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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 inter-organizational coordination and cooperation with key business partners. However, the adoption of such IOSs appears to depend not only on the firm's perspective, but also on the complementary perspective of each of these 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 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 lessons learned from the experiences of these case-study companies may hold valuable implications for both IS research and practice.

1 INTRODUCTION

1.1 Motivations

Interorganizational systems (IOS) are information technology (IT) based systems that link two or more organizations, and facilitate the exchange of products, services, and/or information. The key enabler of an IOS is the telecommunications network, such as the Internet or a private network provided by traditional EDI vendors.

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 this 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 proceed with such projects. For example, IOS implementations require coordination and cooperation with the partners, each of whom 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 a firm's internal contingencies but also on the complementary perspectives, decisions, and actions 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.

1.2 Three IS Theoretical Perspectives: Systems Rationalism, Segmented Institutionalism, and Trust-Based Rationalism

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, and some of these suppliers felt compelled to participate partly due to their dependency on the initiator firms (Iacovou et al. 1995). In addition, 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 (and, therefore, a "firm-centric" perspective toward the need for interorganizational systems). In this regard, Kumar et al. highlight the need for 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. In essence, a "dyad-centric" perspective may be appropriate in the context of interorganizational systems.

1.3 Three Views of Competitive Advantage: Resource-Based, Environmental Models and Relational Views

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 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 *organizational complementarity* is important 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 toward the need for such systems, while the relational view suggests that a dyad-centric perspective may be appropriate.

1.4 Introducing the Relational Perspective of Interorganizational Systems

Therefore, it appears that with regard to implementing an IOS between a firm and a particular key business partner to facilitate the realization of interorganizational competitive advantage, a certain degree of synergistic compatibility in requisite organizational mechanisms may be required for the dyadic adoption to materialize. To capture the multifaceted 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 implementing such an IOS (Figure 1). Such a perspective is lacking in current IOS research. Although this study will only operationalize this relational perspective in the adoption context, we believe that it has general applicability in several other contexts, including diffusion and success of dyadic IOS implementations.

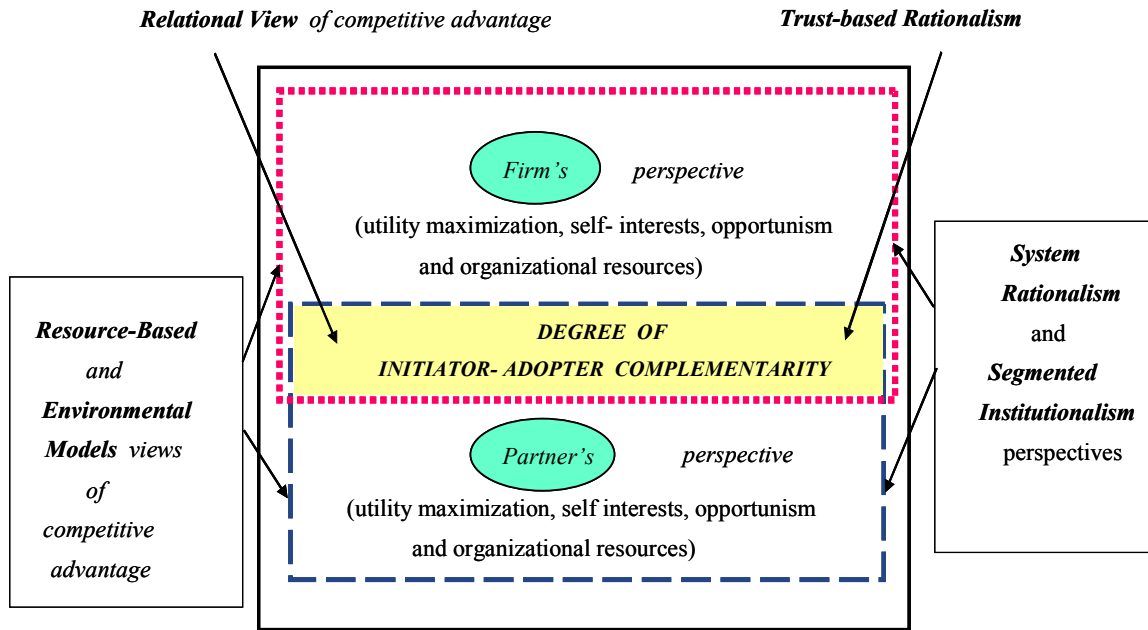


Figure 1. Relational Perspective of Interorganizational Systems for Interorganizational Competitive Advantage

2 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 a dyadic IOS 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 will begin by developing a preliminary research model based on related past EDI studies.

3 A PRELIMINARY RESEARCH MODEL

3.1 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 note that the Iacovou et al. (1995) model incorporates many of the factors previously demonstrated 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).

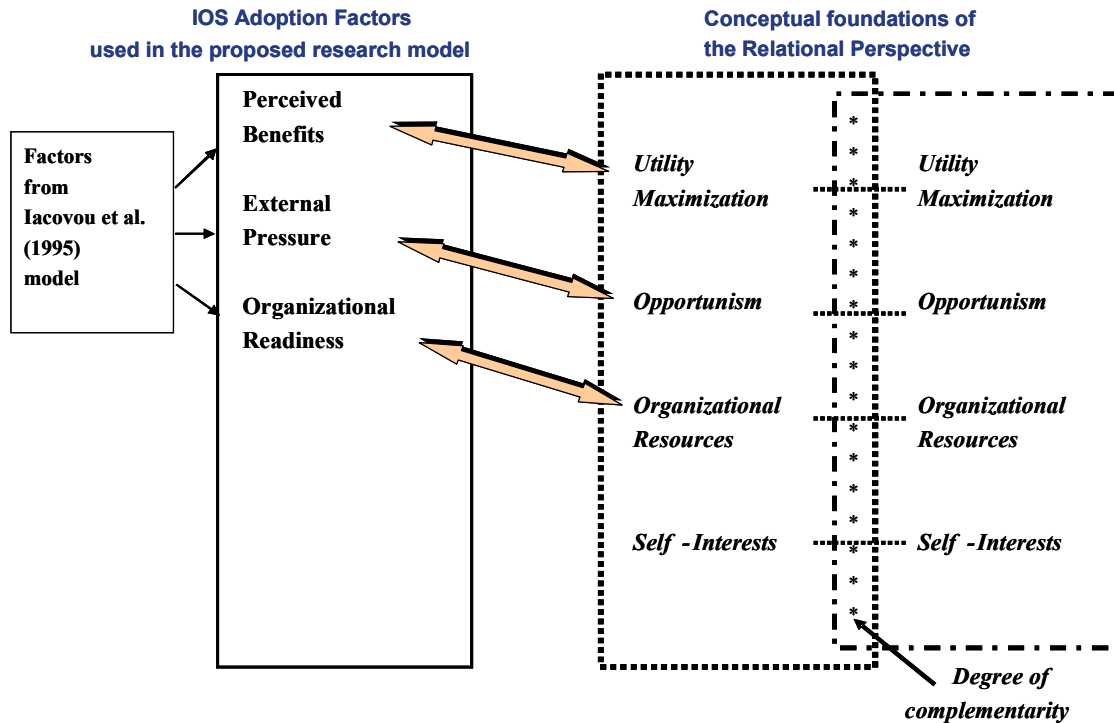


Figure 2. Factors Related to IOS Adoption for Transaction Processing and Their Conceptual Foundations in the Relational Perspective

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. As such, the relational perspective may offer a better explanation than a firm-centric perspective in the case of dyadic IOS adoption or non-adoption.

Notwithstanding the above, close examination of Figure 1 reveals that the three factors in the Iacovou et al. model have strong parallels with part 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*.

3.2 Operationalizing the Relational Perspective

To investigate IOS adoption within the context of our research (transaction processing vis-a-vis task support), Figure 3 shows how the relational perspective is initially operationalized in terms of the three EDI adoption factors and the three research perspectives. The resulting model that we use as a starting point for this research is shown in Figure 4, 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.

In Table 1, we illustrate how *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 organizational readiness, or both parties have low organizational readiness. This distinction between strong and weak complementarity also applies to the other factors.

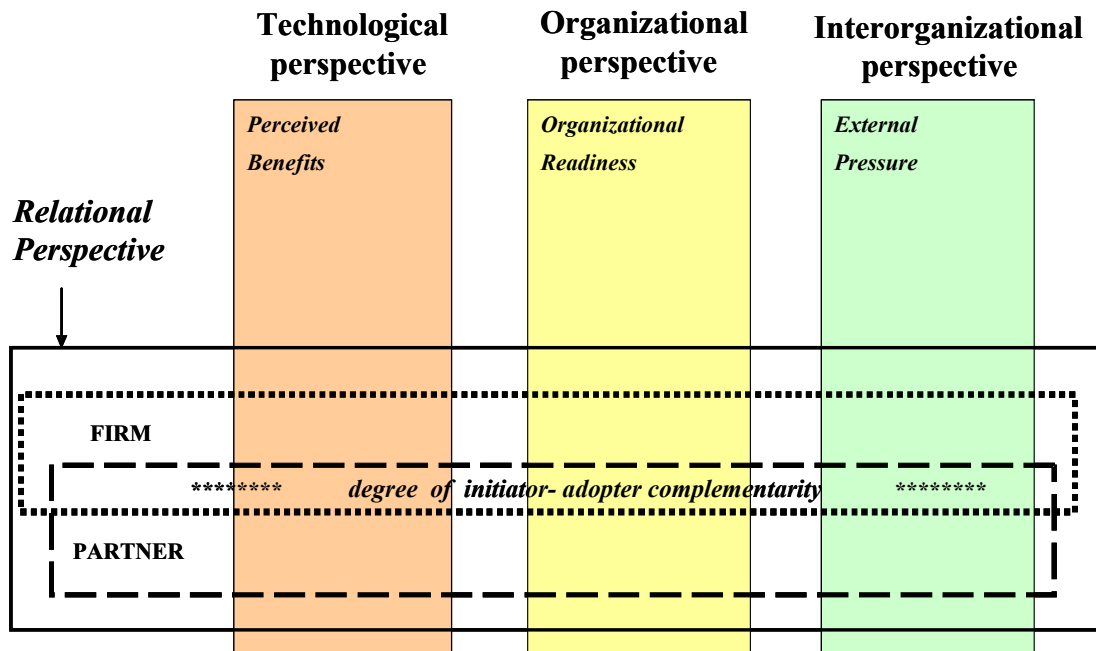


Figure 3. The Relational Perspective as Initially Operationalized in This Research (In terms of the three adoption factors and the three research perspectives)

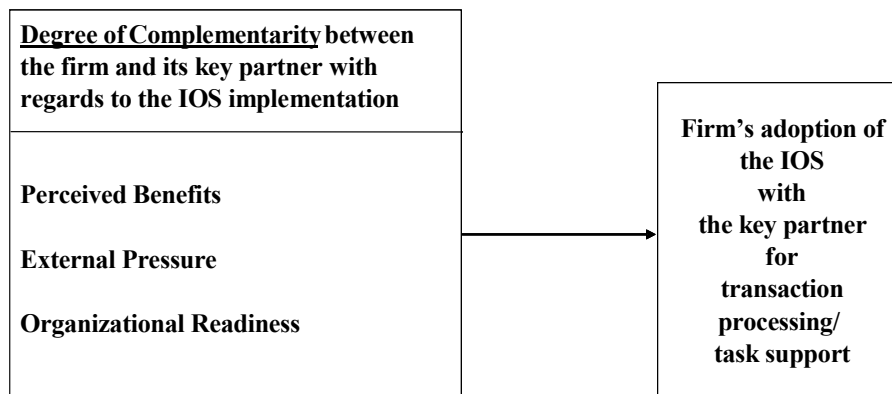


Figure 4. Preliminary Model for the Adoption of Interorganizational Systems for Transaction Processing vis-à-vis Task Support

4 RESEARCH METHODOLOGY

This research has two parts and employs a case approach due to this study's 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 (Benbasat et al. 1987; Lee 1989; Yin 1994).

Table 1. Strong Complementarity Versus Weak Complementarity Defined Using a High/Low Dichotomy as per Iacovou et al. (1995)

Firm	Partner	Degree of Complementarity in ORGANIZATIONAL READINESS
HIGH	HIGH	STRONG
HIGH	LOW	WEAK
LOW	HIGH	WEAK
LOW	LOW	WEAK

4.1 Part 1 Results: Influence of *Weak* Complementarity

In Part 1 (August–December 2001), a case study of two book publishing firms (and their one-to-one relationships with two key book-retailer customers each as subunits of analysis) has been completed. This study was conducted against the backdrop of a *discontinued* industry-wide IOS project in Singapore (BookNet). Here, we found that while the two publishers (Publisher-YES and Publisher-NO) *initially* had a clear *intent* to adopt (at BookNet’s initiation), actual dyadic *adoption* did not *subsequently* materialize due to weak complementarity between them and each of the two book retailers (Retailer-SG and Retailer-FN). Using the same high/low dichotomy as employed by Iacovou et al. (1995), Tables 2 and 3 provide evidence (pattern matches as per Yin 1994) for the influence of *weak* complementarity (in perceived benefits, external pressure and organizational readiness) in *reducing* the likelihood of adoption.

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

Part 2A (April–July 2002) consists of a follow-up case study of Publisher-NO and its relationships with two other book retailers (Retailer-SL and Retailer-PG) within the context of the aforementioned BookNet project. Here, we found that these two retailers joined with Publisher-NO to participate in the pilot project of BookNet due to strong complementarity. Table 4 provides evidence (pattern matches) for the influence of *strong* complementarity (in perceived benefits, external pressure and organizational readiness) in *increasing* the likelihood of adoption.

In Part 2B (which is in progress), a separate case study of two construction-related companies (and their one-to-one relationships with two key partners) is being undertaken. This part of the research examines the aforementioned relationships within the context of events from the initiation of CoreNet (an *ongoing* government-facilitated industry-wide IOS project in Singapore) to its present status. As part of CoreNet, these construction-related companies and their key partners have been leveraging the use of IOS (through government-facilitated business-to-business project Web sites) for project-based collaboration.

While the issue of *party trust* has featured prominently in many 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 business document exchange (*transaction processing*) and the government’s strong role in the project. However, this “trust” factor appears to be significant in Part 2B due to the use of IOS in the CoreNet project for facilitating collaborative activities (*task support*) between firms. We will present the completed analysis of Part 1 and 2A results (BookNet), and the status of Part 2B (CoreNet) results at ICIS 2002.

5 EXPECTED CONTRIBUTIONS

This study is novel in its introduction of the concept of *initiator-adopter complementarity* to IOS research, which may offer a new relational perspective to guide future empirical studies on the adoption, diffusion, and success of dyadic IOS implementations. In particular, this study points to the existence of different sets of factors in impacting IOS adoption for transaction processing vis-à-vis task support. Using Dyer and Singh’s (1998) analysis, the dyadic IOS is a particular type of relation-specific asset and may be a source of interorganizational competitive advantage. Since the relational perspective has part of its conceptual foundations in business strategy research, we posit that it may also have conceptual applicability in the context of non-IT relation-specific asset investments (e.g., expensive machinery that has been customized for each other’s operations). Future studies in business strategy research may thus wish to operationalize the relational perspective in terms of factors specific to the non-IT context of such investments.

Table 2. Part 1: Summarized Case Descriptions for Non-Adoption During Official Launch of BookNet Project (Publisher-YES with Retailer-SG and Retailer-FN)

	Publisher-YES	Book Retailer-SG	Degree of Complementarity ↓	Publisher-YES	Book Retailer-FN	Degree of Complementarity ↓
Perceived Benefits	High	Low	Weak	High	High	Strong
External Pressure	Low	Low	Weak	Low	Low	Weak
Organizational Readiness	High	Low	Weak	High	Low	Weak

Table 3. Part 1: Summarized Case Descriptions for Non-Adoption During Official Launch of BookNet Project (Publisher-NO with Retailer-SG and Retailer-FN)

	Publisher-NO	Book Retailer-SG	Degree of Complementarity ↓	Publisher-NO	Book Retailer-FN	Degree of Complementarity ↓
Perceived Benefits	Low	Low	Weak	Low	High	Weak
External Pressure	Low	Low	Weak	Low	Low	Weak
Organizational Readiness	Low	Low	Weak	Low	Low	Weak

Table 4. Part 2A: Summarized Case Descriptions for Adoption During Pilot Phase of BookNet Project (Publisher-NO with Retailer-SL and Retailer-PG)

	Publisher-NO	Book Retailer-SL	Degree of Complementarity ↓	Publisher-NO	Book Retailer-PG	Degree of Complementarity ↓
Perceived Benefits	High	High	Strong	High	High	Strong
External Pressure	High	High	Strong	High	High	Strong
Organizational Readiness	High	High	Strong	High	High	Strong

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