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INTERORGANIZATIONAL SYSTEMS AND TRANSFORMATION OF INTERORGANIZATIONAL RELATIONSHIPS: A RELATIONAL PERSPECTIVE

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Abstract

Increasingly, organizations have been investing heavily in information systems to support greater cooperation with key business partners. However, the adoption of such interorganizational systems appears to depend not only on the firm's perspective and internal contingencies, but also on the complementary perspective and contingencies of each of its key partners.

Drawing on three IS theoretical perspectives and three views of competitive advantage, this study first develops a relational perspective which we posit to have general conceptual applicability in several different contexts including adoption, diffusion and success of dyadic IOS implementations. In this current study, the relational perspective is operationalized in the specific context of dyadic IOS adoption, and its applicability is being demonstrated in two parts via case studies in the context of the BookNet and CoreNet projects in Singapore. The insights gained and the lessons learned from the experiences of these case-study companies may hold valuable implications for both IS research and practice.

Introduction

Interorganizational systems are IT-based systems that link two or more organizations, and facilitate the exchange of products, services and/or information. In this study, we focus on dyadic interorganizational systems using EDI protocols and which are enabled by either the Internet or a private network provided by traditional EDI vendors. We believe that this work can also serve as the theoretical basis for research on the similar use of XML for data interchange between companies.

Over the years and especially with the advent of Internet and web-based technologies, organizations have realized that there is value in implementing such systems with each of their key business partners. Despite the promise and potential of IOS in facilitating organizations to work more cooperatively with each other, certain obstacles lay in the path of a firm's ability to actually proceed with such projects. While internal contingencies are obviously important, IOS implementations also require the firm to seek out appropriate partners, each of which must first agree to participate and then sustain the use of the system. While there have been some classic cases of success, the IOS literature also has many documented cases of mixed results and limited payoffs due to partner resistance and/or lack of cooperative relationships (e.g., Clemons and Row, 1993). Benefits (i.e., *utility maximization*) accruing from IOS implementations seem to depend not only on the firm's perspective and internal contingencies but also on the complementary perspectives and contingencies of its business partners (e.g., Hart and Saunders, 1998). It is this element of firm-partner interdependence that provides the underlying motivation for this study.

Three IS Theoretical Perspectives

As an example of such interdependence, Kumar and van Dissel (1996) note that depending on the nature of the proposed IOS implementations, partners may be concerned about the potential for conflict of interests, and the accompanying technical, economic and socio-political risks involved (i.e., *self-interests*). Some of these risks include becoming locked in with relation-

specific investments, changes in bargaining power, trust in the ongoing nature of the relationship and concerns about the other party's commitment (e.g., Clemons and Row, 1993). Varying perceptions of these risks may thus have an influence on the level of interfirm engagement and consequently, the extent of benefits attained. Moreover, large firms frequently exercised their power over their suppliers to pressure them into participating in IOS implementations (i.e., *opportunism*), and some of these suppliers felt compelled to participate due to their dependency on the initiator firms (Iacovou et al. 1995). On the other hand, many firms are also frequently motivated by industry or competitive pressure to join forces in the first place (i.e., *opportunism*).

Indeed, the "system rationalism" and "segmented institutionalism" theoretical perspectives (Kling, 1980) used in past IS research have focused on *utility maximization*, *self-interests* and *opportunism* in studying the social impact of the *IT resource* in organizations (Kumar et al., 1998). While important, this singular focus may thus cause interorganizational relationships to be viewed only from the narrow perspective of a "win-lose" dichotomy (in effect, thus prompting a "firm-centric" perspective towards the need for interorganizational systems). Recognizing the inadequacies of such perspectives, Kumar et al. (1998) thus propose a complementary third rationality (based on trust, cooperation, collaboration and win-win relationships) to study the role of IT in helping to achieve competitive advantage, both within and between organizations. More importantly, this third rationality suggests that a "dyad-centric" perspective may be appropriate in the context of IOS research.

Three Views of Competitive Advantage

Meanwhile, a similar line of thinking has emerged in business strategy research. While the Resource-Based view (e.g., Barney 1991) examines competitive advantage from the standpoint of the firm's *organizational resources* residing within its organizational boundaries, the Environmental Models view (e.g., Porter 1980, 1985) focuses on analyzing a firm's opportunities and threats (i.e., *opportunism*) in order to maximize its strategic advantage (i.e., *utility maximization*) while protecting its *self-interests*. In fact, the concept of competitive advantage in the Environmental Models view emphasizes the importance of gaining power over the firm's suppliers and customers, while attempting to contain the power of competitors. In the emerging Relational view (e.g., Dyer and Singh 1998), the focus shifts to the ongoing strategic relationship between the firm and its partner in jointly creating value beyond what could be created by each of them independently. In this regard, Dyer and Singh (1998) note that the ability to realize benefits from such alliances is contingent on a number of factors including effective governance (e.g., based on *mutual trust*) and *organizational complementarity* (compatibility between firm and partner in decision-making processes, organizational culture, IT and control systems, etc). Indeed, past business strategy research indicates that the potential for relational rents can be realized only if the firm and its partner have the necessary complementary organizational mechanisms to facilitate coordinated action (e.g., Doz 1996).

In the context of interorganizational systems, the two earlier views may have motivated a "firm-centric" perspective towards the need for such systems, while the Relational view suggests that a "dyad-centric" perspective may also be appropriate.

Introducing a Relational Perspective of Interorganizational Systems

Extrapolating the concept of organizational complementarity to the context of this research, we posit that in order for the firm to adopt or implement an IOS with a particular partner to reap the benefits of greater cooperation, the degree of complementarity between the two parties in certain organizational mechanisms may be critical. Clearly, such organizational mechanisms would take the form of firm-centric factors specific to the context of such IOS adoption or implementation. We call this construct "initiator-adopter complementarity" for two reasons. Firstly, it is to denote the strong parallels between this concept in IOS research and the concept of organizational complementarity in business strategy literature. Secondly, we wish to underscore the existence of a certain dynamic between the two parties during the adoption or implementation process.

To capture the multi-faceted influences of the above three IS perspectives and the three views of competitive advantage, we introduce the concept of the "relational perspective" to refer to the degree of "initiator-adopter complementarity" between the firm and its partner with regards to adopting or implementing such an IOS (Figure 1). Such a perspective is lacking in extant IOS research. Although this study will only specifically operationalize the relational perspective in the adoption context, we believe that such a perspective would also have applicability to the post-adoption implementation process, although it would of course have to be suitably operationalized in that different IOS context.

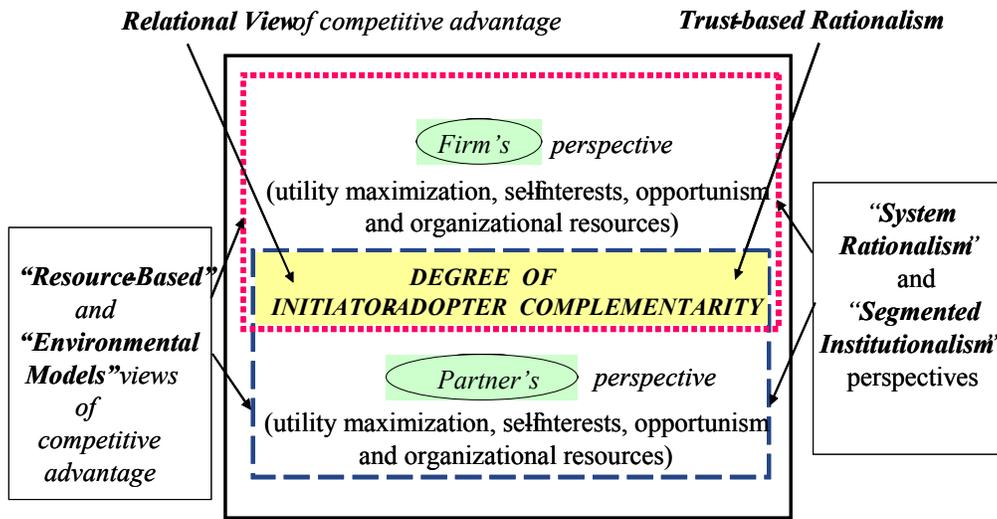


Figure 1. Relational Perspective of Interorganizational Systems for Interorganizational Competitive Advantage

Research Questions

The focus of this research is on the dyadic adoption of an IOS between a firm and its key business partners to enable either transaction processing or task support (Benjamin et al. 1990). For each firm, we are focusing on its one-to-one (1:1) relationship with a key business partner. Therefore, our objective is to answer two fundamental questions:

- (1) Are there any differences in the factors influencing the firm’s adoption of an IOS with a particular partner for transaction processing vis-à-vis task support?
- (2) How does the degree of initiator-adopter complementarity between the firm and the partner impact the adoption of such an IOS?

We begin by developing a preliminary research model based on important past EDI studies.

A Preliminary Research Model

Key Adoption Factors from Past EDI Research

In a comprehensive literature review, Chwelos et al. (2001) note the three different perspectives that have been used in much of past EDI adoption research: *technological*, *organizational* and *interorganizational*. In addition, they (Chwelos et al.) note that the Iacovou et al. (1995) model provides a parsimonious representation of many of the factors previously demonstrated by other researchers to be significant predictors of EDI adoption, while drawing on all three perspectives as noted above. Validated through a case-study of seven firms, this model hypothesizes three factors as determinants of EDI adoption (for transaction processing) in small-and-medium-sized enterprises: *perceived benefits* (technological), *organizational readiness* (organizational) and *external pressure* (interorganizational). Chwelos et al. have also used a slightly enhanced version of this model (augmented to include *trading partner readiness*) to study “EDI adoption intention” of more than 250 Canadian companies (with annual revenues up to \$1 billion).

A close examination of Figure 1 reveals that the three factors in the Iacovou et al. model have strong parallels with the “firm-centric” aspect of the conceptual foundations of the “relational perspective”, as illustrated in Figure 2. *Perceived benefits* has a strong parallel with “*utility maximization*”, *organizational readiness* with “*organizational resources*”, and *external pressure* with “*opportunism*”.

Viewed against the backdrop of our arguments for the relational perspective, it is clear that the “firm-centric” perspective of the Iacovou et al. model may not be able to explain certain cases of dyadic non-adoption. For example, an initiator firm may have high levels of *perceived benefits*, *organizational readiness* and *external pressure*, but yet may still be unable to adopt with a particular partner. Clearly, the relational perspective may offer a better explanation than a “firm-centric” perspective in the case of IOS adoption or non-adoption between two parties.

Operationalizing the Relational Perspective

To investigate IOS adoption within the context of our research (transaction processing vis-a-vis task support), we operationalize the relational perspective in terms of the three EDI adoption factors and by applying the concept of initiator-adopter complementarity to each of these factors. The resulting model that we use as a starting point for this research is shown in Figure 3, with the same constructs as defined by Iacovou et al and Chwelos et al. *Perceived Benefits* refers to the anticipated advantages that the IOS can provide the firm or the partner. *External Pressure* refers to influences arising from several sources that affect the firm or the partner: competitive pressure; industry pressure and influence by the other party. *Organizational Readiness* refers to whether the firm or the partner has sufficient IT sophistication and financial resources to undertake the adoption of the IOS.

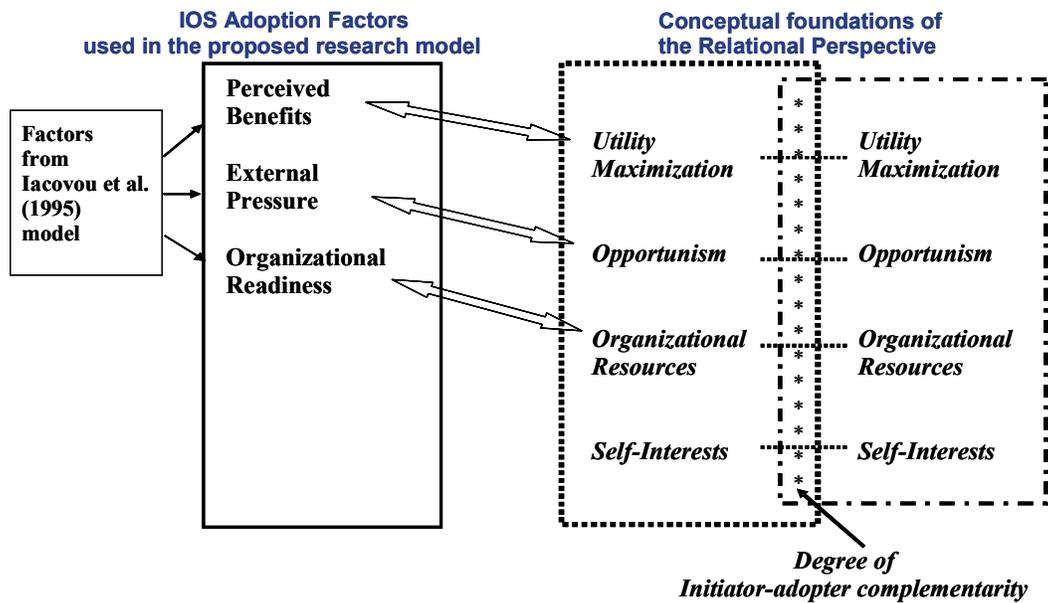


Figure 2. Factors Related to IOS Adoption for Transaction Processing and Their Conceptual Foundations in the Relational Perspective

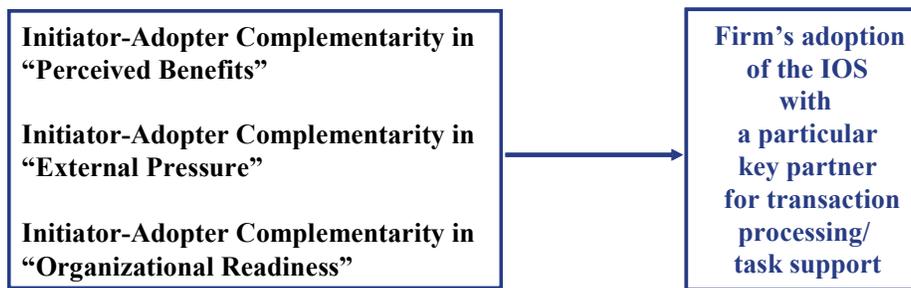


Figure 3. Preliminary Research Model

Research Methodology

This research has 2 parts and employs a case approach due to its potential for yielding rich and interesting insights. The preliminary model is thus used as an evolving blueprint to guide the research, with due attention paid to the validity, consistency and reliability of the data collected, in line with positivist case-study conventions (Yin 1994; Lee 1989; Benbasat et al 1987). In particular, pattern-matching is a qualitative procedure that lends itself to structured analysis while helping to frame supporting narrative discussions in keeping with our positivist approach. To frame such analysis for the purpose of this study, we build upon the high-low dichotomy approach that was successfully employed by Iacovou et al. (1995) to similarly operationalize the initiator-adopter complementarity construct. Table 1 shows how this operationalization is done using a strong-weak dichotomy. For example, *strong* complementarity in *organizational readiness* is defined to be the situation where both parties have adequate technical/financial resources to jointly undertake the IOS implementation. Conversely, we define *weak* complementarity in *organizational readiness* to be the situation where either one or both of the parties does/do not have adequate technical/financial resources for the undertaking. Weak complementarity in this case therefore means that one of the parties may have high organizational readiness while the other has low readiness, or both parties have low organizational readiness.

Part 1 Results: Influence of Weak Complementarity

In Part 1, a case-study of two book publishing firms (and their 1:1 relationships with two key book-retailer customers each as sub-units of analysis) has been completed. This study was conducted against the backdrop of a *discontinued* government-facilitated industry-wide IOS project in Singapore (BookNet). Here, we found that dyadic adoption between the two publishers (Publisher-YES and Publisher-NO) and each of the two book retailers (Retailer-SG and Retailer-FN) did not materialize due to weak complementarity between them. At the AMCIS doctoral consortium, I will provide evidence (including pattern matches against Table 1) for the influence of weak complementarity (in perceived benefits, external pressure and organizational readiness) in reducing the likelihood of adoption.

**Table 1. Strong Complementarity vs. Weak Complementarity Defined:
Using a High/Low Dicotomy as per Iacovou et al. (1995)**

		degree of Complementarity			degree of Complementarity		
		Firm	Partner	↓	Firm	Partner	↓
Perceived Benefits	High	High	High	Strong	High	Low	Weak
	Low	High	High	Weak	Low	Low	Weak
External Pressure	High	High	High	Strong	High	Low	Weak
	Low	High	High	Weak	Low	Low	Weak
Organizational Readiness	High	High	High	Strong	High	Low	Weak
	Low	High	High	Weak	Low	Low	Weak

Part 2A / 2B Results: Influence of Strong Complementarity

Part 2A consists of a follow-up case-study of Publisher-NO and its relationships with two other book retailers (Retailer-PO and Retailer-LT) within the context of the aforementioned BookNet project. Here, we found that prior to its eventual discontinuation, these two retailers joined with Publisher-NO to participate in the *pilot project* of BookNet due to strong complementarity. At the AMCIS doctoral consortium, I will provide evidence (including pattern matches against Table 1) for the influence of strong complementarity (in perceived benefits, external pressure and organizational readiness) in increasing the likelihood of adoption.

In Part 2B, a separate case-study of two construction-related companies (and their one-to-one relationships with two key partners) is being undertaken. This is a longitudinal study which may extend beyond the completion of this PhD thesis depending on the pace of developments in the real-world. This part of the research aims to examine the aforementioned relationships within the context of events starting from the initiation of CoreNet (an *ongoing* government-facilitated industry-wide IOS project in Singapore). As part of CoreNet, the two construction-related companies and their key partners are being encouraged by government-linked agencies to adopt the use of IOS (through B2B project web sites) for project-based collaboration.

While the issue of *party trust* has featured prominently in some IOS studies (e.g., Hart and Saunders 1998), it was not a significant factor in Parts 1 and 2A of this study due to BookNet's focus on transaction-oriented document exchange (transaction processing) and the government's strong role in the project. However, early results from CoreNet indicate that this "trust" factor may be significant in Part 2B due to the anticipated use of IOS for facilitating collaborative activities (task support) between firms. An examination of the conceptual foundations of the relational perspective (Figure 2) also reveals the strong parallel between *party trust* and *self-interests*, thus increasing theoretical support for party trust as a possible factor in this study.

Expected Contributions and Limitations

This study is novel in its introduction of the concept of "initiator-adopter complementarity" to IOS research, and may thus offer a promising and richer theoretical base to guide future empirical studies on the adoption and implementation of IOS. Beyond such a relational perspective, this study also points to the possible existence of different sets of factors impacting IOS adoption for transaction processing vis-à-vis task support. Last but not least, some of the insights gained and lessons learnt from the case-study companies may be valuable for practitioners. A limitation of this study is that it is conducted in a highly specific technological and cultural context where government-linked agencies in the country were/are very active in trying to promote adoption. Generalization to other contexts should therefore be proceeded with cautiously.

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