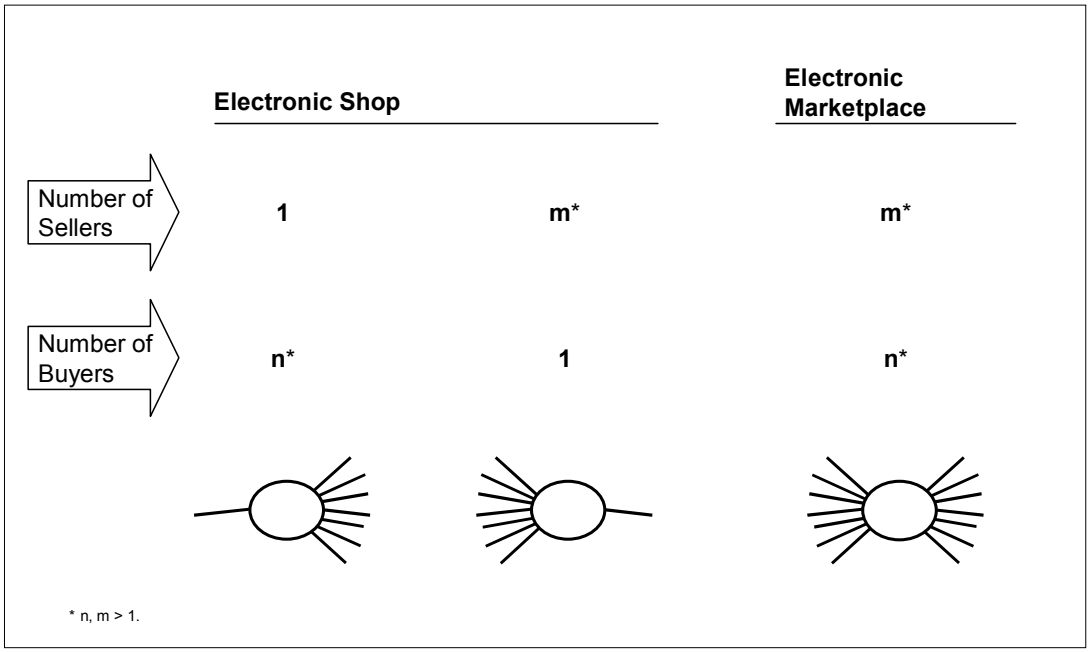

Figure 1: Buyer-Seller-Relation in Electronic B2B Marketplaces

From the buyer's perspective, the goal in using Electronic B2B Marketplaces is to lower purchasing cost, in terms of both product price and process cost. Electronic B2B Marketplaces can help them achieve this goal in different ways. First, marketplaces can provide buyers with information on many suppliers, their products and prices at one glance. A marketplace that offers these services is called a *catalogue consolidator*. It is characterized by a large number of suppliers whose products are presented and elaborate search and comparison functions. Second, Electronic B2B Marketplaces can establish electronic links between the transaction parties. Such a marketplace fulfills an *integrator* function. It ensures electronic data interchange between the information systems of all participants thus reducing paper work (McKinsey/CAPS Research 2000). Third, Electronic B2B Marketplaces can act as demand aggregators by bundling the volumes of small buyers. Joint negotiations are held with suppliers for the aggregated purchasing volume (Phillips/ Meeker 2000). Fourth, Electronic B2B Marketplaces can act as real-time *market makers*. In this function, they provide dynamic pricing mechanisms and create a liquid market, e.g. for perishable goods (Kaplan/

Sawhney 2000). An Electronic B2B Marketplaces offering can incorporate just one or several of the presented functions.

In the German hospital supply market, there have been a number of initiatives to set up Electronic B2B Marketplaces. Some of these companies failed mainly due to the fact that they couldn't generate enough transactions. One reason behind that is that adoption of Electronic B2B Marketplaces by hospitals has been slow. [1] To date, there are four electronic marketplaces that focus on hospitals.[2] They mainly address the first two functions of marketplaces, catalogue consolidator and integrator. [3]

3. Relevant Aspects of Electronic B2B Marketplace Usage and Relationship Closeness

This paper examines the effect of Electronic B2B Marketplace usage on buyer-seller-relationship closeness in the German market for hospital supplies. Due to the slow adoption of Electronic B2B Marketplaces in this market, actual usage of Electronic B2B Marketplaces, especially for conducting transactions, could not be observed in many relationships. In order to generate sufficient responses, hospitals were asked to evaluate the likelihood with which they were going to use Electronic B2B Marketplaces within the next two years. According to the main functions of Electronic B2B Marketplaces for hospitals, the likelihood for usage was measured for the purpose of gaining information through the marketplaces and for conducting transactions including the exchange of data over the marketplace.

We use the term "relationship closeness" to indicate how strong the relationship of a hospital with its supplier is. In terms of the IMP model, relationship closeness must therefore contain aspects of the relationship interaction and atmosphere. A number of constructs, such as communication or adaptation representing interaction, or trust and commitment representing atmosphere, have evolved as relevant in characterizing these two fields. To select constructs relevant to our point of view, we examined each identified measure to whether it could potentially be affected by the use of an Electronic B2B Marketplace. We decided to include the following constructs of relationship closeness in our study:

- *Communication*. Communication has repeatedly been identified as an important prerequisite for intense business relationships (Cannon/Perreault 1999, Doney/Cannon 1997, Gemünden/Walter/Helfert 1996, Morgan/Hunt 1994). Communication can be understood as formal and informal exchange of relevant

[1] In our survey of 115 German hospitals xxx% stated they had any kind of experience with Electronic B2B Marketplaces and only xxx% had conducted transactions via such marketplaces.
[2] These include: *Vamedis* (www.vamedis.de), *Medicforma* (www.medicforma.de), *Medical Columbus* (www.medicalcolumbus.de), and *Global Healthcare Exchange* (www.ghxonline.com).
[3] Our research also shows that these two types are preferred by the buyers, i.e. by hospitals.

information (Anderson/Narus 1990). Using an Electronic B2B Marketplace offers new ways of communicating and thus may affect the communication behavior of the involved parties.

- *Cooperation*. Cooperation has been found to evolve in relationships with a good relationship atmosphere (Morgan/Hunt 1994). It can easily be measures because it is linked to specific activities (see the operationalization with Kim 1999). The fact that transaction partners agree on jointly using a certain Electronic B2B Marketplace can already be considered a cooperation. Using Electronic Marketplaces can further affect cooperation in related areas, such as logistics.
- *Long-term orientation*. Long-term orientation or expectation of continuity is by definition a characteristic of a business relationship (Noordewier/John/Nevin 1990). Electronic B2B Marketplaces can affect long-term orientation, e.g. when buyers learn about other potential supplier.
- *Planned business expansion*. Similarly to long-term orientation, intended business expansion expresses the expectancy to do more business with the focal supplier in future (Kiedaisch 1997). This anticipation can be affected by using an Electronic B2B Marketplace. It is selected for appraisal in our study because it is easy to evaluate and because it is an indicator for a potential impact of Electronic B2B Marketplaces on business sales.

Further relevant constructs characterizing relationship interaction and atmosphere include trust, commitment, and satisfaction (e.g. Morgan/Hunt 1994, Diller/Kusterer 1988, Anderson/Narus 1990). Even though they play a critical role in business relationships and they might be affected by the use of Electronic B2B Marketplaces they will not be measured in this study. The reason lies in the hypothetical situation into which respondents are put when answering the questionnaire. They have to evaluate the change in the supplier relationship pretending they were using an Electronic B2B Marketplace. Due to the affective nature of the above mentioned constructs their evaluation is almost impossible under these circumstances.

4. Hypotheses for the Effect of Electronic B2B Marketplace Usage on Relationship Closeness

In developing our hypotheses how the use of Electronic B2B Marketplaces will influence the selected dimensions of relationship closeness, we will mainly draw on transaction economics, information economics, the IMP interaction approach and empirical studies in this area. We will distinguish between the use of Electronic B2B Marketplaces for information purposes and the use for transaction purposes (i.e. ordering and exchanging data via the marketplace).

4.1 Impact on Communication

Electronic B2B Marketplaces can influence communication both directly and indirectly. Directly, information formerly exchanged by mail, fax or telephone can now be transmitted via the marketplace. Indirectly, using an electronic marketplace can provoke offline communication, e.g. when coordinating the use of a specific Electronic B2B Marketplace with current suppliers.

When buyers use Electronic B2B Marketplaces for information purposes, both of these effects can occur. The direct availability of information on the marketplace system can on one hand reduce the need to communicate with the supplier. On the other hand, it can indirectly lead to more contacts with the supplier e.g. for negotiating new conditions (Stump/Sriram 1997). As we asked respondents to evaluate the change in communication with their existing supplier, we expect a positive effect on communication since any information gained through the Electronic B2B Marketplace will probably lead to first talks with the current supplier.

The use of Electronic B2B Marketplaces for transaction purposes with direct data exchange between the buyer's ERP system, the marketplace system, and the seller's ERP system will reduce errors in the information transmission, speed up information exchange and improve data quality and reliability. In this direct way, it will thus influence communication positively. Besides, the implementation of such an interconnection between information systems requires extensive communication.

Therefore, we assume the following:

Hypothesis 1a: The likelihood for using an Electronic B2B Marketplace for information purposes has a positive effect on communication.

Hypothesis 1b: The likelihood for using an Electronic B2B Marketplace for transaction purposes has a positive effect on communication.

4.2 Impact on Cooperation

Cooperation between business partners is initiated based on the common understanding that joint problem solving will yield better results (Anderson/Narus 1990). If hospitals make use of Electronic B2B Marketplaces they are more open to innovations to the purchasing process. This can also be seen as signal to cooperate with suppliers. The effect is expected to be weak though, if the marketplace is only used for information purposes.

The use for transaction purposes, however, can be regarded as a cooperation in itself. Advantages in form of lower transaction costs can only be realized if both supplier an buyer are connected to the same Electronic B2B Marketplace. The resulting integration of information systems is also a prerequisite for many

cooperative arrangements in the supply chain (Borders/Johnston/Rigdon 2001) or other collaborative solutions. Additionally, the automation of order processes leaves more time in purchasing and sales departments to initiate more strategic cooperation.

Therefore, we assume the following:

Hypothesis 2a: The likelihood for using an Electronic B2B Marketplace for information purposes has a (weak) positive effect on cooperation.

Hypothesis 2b: The likelihood for using an Electronic B2B Marketplace for transaction purposes has a positive effect on cooperation.

4.3 Impact on Long-Term Orientation

The value proposition of Electronic B2B Marketplaces designed for information purposes holds that it is easier and cheaper to locate potential suppliers on the marketplace. With decreasing search costs, it is possible for the buyer to increase the sample of evaluated alternatives (Stigler 1961). I.e. when using an Electronic B2B Marketplace, more alternatives are taken into consideration than before.[4] Ideally, when providing full information on every potential supplier with one inquiry, the electronic marketplace can drive marginal search cost down to zero, allowing for a complete evaluation of the market and an elimination of price uncertainty. The search for information on Electronic B2B Marketplaces reveals a potential interest of buyers to find new suppliers and is therefore expected to have a negative effect on the long-term orientation in the current supplier relationship. Again, we only expect to see a weak correspondence here, because price information may also be used for re-negotiating deals with current supplier and need not lead to a change in suppliers.

If an Electronic B2B Marketplace is used for transaction services including data interchange, its implementation requires some investment on part of the buyer. These investments are specific to relationships with suppliers that are also connected to the marketplace. The pay-off of these investments can only be realized if the buyer stays in the current relationship, thus creating a lock-in effect (Picot/Dietl 1990, Steinfield/Chan/Kraut 2000). This lock-in effect will result in the expectation of the buyer to maintain the existing the existing supplier relationship and thus increase long-term orientation.

Therefore, we assume the following:

[4] It can be argued then, that the use of Electronic B2B Marketplaces is more valuable in markets with large numbers of suppliers. An increase in the number of sellers will c.p. lead to larger price dispersion and thus higher potential savings from searching (Stigler 1961). Our research on the use of Electronic B2B Marketplaces in specific purchase situations actually confirms this proposition.

Hypothesis 3a: The likelihood for using an Electronic B2B Marketplace for information purposes has a (weak) negative effect on long-term orientation.

Hypothesis 3b: The likelihood for using an Electronic B2B Marketplace for transaction purposes has a positive effect on long-term orientation.

4.4 Impact on Business Expansion Plans

The argument on how the use of Electronic B2B Marketplaces will effect business expansion plans follows the same lines as the one on long-term orientation. Again, using an Electronic B2B Marketplace for information purposes reveals a tendency to re-think current supply arrangements and consider new suppliers. If a cheaper supplier can be localized, savings can be realized by shifting some of the purchase volume from the existing supplier. Once more, we can only expect a weak negative effect on business expansion plans because new suppliers can only be added if they fulfill all criteria regarding quality, safety etc. (a very important issue in hospital supplies!).

As we have already pointed out, the use of an Electronic B2B Marketplace as integrator, however, requires investments and creates lock-in effects. At the same time, cost savings can be realized for each transaction conducted via the marketplace instead of through traditional channels. This provides an incentive to the buyer to conduct as many transactions as possible via the marketplace. Other prerequisites (e.g. quality, price) being met, this can lead to shifting purchase volume from suppliers not connected to the marketplace to suppliers connected to the marketplace.

Therefore, we assume the following:

Hypothesis 4a: The likelihood for using an Electronic B2B Marketplace for information purposes has a (weak) negative effect on plans to expand business with the supplier.

Hypothesis 4b: The likelihood for using an Electronic B2B Marketplace for transaction purposes has a positive effect on plans to expand business with the supplier.

Figure 2 summarizes the hypotheses.

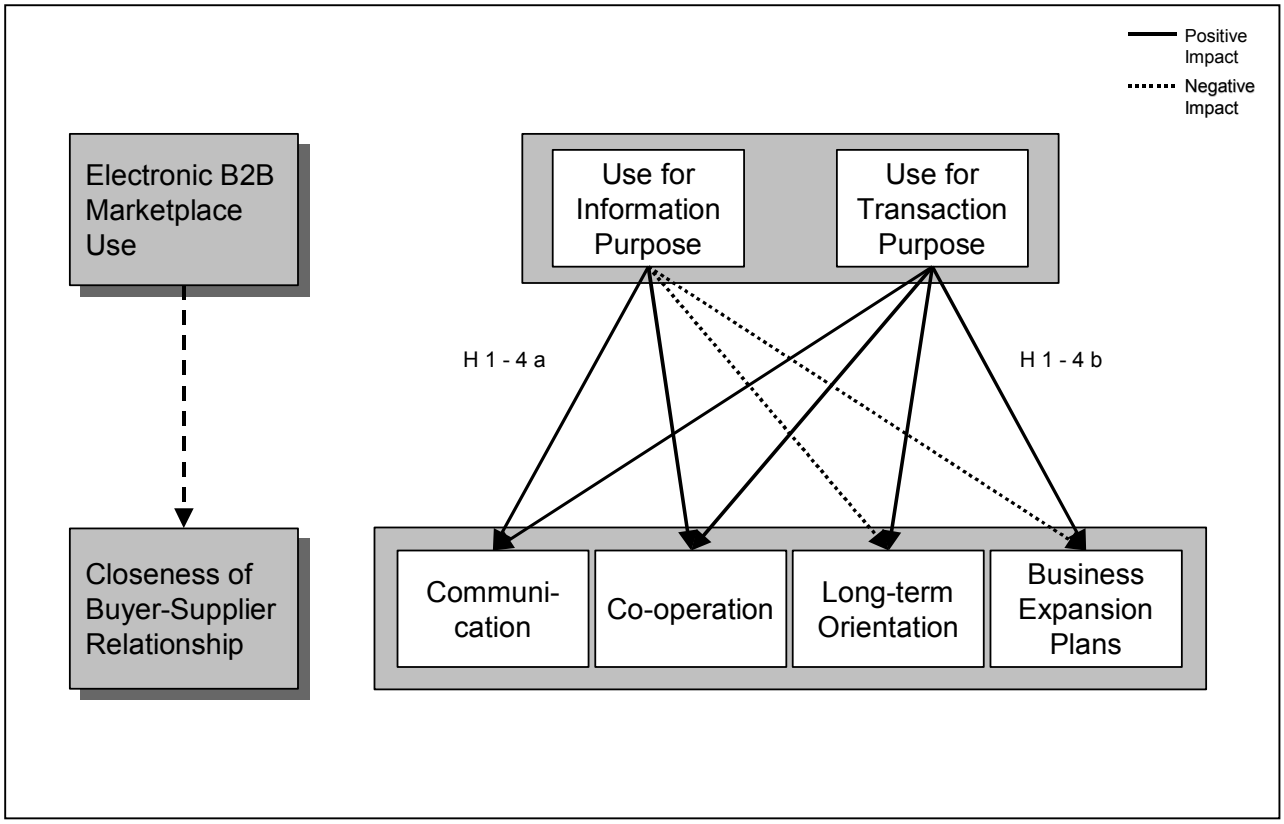

Figure 2: Overview of Hypotheses

5. Empirical Findings

5.1 Data Collection and Sample

As Electronic B2B Marketplaces are mainly seen as a procurement tools and thus might change the purchasing process in companies rather than the sales process, the study was conducted from the point of view of buyers. Hospitals in Germany were selected as the unit of analysis because a number of Electronic B2B Marketplace initiatives are currently being developed in this sector. We asked the purchasing responsible of each hospital to answer our questionnaire since it can be expected that he would be the most knowledgable person concerning supplier-relationships.

629 hospitals representing 25% of all German hospitals were contacted to participate in the survey. The sample was stratified to represent the population in terms of hospital size and ownership. Each hospital was telephoned to identify the correct respondent and ascertain his willingness to participate in the study. 338 hospitals (54% of those contacted) were ready to take part in the survey and subsequently mailed the questionnaire. 115 questionnaires (34% of those mailed, 18% of the hospitals contacted) were returned.

The sample of hospitals that returned questionnaires differs from the population of all German hospitals. Small hospitals (i.e. those with less than 200 beds) are under-represented in the judgement sample. Reasons for this lie in the fact that a large number of these clinics does not have a dedicated purchase organization. Supply is either ordered by each department separately or supply management has been transferred to another hospital. Nevertheless, the jugdement sample can be regarded as suitable for examining our research question, because for very small hospitals the use of Electronic B2B Marketplaces is less likely than for larger hospitals. We expect to receive more realistic statements from hospitals that see using Electronic B2B Marketplaces as a real option rather than a fantasy. Thus, the non-representativity of the judgement sample will probably not reduce validity of the results.

Each hospital evaluated the likelihood of Electronic B2B Marketplace use and its effect on their supplier relationship for two specific products. Thus, a total of 230 statements was generated. Four products were selected and grouped into pairs. In each pair, one product represent a complex purchase situation and the other a simpler situation. Product pairs were assigned to respondents by chance.

5.2 Operationalisation

The measurement scales employed in this study were adapted from existing scales wherever possible. To measure Electronic B2B Marketplaces use likelihood, however, a specific scale had to be developed.

5.2.1 Likelihood for Electronic B2B Marketplace Use

In order to receive realistic responses, respondents were asked to assess the likelihood with which they would use Electronic B2B Marketplaces for specific activities in the purchasing process (cf. Ryssel/Ritter/ Gemünden 2000). Items represent tasks from the information und negotiation phase of a transaction mainly (Krähenmann 1994, Reus 1998). For the information phase, respondents had to evaluate how likely it was that they would use Electronic B2B Marketplaces for four tasks: gathering information on suppliers, on products and on prices and making this information support their supplier selection. For the negotiation phase, six items were generated ranging from negotiating prices via the marketplace to specifying delivery details. From the delivery phase, only data exchange was included in the task list.

Respondents were asked to indicated the likelihood for Electronic B2B Marketplace use for each of the activities on a 7-point scale on which the first position was labeled "very unlikely", the sixth "very likely" and the seventh provided the opportunity to indicate that Electronic B2B Marketplaces were already being used for that purpose. We consider it justifiable to interpret the seventh point as a continuous extension of the "very unlikely" - "very likely" span and therefore will treat the data as being interval-scaled.

Traditional psychometric methods were used to evaluate scale reliability and validity. An exploratory factor analysis with all 10 items revealed a two-dimensional structure. The two factors represent the likelihood of use for information purposes and transaction purposes respectively, as we had expected. Each factor was analyzed separately regarding item-to-total correlations and Cronbach's Alpha. The results are represented in Table 1 and Table 2 in the appendix. Both factors show satisfactory levels of reliability (Cronbach's Alpha > 0,7; cf. Homburg/Giering 1996) and validity (variance extracted > 50%)..

5.2.1 Constructs of Supplier Relationship Closeness

To measure communication between the transaction parties, items were generated that cover both quantity and quality of the information exchanged (cf. Wertz 2000). Communication quantity is assessed by evaluating the frequency with which the supplier passes information on to the hospital and vice versa and the frequency of informal contacts. The quality of communication is measured in the quality of transaction information and general information exchanged between the parties. Additionally, the technical possibilities for information exchange are considered (cf. Picot/Reichwald/Wigand 1998) resulting in seven items for the construct. Since communication can potentially improve or deteriorate with the use of an Electronic B2B Marketplace, respondents were presented a seven-point scale ranging from "Deteriorate" to "Improve" with the middle being labeled "No change".

An exploratory factor analysis with all items reveals that the construct is two-dimensional. One factor can be interpreted as communication related to the specific transaction. Items indicating timely exchange of product and order data constitute this factor. The second factor encompasses general communication, represented by items like information exchange on general business development. Both factors fulfill the recommended criteria for reliability and validity evaluation. The results are presented in Table 3 and Table 4 in the appendix.

Measurement of cooperation has been industry-specific (cf. Kim 1999 and Morgan/Hunt 1994 for scales used in the retailing sector, Heide/John 1990 and Bensaou 1997). Accordingly, our scale had to be adjusted to the hospital situation. We chose four items relating to joint product (1) and process (3) improvement. Respondents were asked to indicate their level of agreement with the statements of this and the two follwing constructs on a seven-point scale ranging from "Do not agree at all" to "Totally agree". Table 5 in the appendix shows the results of the construct review. The construct can also be regarded as reliable and valid according to the evaluated criteria.

The measurement of long-term orientation in this study is based on the scale developed by Ganesan (1994). The scale was reduced to four items by omitting items that had had to be eliminated in other studies employing this scale (cf. Kiedaisch 1997, p. 162f.). Results of the scale validation are shown in Table 6.

To measure business expansion plans, we use a four-item scale developed by Kiedaisch (1997). The items ask for the general intention of the hospital to expand business with the focal supplier due to the use of an Electronic B2B Marketplace. The scale shows satisfactory levels of both reliability and validity, as can be seen in Table 7 in the appendix.

5.3 Hypotheses Tests

The hypotheses are tested using multiple regression analysis. A regression model is estimated for each of the dependent constructs of relationship closeness. The results are presented in Table 1.

Linear Regression Models[1)]						
	Regression Coefficients[2)]					
Independent Variables	**Transaction Specific Communication**	**Extended Communication**	**Cooperation**	**Long-Term Orientation**	**Business Expansion Plans**	**VIF[3)]**
Use for Information Purposes. [4)]	-0.090	-0.036	0.109	-0.005	-0.099	1.718
Use for Transaction Purposes. [4)]	0.387 ***	0.160 *	0.346 ***	0.320 ***	0.398 ***	1.718
R^2	0.113	0.020	0.180	0.101	0.117	
Adjusted R^2	0.105	0.011	0.173	0.092	0.109	
Significance (F-Test)	0.000	0.119	0.000	0.000	0.000	
N	218	218	220	218	220	

Remarks:
*** Significance level (t-Test) ≤ 1%
** Significance level (t-Test) ≤ 5%
* Significance level (t-Test) ≤ 10%
1) Five regression models were estimated, one for each dependent construct of relationship closeness. The two dimensions of likelihood for Electronic B2B Marketplace use represent the independent variables.
2) Regression coefficients Beta are given.
3) VIF = "Variance Inflation Factor", indicator for multicollinearity. Values close to 1 indicate low multicollinearity. Cf. Backhaus et al. (2000), S. 49f.
4) Factors values of the constructs of Likelihood for Electronic B2B Marketplace use are used.

Table 1: Results of regression analyses

The likelihood of Electronic B2B Marketplace use can explain a proportion significantly greater than 0 for all but one dimension of relationship closeness. Extended Communication, however, is not significantly influenced by the use of Electronic B2B Marketplaces. The significant squared multiple correlations lie between 10.1 and 18%, indicating that other factors than the use of Electronic B2B Marketplaces influence relationship closeness (cf. Bensaou 1997). Such factors may include among others experience and satisfaction with the supplier, strategic decisions of the hospital management etc.

Looking at the influence of the independent variables, it can be seen that only the use of Electronic B2B Marketplaces for transaction purposes has a significant influence on the relationship closeness dimensions considered. The coefficients of the likelihood of use for information purposes are insignificant throughout the models. Besides the arguments which we have mentioned in developing the hypotheses that only allowed for expecting a weak influence of this type of use, the correlation between the two independent variables is a reason for these results.[5] The relevance of the use for transaction purposes underlines the importance of the investments that are inherent in using such an e-commerce application. Stump/Sriram (1997) found similar evidence for the importance of using IT in conducting transactions.

The regression analyses lead to the following results for the hypotheses:

As predicted, the likelihood for using an Electronic B2B Marketplace for transaction purposes, has a positive effect on transaction specific communication (H 1a supported). The use for information purposes has a tendentiously negative, though insignificant effect, indicating that retrieving information from an Electronic B2B Marketplace might outweigh direct communication with the supplier (H 1b not supported).

The two types of Electronic B2B Marketplace use cannot explain extended communication. Communication beyond daily business issues is less a matter of necessity than of personal similarity and liking (Smith 1998), traits probably not affected by the use of an Electronic B2B Marketplace.

As hypothesized, the use of Electronic B2B Marketplaces for transaction purposes also positively influences cooperation (H 2a supported). The same can tendentiously, but not significantly be seen in the coefficient of Electronic B2B Marketplace use for information purposes (H 2b not supported).

The hypothesis that the use of Electronic B2B Marketplaces for transaction purposes has a positive impact on long-term orientation is supported, too (H 3a supported). Drawing on the coefficient of the use for information purposes, it has to be concluded, that this use has now effect on long-term orientation (H 3b not supported). Thus, the use of an Electronic B2B Marketplace to gather information will neither lead to longer

[5] The use for transaction purposes thus acts as a suppressor variable (cf. Bortz 1993).

or shorter horizons in the business relationships. There are several arguments that actually support this empirical result. First, it cannot be predicted what kind of information the buyer will find on the Electronic B2B Marketplace. Even assuming the best result, i.e. a buyer finding a supplier that offers a comparable product for a lower price, this information need not to be used to switch supplier. Rather, the buyer may use this information to re-negotiate its contract with his current supplier, thus not affecting the long-term orientation at all. Additionally, suppliers are not merely selected on basis of the lowest price. Other factors such as quality play an important role, especially in hospitals, making a switch in suppliers very difficult.

The hypotheses concerning business expansion plans are also partially supported (H 4a supported). The use of an Electronic B2B Marketplace for transaction purposes raises the expectation with buyers that they will do more business with their suppliers that also use the Electronic B2B Marketplace. Conducting as many transactions over the marketplace as possible helps to amortize the investment, thus providing an incentive to the buyer to give more volume to suppliers connected to the marketplace. The impact of the use for information purposes is insignificant but tendentiously negative, reflecting the wish to reduce the purchase volume with this supplier (H 4b not supported). Both independent and dependent variable might have a common antecedent not considered in our study that could explain their negative association: Satisfaction. Not being satisfied with the performance of a specific supplier might raise the inclination to reduce this supplier's volume (Wilson 1995). At the same time, this might provide the reason for using an Electronic B2B Marketplace to search for other suppliers.

Figure 3 gives an overview over the results from the hypotheses tests.

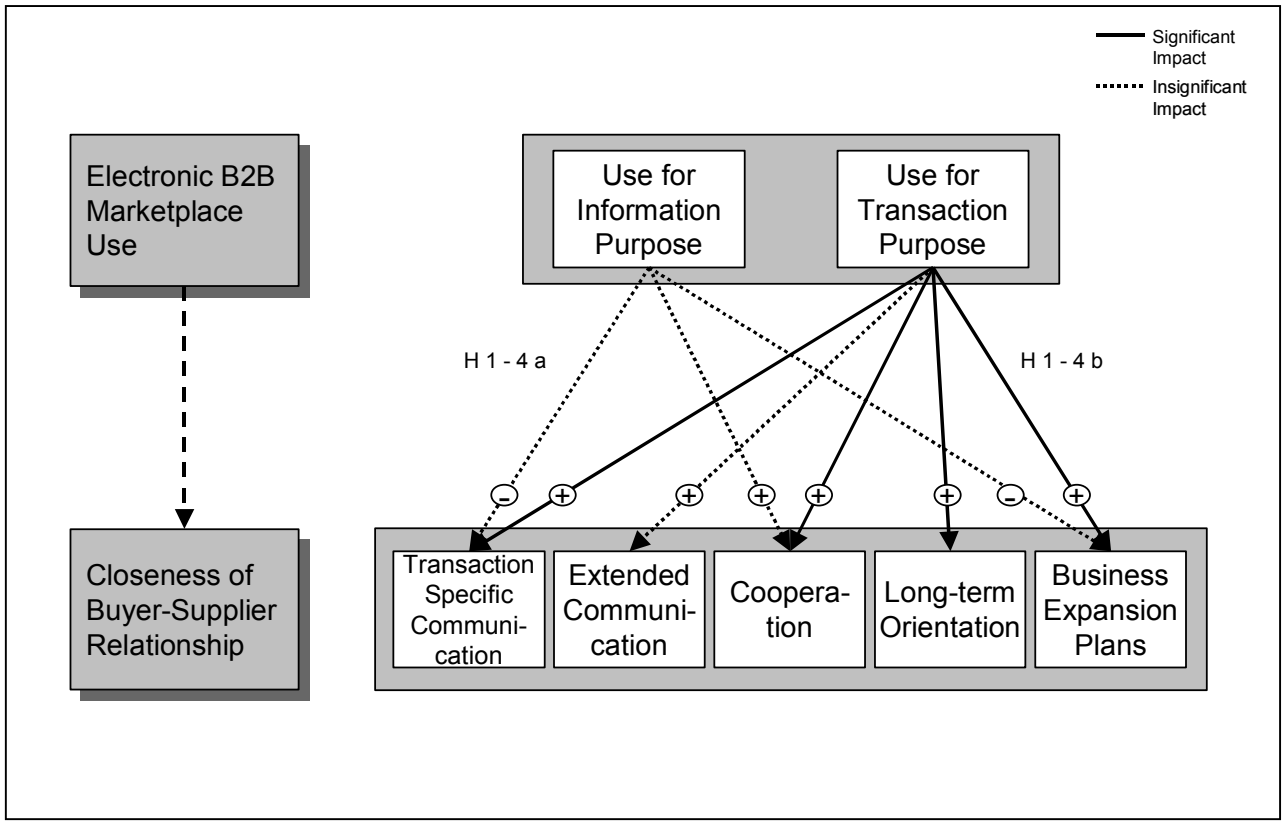

Figure 3: Empirical Results of Hypotheses Tests

5.5 Discussion and Conclusion

Focus of this paper is the research question whether Electronic B2B Marketplaces will have positive or negative effects on buyer-supplier relationships. While the use of Electronic B2B Marketplaces for information purposes shows weak negative effects, hospitals expect intensified relationships with suppliers with which they can conduct transactions via the marketplace.

The use of Electronic B2B Marketplaces for information purposes has no significant effect on the supplier relationship but indicates that transaction specific data, such as product information and prices will increasingly be exchanged through Electronic B2B Marketplaces. Additionally, using an Electronic B2B Marketplace - even if it is just for information - seems to indicate the readiness of the hospital to try out new concepts in purchasing, thus serving as a signal for the openness to cooperation with suppliers.

The positive effect of using an Electronic B2B Marketplace for transaction purposes is probably partially caused by the lock-in effect that arises with the investment made for connecting the hospital's ERP system to the marketplace system. Savings can only be realized if transactions are conducted via the marketplace thus limiting the hospital to suppliers connected to the marketplace. As long as only a portion of all potential

suppliers is represented on the marketplace, this intensification of relationships may be attributed to the lock-in effect.

5.6 Limitations of the Study

When interpreting the results from this study, certain limitation have to be kept in mind. One of the major limitations is that at the time of the study, hospitals had little experience with Electronic B2B Marketplaces. Accordingly, we could only draw on their expectations not on actual experiences. Asking for expectation raises similar problems to those that arise when consumers are asked for their purchase intentions (cf. Jamieson/Bass 1989): Intentions or expectations need not turn into action or reality. In our case the situation is even more difficult due to the fact that the respondents represent organizations and, besides their own opinion, need to take organizational circumstances into account. It would be interesting to repeat the study some time later to verify whether those expectations can be verified.

The lack of experience with Electronic B2B Marketplaces also limited the selection of constructs to be evaluated. As we have argued earlier, it would have been difficult for respondents to assess the hypothetical change in satisfaction with or commitment to the supplier due to the use of an Electronic B2B Marketplace. Although it would be interesting to investigate the impact of Electronic B2B Marketplaces on these central constructs of B2B relationships, we think that the dimensions of communication, cooperation, long-term orientation and business expansion - some being seen as antecedents or consequences of trust, commitment or satisfaction - provide a good picture on how relationships might be affected.[6]

As we have pointed out before, the use of Electronic B2B Marketplaces only explains a small portion of expected change in the supplier relationship. Relationship closeness is certainly influenced by a number of other factors not considered in this study.

The specific situation in purchasing in hospitals also has to be taken into account when transferring the results to other sectors. Due to the lack of incentives for hospitals to reduce cost and the fact that purchased material accounts for only 30% of total cost, the purchasing function is not developed to the degree that can be seen in other industries. Additionally, hospitals handle a lot of sensitive material used in treatments which fall under the therapeutic responsibility of each physician.

[6] Communication is considered a antecedent of trust (e.g. Doney/Cannon 1997, Morgan/Hunt 1994). Cooperation can be seen as a consequence of trust and commitment (e.g. Morgan/Hunt 1994). Long-term orientation also is considered a consequence of trust (Ganesan 1994).

6. Implications

6.1 Managerial Implications

When assessing whether Electronic B2B Marketplaces can be a tool for customer retention, one needs to differentiate between the two types of purposes for which such marketplaces are used. The use for information purposes has no significant effect in buyer-supplier relationships. The use of Electronic B2B Marketplaces for transaction purposes, however, seems to be suitable for intensifying customer relationships. The buyers in our study associated intensified interaction in terms of communication and cooperation with this type of Electronic B2B Marketplaces use. They even expect to lengthen and expand the relationship with suppliers to which they are linked via and Electronic B2B Marketplace. As we have pointed out, this may be partly attributed to a lock-in effect. In as far as this is the case, the impact on closeness would only be a temporary effect until all potential suppliers were connected to the marketplace.

The lock-in effect can be reduced by connecting as many suppliers as possible to the marketplace. Thus, hospitals should try to move all their current suppliers to the marketplace. Besides being able to conduct more transactions vie the marketplace they may also benefit from network externalities if other hospitals do the same. Agreeing with a supplier on using a specific Electronic B2B Marketplace can also serve as a test run for cooperation in other areas like logistics etc.

6.2 Theoretical Implications

This paper adds empirical evidence to the question how Electronic B2B Marketplaces will affect B2B relationships. Malone/Yates/Benjamin (1987) hypothesized that the use of electronic markets would shift transactions to more market-like coordination because transaction cost is reduced by using electronic networks. Steinfield/Kraut/Plummer (1995) on the contrary found that "the more extensively firms used inter-organizational networks, the more hierarchical were their relationships with trading partners". Their results are mainly based on proprietary networks, however, which create lock-in effects.

Considering these positions and the results from our study, we conclude that Electronic B2B Marketplaces probably affect B2B relationships in two steps. In the medium term, they intensify relationships due to lock-in effects. As more and more companies use the Electronic B2B Marketplace, switching costs sink, allowing for easier change in suppliers and thus more market-like coordination (see Figure 4).

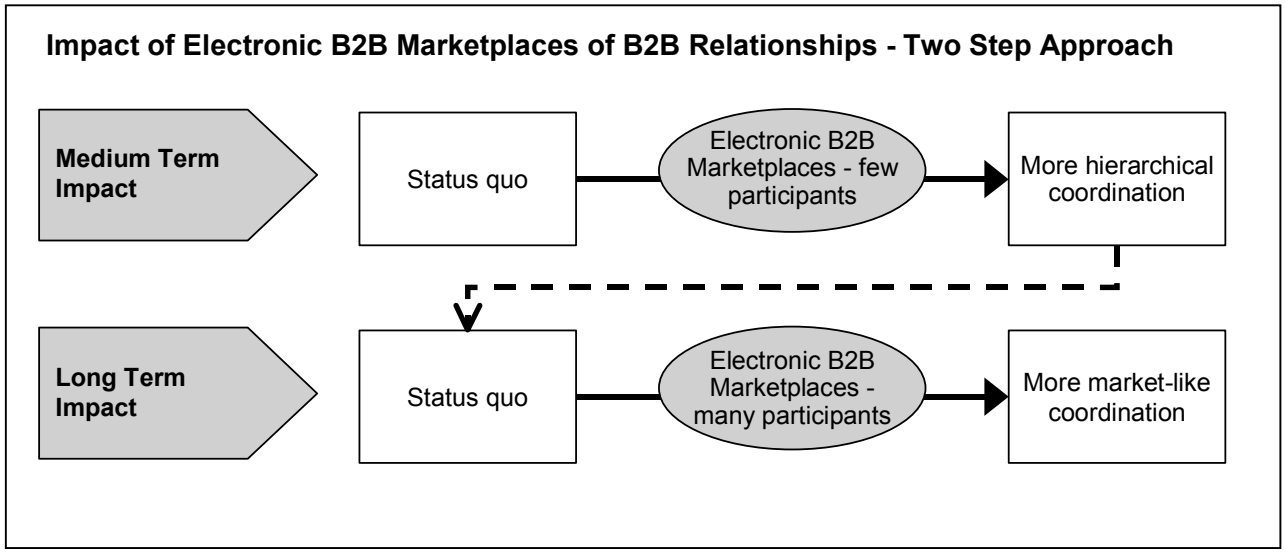

Figure 4: Impact of Electronic B2B Marketplaces on B2B Relationships

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List of measures

Factor	**Likelihood of use for information purposes**		
Item		**Factor loading**	**Item-to-total-correlation**
Within the next two years, we will use an Electronic B2B Marketplace for purchasing the respective product in order to...			
1	... gather information on suppliers.	0.834	0.701
2	... gather information on products.	0.913	0.830
3	... gather information on prices.	0.804	0.661
4	... support the purchasing decision.	0.865	0.748
Variance extracted (%)		**73.071**	
Cronbach's Alpha		**0.8762**	

Remarks: N=226 valid cases.

Table 1: Scale for measuring Likelihood of use for information purposes

Factor	**Likelihood of use for transaction purposes**		
Item		**Factor loading**	**Item-to-total-correlation**
Within the next two years, we will use an Electronic B2B Marketplace for purchasing the respective product in order to...			
1	... place orders.	0.826	0.743
2	... retrieve data of orders.	0.819	0.738
3	... exchange data with the supplier.	0.858	0.782
4	... coordinate delivery details with the supplier (e.g. place of delivery).	0.876	0.806
5	... coordinate collaboration with the supplier.	0.911	0.859
6	... negotiate conditions with suppliers.	0.740	0.642
Variance extracted (%)		**70.569**	
Cronbach's Alpha		**0.9148**	

Remarks: N=226 valid cases.

Table 2: Scale for measuring Likelihood of use for transaction purposes

Factor	Transaction Specific Communication		
Item		**Factor loading**	**Item-to-total-correlation**
In which way will the use of an Electronic B2B Marketplace affect the exchange of information between your hospital and your supplier regarding the following aspects?			
1	Technical capabilities for the exchange of information	0.741	0.527
2	Frequency with which you receive information from your supplier.	0.840	0.650
3	Frequency with which you pass information on to your supplier.	0.810	0.612
4	Quality of information exchanged on the specific product.	0.662	0.452
Variance extracted (%)		**58.736**	
Cronbach's Alpha		**0.757**	

Remarks: N=228 valid cases.

Table 3: Scale for measuring Transaction Specific Communication

Factor	Extended Communication		
Item		**Factor loading**	**Item-to-total-correlation**
In which way will the use of an Electronic B2B Marketplace affect the exchange of information between your hospital and your supplier regarding the following aspects?			
1	Frequency of informal contacts between your hospital and your supplier	0.887	0.721
2	Exchange of information on general developments in your hospitals	0.863	0.683
3	Exchange of information on general developmentsin your supplier's company	0.814	0.609
Variance extracted (%)		**73.167**	
Cronbach's Alpha		**0.815**	

Remarks: N=228 valid cases.

Table 4: Scale for measuring Extended Communication

Factor	Cooperation		
Item		**Factor loading**	**Item-to-total-correlation**
1	Due to the use of the Electronic B2B Marketplace we will intensify our cooperation with this supplier in joint product development.	0.674	0.491
2	Due to the use of the Electronic B2B Marketplace we will intensify our cooperation with this supplier to improve processes in our hospital.	0.840	0.695
3	The use of the Electronic B2B Marketplace will intensify our cooperation with this supplier to improve order processing.	0.802	0.611
4	The use of the Electronic B2B Marketplace will intensify our cooperation with this supplier to improve logistics.	0.864	0.710
Variance extracted (%)		**63.693**	
Cronbach's Alpha		**0.808**	

Remarks: N=230 valid cases.

Table 5: Scale for measuring Cooperation

Factor	Long-Term Orientation		
Item		**Factor loading**	**Item-to-total-correlation**
1	We believe that with the use of the Electronic B2B Marketplace our relationship with this supplier will be even more profitable in the long run.	0.747	0.586
2	We expect that due to the use of the Electronic B2B Marketplace this supplier will more than ever want to do business with us for a long time.	0.831	0.689
3	Due to using the Electronic B2B Marketplace it is even more important to us to maintain a long-term relationship with this supplier.	0.849	0.705
4	The use of the Electronic B2B Marketplace helps us to focus on long-term goals in this supplier relationship.	0.870	0.740
Variance extracted (%)		**68.181**	
Cronbach's Alpha		**0.843**	

Remarks: N=230 valid cases.

Table 6: Scale for measuring Long-Term Orientation

Factor	Business Expansion Plans		
Item		**Factor loading**	**Item-to-total-correlation**
1	Due to using the Electronic B2B Marketplace this supplier will receive a larger portion of our purchasing volume in the future	0.884	0.760
2	Even though we use the Electronic B2B Marketplace we do not intend to expand our purchase volume with this supplier in the future.*	0.607	0.443
3	Due to using the Electronic B2B Marketplace we plan to expand our business activities with this supplier.	0.912	0.777
4	In the course of the coming years, we will more often turn to this supplier than to date.	0.914	0.773
Variance extracted (%)		**70.411**	
Cronbach's Alpha		**0.839**	

Remarks: N=230 valid cases.
* Item is reversed.

Table 7: Scale for measuring Business Expansion Plans