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BUSINESS-TO-BUSINESS ELECTRONIC MARKETPLACES AND THE STRUCTURE OF CHANNEL RELATIONSHIPS

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Abstract

Business-to-business (B2B) marketplaces have significant potential impacts on the structure of channel relationships and IT management arrangements. IS theory traditionally investigated electronic marketplaces from a transaction cost theory point of view. We identify three major limitations of transaction cost theory as it applies to B2B electronic marketplaces. A number of other literatures with a bearing on electronic marketplaces have critiqued and extended transaction cost models. Among them are strategic networks theory, marketing channel theory, and political economy. This paper reviews and attempts to synthesize these perspectives on electronic marketplaces and exchanges. We propose an integrative model combining transaction cost theory, strategic networks theory, relational exchange theory, and the theory of political economy. The synthesis promotes better operationalizations of EMP channel structure, identifies the antecedents and consequences of EMP channel structures, and suggests an agenda for future research.

1 INTRODUCTION

Business-to-business (B2B) electronic marketplaces (EMPs) are an interesting and important phenomenon because of their potential to affect company and supply chain performance and to alter industry structure. They are also especially interesting for the IS field because of their potential to alter information technology (IT) management arrangements. Today, organizations are highly autonomous in their choices of information technologies and pair-wise “trading partner agreements.” Widespread adoption of EMPs as intermediaries in interorganizational relationships could lead to much greater levels of standardization and/or IT outsourcing.

In the information systems (IS) literature, the leading perspective on EMPs is transaction cost theory. The strengths of transaction cost theory for the analysis of EMPs are many: it yields interesting predictions about EMP impacts, it highlights the importance of economic factors in interfirm relationships, and it focuses particular attention on the role of assets that have been specialized to particular interorganizational relationships—an issue central to the challenges of systems integration and maintenance.

But transaction cost theory also neglects several other important factors that are highly relevant to an understanding of EMP impacts on industry structure and IT management arrangements. These important factors include integration benefits (that is, collaboration and coordination *other than* selling and buying), preexisting and extended supply chain relationships among the participating organizations, and noneconomic factors such as power. This paper reviews and synthesizes three literatures that have extended transaction cost theory to include those three concepts. The literatures are strategic networks theory, marketing channel theory, and the theory of political economy.

In some respects, our analysis of transaction cost theory as it relates to EMPs parallels Barringer and Harrison’s (2000) review of the literature on interorganizational relationships. Barringer and Harrison reviewed six theoretical perspectives (transaction

cost theory, resource dependency, strategic choice, stakeholder theory, organizational learning, and institutional theory). They observed that each theory contributes to an understanding of interorganizational relationships and argued that the theories should be blended. However, Barringer and Harrison did not actually provide a specific synthesis of the theories, whereas we attempt to do so by adapting a model proposed by Robicheaux and Coleman (1982). We conclude with an agenda for future research.

2 THEORETICAL BACKGROUND

EMPs are intermediaries that employ IT capabilities and business rules to facilitate interorganizational relationships in an industry sector (e.g., electronics, chemicals). Today, it is generally accepted that the label EMP covers three types of arrangements (Brooks and Dik 2001): (1) private trading exchanges, by which individual companies manage electronic relationships with their suppliers and/or customers (e.g., Cisco's eHub), (2) industry consortia, in which some or all companies in an industry group support a common technology platform for trading and/or collaboration (e.g., Elemica in the chemical industry), and (3) independent electronic marketplaces, that is, private entrepreneurial ventures (dot-coms) that intermediate trading and/or collaboration for an industry or industries (e.g., Global Sources, a multi-vertical marketplace). Our focus in this paper is the latter two "many-to-many" electronic marketplace types.

2.1 Transaction Cost Theory and EMPs

Within the IS literature the dominant perspective on electronic marketplaces is traditional microeconomics (Kauffman and Walden 2001). Perhaps the best-known IS analysis of EMPs is Malone, Yates, and Benjamin's (1987) application of transaction cost theory (TCT).

Transaction costs are believed to be a function of three underlying dimensions (Williamson 1985): (1) asset specificity, the degree to which transactions (the sales/purchases of goods/services) are supported by "transaction specific" investments, (2) transaction frequency, and (3) the uncertainty surrounding the transaction. High asset specificity, low transaction frequency, and high uncertainty equate to high transaction costs and are associated with vertically integrated (also called hierarchical) transaction governance; conversely, low asset specificity, high frequency, and low uncertainty result in lower transaction costs and are associated with arms-length market relationships.

Malone et al. argued that IT has three potential effects on the costs of transacting with external parties: the *communication* effect (efficient information flow), the *brokerage* effect (improved matching of buyers' needs with sellers' offerings), and the *integration* effect (tightened process coupling). Arguing that IT would reduce the costs of transacting with external parties relative to internal coordination costs, Malone et al. predicted a shift from hierarchical arrangements to market-type relationships among firms—in a phrase, a shift from *make* to *buy*. The importance of such a shift can hardly be understated, since the greater price transparency associated with electronic markets is hypothesized to drive down the prices of products traded on EMPs (Bakos 1997)—an impact expected to be greater in the case of commodity goods and services.

2.2 Limitations of TCT for B2B Exchanges

As useful as TCT is for the analysis of EMPs, it has three notable limitations, only the first of which has received much attention in the IS literature. First, TCT overemphasizes *communication* and *brokerage* effects (Malone et al. 1987) to the expense of *integration effects*; the result is to ignore potential shifts from hierarchical to *network* relationships (subsets of markets) instead of to *markets*. Second, TCT neglects the influence of preexisting and extended supply-chain relationships among transacting firms, which might also favor network over market relationships. Third, TCT neglects power relationships among firms, which can influence the structure of interfirm transactions. We elaborate on these limitations below.

2.3 Overemphasis on Communication and Brokerage Effects

A number of IS researchers (Clemons et al. 1993; Holland and Lockett 1997; Sarkar et al. 1995) have pointed out that the predicted shift from hierarchies to markets is inconsistent with the observation that many firms have downsized and now "make" less and outsource more, but do so not with many suppliers in arms-length market-type relationships, but rather with few suppliers

in tightly-knit network relationships. Network relations among firms have been defined as “subsets of markets” (Thorelli 1986) and are viewed either as a hybrid, intermediate form between hierarchies and markets (Clemons et al. 1993) or as a distinct third type (Van Alstyne 1997).

A hallmark of network relationships is relational contracting and negotiations, in contrast to the legal contracts of market relationships (Van Alstyne 1997). Thus, in network relationships, the emphasis is on collaboration or *integration* as opposed to *brokerage* (using the terms of Malone et al. 1987). Consistent with this view, many EMPs (especially consortia) provide technological capabilities that support *integration* or *collaboration* (Christopher and Jutter 2000; Lee and Whang 2001) instead of (or in addition to) capabilities for communication and brokerage. Integration-oriented EMPs facilitate post-sale operations and collaboration, e.g., around new product development, and may not enable buying and selling at all (Christiaanse 2002). An example is Elemica in the chemicals industry, which provides a platform for connections between the ERP systems of participating companies (Christiaanse and Damsgaard 2001). EMP integration capabilities have been neglected in most economic analyses of EMPs (Christiaanse and Damsgaard 2001; Soh and Markus 2002).

EMPs' collaboration services require high levels of external systems integration (Markus 2000). Investments in system integration can be viewed as *asset specific* investments (Christiaanse and Venkatraman 2002). Because asset specific investments are associated in TCT with hierarchical, not market, relationships, TCT does not adequately address the important integration functions of many EMPs.

Not only do many EMPs have integration and collaboration functions, it is also the case that some industries cannot support EMPs with communication and brokerage business models. The *market* model assumes a critical mass of buyers and sellers and frequent transactions. These conditions do not apply to, for example, the market for aircraft. Only very large markets (in terms of numbers of buyers and suppliers) will support catalog and auction EMPs that charge 0.5 to 2 percent transaction fees (Andrew et al. 2000). Consequently, some analysts argue that collaboration services will comprise as much as 50 percent of what EMPs do by 2005 (Andrew et al. 2000, p. 2).

Finally, the integration capabilities of EMPs might be attributable in part to another concept neglected by TCT: the power relationships among firms. For example, it has already been noted that EMPs are linked theoretically to lower prices for traded products (Bakos 1997). Lower prices, in turn, can be expected to generate supplier backlash, leading to EMP failure from refusal of suppliers to participate (Bakos 1991a, 1991b, 1997). Consistent with such a view, suppliers have resisted participating in independent EMPs with a focus on lower prices (Christiaanse and Damsgaard 2001; Christiaanse and Huigen 1997), and EMP failures have resulted. Therefore, one would expect many EMPs *not* to emphasize price information, especially where seller power is high (Bakos 1997); while EMPs might emphasize product information instead of price information (Bakos 1997), they might equally eschew brokerage activities altogether and focus instead on integration.

2.4 Failure to Emphasize Supply Chain Relationships

A second limitation of TCT with respect to EMPs is that it takes dyadic sales transactions as the basic unit of analysis. There are two problems with this view. First, many sales transactions take place in the context of preexisting relationships between buyers and sellers. The nature of this relationship affects the choice of a transaction governance mechanism. Particularly in markets characterized by consolidation on the supply side, the demand side, or both, buyers and sellers may engage in long-term contractual relationships with each other. Fears of alienating suppliers may lead buyers to engage in partnership arrangements with suppliers (Buzzell and Ortmeier 1995), even when market-like arrangements might be more advantageous (Kapoor and Gupta 1997). Although preexisting relationships between buyer and suppliers are clearly important in many cases, TCT does not address their potential effects.

Second, dyadic B2B sales transactions exist in the context of extended supply chains with at least three parties, for example, buyer, supplier, and customer, or a company with two or more supplier tiers. Organizations can run into serious problems by focusing exclusively on pair-wise relationships, as Cisco learned when it racked up huge inventory losses through lack of visibility into the ordering behavior of its first tier suppliers (Kaihla 2002). To avoid such problems in the future, Cisco is currently building an “eHub” to automate the flow of information between Cisco, its contract manufacturers, and its component suppliers (Kaihla 2002). We consider Cisco's eHub a private trading exchange, rather than an EMP; however, true EMPs like Elemica are developing similar multiparty collaborative planning, forecasting, and replenishment capabilities to address the extended supply chain.

A characteristic of extended supply chains is that optimizing the performance of the chain overall may result in what one partner perceives as a suboptimal relationship with an adjacent party. For example, companies might be willing to make tradeoffs in their dealings with first tier suppliers if the higher performance of the chain as a whole resulted in greater customer loyalty or profitability. TCT does not address these important extended supply chain effects.

2.5 Failure to Address Power Issues

A third limitation of TCT applied to EMPs is that it does not address power. A primary exponent of TCT, Williamson (1985) noted that TCT's focus on dyadic relationships might increase the likelihood that "interdependencies among a series of related trading relationships would be missed." One such interdependency is power.

Power relationships are commonly considered in treatments of interorganizational systems like EDI (Damsgaard and Lyytinen 1998, 2001; Damsgaard and Truex 2000; Swatman and Swatman 1992; Webster 1995). For example, it has often been observed that powerful suppliers like Sears or WalMart can mandate the use of EDI (or VMI, vendor managed inventory) by suppliers. Similarly, power relative to suppliers is a frequently mentioned consideration in companies' purchasing strategies (Kraljic 1983).

An especially interesting aspect of power in supply chain relationships is its asymmetry. Companies usually have more power over their suppliers than over their customers, according to resource dependence theory (Conner and Prahalad 1996). However, situations exist in which a supplier of scarce and critical inputs has greater power over its customers (Kraljic 1983). Power relationships are likely to be reflected in an organization's choice of (or preference for) electronic interconnection arrangement: Companies may, for instance, prefer private trading exchanges when dealing with customers, because these arrangements give them greater control (Davenport et al. 2001). However, the asymmetry in power relations may also mean that companies' preferences are frustrated: The customers of the company that wants to use a private exchange may prefer to transact via an EMP. Thus some firms might be forced into an unwanted electronic relationship, regardless of preferences or transaction costs—a situation we have observed while conducting research in various organizations.

3 ALTERNATIVE PARADIGMS

In the preceding section, we showed that TCT—the dominant theory applied to EMPs in the IS literature—does not adequately address three important EMP issues: (1) network relationships and integration effects, (2) preexisting and extended supply chain relationships, and (3) power dependence relationships. In this section, we review three theories that do address these issues: strategic networks theory, marketing channel theory, and the theory of political economy.

3.1 Strategic Networks Theory

One alternative to classic TCT for the study of EMPs is strategic networks theory. Strategic networks theory originates from Ouchi's (1980) splitting of the hierarchical governance mechanism into two types, bureaucracies and clans, depending on goal congruence. Originally referring to intra-firm relations, the concept of clan was applied to interfirm relations and labeled *network*. Networks are "two or more firms which, due to the intensity of their interaction, constitute a subset of one or several markets" (Thorelli 1986) and possibly "the most efficient form of organization for today's economic circumstances" (Miles and Snow 1984, p. 27). *Strategic* networks are "long term purposeful arrangements among... organizations that allow those firms in them to gain or sustain competitive advantage vis-à-vis their competitors outside the network" (Jarillo 1988). Strategic networks are differentiated from vertical integration by the relative independence of participating firms.

Strategic networks theory expands TCT to explain the emergence of long-term relationships among firms in terms of the reduced transaction costs enabled by network collaborations. For example, firms can be decomposed into their separate value chain activities, and TCT can be applied on a function-by-function basis (Jarillo 1988). When goal compatibility is high, firms cooperating in a network relationship can perform activities at lower *total* costs than are possible with vertical integration. From this point of view, EMPs can be understood as participants in collaborative supply networks, also called dynamic supply webs (Christiaanse and Kumar 2000).

Strategic networks theory redresses TCT's excessive focus on communication and brokerage effects at the expense of integration effects. It augments prior attempts to explain EMPs in terms of "a move to the middle" (Clemons et al. 1993) or a move to network relationships (Holland and Lockett 1997; Sarkar et al. 1995).

3.2 Relational Exchange Theory

A second alternative to the TCT perspective on EMPs is afforded by the marketing channels literature. *Marketing channel* refers to the chain of interorganizational relationships involved in getting goods to market: A simple marketing channel consists of a manufacturer, a wholesaler, and a distributor (Stern and El-Ansary 1996).

Marketing channels literature has been critical of simple applications of TCT. For example, Heide and John (1988) criticized TCT for focusing *solely* on vertical integration in situations requiring asset specific investments. Bradach and Eccles (1989) criticized TCT for “viewing markets and hierarchies as mutually exclusive control mechanisms which do not take into account [interdependencies among them]” (pp. 463-464). Similarly, Boyle et al. (1992) argued that TCT alone is insufficient to explain channel structure differences; the broad array of control mechanisms found in practice must be factored in. Anderson and Weitz (1987) found that factors unrelated to transaction costs had a significant effect on channel structure.

Marketing channel theorists adapted TCT as relational exchange theory. Together with the theory of political economy (described below), relational exchange theory provides a more complete view of dyadic relationship structures. *Relationship structure*, a continuum of relationships ranging from discrete (market-like) to relational (or network-like) (Mohr and Nevin 1990) has two dimensions (Stern and Reve 1980): (1) *decision making structure* and (2) *operational integration*. Among the facets of decision-making structure discussed in marketing channels literature are several of particular interest to IS researchers: formalization (Dwyer and Oh 1988; Dwyer and Welsh 1985), information exchange (Noordewier et al. 1990), and centralization (Dwyer and Welsh 1985; John 1984; Reve and Stern 1986). Similarly, operational integration must include uniquely IS issues, like external systems integration (Markus 2000). Prior literature on EMPs has discussed concepts similar to relationship structure such as Kaplan and Sawhney’s (1999) discussion of spot sourcing vs. systematic sourcing.

Other relational exchange theory extensions to TCT include Mallen’s (1973) explanation of channel structure evolution in terms of total distribution costs, which enhance or diminish opportunities for specialized functional intermediaries. This observation certainly applies to the role of electronic markets in B2B channel relationships. In sum, relational exchange theory helps overcome TCT’s inability to accommodate preexisting and long-term relationships, specialized codes of conduct, or customised norms.

3.3 The Theory of Political Economy

A third literature that informs the study of EMPs is the theory of the political economy of marketing channel relationships (Stern and Reve 1980). According to the theory of political economy, a social system comprises interacting sets of internal and external economic and socio-political forces that affect collective behavior and performance (Stern and Reve 1980). The main concepts of the theory are, according to Stern and Reve:

- *internal economy*: economic forces within the channel, such as transaction form, or vertical economic arrangements and decision mechanisms used to decide the terms of the transaction—these are the factors considered by conventional TCT
- *internal polity*: socio-political forces within the channel, such as power/dependence balance, cooperation, and conflict
- *external economy*: the prevailing and prospective economic environment in which the channel exists
- *external polity*: the external socio-political system in which the channel operates.

A substantial stream of marketing channel research has relied either implicitly or explicitly on political economy views (Dwyer and Oh 1988; Dwyer et al. 1987; Reve and Stern 1979; Stern and Reve 1980). New frameworks have resulted, including ones that integrate ideas from TCT, relational exchange theory, and political economy (Anderson and Weitz 1989; Anderson and Narus 1990; Heide and John 1990; Robicheaux and Coleman 1994).

The key contributions of the theory of political economy for the analysis of EMPs are twofold. First, the theory of political economy distinguishes between economic factors and noneconomic factors that affect the structure of interfirm relationships. Chief among the noneconomic factors addressed by the theory of political economy is power—a concept that we previously noted as absent in TCT and a limitation of that theory for the study of EMPs. Second, the theory of political economy considers factors both internal and *external* to the interfirm relationship, allowing for consideration of such factors as industry-wide data standardization agreements (Markus et al. 2002).

4 TOWARD THEORETICAL CONVERGENCE

The foregoing analysis suggests the need to augment TCT for IS research on EMPs and their impact on channel relationship and IT management structures. We adapted for EMPs a model that incorporates TCT, strategic networks theory, relational exchange theory, and the theory of political economy (Robicheaux and Coleman 1994). Figure 1 depicts three key dimensions of EMP channel structures: relational integration, decision-making structure, and ownership structure. Recall that decision-making structure and operational integration were the two dimensions of marketing channel structure identified by Reve and Stern (1986). Decision-making structure has been operationalized in prior literature by the variables of formalization, information exchange, and centralization. Operational integration was operationalized (Robicheaux and Coleman 1994) by three variables: joint actions, assistance, and monitoring and information exchange. We prefer the term *relational* integration to operational integration, because the former term has stronger relational exchange theory connotations. Consistent with marketing channels literature, we believe that relational integration is a continuum, with discrete or market-like interactions on one end and integrated or network-like relationships on the other. To the dimensions of relational integration and decision-making structure, we add a third, *ownership structure* to reflect the two major types of EMPs: independent and consortium-owned.

Figure 1 also shows the antecedents and the consequences of EMP channel structures. Antecedents of EMP channel structures include the four categories of the theory of political economy: internal economy (TCT variables), internal polity (especially power and dependency imbalances between buyers and suppliers), external economy (particularly concentration on the supply side, the demand side, or both, cf. Kaplan and Sawhney [1999]) and external polity (especially industry-wide IT standardization initiatives). The nature, level, and interaction of the antecedent conditions jointly influence EMP channel structures. The consequences of EMP channel structures are both economic (e.g., total channel distribution costs) and noneconomic (e.g., relationship quality, legitimacy, etc.) Because channel relationships are not static, the degree and character of economic and polity performance variables iteratively affect the degree and interaction of the antecedent conditions.

In short, Figure 1 proposes that EMP channel structure is affected by many factors beyond transaction costs and asset specific investments. Alone, TCT-based antecedents, like asset specific investments, transaction frequency and performance ambiguity—the focus of much prior IS research on EMPs—are unable to explain the complex relationship structures and the economic and political consequences of B2B electronic markets.

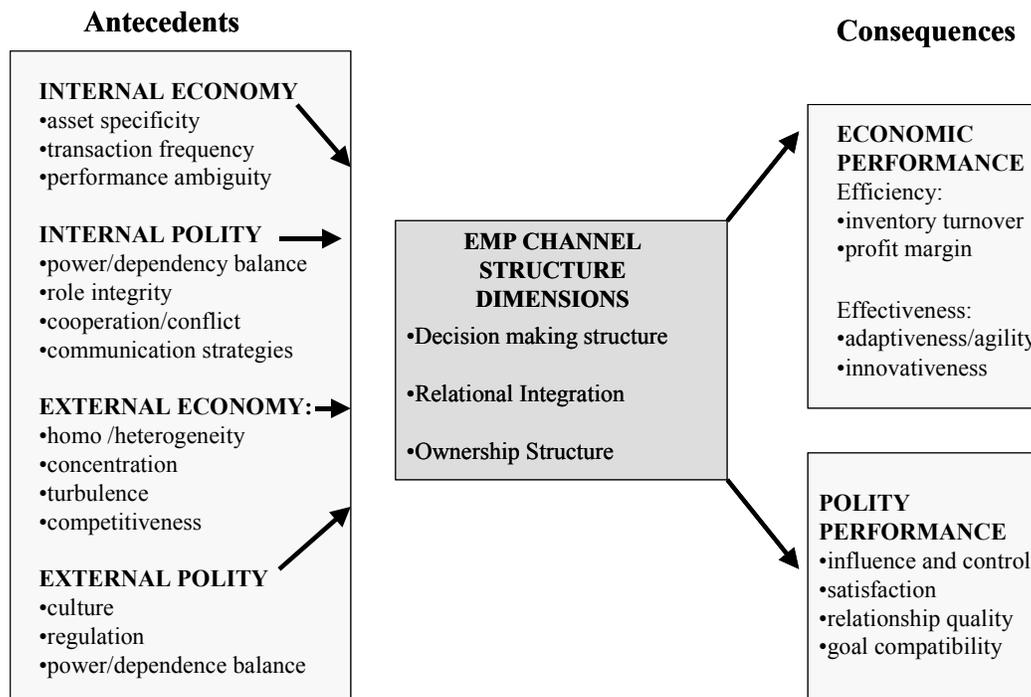


Figure 1. A Model of Channel Relationship Structure
(Adapted from Robicheaux and Coleman 1992)

5 DISCUSSION AND CONCLUSIONS

The model in Figure 1 suggests several promising lines of further theoretical development or empirical investigations of EMPs. One promising line involves recognizing that participating in EMPs may represent a defensive reaction intended to limit partner power, rather than a proactive effort to reduce transaction costs. In a political economy analysis of joint actions between buyers and suppliers in industrial purchasing, Heide and John (1990) introduced the concept of dependence-offsetting investments, in which companies intend, not to build effective transactions (e.g., through investments in specific assets), but rather to offset the possibility of opportunistic behavior or undesirable dependence on a powerful partner.

For example, the consortium EMP Covisint was formed when automotive industry suppliers rebelled against Ford's and General Motor's demands that the suppliers join Ford's and GM's separate private trading exchanges. Since most automotive industries suppliers in the United States supply all three big automakers, the demand that suppliers make asset specific investments in systems integration was viewed by suppliers as unbearably onerous. In addition, the very development of the Covisint EMP can be seen as a dependence-offsetting investment by automotive suppliers. All in all, this example highlights the importance of power and industry structure characteristics.

Another promising line of investigation concerns the consistency between the economic and political consequences of EMP channel structure. Is relationship quality good when economic performance is also good, or it is possible that high economic performance is associated with lower satisfaction? If the latter case obtains, successful EMP channels might carry the seeds of their own destruction.

Yet a third line of investigations concerns the combinations and relative priority of the antecedents of EMP channel structure. How many distinctly different EMP channel structures are empirically observed? Are there only a few basic archetypes? And for each archetype is there only a single set of antecedent conditions, or are there many possible ways that a particular EMP channel structure can be formed?

In this paper, we identified three major limitations of transaction cost theory as it applies to B2B electronic marketplaces. We described three theoretical perspectives that also apply to electronic marketplaces and that help overcome the deficiencies we identified in TCT. We proposed an integrative model combining transaction cost theory, strategic networks theory, relational exchange theory, and the theory of political economy, making suggestions about operationalization. Finally, we identified some promising directions for future research. It is our belief that this integrative perspective will foster cumulative IS research on the important EMP phenomenon.

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