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THE DEVELOPMENT OF AN AUGMENTED CONSTRAINED-EFFICIENCY FRAMEWORK FOR THE ADOPTION OF ELECTRONIC INTERORGANIZATIONAL GOVERNANCE

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Abstract

Business-to-business electronic commerce provides new mechanisms for interorganizational exchange governance. This study contributes to the research of the adoption of interorganizational exchange governance by developing an augmented constrained-efficiency framework that summarizes the salient factors influencing organizational selection and adoption of electronic exchange governance. Drawing upon the literature on organizational and interorganizational governance design and adoption, the augmented constrained-efficiency framework posits that organizational selection and adoption of electronic interorganizational exchange governance are an efficiency pursuing process and also constrained by some critical forces. Internally, the constraints include organizational decision makers' bounded rationality and organizational resources and capabilities. Externally, an organization's institutional environments, its dependency relationship, contractual arrangements and relational norms developed with its business partners through physical transactions are important constraining forces. To demonstrate the usefulness of the augmented constrained-efficiency framework, the paper applies it to the analysis of two important modes of electronic interorganizational exchange governance, namely electronic hierarchy and electronic marketplace. By doing so, the paper sets foundations for future theory development and empirical study.

Keywords: Electronic exchange governance, constrained-efficiency framework, electronic marketplace, business-to-business electronic commerce.

1 INTRODUCTION

The substantial impacts of business-to-business electronic commerce on organizations at microeconomic level and on the related supply chain and industry market structures at macro-level are partially brought about by its ability to serve as an effective mechanism for interorganizational exchange governance. There are diverse forms of electronic interorganizational governance available (Soh and Markus 2002), ranging from simple information links facilitating physical exchange governance to complex systems substituting physical governance thoroughly. Given the vast implications and the wide selection options of electronic interorganizational governance, insights into organizational adoption behavior and choosing criteria are of paramount importance and practical relevance.

The studies that can provide such insights however bear some significant limitations. First researchers tend to examine organizational adoption and choice of electronic interorganizational exchange governances from technology (Koch 2002) and economic perspectives and neglect the implications of organizations' current interorganizational governance (Christiaanse and Markus 2002). The general case however is that the adoption of business-to-business electronic commerce will bring new forms of engagement into the already existing exchange governance or simply replace it. Given the dramatic changes upon the adoption of electronic governance, it is deducible that the characteristics of preexisting governance would produce constraining or facilitating influences and shape organizational decision. Second, current research tends to study a single electronic governance mechanism (for example, EDI, e-procurement system) whereas in reality organizations may have more options. In fact technology developments provide multiple choices of electronic interorganizational governance feasible to accomplish a task. For instance, a firm can either use EDI to assist communication with its supplier or join an electronic reverse auction marketplace and select the supplier with the lowest bids to acquire supplies. Focusing on one form of interorganizational electronic governance may render researchers unable to account for some salient forces that influence organizational comparison of different electronic governance mechanisms and to offer a more complete picture of the process that an organization undergoes to reach its final decision to adopt a particular form of governance mechanism.

Aiming to address the above limitations, our research attempts to mount an initial conceptualization of organizational adoption and selection of electronic interorganizational governance. Drawing upon the literature on organizational and interorganizational governance this study develops an augmented constrained-efficiency framework. The framework conceptualizes the adoption and selection of electronic interorganizational governance as an efficiency seeking process within certain constraints. The paper also applies the framework to the analysis of organizational choice of two important electronic interorganizational governances, namely electronic hierarchy and electronic marketplaces.

By addressing the adoption issue, which is of paramount importance in the development of interorganizational electronic governance given the effect of critical mass (Koch 2002), this research also makes important contributions to the practice. The framework can guide practitioners to derive knowledge of what drives and what impedes organizational adoption of electronic governance and knowledge of how customers' preferences vary across different forms of electronic governance given their different contexts. The knowledge is thus useful, for example, for electronic governance developers and providers to segment potential companies according to their different willingness to adopt electronic governance and conceive targeted product development strategy and marketing strategy. The research may also help investors interested in electronic governance generate more accurate expectations of the returns on their investments based upon better understanding of their acceptance among companies under their current economic and contextual conditions.

2 THEORETICAL DEVELOPMENT OF AN AUGMENTED CONSTRAINED-EFFICIENCY FRAMEWORK FOR ELECTRONIC INTERORGANIZATIONAL EXCHANGE GOVERNANCE ADOPTION

2.1 Interorganizational design and electronic exchange governance

Organizations are open systems consisting of elements that not only are interdependent on each other internally but also relate to some elements in the territories of other organizations on exchange basis. Thus, internally, organizational design deals with task division, job structuration and networking, and authority allocation. Externally, organizational design is more of the nature of exchange governance and determines what and how to interact with other organizations. Therefore, interorganizational exchange governance can be described along two dimensions – the boundary and the interface. Figure 1 presents a simplified model showing the two dimensions involved in the interorganizational transaction activities. There are four companies in the value chain, W, X, Y, Z. Company X performs activities S1, S3, S4, and S6 internally and procures S2, S7, and S5 from company Y, Z, and W respectively. The three sides of the central triangle define the organization's boundaries and the linkages of S1 – S2, S3 – S7, and S4 – S5 represent organizational exchange interfaces.

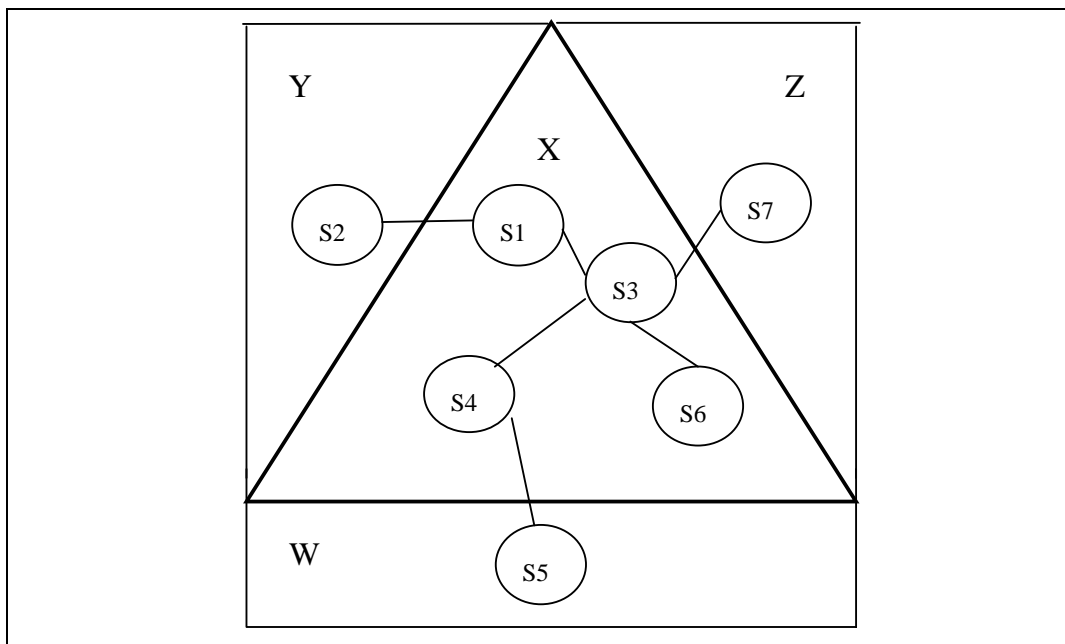


Figure 1. *Modelling the Dimensions of Interorganizational Exchange Governance*

The early theoretical development of organizational design focuses on what determines an organization's boundary (e.g., Williamson 1981). It provides identification of the scope and shape of an organization and the location of organizational boundaries for the transactions of interest, i.e., it helps draw the triangle in Figure 1. Further analytical explorations extend organizational design research to the various types of interfacing mechanisms among organizations. The research is more concerned with the linkages between transaction activities (S1 and S2, S4 and S5, and S3 and S7 in Figure 1) with the specific governance mechanisms employed for carrying out the exchanges being its primary interests. For example, Joskow (1987) studied the length of contract duration to the benefits of the parties in the exchange; Osborn and Baughn (1990) compared the choice of joint venture and contractual agreement for obtaining external resources; Sriram, Krapfel and Spekman (1992)

examined the degree of collaboration between exchange partners. In most cases, the governance mechanisms enforce exchanges contractually, physically, and socially.

With fast development and deep penetration, information technologies show increasingly significant influence on organizational design. Besides their profound impact on organization internal design (Nault 1998) and ability to redefine organizational boundaries (Afuah 2003), information technologies and systems also give rise to the proliferation of electronic mechanisms for interorganizational exchange. In as early as 1980s, without many empirical references, Malone, Yates and Benjamin (1987) have foreseen the abilities of information systems to change interfacing mechanisms fundamentally. It is proposed that information technologies, enabled by their inherent communication, brokerage, and integration effects, would create electronic markets, which assemble supply and demand forces and coordinate the flow of resources involved in the supply chain. Malone, Yates and Benjamin (1987) predicted the shift to electronic markets for exchanges from physical market and physical and electronic hierarchies. In a similar vein, Bakos (1991a, 1991b) stressed the effects of information systems on the interfacing mechanism between the adjacent supply chain parties by setting up information links and electronic marketplaces and projected the development of electronic marketplaces in the long run favorably. One important implication of the above arguments is that given that an appropriate electronic marketplace is present, there is a high possibility that an organization would participate in it for exchange purpose and at the same time establish partner relationships, which would be more efficient than its preexisting physical ones. Taking Company X in Figure 1 for example, it is very likely that at least one of S1-S2, S4-S5, and S3-S7 would be replaced by new electronic link.

On the contrary, Clemons and Row (1992) valued interorganizational relationships and argued that information systems could strengthen the relationships. Clemons, Reddi, and Row (1993) proposed that organizations would adopt a “move to the middle” strategy to maintain long-term relationships with a few partners and information systems would be used to sustain such relationships effectively. Applying the “move to the middle” hypothesis to company X, it is most likely that it will invest in information technologies to enhance its partnerships with W, Y, and Z.

The conflicting conclusions derived above could be explained by the different business and economic situations assigned to the organizations by the researchers; however, they also signify the lack of an overarching framework for communicating and sharing the research on electronic exchange governance. Furthermore, the importance of exchange governance to organizational overall activities and performance also necessitates the development of a framework of interorganizational electronic exchange governance adoption, which may serve as a practical guide or benchmark. Considering that exchange governance is a specific organizational design, we attempt to derive such a framework by drawing upon the literature on organizational and interorganizational governance adoption and change.

2.2 Literature on organizational and interorganizational governance design

Interorganizational exchange governance deals with transactions through which organizations acquire necessary resources. Being the most influential theory of exchange governance, transaction cost economics (Williamson 1981) is distinctive in its focus on exchange transactions. Following the tradition of efficiency approach to organizations of economics, transaction cost economics proposes that the adoption of organizational transaction governance is determined by the comparative efficiency of acquiring from external markets or producing internally. The focus on transaction and efficiency makes transaction cost economics accepted extensively and subsequent developments extend it to analysis of organizational employment of diverse mechanisms of interorganizational exchange governance (Leffler and Rucker 1991, Heide and John 1990, Dutta et al 1995).

However, transaction cost economics bears some limitations (Robins 1987). For example, the optimal levels of efficiency offered by the strict comparative-efficiency framework of transaction cost theory are valid only in the extreme case of perfect competition (Roberts and Greenwood 1997). Focusing solely on competitive environment makes transaction cost economics an undersocialized approach

without adequate appreciation of the institutional environment and its implications for organizational economic behaviors. To address this limitation, Roberts and Greenwood (1997) developed constrained-efficiency framework by grafting institutional theory into the comparative-efficiency framework, which is an important theoretical advance of organizational governance research.

Institutional theory has its primary interest in the effects of various institutional influences on organizational behaviors with the underpinning assertion that organizations will attempt to conform to the pressures from the social environment in which they exist to become isomorphic with institutionally prescribed expectations (Scott 1987; Slack and Hinings 1994; Westney 1993). Empirical studies validate the tendency toward increasing homogeneity over time in organizational design as a result of reactions to the influences of the ideas, values, and beliefs that originate outside of an organization in the institutional context (Slack and Hinings 1994; Greenwood & Hinings 1996).

Constrained-efficiency framework posits that the institutional influences in the forms of mimetic, coercive and normative pressures (DiMaggio and Powell 1973) will affect all of the four steps, namely *evaluation of current design*, *search for alternative organizational designs*, *formation of efficiency expectations*, and *design adoption*, proposed by comparative-efficiency framework as necessary for adopting new organizational design. The framework suggests that organizational governance decisions are driven by efficiency maximization under the restrictions of organizational situations and external environment and what will be achieved would be satisfying as opposed to optimal.

Another shortcoming of transaction cost economics is the oversimplification of organizations as bundles of contracts and transactions (Madhok 1996). Thus resource-based theory (knowledge-based theory included) (Conner and Prahaland 1996, Schilling and Steensma 2002) provides complementary view of organizational governance decision by conceptualizing organizations as bundles of resources and capabilities where individual skills, organization and technology are inextricably woven together through dynamic and interactive firm-specific processes (Nelson and Winter 1982). The resources and capabilities may generate constraints for organizational economic pursuits (Madhok 1996). The most economic exchange governance mode is not necessarily the preferred one due to the diseconomies associated with acquiring the knowledge and developing capabilities. Similarly, less economic governances may be chosen because of the lack of relevant organizational resources (Madhok 1996).

The above theoretical perspectives discuss the adoption of general interorganizational governance. For the electronic forms of interorganizational governance, Christiaanse and Markus (2002) highlighted the potential constraining effects of organizations' current physical governance relationships. The constraints could be caused by organizational dependence on, contractual responsibilities specified by, and relational norms developed from current exchange governances.

Resource dependency theory (Pfeffer and Salancik 1978) suggests that few organizations are self-sufficient with respect to their critical resources and have to rely on external organizations to some extent. The dependence introduces uncertainty into organizational functioning and cause imbalance of power in interorganizational relationship (Dwyer, Schurr, and Oh 1987). Interorganizational links are necessary for managing uncertainty and safeguarding organizational well-being. Thus an organization's dependence on external environment will significantly shape interorganizational governance mechanisms serving as linkages to obtain critical resources (Heide 1994).

Traditional exchange linkages are enforced contractually and socially. Contracting has been an effective way to govern interorganizational exchanges. Conventional contracting theory posits that market participants rely largely on economic and legal sanctions for the purpose of enforcing contractual obligations. The relational contract theory (Macneil 1980) however proposes that strict contractual arrangements prevail in discrete transaction whereas contemporary economy sees most exchanges occurring within the relation web organizations embed in. The relation nature of exchange fosters relational norms such as role integrity, relation preservation, and conflict harmonization norms among the exchange parties to complement the legal enforcement. As posited by the relational contract theory, any given interorganizational exchange embodies the combination of discreteness and relationalism and its governance involves both contract law enforcement and relational norms.

2.3 An augmented constrained-efficiency framework

The multiple theoretical perspectives above suggests a comprehensive framework for studying electronic interorganizational governance adoption in general and electronic marketplace in particular, which is named as augmented constrained-efficiency framework here (Figure 2). The framework conceptualizes organizational adoption of interorganizational electronic governance mechanism as an efficiency pursuing process and also recognizes the various constraints encountered in this process.

Consistent with constrained-efficiency framework (Roberts and Greenwood 1997), organizational adoption of interorganizational electronic exchange governance undergoes four logic stages with the motivation to alter current exchange governance with a new one that is capable of offering higher efficiency level. There are three main sources of constraints influencing the adoption of electronic interorganizational exchange governance. Individually, organizational main decision makers' biased predisposition (cognitive constraints) toward information technology in general and electronic interorganizational exchange mechanisms in particular may affect organizations' overall adoption behavior. At organization level, organizational resources and capabilities affect organizational awareness of alternative modes of electronic exchange governance, efficiency expectations, and the ultimate adoption decision. The third source of constraints is organizations' interactions with their environment. The augmented constrained-efficiency framework suggests four types of interorganizational constraints, including institutional environment, dependence relationship, contractual arrangements, and relational norms. The influences of the constraints manifest themselves by impacting on organizational evaluation of their current interorganizational governance, scope of the electronic governance alternatives developed, and the evaluation of these alternatives. Additionally the adoption of electronic exchange governance will produce feedback effects on an organization's interactions with its institutional and business environments and on its resources and capabilities.

3 AN APPLICATION OF THE AUGMENTED CONSTRAINED-EFFICIENCY FRAMEWORK: ADOPTION OF ELECTRONIC HIERARCHY AND ELECTRONIC MARKETPLACE

To demonstrate the usefulness of the framework, we apply it to organizational comparison and adoption of electronic hierarchy and electronic marketplace. Electronic hierarchy functionally establishes electronic information link at the interface of two adjacent parties in a value chain, i.e., a supplier and a buyer. It represents either one-to-one or one-to-more integration (Malone, Yates, and Benjamin 1987; Bakos 1991). An exemplary technology of information links is EDI, which allows for electronic information exchange between a company and its suppliers or customers. On the other hand, electronic marketplace (EMP) allows participants to exchange information about market price and product offerings. It presents a more-to-more multilateral integration by gathering suppliers and buyers and providing them transaction opportunities and channels (Malone, Yates, and Benjamin 1987; Bakos 1991). Although the two transaction governance mechanisms are different functionally and can promote organizational efficiency from different dimensions, both are variants of interorganizational information system.

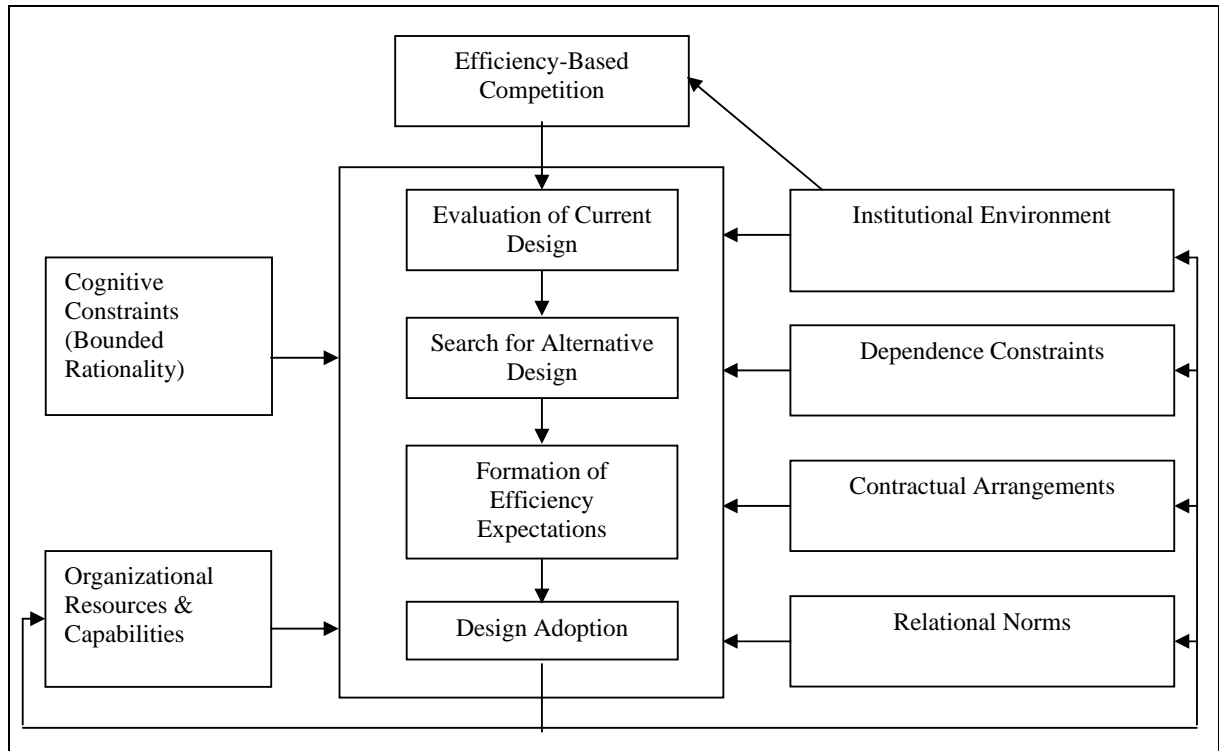


Figure 2: *Augmented Constrained-Efficiency Framework for Electronic Interorganizational Exchange Governance Adoption*

There are some views favoring electronic marketplaces over electronic hierarchy based on theoretical analysis (Malone, Yates, and Benjamin 1987; Bakos 1991). However, in practice, the development of electronic marketplaces is far from satisfactory (Krovi 2001). In contrast, with the advent of Internet, information technologies like Web-based EDI emerge to offer less capital-intensive and more open solutions for organizations to strengthen their interfirm information linkages (Mithas, Jones, and Mitchell 2002). Given their limited precious resources, organizations may need to make choice between or set priority for electronic hierarchy and electronic marketplace. We apply the augmented constrained-efficiency framework here to explore the forces driving and inhibiting organizational adoption of the two modes of electronic exchange governance.

To make the study tractable, electronic hierarchy is materialized as an EDI system initiated by one of a company's direct supply chain partners (thus it represents 1:1 relationship for the potential adopter and most likely 1:m from the initiator's perspective). Electronic marketplace is designated to be a neutral electronic market mechanism (Kaplan and Sawhney 2000) offered by a third-party (e.g., market maker) (Malone, Yates, and Benjamin 1987) and represents more-to-more (m:m) relationships among business partners. The analysis involves company X and Y in Figure 1. There are two alternatives for X, being either to join EDI initiated by Y or join EMP (Y is not in EMP) initiated by a third-party company through certain channel. Company X is not allowed to make any changes to the systems of EDI and EMP; however, it can establish some interface applications to set up linkages between EDI and EMP with their management and production systems. The research settings also suggest the focus of analysis to be on the interorganizational constraints. As the major effects of electronic information link and marketplace are geared toward new interorganizational governance, the influence differences of internal constraints (i.e., cognitive constraints, organizational resource and capability constraints) on them are assumed to be trivial.

According to the augmented constrained-efficiency organizational evaluation of alternative electronic governance is efficiency oriented. Both EDI and EMP can improve organizational efficiency level.

However, the new interorganizational governances also impose new costs. Therefore, the efficiency implications of EDI and EMP are derived from the balancing of the potential efficiency and costs. The most frequently examined factors from the perspective of transaction cost economics are asset specificity and transaction uncertainty (Williamson 1981). Asset specificity reflects how easily the assets associated with a transaction are transferable to other transactions. The high transferability means low asset specificity. X's adoption of EDI for transactions with Y would create higher asset specificity than its joining electronic marketplace does. X would find it difficult to use the EDI to engage in exchanges with other partners. On the other hand electronic marketplace would present more opportunities to establish business partnerships.

Proposition 1: Company X will perceive higher asset specificity of adoption of electronic hierarchy than that of electronic marketplace. The perceived asset specificity will exert weaker negative influence on X's intention to adopt electronic marketplace than to adopt electronic hierarchy.

The opportunisms of exchange partners give rise to transaction uncertainty (Williamson 1981). In our context, if X adopted EDI, the uncertainty would remain at the same level as it transacts with Y physically. However, if X adopted EMP to transact with a strange partner, it would perceive relatively high uncertainty. There are two sources of the increased uncertainty. The first is directly from the potential opportunisms of the new partner. The lack of knowledge of the product and credibility of the new partner would translate into high risk in transactions. Secondly, the involvement of a third-party EMP provider would also increase X's concern of uncertainty if there is a lack of trust mechanism (Pavlou 2002).

Proposition 2: Company X will perceive higher transaction uncertainty of electronic marketplace than that of electronic hierarchy. The perceived transaction uncertainty will have significantly negative effects on X's intention to adopt electronic marketplace whereas its effect on X's intention to adopt electronic hierarchy will be insignificant.

The augmented constrained-efficiency framework proposes that institutional environments help organizations derive efficiency implications of electronic mode of exchange governance. Organizational decision makers are not always able to accurately evaluate the efficiency level of governance alternatives due to either cognitive and organizational constraints or the lack of relevant formula and variables. Hence mimetic and normative isomorphism (DiMaggio and Powell 1983) is widely observed from organizations' reliance on the efficiency gains of other similar companies in the related industry to make decisions. If the environment in which an organization embeds presents organizational improvements as a result of the adoption and usage of a particular mode of electronic exchange governance, the organization would show high orientation toward that governance. Secondly, institutional environment could influence organizational adoption of electronic governance directly. The adoption decision is not necessarily made solely out of efficiency evaluations. Organizations may choose interorganizational governance that does not best address their efficiency concerns but sustains their legitimacy in the institutional environment. In this respect, coercive pressures are more visible than mimetic and normative ones, for example, to force an organization to adopt otherwise inefficient exchange governance if it has relatively weak power in transactions and loss of legitimacy might outweigh any expected efficiency gains. Thirdly, institutional environment also influence adoption of electronic exchange governance by affecting organizational awareness of alternative choices. However, since the research settings specify the alternatives of electronic hierarchy and marketplace, we forego the analysis here.

Proposition 3: Institutional environment will significantly affect X's intention to adopt both electronic hierarchy and electronic marketplace. If there are more applications of electronic hierarchy than electronic marketplace in the environment in which X embeds, X will show stronger intention to adopt electronic hierarchy than electronic marketplace, and vice versa.

Organizational dependence on other organizations for critical resources creates power imbalance in interorganizational relationships. The dependence and power in exchange (Dwyer, Schurr, and Oh 1987) affect electronic interorganizational governance adoption by influencing both efficiency

expectation formation and adoption decision. The resource dependence imposes high switching cost for an organization if the channel to acquire the resource is subject to any changes. Thus in the evaluation of the efficiency of any alternative exchange governance for the critical resources, its impact on the dependency relationship must be taken into consideration. The direct effect of resource dependency on adoption decision produces a result similar to coercive isomorphism that the adoption of the electronic exchange governance endorsed by an organization's partner may serve as a way to sustain the critical exchange relationship.

Proposition 4: X's dependence on Y will have significant positive influences on X's efficiency expectation formation of and adoption intention toward electronic hierarchy and significant negative influence on X's efficiency expectation formation of and adoption intention toward electronic marketplace.

The contractual arrangements such as long term buying and supplying agreements between buyers and suppliers are used widely as effective mechanisms to protect organizations against uncertainties in interorganizational exchanges (Heide 1994). An organization's attempt to change exchange governance with a partner will be constrained by their preexisting contractual arrangements. Tight contractual arrangements will encourage the adoption of new electronic exchange governance that is geared toward strengthening preexisting linkage and inversely discourage the adoption of electronic governance facilitating organizational selection and interaction with other potential partners.

Proposition 5: The contractual arrangements between company X and its business partner will positively affect its intention to adopt electronic hierarchy whereas negatively affect its intention to adopt electronic marketplace.

The relational norms developed between exchange partners shape organizational predisposition toward electronic exchange governance that may impose changes to preexisting interorganizational relationships. Two orientations manifest from the various relational norms. One orientation encompasses norms such as role integrity, relationship preservation, and harmonization of conflicts (Heide 1994), emphasizing on the long-term solidarity and continuity and each party's commitment to the relationship. The other orientation reflects the flexibility between exchange partners and encourages arm's-length relationship (Heide 1994). If the electronic governance in question is in conflict with the prevailing relational norms between X and Y, its diffusion into X would be subject to substantial inhibiting forces even though it may present potential efficiency implications.

Proposition 6: The orientation of the relational norms between X and Y influences X's adoption of electronic exchange governance. If the relational norms are solidarity oriented, X will present stronger intention to adopt electronic hierarchy than electronic marketplace; if the relational norms are flexibility oriented, X will present stronger intention to adopt electronic marketplace than electronic hierarchy.

4 DISCUSSIONS AND IMPLICATIONS

This study conceptualizes organizational adoption of business-to-business electronic commerce as a process of inviting new mode of interorganizational governance to organizational design. Drawing upon research on organizational governance, it proposes an augmented constrained-efficiency framework. The augmented constrained-efficiency framework articulates the adoption of various modes of electronic governance as an efficiency-seeking process and confronted with internal and external constraints as well. The paper also presents an example of the application of the framework. The wide set of factors and their varying effects on organizational comparison and adoption of two important modes of interorganizational governance, electronic hierarchy and electronic marketplace, are examined within the framework.

The proposed framework has important implications for theory development of business-to-business electronic commerce. First, the augmented constrained-efficiency framework provides a holistic

perspective of electronic exchange governance adoption and can serve as a structuring model to facilitate the development of research agenda. With the framework the extant literature on interorganizational electronic governance could be clearly positioned and the arenas lacking research efforts could be easily identified. For example, there is a poverty of studies on the effects of interorganizational contractual arrangements and relational norms on the adoption of electronic exchange governance compared to the studies from organizational resource, institutional environments and organizational dependence perspectives. Second, the framework also sets theoretical foundation for empirical studies. Meanwhile, empirical studies can enhance the framework through validating the causalities proposed. In fact, the full value of the augmented constrained-efficiency framework hinges on its ability to offer empirically valid insights into organizational adoption of electronic governance.

With regard to the analysis presented here, researchers may go beyond by relaxing the conditions of the settings. For instance, the setting excludes company Y in EMP. If this constraint is relaxed, company X's predisposition toward EMP will change significantly. Indeed, an organization's encounter with its physical exchange partner in electronic marketplace is practically possible to happen given that the development of electronic marketplace will lead to the increase in the number of participants.

Throughout the analysis the bias toward the effects of the constraining forces could be discerned. However, the bias should not be taken as the thrust of the augmented constrained-efficiency framework, which on the contrary proposes organizational search for the equilibrium between efficiency and constraints. The focus on constraints in the analysis is purposeful because of the relatively rich elaborations on the efficiency implications of electronic exchange governance in terms of cost reduction in information processing, sharing and searching (e.g. Bakos 1991b). Nevertheless, given the varying impacts of different modes of electronic interorganizational governance, scholars are strongly suggested to investigate the combined effects of the efficiency-driving factors and the constraining forces on organizational selection and adoption of business-to-business electronic commerce mechanisms.

The paper examines only two scenarios, electronic hierarchy and electronic marketplace. Future research could enhance the generalizability of the framework by studying other forms of electronic mechanism. Examples include information links provided by third parties or biased electronic marketplaces maintained by the party involved directly in the transaction (Kaplan and Sawhney 2000). More dynamics among organizational efficiency pursuits and constraints are expected given the complexity of the contexts.

References

- Afuah, A. (2003) Redefining firm boundaries in the face of the Internet: Are firms really shrinking. *Academy of Management Review*, 28 (1), 34-53.
- Attewell, P. (1992) Technology diffusion and organizational learning: The case of business computing. *Organization Science*, 3 (1), 1-19.
- Bakos, J. Y. (1991) A strategic analysis of electronic marketplaces. *MIS Quarterly*, 15 (3), 295-310.
- Bakos, J. Y. (1991) Information links and electronic marketplaces: The role of interorganizational information systems in vertical markets. *Journal of Management Information Systems*, 8(2), 31-52.
- Christiaanse, E. and Markus, M. L. (2002) Business-to-business electronic marketplaces and the structure of channel relationships. In *Proceedings of the Twenty-third International Conference on Information Systems*, (Applegate, L., Galliers, R., and DeGross, J. Eds.), p. 237, Spain, Barcelona.
- Clemons, E. K. and Row, M. C. (1992) Information technology and industrial cooperation: The changing economics of coordination and ownership. *Journal of Management Information Systems*, 9 (2), 9 – 35.
- Clemons, E. K., Reddi, S. P. and Row, M. C. (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), 9-36.

- Conner, K. R. and Prahalad, C. K. (1996) A resource-based theory of the firm: Knowledge versus opportunism. *Organization Science*, 7 (5), 477-501.
- DiMaggio, P. and Powell, W. (1983) The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociology Review*, 48 (2), 147-160.
- Dwyer, F. R., Schurr, P. H. and Oh, S. (1987) Developing buyer-seller relationships. *Journal of Marketing*, 15 (April), 11-27.
- Greenwood, R. and Hingings, C. R. (1996) Understanding radical organizational change: Bringing together the old and new institutionalisms. *Academy of Management Review* 21(4), 1022-54.
- Heide, J. B. (1994) Interorganizational governance in marketing channels. *Journal of Marketing*, 58 (January), 71-85.
- Joskow, P. L. (1987) Contract duration and relationship-specific investments: Empirical evidence from coal markets. *American Economic Review*, 77 (March), 168-85.
- Kaplan, S. and Sawhney, M. (2000) E-hubs: The new B2B marketplaces. *Harvard Business Review*, May-June, 97-103.
- Koch, H. (2002) Factors influencing adoption and diffusion of business-to-business electronic commerce marketplaces. In *Proceedings of the Eighth Americas Conference on Information Systems*, 2525-2534.
- Krovi, R. (2001) Surveying the e-landscape: new rules of survival. *Information Systems Management*, 18 (Fall), 22-30.
- Leblebici, H., Salancik, G., Copay, A., and King, T. (1991) Institutional change and the transformation of interorganizational fields: An organizational history of the U. S. radio broadcasting industry. *Administrative Science Quarterly*, 36, 333-363.
- Macneil, I. R. (1980) *The New Social Contract: An Inquiry Into Modern Contractual Relations*, Yale University Press.
- Madhok, A. (1996) The organization of economic activity: Transaction costs, firm capabilities, and the nature of governance. *Organization Science*, 7 (5), 577-590.
- Malone, T. W., Yates, J. and Benjamin R. I. (1987) Electronic markets and electronic hierarchies. *Communications of the ACM*, 30 (6), 484-497.
- Mithas, S., Jones, J. L., and Mitchell, W. (2002) Noncontractible factors as determinants of electronic market adoption. In *Proceedings of the Twenty-third International Conference on Information Systems*, (Applegate, L. Galliers, R. and DeGross, J. Eds.), p. 763, Spain, Barcelona.
- Nault, B. R. (1998) Information technology and organization design: locating decisions and information. *Management Science*, 44 (10), 1321-1335.
- Osborn, R. N. and Baughn, C. C. (1990) Forms of interorganizational governance for multinational alliances. *Academy of Management Journal*, 33 (3), 503-19.
- Pavlou, P. A. (2002) Impersonal trust in b2b electronic commerce: A process view, in *Business to Business Electronic Commerce: Challenges and Solutions* (Warkentin M. ed), Idea Group.
- Premkumar, G. and Ramamurthy, K. (1996) The role of interorganizational and organizational factors on the decision mode for adoption of interorganizational systems. *Decision Sciences*, 26 (3), 303-337.
- Roberts, P. W. and Greenwood, R. (1997) Integrating transaction cost and institutional theories: Toward a constrained-efficiency framework for understanding organizational design adoption. *Academy of Management Review*, 22 (2), 346-373.
- Robins, J. A. (1987) Organizational economics: Notes on the use of transaction-cost theory in the study of organizations. *Administrative Science Quarterly*, 32 (1), 68-86.
- Schilling, M. A. and Steensma, H. K. (2002) Disentangling the theories of firm boundaries: A path model and empirical test. *Organization Science*, 13 (4), 387-401.
- Scott, W. R. (1987) The adolescence of institutional theory. *Administrative Science Quarterly*, 32 (4), 493-511.
- Slack, T. and Hinings, B. (1994) Institutional pressures and isomorphic change: An empirical test. *Organization Studies* 15 (6), 15-29.

- Soh, C and Markus M. L. (2002) Business-to-business electronic marketplaces: A strategic archetypes approach. In Proceedings of the Twenty-third International Conference on Information Systems, (Applegate, L. Galliers, R. and DeGross, J. Eds.), p. 835, Spain, Barcelona.
- Sriram, V., Krapfel, R. and Spekman, R. (1992) Antecedents to buyer-seller collaboration: An analysis from the buyer's perspective. *Journal of Business Research*, 25 (December), 303-20.
- Williamson, O. E. (1981) The economics of organization: The transaction cost approach. *American Journal of Sociology*, 87 (3), 548-577.