Internet-based Electronic Markets

Arie Segev, Judith Gebauer, Frank Färber

Fisher Center for Information Technology & Marketplace Transformation
Haas School of Business
University of California, Berkeley

{segev|gebauer}@haas.berkeley.edu, faerber@aol.com

To appear in: EM – International Journal of Electronic Markets
Published by Media Communication Management (mcm) Institute
University St. Gallen, Switzerland

This article provides an overview of Internet-based electronic markets as a mechanism to support the procurement of non-production related items (indirect procurement). We describe the general concept and provide a number of representative examples. We also put the approaches in perspective with earlier research on electronic markets and intermediaries, point out similarities with other concepts, and address some of the success factors that are critical to gain widespread adoption.[1]

Keywords: Electronic Markets, Intermediaries, Internet, Electronic Procurement

1 Introduction

Compared to many other electronic procurement solutions, electronic markets occupy a more neutral, intermediary position between buyers and sellers and provide services to both sides of a transaction[2]. An electronic market represents a virtual place where buyers and sellers meet to exchange goods and services. Either side of the market – buyers and sellers, or their representatives can host it as well as third parties. In some cases (stock market), electronic markets perform additional functions such as to help determine market prices (Schmid 1998).

Internet-based electronic marketplaces use Internet technologies and standards to distribute product data and to facilitate online-transactions. They are often initiated by either the buying or the selling side, and frequently involve vendors of electronic commerce software. They can be distinguished by a variety of factors, such as the main focus, motivation of initiators, revenue models, restriction on participation, degree of catalog content management that is included, and how may steps of a market transaction is automated by the electronic market system.

---

[1] This article is part of a comprehensive report on Internet-based purchasing systems to be published by the same authors in 1999. For more information see http://haas.berkeley.edu/cmit/procurement .

[2] This is not to say that the market structure does not favor a buyer or a seller, e.g., in the fee structure or in the amount of information revealed.

In this paper, we discuss Internet-based electronic markets as they are currently emerging to support the exchange of indirect (non production-related) goods and services. These include all items outside the immediate supply chain, which are not part of finished products, such as office products or maintenance, repair, and operations (MRO) supplies. We start out Section 2 with an overview of representative examples of Internet-based electronic markets and subsequently outline a set of common elements and distinctive features. In Section 3 we discuss the initiatives in further detail. We put them into perspective with research on electronic markets and intermediaries, point out similar concepts in the market, and address some of the critical success factors that have to be met in order to gain widespread adoption. Section 4 concludes the paper with some final remarks.

2 Market Overview

In recent years, many attempts have been made to use the Internet to set up electronic marketplaces. At their core, electronic product catalogs provide the central data repository that facilitates transactions between the participants.

The concept differs from commodity markets for large-volume trades of agricultural goods, precious metals, or financial products. Here, the number of participants is usually limited, the identity of buyers and sellers plays a certain role, and no brokers in the traditional sense are used.

The concept also differs from consumer-oriented markets and shopping malls, such as Garden.com (www.garden.com), Golfnet (www.golfnet.com), or Yahoo's Classified ads section and shopping areas (www.yahoo.com). Here, transactions and information exchange between businesses and their suppliers and business partners are targeted.

2.1 Representative Examples

After outlining several examples of Internet-supported marketplaces representing current developments, we identify a set of common elements and distinctive features in Section 2.2. Although the markets described below have all been initiated in the U.S., the underlying concepts are valid in other geographical areas as well.

- *MetalSite* (www.metalsite.com, founded as MetalExchange in August 1998) was initiated by steel-makers LTV Steel, Steel Dynamics, and Weirton Steel Corp as a neutral marketspace for the metal industry. It offers access to industry news and encourages visitors to interact with each other in discussion groups and via bulletin boards. It is also designed as an electronic outlet for the products and services of the participating suppliers and offers secure online transactions, including online negotiations and auctions. Buyers submit bids for the online-offerings. The sellers subsequently notify them about the success of their bids. Initially, hard to sell secondary and excess products such as flat-roll steel for construction materials and cans are included in the online catalog. Future scenarios encompass also prime- and made-to-order products as well as other metals such as copper, aluminum, and zinc. Sales are expected to reach $500 million by the end of 1999.

The site aims at establishing itself as an independent clearinghouse for metals industry information, product availability, and online purchases. Individual sellers are responsible for pricing, order fulfillment, and payment processing through traditional channels.

- *Digital Exchange* (www.digitalmarket.com, formerly digital.market) is an online market place for semiconductors and other electronic components set up by software vendor Digital Market. The mall brings together franchised electronics distributors with buying companies. Users can search several distributor catalogs and are also provided with features such as part identification, part list management, quote preparation and dissemination, and ordering support. Buyers have to register separately with each distributor that they would like to do business with. In 1997, the market handled $800 million worth of procurement transactions from more than 1,000 buying organizations.

  Recently, Digital Market has added support for buying organizations by introducing Digital Buyer. The tool helps automate procurement operations such as quoting and ordering, but also provides support for supplier and materials, negotiations and supply chain management. Suppliers may select between several alternatives for communicating electronically with users of Digital Buyer software. The choices range from simple e-mail messaging to direct links into supplier legacy systems.

- Like Digital Exchange, *NetBuy* (www.netbuy.com) offers services for the distribution of electronic components. Target users are buyers from OEMs (original equipment manufacturers). Founded in 1996, NetBuy attempts to establish a spot market for non-scheduled orders, i.e. unforeseen demand, requiring immediate delivery. This segment covers about 20% of the US electronic components distributors market; relationships between buyers and sellers tend to occur ad hoc. NetBuy's online catalog features more than 300,000 parts from 56 franchised distributors representing over 1,800 manufacturers. By 1999, the total available inventory exceeded $2 billion.

  NetBuy provides prospective buyers with information about prices and availability of the products that they are sourcing. It also handles parts of the purchase transaction including order management, invoicing, and payment. Throughout the entire transaction process, the identity of the distributors is hidden from the buyers. It is only at the time of the actual shipment that the distributors may identify themselves to their customers. The concept promises distributors an additional, low-cost sales-channel, which completes their traditional set of channels in a discrete way and helps broaden their customer base.

- *TPN Register* (www.tpnregister.com) is a joint venture between electronic commerce services provider GE Information Services (GEIS) and Thomas Publishing Company, publisher of the Thomas Register of American Manufacturers. Thomas Register is a catalog listing more than 60,000 products from 5,500 vendors. Engineers and designers use the catalog to source for parts they need to make their products. TPN Register is an extranet-based electronic marketplace for MRO

(Maintenance, Repair and Operation) and other indirect goods and services based on Thomas Register's classification system.

The services have been developed and tested inside General Electric before they were offered to the general public in 1996. In addition to facilitating business transactions TPN Register provides business process consulting, systems integration and community management. Buying companies can use the marketplace to transmit design and engineering specifications to several of participating suppliers, which can then make bids. The system allows its users, especially from smaller companies, to find low bidders among suppliers that might not consider them via traditional channels. Recently, a strategic alliance with Oracle has been established: the customers of Oracle's Strategic Procurement can access its resources.

In addition to the electronic market platform, TPN Register also offers its own self-service purchasing application. It helps buying organizations to provide requisitioners with controlled desktop access to approved supplier product content. Buyer-specific electronic catalogs are populated with detailed descriptions of pre-approved products at negotiated prices. Unique business rules can be applied to the customized catalog to control usage and provide detailed purchasing reports. TPN Register hosts the catalog and provides access to both buyers and sellers, so they can access information and make changes as necessary.

- With *MarketSite*, electronic commerce software provider Commerce One (www.commerce-one.com) attempts to establish an electronic market for the customers of its self-service procurement product, BuySite. The extranet gives buying companies access to a huge centrally managed multi-supplier catalog. By mid 1998, 5,000 suppliers and distributors had signed up to provide content and several hundred were included in the online catalog, mostly in the context of BuySite implementations. Each buying company creates its own individual view of the MarketSite catalog by selecting a set of suppliers and products. Purchasing people and requisitioners can then access the data set using Commerce One's BuySite purchasing software.

  MarketSite provides manufacturers and distributors with the opportunity to upload their catalog data in basically any format that is convenient for them. At a minimum, suppliers need a browser and an Internet connection; Commerce One can host the data on its server. Suppliers also have the option to link their internal systems directly with the central catalog. This allows real-time interactions between sellers and buyers to exchange orders, to check product pricing and availability, and to perform status checking.

  MarketSite is responsible for cleaning, validating, normalizing, and categorizing all content that is collected from the suppliers. As categorization scheme, the UN/SPSC schema is used.

The foregoing examples provide a brief overview of how the Internet and Internet-technologies is utilized to bring together corporate buyers and sellers by creating electronic marketspaces. Given the rapid developments in this area, they only represent a snapshot in time.

2.2 Characteristics and distinctive features

Although the approaches to Internet-based electronic markets that we introduced vary significantly in their detail, some elements are typically present. These include directories of suppliers and/or buyers, as well as electronic product catalogs based on classification schemes and providing some form of content management. Search engines of varying sophistication are frequently part of the solutions as is a certain level of security for data access and communication between the market participants.

The solutions differ with respect to aspects, such as focus, motivation of the initiators and revenue model, number and characteristics of participants, requirements to participate in the market, point of control of catalog data and market information, and the party responsible for catalog content integration, management and maintenance. The solutions can also be distinguished according to which phases of buying and selling processes they support, including sourcing, bids and quotes, ordering, and payment. In some cases, additional services for buying companies are included, such as support for internal purchasing policies, integration with backend systems, reporting functionality, decision or negotiation support. Table 1 provides a summarizing overview of the systems outlined in Section 2.1.

Table 1 - Representative examples of Internet-based electronic markets

	MetalSite	**DigitalExchange**	**NetBuy**	**TPN Register**	**MarketSite**
Main Focus	Portal for steel industry, marketspace currently focused on secondary and excess products	Online market for semiconductors and electronic components	Online market for electronic components, targeting the "spot market" (small orders, short-term notice)	Online market for MRO and other indirect goods	Online market for indirect goods and services
Initiative	Initiated by three steelmakers (LTV Steel, Steel Dynamics, Weirton Steel) as new outlet for products	Initiated by Digital Market, a software startup aiming at Internet commerce in the electronics industry	Initiated by NetBuy, a software startup with procurement background	Initiated by TPN Register, a joint venture of GEIS (IT-services provider) and Thomas Register (supplier catalog)	Initiated by Commerce One, a provider of electronic procurement systems
Revenue Model	Sellers: annual fee and volume-based transaction fees No fee for buyers Additional revenues: advertisements	Sellers: fee structure not disclosed No fee for buyers Additional services (e.g., hosting and system management)	Sellers: percentage of transaction No fee for buyers	Sellers: data load charge plus annual fee based on number of line items. Buyers: annual subscription fee Additional services (proc-	Sellers: charged according to the quality of data they are providing and per transaction No fee for buyers

	MetalSite	DigitalExchange	NetBuy	TPN Register	MarketSite
				ess consulting, systems integration, community management)	
Participants & requirements to participate	Sellers: three steelmakers Users: registered Internet-users, buyers must qualify as "merchants" with each supplier individually Additional services by providers of electronic market-software and industry information; neutral 3rd party to ensure unbiased transactions	Sellers: six distributors of electronic components Users: registered Internet-users (1997: 1,000), buyers must qualify with each seller individually	Sellers: 56 franchised distributors for electronic components, partly anonymous Users: registered Internet-users, buyers to be approved by NetBuy	About 100 customers (buyers and suppliers) Buyers subscribe to service, TPN Register tries to recruit strategic suppliers GEIS as partner in transaction delivery (e.g. EDI), receives a document fee for every transaction	Sellers: by mid 1998, 5,000 suppliers of indirect goods and services indicated plans to participate in market, several hundred signed up by early 1999 Buyers: Customers of Commerce One's BuySite procurement solution, Commerce One tries to recruit strategic suppliers
Point of control of catalog data and responsibility for content management	Individual suppliers	Individual sellers, Digital Exchange provides limited integration of catalog data	Catalog maintained by NetBuy	TPN Register controls and manages catalog content. Customized data provided to buyers	Commerce One controls and manages catalog content. Customized data loaded into individual procurement systems

	MetalSite	DigitalExchange	NetBuy	TPN Register	MarketSite
Role of market	Facilitator, no responsibility for fulfillment of market transactions	Facilitator, no responsibility for fulfillment of market transactions	Facilitator, matches supply and demand, handles parts of the purchase	Facilitator of individualized trading communities	Facilitator of individualized trading communities, complement to proprietary electronic procurement solution
Parts of transactions that are covered	Market and product information , online negotiations (bidding, auctions), ordering	Limited product information, quote preparation, ordering Buy-side support	Product information, support to submit quotes, online ordering, payment	Customized product information, negotiation support, electronic communication between sellers and buyers Buy-side support	Customized product information, supplier ramp-up Buy-side support

Some initiatives focus on providing an electronic platform for buyers and sellers to meet and exchange information (Digital Exchange). Similar to the situation at a farmers market, buyers have to visit each seller in order to obtain information of the full supply. In other cases the provider of the market helps integrate the individual catalogs and present the entire range of products in one comprehensive multi-vendor catalog – easing the task for the buyer to go out and compare products and services (NetBuy, MarketSite).

Like traditional marketplaces, the electronic markets that we introduced are implementing different policies when it comes to admitting new participants. Usually they are not completely open; in most cases some screening of the prospective participants is performed before access is granted. The admission processes for buyers differ, ranging from simple sign up routines on a web site to more thorough procedures including credit checks (MetalSite). The relationship with a supplier is usually more long-term oriented in the sense that the supplier catalog becomes a permanent part of the market.

The revenue model is another way of distinguishing different approaches. While market access is usually offered free of charge to the buying community, sellers that want to have their products included in the central database are regularly charged. The fees can be substantial and can reach several hundred thousand dollars for signing up, software licensing, and per transaction.

> Commerce One charges the supplier customers of its MarketSite service depending on the quality of the data that they provide to the catalog and depending on the amount of additional services that the supplier uses, e.g., catalog hosting. In addition, a transaction-based fee is charged to the supplier, initially $2.00 per transaction. After realizing, however, that acceptance for this

concept was low the fee has been decreased steadily and might be dropped altogether in the future (other similar service offering, e.g., by Harbinger, are also undergoing restructuring of the prices).

Similarly, MetalSite also provides free access to buyers, while sellers are charged for each online sale (2% of the transaction value). In addition, sellers have to pay a service fee for consulting and site development, which can come up to as much as $150,000. Buyers have to qualify with each seller from whom they wish to buy – a measure to assure quality and establish trust among market participants.

In many cases, additional services are offered to the buying community, generating revenues for the host of the market. Examples are support for purchasing decisions, supply management, reporting, or integration with internal systems.

Lastly, different approaches support different parts of a purchasing process. While some are focusing on support for sourcing activities, others also include order management, provide decision support for supplier and product selection, support payment, and allow integration of the market tool with backend systems. For an extensive analysis of negotiations in such markets, see (Beam et al. 1999).

Compared to more traditional businesses, most providers of the systems discussed above have not yet finalized their business models. Attempts to establish themselves and to achieve significant growth in terms of number of users as well as scope, lead to frequent changes of business strategies. In particular the services that complement the basic product catalogs and supplier directories are frequently adapted, revealing the immaturity of the area.

3 Internet-based electronic markets: a form of electronic intermediaries

The role of third party intermediaries, linking different parts of a value chain, has been covered extensively by researchers in economics and business. The question has been raised whether the future will hold a place for intermediaries, given that new technologies facilitate direct links between market players, such as manufacturers and end-consumers of products, or businesses and their suppliers. Research in this area has been based on a number of theory concepts, such as transaction cost theory (Malone, Yates, Benjamin 1987; Hanker 1990; Gurbaxani, Whang 1991; Gebauer 1995), principal agents theory (Gurbaxani, Whang 1991; Bakos, Brynjolfsson 1993; Brynjolfsson 1994; Gebauer 1995), or resource based approaches (Peteraf 1993; Mata, Fuerst, Barney 1995). The emergence of affordable network technologies and public networks such as the Internet has refueled the discussion recently (Clemons, Reddi, Row 1993; Sarkar, Butler, Steinfield 1996; Buxmann, Gebauer 1998; Beam et al. 1999; Bichler, Segev 1999).

The research efforts have generally yielded multi-facetted results and did not reveal clear trends. Many researchers agree that, although the role of intermediaries is changing with the advent of information and network technologies they will remain at least as important in the future as they were in the past. Reality surely provides evi-

dence for both scenarios, with and without intermediaries (Ware et al. 1998): Computer manufacturer Dell (www.dell.com) as well as network technology provider Cisco (www.cisco.com), are both using Internet-technologies very successfully to establish and maintain direct links with their customers and business partners. On the other hand, T-shirt manufacturer Fruit of the Loom (www.fruit.com) is using the Internet even to strengthen the position of intermediaries in its value chain. In a similar fashion, pharmaceutical wholesaler McKesson (www.mckesson.com) deploys emerging technologies to intensify the links with its various business partners and customers, attempting to solidify its role in the industry.

Internet-based marketplaces as they have been introduced in Section 2 assume an intermediary role between the participants of different industries. This raises issues similar to the ones that have been addressed in earlier discussions of electronic markets, such as the importance of reaching critical mass on both sides of the market and the resulting needs to address the objectives of sellers and buyers simultaneously.

3.1 Perfect markets vs. trading communities

Markets have long been the subject of economic research, (Fourie 1991; Samli, Bahn 1992). In their “purest” sense, markets are characterized by an infinite number of anonymous participants, perfect information transparency, and instant competition based on price alone. Although such a scenario promises maximum economic welfare via optimal allocation of resources, it is as the same time highly unrealistic as it results in a situation where corporate profit margins are approaching zero.

In this sense, it is not surprising that the Internet has not been used extensively to establish perfect marketplaces, linking large numbers of anonymous buyers with large numbers of equally anonymous sellers. In the consumer-to-consumer area, online trading house eBay (www.ebay.com) represents a notable exception providing a platform for online auctions among thousands of participants.

Most inter-business systems, however, resemble online trading communities rather than true marketplaces and include only a limited set of buyers and/or sellers. In this sense they support the “move to the middle”-hypothesis of Clemens et al. (Clemons, Reddi, Row 1993). In addition to aggregating and disseminating data about supply and demand, such communities provide value to their members by increasing the transparency of market information, leveraging buying and selling power through the aggregation of demand and supply, and improving trust between the participants (Bailey, Bakos 1997). Transaction support through supplementary information and services provides additional value and also helps to reach a critical mass of participants (see below Section 3.3).

Particularly in the context of the Internet, electronic market initiatives often focus on the aspect of added value. They aim, for example, at establishing one-stop shopping sites (“vertical industry-portals”) including up-to-date information about a specific industry. Like Metal Site, which is targeting the steel industry, the chemical industry features Chemdex (www.chemdex.com), PartNet (www.partnet.com) and PlasticsNet (www.plasticsnet.com) are covering the manufacturing and plastics industries. While

buyers benefit from the single point of entry to an entire industry community, sellers hope to expand sales by reaching a larger number of potential customers than is possible through individual efforts.

3.2 Business models

There are significant overlaps between the examples that we introduced in Section 2 and other approaches that are utilizing the Internet to support business-to-business transactions.

Companies such as FreeMarket (www.freemarket.com) and auction houses such as Onsale (www.onsale.com) have established similar marketspaces. Compared to the static pricing models of those, however, these incorporate dynamic pricing schemes.

Catalog providers such as Harbinger (www.harbinger.com) and Requisite Technologies (www.requisite.com) have extensive databases containing data from a large number of suppliers, which they make available individually to their customers.

Similar to the electronic marketplaces that we introduced, large suppliers and distributors such as Marshall Industries (www.marshall.com), Avnet (www.avnet.com), or McKesson (www.mckesson.com) have established themselves as intermediaries in specific industries for a long time. They also maintain comprehensive electronic catalogs that integrate product information from a large number of suppliers and provide additional value such as ordering functionality and supply chain services.

The set up of electronic market sites is not cheap and can easily reach several million dollars for a well thought out system. Weirton Steel spearheaded the MetalSite project, spending more than $3 million and two years on development and committing another $2 million to launch the site (Cone 1998).

Revenue models of electronic markets differ (see Table 1). Often, access charges depend on a combination of transaction-based fees and subscriptions with additional services being charged for separately (MetalSite, MarketSite). Revenue models regularly mirror the distribution of power between market participants. Today, many market places have to be considered buyer markets where competition among suppliers is fiercer than among buyers. The result is a situation where the buyer side in its entirety has more market power than the supply side.

3.3 Critical success factors

All the initiatives that we discussed have a very short history and still have to prove viable over time. This viability depends most strongly on the ability to attract a sufficiently large number of participants on either side of the market. As is the case for intermediaries in general, Internet-based market initiatives face a very delicate task, as they need to balance the interests and objectives of all market players simultaneously (Bakos 1991).

To the extent that they disseminate market information to the community, electronic markets help increase competition. In buyer-dominated markets, suppliers are often particularly skeptical to participate in electronic market initiatives. They anticipate an additional loss in market power as comparison buys are facilitated and market trans-

parency is increased. Sellers wanting to distinguish themselves on factors other than price, often feel they have little possibilities to do so. Technologies are still immature and many sites are currently set up in a way that companies competing on factors such as service quality or the ability to offer comprehensive solutions find themselves in a disadvantage and hesitate to join in the electronic market. To account for these issues, MetalSite for example is not fully integrating the data of the suppliers participating in the market. This means it does not provide complete transparency of supplier information.

Buying companies, however, have specific requirements, too. In the case of Digital Exchange, for example, smaller OEMs have been positive about its service, mainly because it provides them with visibility among distributors that would otherwise not consider them as priority customers. Larger purchasers, however, did not consider the service sufficient (Trommer 1998; Wilder 1998). They were asking for a system that allows them to reach all of their suppliers, not just the set of six distributors provided the electronic catalog. In addition, integration with ERP systems was demanded, as were purchasing decision support-features, and full control over the application instead of having to rely on remote access. It was in reaction to these requirements that Digital Market introduced its procurement tool, Digital Buyer.

From a technical standpoint, electronic market places have to be designed in a way that supports a large number of users in a high transaction-volume web-based environment. Integrated security features are important as soon as online transactions are supported, and so are means to control access over corporate intranets, extranets, and the Internet. The use of open component-based designs can provide the flexibility to meet diverse individual customer requirements.

As has been mentioned above, directories of suppliers, buyers and/or multi-vendor product catalogs represent an essential part of the electronic market initiatives that we introduced (Ginsburg, Gebauer, Segev 1999). Although many attempts have been made to establish commonly accepted standards to categorize and list businesses (Dun & Bradstreet), products and services (UN/SPSC), as well as to standardize inter-business communication schemes (OBI, RosettaNet), efficient solutions have not yet been developed (CommerceNet 1998; OBI Consortium 1998; Fraone 1998). As a result, the integration and management of catalog content which currently involve much manual work, have become one of the key success factors for the providers of such systems and services. Emerging software standards, such as XML raise hopes to overcome this issue by providing a commonly accepted communication infrastructure.

4 Summary and concluding remarks

In this paper, we provided an overview of Internet-based systems to support inter-business procurement of indirect goods and services as they are currently emerging. We pointed out common elements as well as distinctive features and compared a number of representative market examples.

Our overview shows markets with a limited number of sellers as well as buyers. To date, none of the approaches that we introduced seems to be profitable. All of them

need a significant increase in the number of participants and market activity in order to break even.

Earlier research on electronic markets and intermediaries can help explain why current approaches actually resemble electronic trading communities rather than perfect markets in the economic sense and provide some hints on how to reach critical mass.

Transaction cost-based research by Bakos and Brynjolfsson (Bakos, Brynjolfsson 1993), for example, points to a possible relationship between the number of market participants and the efforts that are necessary to enter the market. In a setting, where a supplier needs to make significant investments to participate in an electronic market, it might only want to do so if the number of competing suppliers is low enough to ensure sufficient market share and transaction volume in return. The situation might change with the development of more sophisticated systems that allow participants to distinguish themselves from their competitors with information other than price data.

To date, many businesses are decreasing the numbers of relationships with business partners, while at the same time intensifying them, with the intent to build up trust, save switching costs, and leverage purchasing power (see Segev, Gebauer, Beam 1998 and also Keough 1993). Third party intermediaries can assume some of these tasks, e.g., establishing trust by pre-qualifying market participants. The overall cost for maintaining a large number of relationships, however, currently seems to be too high for most companies.

More research is necessary to determine how electronic markets need to be designed in order to reach critical mass in an optimal way. This means taking into account the divergent objectives of different market players, addressing the requirements of different forms of procurement and sales processes, as well as assessing the requirements and feasibility of different concepts from a technical standpoint.

5 References

Bailey, Joseph P.; J. Yannis Bakos (1997). “An Exploratory Study of the Emerging Role of Electronic Intermediaries.” International Journal of Electronic Commerce **1**(3): 7-20.

Bakos, J. Yannis (1991). “A Strategic Analysis of Electronic Marketplaces.” MIS Quarterly **15**(3): 295-310.

Bakos, J. Yannis; Erik Brynjolfsson (1993). “Information technology, incentives, and the optimal number of suppliers.” Journal of Management Information Systems: JMIS **10**(2): 37-53.

Beam, Carrie; Martin Bichler; Ramayya Krishnan; Arie Segev (1999). “On Negotiations and Deal Making in Electronic Markets.” Information Systems Frontiers(forthcoming).

Bichler, Martin; Arie Segev (1999). “A Brokerage Framework for Electronic Commerce.” Journal of Distributed and Parallel Databases, Special Issue on E-Commerce (forthcoming).

Brynjolfsson, Erik (1994). “Information assets, technology, and organization.” Management Science **40**(12): 1645-1662.

Buxmann, Peter; Judith Gebauer (1998). Internet-based intermediaries - the case of the real estate market. 6th European Conference on Information Sytstems (ECIS'98), Aix-en-Provence, France.
Clemons, Eric K.; Sashidhar P. Reddi; Michael C Row (1993). "The Impact of Information Technology on the Organization of Economic Activity: The "Move to the Middle" Hypothesis." Journal of Management Information Systems **10**(2): 9-35.
CommerceNet (1998). Catalog Interoperability Study. Palo Alto, CA, CommerceNet.
Cone, Edward (1998). "Less complexity, more cost-efficiency." Informationweek(700): 209-214.
Fourie, F.C.v.N. (1991). The Nature of the Market: a Structural Analysis. Rethinking Economics - Markets, Technology and Economic Evolution. G.M. Hodgson; E. Screpanti. Aldershot, Hants, England, E. Elgar**:** 40-57.
Fraone, Gina (1998). "Finding a common language." Electronic Business **24**(8): 22.
Gebauer, Judith (1995). Electronic Markets from an Economic Perspective. 2nd International Workshop on Electronic Markets, Ermatingen/Switzerland, Univ. St. Gallen/Switzerland.
Ginsburg, Mark; Judith Gebauer; Arie Segev (1999). Multi-Vendor Electronic Catalogs to Support Procurement: Current Practice and Future Directions. Twelfth Int'l Bled Electronic Commerce Conference, Bled, Slovenia (submission).
Gurbaxani, Vijay; Seungjin Whang (1991). "The Impact of Information Systems on Organizations and Markets." Communications of the ACM **34**(1): 59-73.
Hanker, Jens (1990). The strategic role of infomation systems for organizations - industry economics as foundation for strategic management (in German). Stuttgart/Germany.
Malone, Thomas W.; Joanne Yates; Robert I. Benjamin (1987). "Electronic Markets and Electronic Hierarchies." Communications of the ACM **30**(6): 484-497.
Mata, Francisco J.; William L. Fuerst; Jay B. Barney (1995). "Information technology and sustained competitive advantage: A resource-based analysis." MIS Quarterly **19**(4): 487-505.
OBI Consortium (1998). Open Buying on the Internet (OBI), Technical Specification, OBI Consortium.
Peteraf, Margaret A. (1993). "The cornerstones of competitive advantage: A resource-based view." Strategic Management Journal **14**(3): 179-191.
Samli, A. Coskun; Kenneth D. Bahn (1992). "The Market Phenomenon: An Alternative Theory and Some Metatheoretical Research Considerations." Journal of the Academy of Marketing Science **20**(2): 143-153.
Sarkar, Mitra Barun; Brian Butler; Charles Steinfield (1996). "Intermediaries and Cybermediaries: A Continuing Role for Mediating Players in the Electronic Marketplace." Journal for Computer Mediated Communication **1**(3).
Schmid, Beat F. (1998). Electronic Markets - Characteristics, Organization, Potentials (in German). Handbook Electronic Commerce. Arnold Hermanns; Michael Sauter. München, Franz Vahlen Verlag.
Trommer, Diane (1998). "Software eases buying on the Net - Application lets purchasers create trading communities." Informationweek(June 8).
Ware, James P.; Judith Gebauer; Amir Hartman; Malu Roldan (1998). The search for digital excellence. New York, McGraw-Hall.

Wilder, Clinton (1998). “Digital market debuts app for buying from Intranet - Digital Buyer will give big customers supply-chain control.” Informationweek(June 8).