Sustainable Collaboration: Managing Conflict and Cooperation in Interorganizational Systems¹

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Abstract

Current interorganizational systems literature focuses on describing the role of information technology in enabling the transition from interfirm competition to cooperation. This article points out that the promise of IT enabled coop-

eration, if not nurtured, can degenerate into conflict. The objective of this article is to identify possible risks of conflict in the IOS arena and to suggest strategies for minimizing the likelihood of such conflict. It does so by developing a typology for characterizing IOS along the dimension of interorganizational interdependence in interfirm relationships. This typology classifies interorganizational systems into three types: pooled information resource IOS, value/supply chain IOS, and networked IOS. By examining the characteristics of these three types of IOSs the article identifies the economic, technical, and socio-political arguments for potential conflict in these systems. The identification of the risks, in turn, leads to a discussion of possible strategies for containing these risks. The article finally suggests that if the intended benefits of the collaboration are to be realized and sustained, corporate "statesmen" need to nurture the cooperation by anticipating these risks and managing them proactively.

Keywords: Interorganizational systems, sustainability, organizational strategies, collaborative use of IT/IS

ISRL Categories: A10107, DA03, DC06, DC08, DD04, HA07

Introduction

Interorganizational systems are information and communication technology-based systems that transcend legal enterprise boundaries (Bakos, 1991; Chismar and Meier, 1992; Konystynski, 1993). The boundary-spanning aspect implies a level of cooperation and coordination well beyond that of the traditional arms-length relationship that exists between organizations acting as free-agents in a market. At the same time, the relationship between the cooperating parties, and therefore the coordination and cooperation between them is not as tightly coupled by structural authority as usually exists in vertically integrated hierarchies. Thus, interorganizational systems (IOS) can be considered as

¹ Izak Benbasat was the accepting senior editor for this paper.
planned and managed cooperative ventures between otherwise independent agents.

Like any human endeavor, ventures that start out as cooperative enterprises can sometimes degenerate into conflict. A managerial culture with an adversarial view of extraorganizational actors such as suppliers, customers, employees, and competitors, coupled with a short-term, gain-taking mentality, can result in opportunistic behavior by one or more participants in the collaboration. This opportunistic behavior, in turn, may be perceived by other partners in the alliance as a betrayal that can result in counter-action by the injured party. Consequently, interorganizational systems that started out with initial intentions of cooperation can be subject to risks of potential adversarial behavior and conflict.

Traditionally, IOS literature has relied on economic arguments to explain the transition from a competitive to cooperative stance between the organizations. The typical observation of this literature is that as organizations move toward closer, more collaborative economic relationships, information technology and IOSs play an enabling role in making this transition feasible (Clemons and Knez, 1988; Clemons and Row, 1992; Reich and Huff, 1991). However, rational/economic arguments coupled with technical feasibility are not sufficient to consummate the collaborative alliance (Moss–Kanter, 1994). Ultimately sociopolitical issues, such as personal chemistry and interfering action between corporate leaders, and compatibility between the organizations on broad cultural, philosophical, and strategic grounds determine if the alliance will come into existence and mature (Moss–Kanter, 1994). Thus, all three arguments—rational/economic, technical, and socio–political—are needed to explain collaborative alliances.

In an otherwise optimistic scenario, there is potential for conflict in the development of EDI standards and systems (Webster, 1993). EDI systems can be used by participants in the supply chain to establish or re–enforce domination over their trading partners, replicating the control of vertically integrated organizations without incurring ownership costs and in extreme cases make upstream suppliers redundant by "desourcing" practices (Webster, 1993). Our article builds upon Webster's work by generalizing and expanding it to the broader context of interorganizational systems.

The objective of this article is to identify possible dangers of conflict in the IOS arena and to suggest strategies for minimizing the likelihood of conflict. It does so by extending the traditional economic arguments to also include socio–political and technological considerations in explaining the potential for cooperation and conflict between the participants in the alliance.

Such analysis is useful for both practice and research. From a practice perspective, the fruits of cooperation can only be realized if the cooperation is sustained over time, and all parties to the cooperation continue to perceive the arrangement to be fair and beneficial. Furthermore, any short–term opportunistic behavior, by increasing the level of distrust between participants, could also deter future cooperation. It is, therefore, important that these risks are anticipated and identified early in order to guard against the possibility of future conflict. From the perspective of the IS researcher, an analysis of such risks provides a basis for analyzing and examining failures of interorganizational systems and the conse-

2 Managed does not imply that the management is necessarily well done or effective. The only implication is that these boundary-spanning organizations do not come into being and operate spontaneously; they need joint intentions and action to be initiated and developed and to exist.

3 History is replete with examples of cooperation within political alliances, where entities (nations, states, individuals) starting out as cooperating agents very quickly degenerate into jockeying for advantage, sometimes culminating in open conflict. However, in those cases where "statesmen" recognize the need for cooperation and actively work to smooth over possible risks of conflict, the cooperation can be sustained over time.

4 Modern economic thinking takes opportunistic behavior, a logical consequence of "individual utility maximization," as a basic premise of economic theory.

5 Yates and Benjamin (1991) call this phenomenon "virtual vertical integration."
quent disintegration of interorganizational alliances.

The remainder of the paper is structured as follows. The next section identifies reasons from the literature for the emergence of interorganizational systems. It is followed by an interdependence-based analysis of interorganizational relationships and a typology for characterizing the variety of relationships in interorganizational systems. This typology is used to identify the risk of potential conflict in different types of IOSs. The final section offers strategies for anticipating and containing these risks.

Interorganizational Collaboration—Background Literature

Interorganizational systems exist to support and implement cooperation and strategic alliances between two or more organizations. There are a variety of economic reasons for the formation of these alliances (Culpan, 1993; Gilroy, 1993). And there are a number of reasons for the formation of interfirm collaborations (Guglan and Dunning, 1993). These collaborations are formed for sharing the costs of large investments, pooling and spreading of risk, and access to complementary resources (specific advantage theory) (Guglan and Dunning, 1993). Economies of scale, specialization, rationalization, and in some cases the motive of neutralizing competition by co-opting it are also cited as possible reasons for these partnerships. Further, increasing the return on investment by a geographically wider diffusion of the firm's products and services and thereby increasing the product life cycle expectancy may also play an important role. Increased resource utilization (or reducing resource idle time) can be a motivator for strategic alliances (Clemons and Row, 1992). Finally, reduction in supply-chain uncertainty is a possible motive for virtual vertical integration (Konsynski, 1993; van der Heijden, et al., 1995).

Researchers in interorganizational systems have developed a variety of theoretical arguments to explain the formation and structure of IOS-enabled alliances between organizations. These arguments are usually derived by adapting and extending existing theories of the organization from *intra* to *interfirm* behavior. For example, Malone, et al. (1987) use transaction cost theory to suggest that IT, by reducing transaction costs, will reduce forces for vertical integration and induce a move to a market structure. Clemons and Row (1992), on the other hand, also use transaction cost theory to argue that the use of IT, through explicit IT-based coordination, will bring about "a move to the middle" resulting in a network of interacting organizations. Gurbaxani and Whang (1991) observe that IT can support both decrease or increase in vertical integration. Ciborra (1993) provides a comprehensive discussion of the role of transaction cost theory in explaining IT-enabled formation of teams, markets, and hierarchical structures.

Bensaou and Venkatraman (1994), in a comprehensive survey of the literature, examine the theories of transaction cost economies (Williamson, 1985; 1991), political economy (Benson, 1975; Zald, 1970), information-processing and uncertainty (Galbraith, 1977; March and Simon, 1958; Woodward, 1965), and organizational theory (e.g., Aiken and Hage, 1968; Gaski, 1984; Marrett, 1971; Paulson, 1974) as possible bases for explaining interfirm cooperation. They (Bensaou and Venkatraman) propose an information-processing-theory-based framework that integrates the concepts of information processing needs and capabilities, with environmental, partnership, and task uncertainties arising from political, organizational, and transaction costs views.

While most of the IOS literature mainly outlines the benefits and advantages of interorganizational systems, some work recognizes the potential for conflict in these systems. As early as 1971, when the focus was mainly on intraorganizational uses of IT, and IOSs were only a gleam in the strategists and researchers eye, Stern and Craig (1971) recognized the potential of "interorganizational data systems" in creating power shifts within a supply chain. These power shifts, by creating winners and losers, can lead to conflict. More recently, Cavaye
(1995) describes the tensions developing in an interorganization system in the European grocery industry because of the attempts at control by the initiating partner. Webster (1993) suggests that EDI systems are being used by automobile manufacturers in the manufacturing supply chain to establish or re-enforce domination over their suppliers. Copeland and McKenney's (1988) documentation of the history of airlines reservation systems and the example of Frontier Airlines (Vitale, 1983) point out the dangers of abuse by dominant partners in the airline industry. Our paper furthers this tradition by developing a theoretical basis for examining the variety of risks of conflict in interorganizational systems.

Figure 1 summarizes some of the influences on the formation of cooperative alliances.

**Developing a Typology for Interorganizational Systems**

As explanations of interorganizational structure, the above literature deals primarily with the structural and governance aspects of interorganizational systems. However, since our interest is in the sustainability of the interfirm collaboration, a typology that can help us to focus on the ongoing aspects of the relationship is needed. Accordingly, this paper takes a somewhat different, relationship-oriented approach to the problem. Interorganizational systems are the software and system manifestation of interorganizational relationships. In order to identify potential sources of conflict in IOSs and to assess their sustainability, these relationships need to be characterized and understood.

Cooperation between organizational units implies that a certain level of interdependence exists between these units (Ouchi, 1980). Extending this concept across organizational boundaries, we suggest that interfirm relationships can be similarly described by interdependence between the actors in the alliance. This focus on interdependence is consistent with Kambil and Short's (1994) assertion that IOSs represent a pattern of interdependent relationships between the activities of a given firm and those of other firms. It is also in line with

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**Figure 1. Formation of Cooperative Alliances**

- **Environmental Forces:**
  - Globalization
  - Environmental Turbulance

- **Motives of the Cooperating parties:**
  - Resource pooling
  - Risk sharing
  - Utilizing relative advantages
  - Reducing supply chain uncertainty
  - Increasing resource utilization

- **Support Role of IT in Reducing:**
  - Transaction costs
  - Transaction risks

- **Enabling Role of IT Making the collaboration feasible**

- **Collaborative Strategy and Interorganizational Systems**
Rockart and Short’s (1989) argument that “managing interdependence” is the critical concept in understanding and formulating the role of IT in the 1990s. This paper suggests that the level and the nature of interdependence are likely to influence the potential and source for conflict. This section argues that increased level of interdependence is likely to increase the potential for conflict by increasing the need for coordination. The next section examines the different sources of betrayals and conflicts that are possible under various types of interdependence.

**Interdependence between interorganizational units**

To examine interdependence this research uses Thompson’s “interdependence” view of the organization. Thompson (1967) distinguishes three different ways in which the work of organizational units may be dependent on one another. First is pooled dependency, where the units share and use common resources but are otherwise independent. A within-firm example would be the use of a common transportation pool or a common mainframe by different units within the organization. An across-firm example would be the use of a common data processing center by a number of firms. Second, in sequential dependency units work in series where the output from one unit becomes input to another unit. An intrafirm example would be the marketing plan becoming the input to production and/or purchasing plans. An interfirm example would be the various supplier–customer relationships along a “value system” or a logistics chain (Porter and Millar, 1985). Third, in reciprocal dependency units feed their work back and forth among themselves; in effect, each receives input from and provides output to others, often interactively.6 Within-organization examples include a surgical team performing an operation, a group of research colleagues designing a study as a “think tank,” or an executive committee of the firm developing a corporate mission statement and strategy (Thompson, 1967). An interfirm example would be a concurrent engineering team consisting of customers, suppliers, distribution centers, dealers, shippers and forwarders, and the multiple within–firm units working together to concurrently design, develop, produce, and deliver the Ford Taurus automobile (Mishne, 1988; Zimmerman, 1991). Thompson (1967, p. 55) suggests: “The types of interdependence form a Guttman–type scale: ... all organizations have pooled interdependence; more complicated organizations have sequential as well as pooled; and the most complex have reciprocal, sequential, and pooled.”

The level of interdependency or coupling between units is a key factor in determining the potential for one unit to harm the operations of another unit. The closer the coupling or interdependency, the greater the intentional or accidental harm one unit can inflict upon the other. Pooled interdependence involves the least amount of interdependence because any one participating unit can be plucked out, and as long as there is no significant corresponding withdrawal of resources, the others can continue to work uninterrupted (Mintzberg, 1979). Consequently, the actions of one unit can, at worst, affect the alliance by affecting the overall pooled resource.

With sequential interdependence there is a direct directional dependence between the units (Robey and Sales, 1994). Pulling out a sequentially interdependent unit is like breaking a chain—in extreme cases the whole subsequent set of activities may cease to function. Consequently, actions of any unit are likely to affect at least the adjacent and possibly all subsequent downstream units in the value system. Finally, reciprocal interdependence means that units provide each other with

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6 Building upon Thompson, van de Ven, et al. (1976, p. 325) further subdivide reciprocal dependency into two categories: reciprocal dependence and team interdependence. They suggest that while there could be a “measurable temporal lapse in flow of work” in the reciprocal case, the work is acted upon jointly and simultaneously by the unit members at the same point in time, and thus the interdependency is highest in a team work flow. This level of discrimination, while helpful, is not essential to our argument, and thus we will stay with Thompson’s three types of interdependences.
inputs in no particular predefined sequence (Robey and Sales, 1994). Changes or problems in one unit could affect not only those downstream but also those upstream. In fact, the concept of upstream and downstream is no longer meaningful as the participants in the relationship feed work back and forth to each other. Thus, different types of interdependence are likely to generate different types and degrees of risk of conflict.

**Structure, coordination and the potential for conflict in the interorganizational relationship**

The level of structure in the relationship can influence the potential for conflict. Structure, by formalizing the form, process, and content of the relationship, implies a level of agreement about mutual expectations. It thus reduces equivocality, i.e., the level of ambiguity, in the relationship. Equivocality, with its potential for misinterpretations and misunderstandings, increases the likelihood of disagreements. Lack of structure would, therefore, contribute to the risk of conflict. It should be recognized that interdependence and structure are not orthogonal; the level and type of interdependence between the actors influences the structure of the relationship between them. The interplay between interpartner interdependence and relationship structure, and their potential for conflict is discussed in this subsection.

The concept of structure has its antecedents in organizational theory. Organizational structure is defined as "the sum total of the ways in which its labor is divided into distinct tasks and then its coordination is achieved among these tasks" (Mintzberg, 1993, p.2). In addition, "An organization's structure defines the expectations for each role and the connections between each role" (Robey and Sales, 1994, p. 9).

Extrapolating to the context of interorganizational relationships, structure can be interpreted as the ways in which interorganizational work is divided among the partnering organizations by assigning specific roles to them and the ways in which coordination is achieved among these roles. Coordination consists of protocols, tasks, and decision mechanisms designed to achieve concerted actions between interdependent units (Thompson, 1967). The notion of task structure from decision support literature is used to further refine this idea. "The degree of potential structure in the task predefines the procedures, types of computation and analysis, and the information to be used" (Keen and Scott Morton, 1978, p.86). This concept of task structure is similar to the concept of the programmable nature of task (Melcher, 1976) and the notion of task and problem analyzability (Perrow, 1965; 1967).

These notions are integrated to define the structure of an interorganizational relationship as *the level of specification of roles, obligations, rights, procedures, information flows, data, and analysis and computational methods used in the interorganizational relationship*. The higher the level of prespecification of these coordination aspects, the greater the initial structure in the relationship.

"In the order introduced, the three types of interdependence are increasingly difficult to coordinate because they contain increasing degree of contingency" (Thompson, 1967, p.55). Pooled interdependence involves minimal direct contact among the units (Robey and Sales, 1994). This minimal interaction between units reduces the need for coordination. In sequential interdependence there is always a greater element of contingency because each position in the sequence must be readjusted if any upstream position fails to meet expectations. In the case of sequential interdependence, "This greater degree of interdependence is also a frequent contributor to conflict" as "problems and errors have a tendency to travel downstream and often the responsibility for errors is hard to trace" (Robey and Sales, 1994, p. 120). The level of contingency is the highest with reciprocal interdependence because actions of each position in the set must be adjusted to the actions of many interacting positions (Thompson, 1967).
A number of authors have examined the relationship between the types of interunit interdependence and interunit coordination mechanisms needed to manage the interdependence (Mintzberg, 1993; Robey and Sales, 1994; Thompson, 1967; van de Ven, et al., 1976). For example, Thompson (1967, p. 55–56), using March and Simon's (1958) typology of coordination mechanisms, suggests, "... there are distinct parallels between the three types of interdependence and the three types of coordination. With pooled interdependence, coordination by standardization is appropriate; with sequential interdependence coordination by plan is appropriate; and with reciprocal interdependence, coordination by mutual adjustment is called upon." There is similar correspondence between interdependence and coordination mechanisms (Mintzberg, 1993; Robey and Sales, 1994; van de Ven, et al., 1976).

These coordination mechanisms are increasingly complex and indeterminate in nature and place increasingly heavy burdens on communication and decisionmaking (Thompson, 1967, p.56). Standardization requires less frequent decisions and smaller volume of communication during a specific period of operations than does planning, and planning calls for less decision and communication activity than does mutual adjustment. More complex coordination mechanisms increase the need for human intervention and contact. Furthermore, the increased direct contact increases the likelihood that differences between the interacting members are surfaced thereby increasing the possibility of conflict (Davis and Lawrence, 1977).

Structurability of an interorganizational relationship is the ability or the potential to specify the structure. Structurability of a relationship, and consequently the level of its initial structure, is a function of its a priori structure (i.e., its contingency) and the level of specificity of the coordination mechanisms available. Because pooled interdependence has the least contingency and requires the simplest (most specific) coordination mechanisms, the relationship among pooled units is highly structurable, and its need for structure is easily satisfied by the coordination mechanism. Thus, pooled relationships are likely to have the highest level of initial structure. On the other hand, the greater contingencies in sequential and reciprocal interdependencies not only suggest a lower a priori structure, the more complex and ambiguous coordination mechanisms are also not likely to fully contain the contingencies in the relationship.

Pooled interdependence is likely to be most structured at the time of implementation of the IOS. If a resource is to be shared by a number of independent parties, the resource will need to be clearly identified, defined, and standardized. Otherwise, there would be no agreement about the object of sharing. In addition, given the minimal interaction between participating organizations, the level of interaction contingency is the lowest, and therefore standards as main coordination mechanisms are also likely to be highly structurable and specifiable. This would imply the existence of a high level of structure at the time of initiation of the alliance.

In the case of sequential interdependence, mutual expectations between adjacent parties need to be clarified for the sequential relationship to function. This often takes the form of "output/input" or interface standards between the sequentially adjacent parties and creates a certain level of structure in the relationship. In addition to standards, sequential interdependence requires the use of schedules and plans, which introduces another layer of complexity and uncertainty in the relationship (Thompson, 1967). Furthermore, the increased need for direct contact in the sequential relationship also increases the possibility of human misunderstanding and error (Sproul and Kiesler, 1991). Performance ambiguity and uncertainty in the schedule or plan, in addition to any performance ambiguity in interface standards, can further increase the level of uncertainty, thereby decreasing the initial structure.

Finally, the case of reciprocal interdependence, having the highest level of contingency, implies the lowest level of initial structure. The form, direction, and content of the interaction
between the various actors in the relationship often cannot be anticipated in advance and has little initial structure. Furthermore, mutual adjustment as the coordination mechanism relies upon a high level of *ad hoc* activity that will further reduce the structure. Structure reduces equivocality in the relationship. Consequently, lack of structure contributes to the risk of conflict.

**An interdependence-based typology for interorganizational systems**

A number of organizational theorists have examined the relationship between technology and organizational structure variables. Three types of technology: mediating, long–linked, and intensive (Thompson, 1967). Mediating technologies essentially bring people with complementary needs together through the use or exchange of a common resource. Long–linked technologies involve a series of activities that are sequentially arranged such that performance of earlier activities is necessary before later activities can be performed. Finally, intensive technologies, "signify (that) a variety of techniques is drawn upon in order to achieve change in some specific object; but the selection, combination, and order of application are determined by feedback from the object itself" (Thompson, 1967, p. 17). Firms employing intensive technologies possess a variety of technological resources that can be applied in a variety of combinations (Robey and Sales, 1994). The structure and use of technology is likely to differ from situation to situation. The three types of technologies can be mapped on to the three types of interdependence (Robey and Sales, 1994; Thompson, 1967).

Interorganizational systems are technologies designed and implemented to operationalize the relationships between the partners in the alliance. Furthermore, the structurability of the relationship influences the degree to which the relationship can be programmed and embedded in the IOS. Consequently, the three types of interdependence—pooled, sequential, and reciprocal—and their level of structure are also likely to be reflected in the design of the IOS.

Building upon Thompson’s notion of the association between technology and interdependence and in correspondence with the three types of interorganizational interdependence, we suggest a three–part typology for IOSs: pooled information resource IOSs; value/supply-chain IOSs; and networked IOSs. It should be remembered that the three types of interdependencies form a Guttman-type scale (Thompson, 1967). Therefore, situations with higher-level interdependencies, i.e., reciprocal and sequential, also contain lower-level interdependencies. Thus, networked IOSs are likely to possess characteristics of value/supply chain and pooled information resource IOSs, and value/supply chain IOSs the characteristics of pooled information resource IOS. Furthermore, organizations can participate simultaneously in many kinds of interorganizational relationships (Moss–Kanter, 1994). A particular IOS may, therefore, include features of two or all of these types of interorganizational systems. As discussed above, these different levels of interdependence also imply different levels of structurability of the interorganiza-

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7 Traditionally, organizational theorists have examined the influence of technology on organizational structure (e.g., Perrow, 1967; Woodward, 1965). These early studies typically took a unidirectional view of the influence of technology on organizations. This view was based upon a limited, naïve notion of the process by which technology is designed and implemented (Robey and Sales, 1994). Its implicit premise was that technology was inflexible and therefore a given, and the phenomenon of interest was the impact of technology on the organization. A more mature perspective of the relationship between technology and organizations takes the position that while technology influences organizations, organizations, at the same time, influence the design, implementation, and use (i.e., appropriation) of the technology to suit their requirements. The organization–technology relationship, therefore, is better characterized as a mutually adaptive structuration relationship rather than the unidirectional relationship implied by the early researchers (Poole and DeSanctis, 1990).

8 Robey and Sales (1994) interpretation of mediating technology includes situations where mediating technology may be used to bring together producers (sellers) and consumers of a common good or service. As we will show in our definition of pooled information resource IOSs, this is the characteristic of a typical electronic market.
tional interaction. Hence, the three types of interorganizational systems are likely to exhibit increasing potential for conflict.

Table 1 summarizes the above discussion, and describes the three-part typology for interorganizational systems and locates some of the current IOS implementation technologies in this typology.

The first type, pooled information resource IOSs, is an interorganizational sharing of common IS/IT resources, as exemplified by Konsynski and McFarlan (1990). Typical IS/IT resources shared in a pooled fashion include: common databases (as in the case of CLUE, an automobile insurance industry claims database that collects and stores insurance claims information from all participating insurance firms and provides insurance applicants’ claims history to the participating insurance company on demand), common communica-

tion networks (as in the case of the Philadelphia MAC-ATM network reported by Clemons, 1990), and common applications such as airlines reservations systems (Copeland and McKenney, 1988). The primary forces leading to such cooperation include economies of scale (Clemons, 1990) and consequent cost and risk sharing, and participation externalities (the value of the pooled resource IOS to the ultimate customer increases with the size of the resource and the number of participating members). The partners in the alliance could either be competitors within an industry (as in the above three examples) or organizations in non-competing industries (as in the case of central reservation systems currently being developed to link hotel reservations, car rentals, entertainment reservations, and airlines reservations). The relatively high level of initial structure in this case is the result of the need for definition, standardization, and specification of the shared or pooled resource.

<table>
<thead>
<tr>
<th>Type of Interdependence</th>
<th>Pooled Interdependency</th>
<th>Sequential Interdependency</th>
<th>Reciprocal Interdependency</th>
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</thead>
<tbody>
<tr>
<td>Configuration</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Coordination Mechanisms</td>
<td>Standards &amp; Rules</td>
<td>Standards, Rules, Schedules, &amp; Plans</td>
<td>Standards, Rules, Schedules, Plans, &amp; Mutual Adjustment</td>
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<tr>
<td>Technologies</td>
<td>Mediating</td>
<td>Long–Linked</td>
<td>Intensive</td>
</tr>
<tr>
<td>Structurability</td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td>Potential for Conflict</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Type of IOS</td>
<td>Pooled Information Resource IOS</td>
<td>Value/Supply-Chain IOS</td>
<td>Networked IOS</td>
</tr>
<tr>
<td>Examples of Implementation Technologies and Applications</td>
<td>Shared Databases Networks Applications Electronic Markets</td>
<td>EDI Applications Voice Mail Facsimile</td>
<td>CAD/CASE Data Interchange Central Repositories Desk–Top Sharing Video–Conferencing</td>
</tr>
</tbody>
</table>

Table 1. Interdependence, Structure, and Potential for Conflict
(Adapted from and an extension of Robey and Sales, 1994, fig. 5–3, p.121)
Electronic markets implemented through a variety of proposed international standards, such as UN/EDIFACT and the ISO/IEC's Open—EDI standard, are a special case of the pooled information resource IOS. These IOSs provide the participants with some combination of common databases, common application procedures and software, and/or common infrastructure to conduct arms-length market transactions (Bons, et al., 1994). Being open markets, the membership of any organization in such an IOS exists only for the duration of the market transaction. The level of structure in these systems comes from commonly agreed upon transaction standards.

The second type of IOS, value/supply-chain IOS, supports customer—supplier relationships and occurs as a consequence of these relationships along the value/supply chain. These systems are called pipeline management systems (Manheim, 1993). Such systems are becoming strategic necessities rather than strategic advantages (Manheim, 1993). These IOSs institutionalize sequential interdependency between organizations. Structured sequential interactions could range from formal EDI-based orders and order tracking and database look-up of adjacent partners in the chain to anticipate customer needs, to the transfer of CAD-based specifications from the customer to the supplier. The primary motives behind these collaborations are the reduction of uncertainties in the supply chain, thereby gaining cost, cycle time, and quality advantages over competing supply chains in the industry. The key strategic advantage is through collaboration within the supply chain to compete with other supply chains in the industry. The set of sequentially defined expectations between adjacent partners in the value chain provide some structurability and initial structure to the sequential relationship. However, as discussed in the above subsection, the complexity of the product or service and the uncertainties in the value chain related to schedules and plans serve to reduce this structure.

The third type, networked IOSs, operationalize and implement reciprocal interdependencies between organizations. They typically represent joint ventures between various partners, each partner providing a different specific advantage. The collaboration is sometimes for a finite duration and involves the development of specific target products or services. In some cases, especially in global alliances, the joint venture could also involve long-term, ongoing operating partnerships. In either case, the participating organizations attempt to leverage each other's complementary capabilities. At the most primitive level, these systems include the use of e—mail, fax, and voice communication to coordinate interorganizational joint ventures and partnerships. At a more advanced level, they could involve the use of desk-top/screen-sharing technologies, CAD/CASE data interchange and repositories, discussion databases, synchronous and asynchronous time/place computer—based systems for supporting collaborative work, and the integration of these technologies with video—conferencing.

Unlike the pooled information resource and value/supply chain IOS, initially the networked IOS will tend to be much less structured. Except for some standardized design/graphics data interchange formats (such as CDIF—CASE data interchange format) most of the structure in such systems is likely to come from the participants and the use process. As the participants in the interorganizational alliance interact by actively using IT—based support, they discover elements of deep structure in the interaction situation and incorporate this structure in their evolving use of the technology. Moreover, IT itself becomes one of the structuring partners in the reciprocal relationship. Thus, while IS/IT influences the group structure and dynamics, the group processes themselves influence the appropriation and structure of IS/IT that is used (Poole and DeSanctis, 1990; Quershi, 1994). In these situations information technology is more likely to provide process support for mutual adjustment between the partners rather than information support. Additionally, given the reciprocal interaction process, different joint ventures will appropriate the technology differently and will be influenced by the technology differently.

Finally, networked IOSs are information and communication technology rendering of the
"intensive technologies" concept proposed by Thompson (1967). Intensive technologies consist of a portfolio of resources, technologies, and techniques, which, depending upon the situation, can be selected and applied in a variety of combinations (Robey and Sales, 1994; Thompson, 1967). At present, most enabling technologies for this form of collaboration are under development and mainly in an emergent phase. The integration of task/team support technologies (e.g., groupware, CSCW, discussion databases), high bandwidth telecommunications, and information-rich media (such as color graphics and full motion video) is likely to provide the enabling technological platform for these systems. An example of networked IOSs is the use of telecommunication and CASE technology by Holiday Inn Worldwide, Infosys Bangalore, and Software Sourcing to leverage each others' distinctive IT competencies in reducing the cost and cycle times for database reengineering, while at the same time increasing the quality of the end product (Kumar and Willcocks, 1996). Another example is the use of COMNET-IT (Commonwealth Network of Information Technology for Development), aimed at bringing together expertise and organizations from the British Commonwealth countries to coordinate their efforts toward utilizing information technology in pursuit of development goals (Quershi, 1994).

Sources of Conflicts and Coordination in Interorganizational Systems

As outlined in the above discussion, the three types of IOSs—pooled information resource IOSs, value/supply chain IOSs, and networked IOSs—are manifestations of three different types of interdependencies (pooled, sequential, and reciprocal) between organizations. Given the different levels of interdependence, they imply different levels of structurability and therefore imply different potentials for conflict (see Table 1). In addition, the three types of interdependence are also qualitatively different. Therefore, in each of these three types of relationships, the partnering organizations are subject to different sources of betrayals and therefore different types of risks of conflict. This section examines the sources of risks of conflict for each of the three types of IOSs and then goes on to explore some IS/IT and people-based strategies for managing these risks.

Whereas the previous IOS literature focuses on the reasons for collaboration from a primarily rational economic perspective, this paper examines the risks/threats of conflict from three perspectives: economic, technical, and socio-political. It is our assertion that the rational economic perspective provides only a limited explanation of the interorganizational phenomenon and needs to be complemented with technical and socio-political considerations. From a technological perspective, it has long been recognized that information and communication technologies can be enablers of interorganizational alliances (e.g., Cash and Konsynski, 1985; Rockart and Short, 1989; Stern and Craig, 1971). Conversely, the lack of stable and reliable technological linkages can retard or inhibit interorganizational connections. Similarly, interorganizational alliances may be formed for political reasons such as to comply with foreign ownership regulations of a country or to co-opt potential competition. On the other hand, socio-political issues such as quest for dominance, clash of executive personalities, or incompatibility of organizational culture and values could also underlie the demise of these alliances (Moss–Kanter, 1994). The following discussion, therefore examines the economic, technical, and socio-political risks of conflict in each of the three types of interorganizational systems.

Risks and risk management in pooled information resource IOSs

From an economic perspective, the pooled information resource IOSs are metaphorically similar to the village commons in old England and other parts of Europe, where, at least in theory, a common piece of ground was held...
for use by everyone in the village. The “tragedy of commons” suggests certain risks associated with the common use of commons (Hardin, 1968; Hardin and Bader, 1977)—risks that would seem to be equally applicable to the use of common or pooled IS/IT resources. Typical risks to commons include: overgrazing of the common, fouling or contaminating, poaching the commons, and stealing fellow citizens’ cattle. As long as these potential risks are recognized in advance, pooled information resource IOSs can be designed so that it may be used effectively as the village constable to guard against these risks.

Overgrazing: Because the commons are a public resource, some individuals are likely to use them to support larger herds of cattle and overgraze the commons, thereby harming the long-term viability of the commons. Similarly, in pooled information resource IOSs, it is possible that one of the users of the common database, network, or application overuses the IOS, thereby degrading the service levels for other users. However, in the context of current technology, this risk is minimal and easily controlled by imposing a usage charge proportional to the use (somewhat similar to “per head” grazing charge). Moreover, at least some of the proceeds from the usage charge can be used to improve the future capacity of the information resource. This usage charge can easily be measured and imposed by a software transaction monitor.

Fouling or contamination: The risk of fouling or contamination occurs when one or more users of the commons treat the common as a free dumping ground for their waste and debris. A pooled resource IOS equivalent of fouling would be the dumping of corrupt data, or allowing non-standard or unedited transactions onto the network, or even worse, unintentionally or intentionally infesting the system with viruses. Again, such a risk can be controlled by designing and enforcing data and access standards through IT-based and procedural mechanisms for security, data-edit, virus-scan, and access control.

Poaching: Poaching occurs when commonly held resources are diverted by one of the participants for his or her own private use. For example, while the commons may be intended as a game replenishment sanctuary, some people may poach upon this common resource for private gain. Similarly, in pooled information resource IOSs, it is possible that one of the partners may attempt to collect and summarize information from the entire database, or monitor and analyze transactions over the common network to develop strategic information for private use. Such a misuse is also easily controlled by appropriate IT-based access controls and security measures used to monitor user queries and transactions.

Stealing: Outright stealing occurs when one denizen of the commons captures or steals heads of cattle from another fellow villager. In a pooled resource IOS, it is also possible that one participant, by either database lookups or by monitoring online transactions, can find out information about another firm’s customers, which it can use to entice the customer away from the original company. With adequate software safeguards, such as access control mechanisms and transaction logs, such behavior can be monitored and controlled.

From a technical perspective, the commonly shared databases, networks, and applications in a pooled information resource IOS rely on the relatively mature and stable database and data communication technologies. Furthermore, pre-established concurrency control and security mechanisms in these technologies reduce the possibility of resource contention and conflict. Hence, the potential of technical breakdown and/or conflict is usually not high. However, as new pooled IOSs are implemented using some of the newer technologies, such as distributed databases, distributed processing, broadband communication technologies, and multi-media databases and data communications, the risks of technical breakdown and security breakdown could again become discernible.

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9 Those more comfortable with a nautical metaphor, or desiring a current (EU) metaphor, can replace the commons with The North Sea and cattle-grazing with fishing. Of course, the metaphor starts wearing a bit thin when customers are equated to herds of cattle or school of fish.
From a socio–political perspective, the parties sharing the resource do not need to directly interact with each other. Consequently, the possibility of interpersonal or socio–political conflict is usually minimal. However, socio–political risks could arise from two possible sources. First, as the early airlines reservations (American Airlines/Sabre, United/Apollo) examples demonstrate, in those situations where the pooled information resource is controlled by one of the partners and the controlling partner is also a competitor of the other parties, this dominant partner may use his/her controlling position to intentionally damage other parties (Copeland and McKenney, 1988; Vitale, 1983). Furthermore, partners may also not trust the system controls or be sufficiently comfortable in their own minds that such controls work. If one partner controls the controls, the other may worry, especially if the other partner is a competitor. In these cases, the control of the resources is better placed in the hands of a neutral third party such as a trade association, exchange, government agency, or a joint venture company. Second, if the pooled information resource IOS crosses national boundaries (as is the case with EUROSELECT (Cavaye, 1995; Klein and Kronen, 1993)), the differences in national regulations and customary business practices between the international partners could also create potential for risk.

Finally, because of the supplier–customer relationships inherent in the market transactions, electronic markets present some specialized risks that are not present in other pooled information resource IOSs. These include the risk of repudiation, authentication, and security and integrity (Bons, et al., 1994). Since the market transactions carry contractual, performative, and negotiative information, it is possible that either the sending or receiving party wishing to default on the transaction could repudiate that they either sent or received the transaction. Another associated issue is the need to verify the identity of the parties involved (authentication). Moreover, because of the contractual nature of the transaction, the issues of security and integrity are much more salient than those in other pooled information resource IOSs.

Bons, et al. (1994) propose a variety of technical, encryption-based, and organizational (trusted third party) solutions to manage these risks.

**Risk and risk management in value/supply-chain ISs**

From an economic perspective, value/supply-chain ISs are IT–based implementations of sequential interdependencies. The traditional rational view of sequential relationships—that of supplier–customer relationships inherent in the value/supply chain—is a naive view based upon the assumption of "perfect cooperation" between the parties (Ciborra, 1993). This view is not very realistic under commonly prevailing conditions of information asymmetry, incomplete goal congruence, performance measure ambiguity, and consequent opportunistic behavior by the parties in the relationship (Ciborra, 1993). This opportunistic behavior, in turn, could lead to conflict between the parties.

The concept of "transaction costs," originally introduced by Coase (1937) and later developed by Williamson (1975; 1991) and Ouchi (1980), uses performance ambiguity, goal incongruity, and information asymmetry to explain the formation of alternate forms of economic organizations. Transaction cost economies (TCE) starts with the premise that the elementary social process common to all organizational forms is exchange among human agents. Basic organizational processes, such as coordination, control, and communication are manifested through a network of these exchanges or transactions (Ciborra, 1993). TCE assumes that the human agents in these transactions are prone to behave opportunistically when incomplete goal congruence obtains among them. Transaction costs, then, are the costs of managing the interaction while keeping the opportunistic behavior under control so that ongoing cooperation between the units can be sustained. Hence, the TCE perspective has direct relevance for explaining the co-existence of cooperation and the possibility of conflict within an interfirm alliance.
Transaction costs include: search costs necessary to set up the minimum social unit for the exchange, i.e., the alliance; contracting costs, which are related to the negotiation of the terms of trade and the drawing up of the contract that regulates the exchange; control and regulation costs for implementation of the contract under conditions of uncertainty and the policing of the deviations from the contract terms; and the maintenance costs of the whole transaction, that is, the cost of resources employed to let the exchange develop (Ciborra, 1993). In case of a value/supply chain IOS, the first two costs are incurred either prior to or during the early stages of the development of the IOS. The remaining two costs, control and regulation costs, and maintenance costs are the main transaction costs during the implementation/operation phase of the IOS.

It is useful to divide the transaction costs into coordination costs and transaction risks (Clemons and Row, 1992). *Coordination costs* are direct costs of integrating decisions between the parties in order to improve resource efficiency. This includes the costs to establish and operate information channels and decision processes. Coordination costs, therefore, include the cost of developing and setting up the value/supply chain IOS. It is now commonly accepted that information technology has the potential to reduce coordination costs (Bakos, 1991; Cash and Konosynski, 1985; Ciborra, 1993; Clemons, 1990; Clemons and Row, 1992; Gurbaxani and Whang, 1991; Malone, et al., 1987; Rockart and Short, 1989).

*Transaction risk* is the cost associated with the exposure to being exploited in the relationship. Thus transaction risk could be a direct cause of the risk of opportunism and consequent conflict in the IOS alliance. Three major sources of transaction risk are identified: transaction–specific capital, information asymmetries, and loss of resource control (Clemons and Row, 1992). *Transaction–specific capital* (or asset–specificity risk) is investment by one party that has little or no value in uses other than the specific interaction for which it was originally undertaken. In the case of an IOS, investments in computers, telecommunication, and other hardware are rarely transaction specific (Clemons and Row, 1992). Software development and implementation associated with many IOSs can be far more transaction-specific and thus carries a risk. However, the characteristics of software used, such as reusability, portability, modularity, replicability of know–how, coupled with open standards, IT support for conversion and translation, and intuitive interfaces that reduce the costs of training or re–training can reduce this risk substantially.

The second source of transaction risk, *information asymmetries*, can create problems in monitoring performance, thereby increasing performance shirking by one party at the expense of the other. Such a risk is much higher in cases of performance measure ambiguity (Ouchi, 1980). Again, performance measure ambiguity may be reduced by using IT to generate and collect monitoring information that would otherwise be too expensive to collect manually (Clemons and Row, 1992). The example of the use of point–of–sale (POS) terminals to collect information in the consumer packaged goods industry illustrates how such information can be collected at minimal cost as a by–product of normal operations at appropriate points along the value/supply chain (Clemons and Row, 1992). Historically, this industry has been characterized by conflict in the chain between retailers, wholesalers, and manufacturers. The use of IT (driven by POS checkout scanner systems) for monitoring and supporting new incentive structures has lowered the risk of shirking and opportunistic behavior that results from information asymmetries and performance measure ambiguity.

The third source of transaction risk, *loss of resource control*, may be more difficult to manage. The risk of loss of resource control occurs when resources are transferred as part of the relationship, and these resources cannot be returned or controlled in the event of termination of the relationship. Unlike transaction–specific capital, these resources are not sunk, but have value in other (sometimes future) transactions. The most important resources subject to loss of control are information and know–how, since it is very difficult to control...
access and subsequent utilization of such resources. For example, using a value/supply-chain-based IOS simulation game, if the information about ultimate demand and supply becomes available to other participants in the chain, this information frequently may be used to bypass the middle—man in the chain (Wrigley, forthcoming). Another example may be the use of supply chain information by one of the participants for purposes other than coordinating the supply chain, such as collecting and selling mailing lists to parties outside the supply chain.

Thus, while the use of IT for monitoring and providing incentives for cooperative behavior may reduce some of the risk of loss of resource control, the nature of the information resource may also increase this risk substantially. Consequently, value/supply chain alliances need to take such risk into account in developing both IT-based as well as human and legal/contractual mechanisms to manage this risk.

From a technical perspective, as long as the value/supply chain IOSs rely on mature and stable standards, and data communication and database technologies, the technical risks are minimal and controllable. Similarly, because of their current levels of standardization and structure, supply-chain IOS implementations based upon closed proprietary EDI standards and designs (e.g., LeviLink (Peters, 1989) and the Port of Rotterdam EDI application (Wagenaar, 1992)) also have low technical risks. In the short term, however, technical risks are likely to increase as new value/supply chain IOSs are implemented using relatively immature and untested network technologies such as the Internet, and relatively new and untested open standards such as the open–EDI mentioned in the previous section. Once these technologies mature and open standards currently under development stabilize and are commonly accepted, these risks are likely to decrease.

Suboptimization of value/supply-chain relationships at the adjacent link level may provide another source of risk. Typically, value/supply-chain IOSs (such as EDI systems) are designed to implement the supply/demand relationships between immediately adjacent nodes of the value chain. For example, a value/supply-chain IOS for placing automobile orders may connect an automobile manufacturing plant to the automobile dealer. Usually, it would be optimally designed to facilitate order-entry information between the two adjacent nodes—the manufacturing plant and the dealer. Similarly, another separate system may be designed and implemented to integrate the manufacturing plant to the suppliers of automobile parts. Each of these IOSs will optimize the value/supply link between their own adjacent nodes. However, an overall design across the overall value system/supply chain, including parts and labor suppliers, the design department, the manufacturing planning department, the manufacturing plant, the dealer, the automobile service and repair departments, may require very different structuring and design than either of the two adjacent node IOSs. Thus, from a technical point of view, built-in risks of suboptimization would exist. These risks may explain the drive toward "open" standards.

Value/supply-chain IOSs that span international boundaries carry two additional risks. First, the differences in the availability, maturity, compatibility, and reliability of IT infrastructure across national boundaries may create additional complexity and risks. Second, the differences in customs, business practices, and regulations across national boundaries may also increase the potential for conflict (Cavaye, 1995).

From a socio–political perspective, in general, the level of structure inherent in the sequential relationship could provide a buffer between the two sequentially adjacent parties, thereby structuring and reducing the need for socio–political interactions and consequent risk of conflict. However, recent research suggests that EDI-based supply-chain IOSs can be used by dominant parties in the supply chain to consolidate their dominance of the chain (Webster, 1994). By mandating the use of their proprietary EDI standards, the dominant partners not only restrict their trading partners’ ability to do business with others,
they may also force the subordinate partners to adopt procedures that are less than optimal from their (the subordinate partner's) perspective. It is also quite likely that the design of the IOS may not have accounted for all possible procedural and cultural differences between the two parties. The need for human intervention and the possibility of human misunderstanding, and human error would still remain (Sproul and Kiesler, 1991). This in turn will increase the risk of socio-political conflict. Technology-based structuring of the relationship can reduce, but never completely eliminate, these risks. Additional people-based mechanisms would be needed to manage such risks. Such mechanisms for managing conflict in interorganizational distribution channels are discussed in the next subsection.

**Risks and risk management in networked IOSs**

Like value/supply-chain IOSs, networked IOSs are also based upon exchanges or transactions between the cooperating parties. Therefore, the transaction risks applicable to value/supply-chain IOSs, discussed in the previous section, are also applicable to networked IOSs. However, unlike the sequential relationships that exist in the case of value-chain IOSs, the existence of reciprocal interdependency makes the exchanges and transaction risks much more varied and complex. Given the interactive nature of reciprocal relationships, these transactions themselves are usually much less structured. Moreover, unlike the value/supply-chain IOSs, these transactions are usually formed dynamically and often will not have a history of stable structures. In these cases, through mutual adjustment, the structure usually emerges incrementally and is a product of the network history, adaptive structuring process, and the cultural similarities/differences between the participating nodes in the relationship. The already substantial transaction risks are further compounded by additional structural uncertainties and risks of cultural misunderstandings. As discussed in the previous subsection, some of the transaction risks may be ameliorated through the use of information technology. However, the sheer variety of reciprocal relationships would require the use of human agents and mechanisms such as trust to identify, assess, and manage the dynamically occurring risks in this situation.

Next, since the reciprocal processes themselves are not well-understood, the information system and technology requirements for supporting these processes are at present, not easily defined. As a result, the technology base for these systems (e.g., computer systems for collaborative work, task/team support technologies, desk-top sharing, video-conferencing, high bandwidth communication networks for supporting multi-media) is currently not well-developed. This also implies that technical protocols for minimizing conflicts are also likely to be either non-existent or underdeveloped. Furthermore, given the large number of participants in a variety of organizations, the possibility of incompatible technological platforms is also usually higher. As technologies for reciprocal collaboration and standards for interoperability emerge and mature, these risks should go down.

From a socio-political perspective, the participants in a reciprocal dependency relationship interact with each other much more directly. Technology, rather than providing a buffer, is more likely to facilitate the interaction process. Research in IT-mediated communication shows that participants are much more frank and are likely to speak their mind in technology-mediated communication (Sproul and Kiesler, 1991). Any *a priori* interpersonal differences could affect the interaction thereby increasing the risk of conflict. On the other hand, the use of IT-based collaboration over the long term could contribute to team development and the management of conflict (Chidambaram, et al., 1991).

Interorganizational cultural differences are also likely to exacerbate the transaction risks by increasing the risk of different interpretations of the transaction contract. Moreover, different cultures having different values may attach different levels of significance to the performance of the transaction contract. This, too, may
increase the risk of shirking, opportunism, and loss of control over resources. Finally, because the work being collaborated upon is likely to be intellectual work, the risk of loss of control over resources is also very high. The ownership of the information product and information by-products (e.g., ancillary knowledge generated during the resource development) is somewhat vague and fuzzy. The independent exploitation of these knowledge by-products by one or more parties can create additional sources of conflict.

Consequently, in the case of networked IOSs, the potential sources of conflict increase substantially. With the current level of understanding of networked organizations, networked IOSs, and the supporting network technology, it may not be possible to devise other than very rudimentary IT-based mechanisms to manage these risks.\textsuperscript{10} For the time being, at least, solutions for risk assessment and management in a cross-cultural setting can only be found in informal, people-based mechanisms. Four such mechanisms have been identified (Stern, 1976): bargaining and negotiation for conflict resolution; boundary mechanisms such as channel diplomacy; interpenetration mechanisms such as exchange of ideological education, propaganda, and people; and supraorganizational mechanisms such as setting of supraorganizational goals and supraorganizational conciliation and arbitration mechanisms including mediators and neutral observers. "Companies develop mechanisms—structures, processes, and skills—bridging organizational and interpersonal differences" (Moss–Kanter, 1994, p. 105). Partners in the alliance achieve integration at five levels in order to guard against and contain conflict (Moss–Kanter, 1994): strategic integration, which involves continuing contact among top leaders to discuss broad goals and changes; tactical integration at the middle-management and professional levels to develop plans and to identify organizational and systems changes; operational integration, which provides ways for people carrying out day-to-day work to have timely access to information and resources they need to accomplish their tasks; interpersonal integration, which develops a network of interpersonal ties between members of the separate companies; and cultural integration, which requires people involved in the relationships to have communication skills and cultural awareness to bridge their differences. "Boundary diplomats" or "relationship managers," respectively, can be used to develop and maintain these mechanisms (Moss–Kanter, 1994; Stern, 1976).

\section*{Summary and Conclusions}

The current generation of literature on IOSs usually focuses on the transition from competition to cooperation. In the not-too-distant past, war as a metaphor and competitive advantage as the key strategic objective dominated management thinking. It is only recently that management theorists and practitioners have discovered the potential of cooperation. The move from competition to collaboration, at least in strategic management thinking, and consequently in the literature dealing with strategic information systems, is only an emerging phenomenon. However, as this article points out, the promise of cooperation, if not nurtured, can easily degenerate into conflict once again.

The article has three major contributions. First, by developing a typology of IOSs, it provides an overall map of the IOS phenomenon. This typology classifies IOSs into three categories: pooled information resource IOSs, value-supply-chain IOSs, and networked IOSs. By recognizing the different characteristics of the three types of IOSs, the typology highlights the different strategic and operational implications of these different types of systems. This paper focuses on and differentiates the risks inherent

\footnote{It may be argued that the use of group technologies, such as GDSS, CSCW etc. provide mechanisms for managing some of these risks. However, at their current level of evolution, these technologies, at best, provide a value-neutral platform for enabling such IOSs. At worst, which is usually the case, they incorporate the value judgements of the culture in which they were conceived and developed. Since most of the current generation of these tools come from the United States, they primarily reflect the American cultural biases.}
in each of these three types of interorganizational systems.

Second, the traditional IOS literature relies mainly on economic arguments to examine the IOS phenomenon. This article extends the traditional economic argument to include technical and socio-political issues in the formation and risks of IOSs. Thus, it provides a richer perspective on the behavior of interorganizational alliances.

Third, the traditional IOS literature is often limited to the benefits of interorganizational collaboration. This article, by recognizing the potential for and sources of conflict in IOSs, suggests factors that could lead to problems in the collaborative alliance. The article also suggests strategies to contain these risks. The implication is that as the technology matures and organizations build experience in the use of these IOSs, most of the technological and some of the economic risks may be contained through the use of technical and procedural mechanisms, protocols, and standards. However, it is also recognized that the existence of socio-political risks would additionally need people-based strategies to manage and contain these risks.

The final message of the paper is therefore simple. The IOS literature considers interorganizational systems to be strategic instruments of great promise. This article agrees with this premise. However, in addition to being strategic instruments, they are also "human activity systems," and therefore subject to all the risks and foibles of joint human endeavor. In order for these systems to succeed and provide sustained benefits, the partners in the alliance need to recognize the danger of such conflicts and work actively to identify and avoid them. In the past, von Clausewitz's metaphor of war and competitive strategy\(^\text{11}\) have dominated management thinking and have been instrumental in creating the widely held perception of the role of corporate leaders as command-ers or generals in competitive wars. We need an equally attractive and powerful metaphor to help develop strategies for building and sustaining collaboration.\(^\text{12}\) It is our belief that the antithesis of war, i.e., the concepts of peace and diplomacy, provide such a metaphor. Just as war requires its generals, armament, and foot soldiers; peace too needs its statesmen, treaties, diplomats, and peace monitoring and maintenance mechanisms. Companies seeking to build and sustain interorganizational alliances need to recognize and implement the roles of corporate "statesmen," "diplomats," and "peace observers" who not only seek out and build peace agreements and treaties (i.e., negotiate, design, and implement technical and procedural mechanisms for guarding against encroachment and aggression by parties in the alliance), but also, on an ongoing basis, guard against misunderstandings, misinterpretations, and perceived or real betrayals that may lead to the disintegration of the relationship.\(^\text{13}\) The partners in the alliance need to recognize that peace is often fragile, and once the initial euphoria of reaching the treaty (alliance) has faded, the statesmen and diplomats (relationship/boundary managers) will need to be continuously vigilant in anticipating risks of conflict and nurture the alliance by managing these risks proactively. This article, by pointing out the potential and sources of such risks and by suggesting mechanisms for managing them, is a step in this direction.

\(^\text{11}\) The term strategy comes from the Greek 'strategos,' a compound of 'stratos' (meaning army spread over ground) and 'agein' (meaning 'to lead') (Cummings, 1993).

\(^\text{12}\) Moss-Kanter (1994) uses the metaphor of courtship, marriage, separation, and divorce to illustrate her idea of sustaining collaboration. However, in today's lean and mean corporate climate, with strike forces and war rooms and with lines of command between top management generals and operational foot soldiers, the metaphor of courtship, love, and marriage is likely to be considered as having somewhat less than sufficient machismo and thus not acceptable by the traditional manager.

\(^\text{13}\) Following Moss-Kanter's (1994) recommendations (see section on Sources of Conflicts and Coordination in Interorganizational Systems), these roles are likely to exist at all levels of integration: strategic or top-level; tactical or middle-level; and operational, day-to-day working level.
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MIS Quarterly/September 1996 299
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