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# **Analyzing inter-organizational systems from a power and interest perspective**

Albert Boonstra and Jan de Vries

**SOM theme A:      The human and technical side of production: the management of interdependencies**

## **Abstract**

Inter-organizational systems (IOS) are ICT-based systems that enable organizations to share information and to electronically conduct business across organizational boundaries. Especially since the increasing availability of the Internet, there have been less technological barriers to implement IOS. However, that does not imply that IOS-possibilities are implemented successfully in all occasions: other barriers may remain. Innovation is not only a technical process of ‘solving problems’, it also involves economic and political processes in which interests are articulated, alliances are built and outcomes are struggled over. To explore this observation, this paper presents a model that helps to describe and analyze IOS from a power and interest perspective of multiple parties. To illustrate this model, eight case studies of IOS are discussed, of which two in more depth. After that, we will put the findings of the analysis in a broader perspective. The paper concludes with the assertion that the scope for the design of an effective IOS depends on a combination of technical, economic and social factors, which are intertwined. The model may help users to assess and discuss these factors.

## **Keywords**

inter-organizational systems (IOS), power division, interests from IOS, organizational barriers

## **Introduction**

Many organizations are at a point of change in their ability of using information technology to gather and use information. In the past, computerized information systems were mainly directed to support internal processes, but nowadays technological opportunities enable many businesses to implement electronic networks among suppliers, customers and other business partners. There are hardly any technical barriers left which are keeping organizations from shifting from mainly internal information systems to systems which transcend organizational borders and connect companies electronically with external parties. Different labels are used to characterize such systems, including extra-organizational systems (Howard et al., 2003), e-commerce systems (Huang et al., 2003), e-business systems (Chaffey, 2003) and supply chain management systems (Shah et al., 2003). Since these systems cross organizational borders, we will refer to them as inter-organizational systems (IOS).

Inter-organizational systems may promote major interests of organizations, e.g. by enhancing cost effectiveness, speed and flexibility. Other reasons for using IOS are to create new distribution channels and to deliver new products and services. So IOS can be used for improving the current way of doing business, but also for transformation or expansion (Straub et al., 2001). However, an IOS can also be a threat to some organizations, for instance, when they fear the risk of becoming more dependent on IOS partners, to be disintermediated or to be forced to more competitive markets where profits are lower and pressures are higher. For these reasons, IOS-use may alter the balance of power in inter-organizational relationships, it could raise entry and exit barriers and shift the competitive position of industry participants (Webster, 1995). Consequently, an IOS may be an opportunity for some organizations but at the same time, for other potential IOS users it could be a threat. Clearly, one of the complicating issues regarding IOS is the number of stakeholders involved: an IOS can only function if there are two or more participating organizations. This means that cultural differences, conflicting interests between IOS-parties, unequal expectations and a heterogeneous organizational environment can be assumed to be critical with regard to developing, implementing and using IOS (Huang et al., 2003). Therefore, for parties with a clear interest in an IOS it is important to understand which factors are critical and which barriers may arise during the process of development, implementation and use. This paper aims to contribute to this understanding by presenting and applying a model that can be used to describe and examine IOS from an interest and power perspective. Based on these two perspectives, archetypes of different kinds of IOS are derived, of which some are more sustainable than others. In this way, the paper will provide suggestions on how to overcome IOS barriers and how to make an IOS more sustainable. By

doing so, we intend to contribute to a more effective decision-making process and project management with respect to the development and use of IOS.

In the next sections, first, a framework will be developed based on the notion that two dimensions (*power* and *interest*) are of eminent importance in the process of shaping and applying an IOS. Starting from these two dimensions, a classification scheme is developed aimed to categorize the different relationships that IOS-parties can have in terms of the framework. This classification scheme is then used to describe and analyze various IOS-situations by assessing the interest and power relationships among the parties. The paper concludes with a discussion of the research findings and it addresses some implications for future research as well as future practice.

We view the contribution of this study from three perspectives. *First*, this paper aims to advocate the emerging role of power and interest in the way in which an IOS is shaped and used. Clearly, this role has not yet been fully explored and hardly any articles in the area of IOS have addressed this issue explicitly and coherently. *Second*, a typology is presented for positioning IOS-relationships. This typology positions the power and interest that IOS-parties believe to have when implementing and shaping IOS and it aims to contribute to our understanding of key-barriers which companies are confronted with when applying IOS. *Third*, although our case data come from different organizations which are using different IOS, the case studies show the feasibility of analyzing IOS-relationships from a power and interest perspective. In this way, a contribution is made to identify more profoundly various issues regarding facilitators and barriers to the implementation and usage of IOS.

## **Backgrounds**

In this study, we define inter-organizational systems that enable companies to share information and conduct business electronically across organizational boundaries as ICT-based systems (Applegate et al., 2003). We mainly focus on IOS which have (or have the potential) to be a substantial part of the operational processes of participating organizations and which are directed at a frequent and structured data exchange to support business processes. Generally, IOS are aimed at reducing both transaction costs and organization costs of one or more of the companies involved in the IOS-relationship. In many cases however, companies also try to achieve market dominance and other strategic interests by means of speeding up the process of data transaction and by implementing IOS to support decision-making processes within the company.

There are different types of IOS, such as systems that transcend data, money, forms, shared databases, messages and communication. IOS supports different functional areas and may augment different kinds of processes and be supported by various technologies. IOS are being adopted in diverse industries, such as airlines, health care, the automotive industry, banking, retailing, transport and others (Cavaye, 1995; Cavaye and Cragg, 1995; Short and Venkatraman, 1992; Swatman et al., 1994; Webster, 1995). Currently, many of these IOS are ordering systems and electronic markets which locally, nationally and internationally link organizations to suppliers, distribution channels and customers (Johnston and Vitale, 1988; Meier, 1995). Inter-organizational systems can be used in a 1:1, a 1:n or an n:n interaction pattern (Applegate et al. 2003). In this study, however, we will abstract from these different patterns by focusing on one particular party on both sides of an IOS.

Based on our literature review (Brynjolfsson et al., 1993; Cavaye et al, 1995; Chaffey, 2003; Coltman et al. 2001; Davila et al., 2003; Hong et al., 2002; Howard et al., 2003; Huang et al. 2003; Shah et al. 2002), we found the following groups of IOS inhibitors and barriers:

1. technology-related;
2. ability-, awareness-, or knowledge-related;
3. interest-related;
4. power-related.

Technology-related barriers refer to a lack of standards, incompatibility of software and hardware, problems with security, encryption and so on. Ability, awareness, or knowledge related barriers refer to legal barriers or to barriers related to the awareness of the opportunities of IOS. In some cases, also a lack of knowledge on how to apply available technologies inhibit companies to apply IOS. Interest-related barriers refer to the notion of potential IOS users that IOS does not bring enough economic and/or strategic advantages. Issues such as ‘risks of fraud and loss’, ‘cost justification’, ‘start up costs’, and ‘not sure of benefits’ are examples of interest-related IOS barriers. Power-related barriers refer to situations in which potential users are not able to make others use an IOS to establish transactions, or to situations where users have the power to ignore the IOS of a business partner.

From the literature review on IOS facilitators and inhibitors, it can be concluded that many IOS barriers have already been identified, but that both the facilitators and inhibitors have neither been categorized in groups nor related to each other or used to develop models to diagnose IOS in order to overcome these barriers. In this study, we consider overcoming technology-related barriers (group 1) and ability-/awareness-/knowledge-related barriers (group 2) as pre-conditions for IOS-success. If an IOS causes too many technological

problems or if potential users are lacking the awareness, ability or knowledge to implement IOS, the IOS will not be implemented anyway. Once the preconditions are fulfilled, the conditions 3 (interest) and 4 (power) become relevant. In the next sections, we will focus on these conditions (interest and power), which means that we assume that the pre-conditions have been met. We emphasize however, that only if the appropriate technology is available and if the ability, awareness and knowledge are there, it makes sense to diagnose interest and power positions.

### **A model to diagnose IOS from a interest and power perspective**

In this section, we will set out the IOS-diagnosis model by explaining its two dimensions, namely interest and power.

#### *Interest in IOS*

The interest of a party in an IOS can vary from low to high. In the case of low interest, the IOS-partner does not believe to gain much by using an IOS. With respect to applying an IOS, increasing operational costs, a lack of efficiency due to incompatible internal and external technologies and insufficient support regarding the control of the primary process are examples of a low interest situation. On the other hand, a high degree of interest relates to the perception that an IOS highly contributes to the overall goals of the company. In this study, we define interest as ‘perceived contribution’, which means that a party believes it will benefit from using an IOS and that the benefits will outweigh the costs. Within the context of this study, it is not relevant whether this perception can be realized or not. The perceived interest can constitute several elements and it is often based on economic and/or strategic objectives (Bendoly et al., 2004; Chen, 2003, Coltman et al., 2001). Table 1 summarizes some potential interests perceived by parties in relation to IOS.

<b>Possible perceived interests in relation to IOS</b>
IOS will contribute to the reduction of transaction costs
IOS will help to improve products, services, and customer satisfaction
IOS will contribute to the optimization of internal processes
IOS will contribute to reaching new customers and new markets
Benefits of IOS will outweigh the costs

**Table 1**                      **Possible sources of perceived interest of a party of an IOS**

### *Power and IOS*

However, an IOS does not depend solely on the perceived interest of IOS users but also on the power relation between the involved parties. A powerful party with a clear interest in an IOS can apply its power to urge less powerful parties to use the IOS, independent of their perceived interest in the IOS (Standifera et al., 2003). At the same time, it might be rather difficult for parties with a high interest but with a lack of power to implement an IOS successfully if the other parties feel they do not have enough interest in the IOS. In this paper, we will define power as the capacity to exert the will over others in order to realize certain intended benefits (Buchanan et al., 2000). Since power is a capacity to exert one's will, it is possible to indicate the source of this capacity, or in relation to IOS: parties may possess different sources of power to urge others to use (or not use) an IOS. Fincham (1992) suggests that we can view the concept of power from three perspectives: processual, institutional and organizational. The basis of processual power is in the social interaction between interest groups. Institutional structures of inequality form the external bases from which power is mandated to organizations. Organizational power is embedded in the internal structure of organizations. Since our focus is on the relations between organizations, we will focus on processual and institutional perspectives on power. This approach corresponds with the work of Hardy (1996), who includes four dimensions of power (resource, process, meaning and system) into a framework. Table 2 lists some more specific sources of power which may be relevant in relation to IOS (Morgan, 2000; Pfeffer, 1993; Fincham, 1992; Mintzberg, 1983).

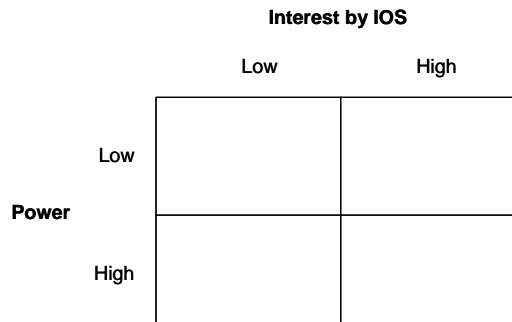
Sources of power to control IOS	Operationalization within IOS context
Independent of partner organization	<p>If an organization is economically independent of IOS-partners (e.g. many small suppliers with bulk goods), its power is high.</p> <p>If an organization is economically dependent on the potential IOS partner, its power is low.</p>
Formal authority, legal requirements	<p>If an organization has the formal or legal authority to force others to use the IOS, its power is high.</p> <p>If a potential IOS partner has the formal or legal authority to force the organization to use the IOS, the organization's power is low.</p>
Control over technology	<p>If an organization has knowledge and expertise to develop and implement the IOS, its power is high.</p> <p>If the other IOS-partner has the knowledge and expertise to develop and implement the IOS, the organization's power is low.</p>
Inter-organizational alliances, networks and control of informal organization	<p>If the organization is influential and active in alliances with respect to IOS, its power is high.</p> <p>If the other IOS partner is not influential and active in IOS alliances, its power is low.</p>

**Table 2 Operationalization of some sources of power in relation to IOS**

To realize IOS or to stop or hinder IOS realization and use, each of these sources may be used in isolation or in combination. In this context, power is a relational construct (French et al., 1958), which means that parties may have a great deal or little power in relation to another relevant party.

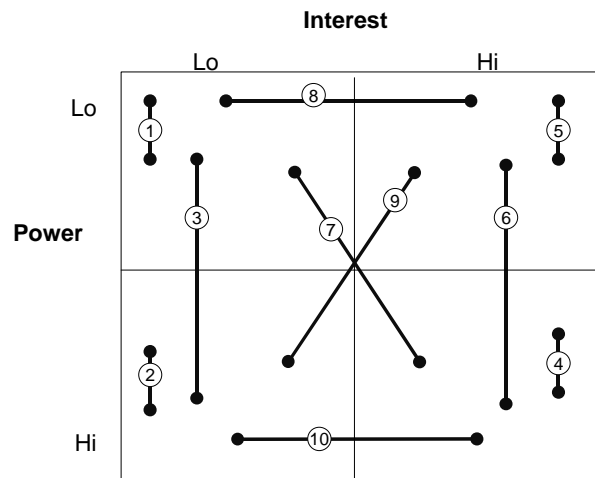
Using the dimensions addressed above, figure 1 depicts four situations regarding the degree of power and the degree of interest parties have when applying an IOS. In fact, figure 1 captures the potential relationships between IOS-partners regarding the use of an IOS by focusing on the perceived interest of the IOS on the one hand, and the power balance between the parties on the other hand.





*Figure 1 General model for analyzing IOS*

Figure 1 can be used as a first step to categorize different IOS relationships. Rather than assigning optimal relationships, it is assumed here that when using IOS, imbalances exist which can be used to identify IOS barriers. Hence, the model can be used to position the various intended users of the IOS. If we simplify our case example by assuming that an IOS has two users, ten IOS-archetypes, or IOS-options, can be derived from the model (*cf.* figure 2).



*Figure 2 Ten archetypes of inter-organizational systems*

In figure 2, option nr. 1 is an IOS where both users have a low degree of power and interest. In option nr 2, both users have a low degree of interest and a high degree of power: both are not interested. A shared low interest and an unequal power division characterize option nr 3. In option nr. 4, both users have a high degree of power and interest. Option 5 and 6 can also be characterized by shared interest. In the case of option number 7, a party with much power and interest dominates a party with a lower degree of power and interest. In case number 8, two parties are both lacking power, while one is interested in an IOS and the other is not. Option nr 9 shows the opposite: a low power party has much interest and a high power party

has a low interest. In option number 10, two high power parties are involved: one of the two is interested in an IOS, the other is not. These 10 options can be divided into three groups: *unlikely* IOS, *unbalanced* IOS and *balanced* IOS, as shown in figure 3. IOS nr. 1-3, as shown in figure 3, are highly unlikely, since both parties believe that they have a low interest in such a system.

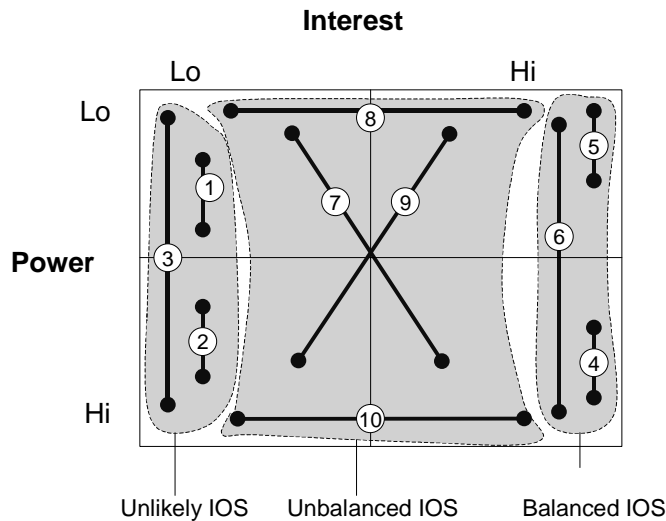


Figure 3 Unlikely (1-3), unbalanced (7-10) and balanced (4-6) inter-organizational systems

Such an IOS might be feasible from a technical point of view, but not from an economic/strategic (interest) or from a social (power) perspective. The relevant parties share their opinion about this. IOS nr. 4-6 show some opposite characteristics and can be addresses as 'balanced' IOS. The relevant parties both believe that they have a clear interest in an IOS. If that perception is stable, a balanced IOS can be developed and used. Disagreement about functionalities and technicalities may arise, but the very existence of the IOS is not an issue. IOS options number 7-10 are the more complicated archetypes, because they are unbalanced. In these situations, there is a party with a perceived low interest and another party with a perceived high interest. Depending on the respective power positions, a certain outcome can be expected. In a situation as shown in option number 7, the powerful party will force the other party to use the system. Option number 8 demands more inventiveness of the interested party, since both parties share a low amount of power to force the other party. Even more complicated is option number 9 where a low power party should 'seduce' a high power party to start using and IOS. Option number 10 is comparable but has opposite characteristics. Both

parties possess important sources of power but one party has a high and the other a low interest.

It has to be emphasized here that the above-mentioned IOS options are archetypes. Clearly, in practice power and interest positions will be ambiguous and mixed. Perceived power and interest may also be dynamic in nature, which means that positions may change over time. Because of this, balanced IOS may become unbalanced and vice versa. This also explains why IOS have life cycles, since perceptions about the importance of the IOS for a company and the power relations among users may change. New technological opportunities or a changing competitive landscape could also cause these changes.

The ten options addressed above assume a 1:1 IOS. However, most IOS have a 1:n or n:n interaction pattern. However, from the point of view of one party, e.g. a bank, the model can be used to assess an IOS-application of other parties (e.g. customers, see figure 4).

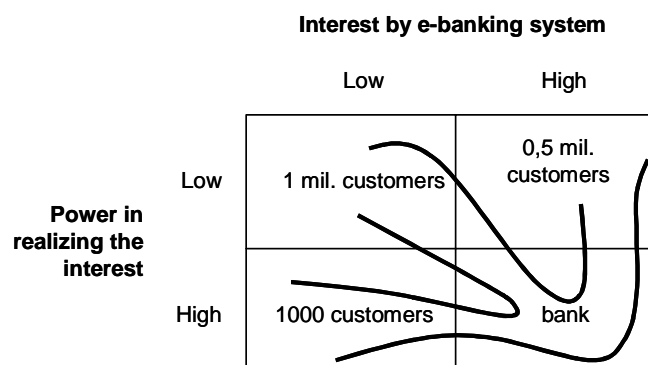


Figure 4 Example: power and interest of an e-banking IOS

An analysis of an e-banking IOS-application for instance, shows a combination of option number 6, 7, and 10. One million customers believe that they have a low interest in this particular system, e.g. because they do not feel that the benefits will outweigh the costs. The customers may have the choice to move to another bank, but since other banks are implementing similar systems and the relative importance of these customers to each bank is low, this option is not very attractive. Half a million customers share the interest in the e-banking application. These are online customers, which welcome new applications. A thousand customers (very profitable and important customers) do not feel an interest in the system, e.g. because of the incompatibility with their own systems or because of a lack of

economic interest. In relation to these customers, a careful and sensitive policy has to be followed, since they are attractive to other banks. Parties will use different means to convince the other party to either use or not use the IOS. This negotiation process may also lead to changes in the system design, e.g. by improving compatibility and user friendliness or by covering installation costs.

It is concluded here that IOS can be categorized by dividing participants in terms of power and interest. This leads to ten IOS archetypes, which can be grouped into three groups: unlikely, balanced and unbalanced. Each type of IOS has implications: an IOS can be 'weak' in case of relatively low interests, 'strong' in case of two-sided interests, or 'one-sided' in case of an unequal division of benefits. Based on such a diagnosis, the interested parties can develop appropriate policies to strengthen the IOS coalition.

### **Research methodology**

The empirical part of the research is founded on eight case studies. Case data was collected during the period 1998-2003. During this period, developments regarding the IOS and the barriers faced by companies during the implementation and use of the IOS were intensively studied. The initial research objective of these projects was to study under which conditions organizations decide to participate in developing and/or using IOS and to explore the main barriers with regard to applying such systems. This is a 'how' question about a contemporary set of events over which the researcher has no control. It also has open and explorative characteristics. Consequently, a case-study approach appeared to be the most appropriate (Yin, 1991) and it is for this reason why we decided to conduct a multiple case study in order to compare different IOS and to categorize them into certain groups. In our study, we selected the firms from a variety of industries, such as retail, health care, transport and manufacturing (*cf.* table 3).

Case	Parties	Interest		Power		Analysis	Type
#1	Computer hardware supplier	Internal processes Transaction cost	high	Technology	high	A web-based IOS. A power-balanced situation caused by a necessity to convince customers of potential benefits	Balanced
	Academic hospital	Internal processes Transaction cost	mod	Economically independent	high		
#2	Developer/ manufacturing communication systems	Improving products Transaction costs Internal processes	high	Independence Influential in network	high	ERP-based IOS. During the implementation process many technological and cultural barriers were encountered.	Unbalanced
	Supplier of electronics	Internal processes	low	Dependent on buyer	low		
#3	Oil company	Transaction costs Internal processes Market domination	high	Market dominance Influential Independent	high	Custom-made IOS. Numerous technological and cultural barriers during the application of the IOS	Balanced
	Supplier of microprocessor cards	Internal processes Transaction costs Improving services	high	Benefits of IOS outweigh the costs	mod		
#4	Wholesaler of electronic products	Internal processes Improving services Transaction costs	high	No means to force customers to use IOS	low	WEB-based IOS aimed at achieving a robust system. A strong necessity to convince customers to use the IOS.	Unbalanced
	Individual customer	Transaction costs New products and services	mod	No necessity to use the IOS	high		
#5	Provider of B-to-B express delivery	Transaction costs New services Optimizing internal processes	high	Technology dominance	low	A custom made IOS initiated by one party. During the adoption process many technical problems were encountered.	Balanced
	Individual customer	Transaction costs Benefits outweigh costs	mod	Independent	high		
#6	Yacht builder	Transaction costs Optimizing processes	high	Influential and active in alliances	mod	ERP-based IOS The IOS situation was characterized by a win-win situation.	Balanced
	Supplier of power generating equipment	Transaction cost Optimizing processes	high	Independent main supplier	high		
#7	Auction	Transaction costs Reaching new customers and markets	high	No means of power to force retailers to use the system	Low	The auction had a strong interest but a low interest of relatively powerful retailers caused failure	Unbalanced
	Retailers	Only an interest in remote areas	Low	Power to ignore system and remain using wholesalers	high		
#8	Wholesaler	Transaction costs Optimizing internal processes	high	Influential and active supply chain partner	mod	The IOS situation of Superstore Corp changed in time from a high interest to a low interest situation	Unbalanced
	Superstore	Optimizing internal processes	low	Power to ignore system due to alternatives	high		

**Table 3 IOS relations: eight case studies**

These industries were selected to ensure substantial variance and because they included companies in both consumer and industrial markets.

Data collection was conducted in two phases. Phase 1 involved an in-depth case study of five companies during a period of six months (case 2,3,5,7,8). The five companies studied were interested in a critical evaluation of the IOS for various reasons, including finding answers to questions such as:

- 1) What are the main barriers with respect to IOS-use?
- 2) Can the IOS be revised after comparison with other IOS-relationships?

As a result of this evaluation, an improvement process was conducted in four companies (case 2,3,7,8). However, the nature and characteristics of these processes differed from making some minor improvements to significantly changing the IOS relationship with the other IOS partner. In two companies, changes encompassed a reorientation of the strategic relationship with the IOS partner (case 7,8). In the two other cases (case 2,3), some minor technology-oriented modifications were made as well as a reassessment of the objectives and goals related to the IOS being developed. During this process of change, the role of the researcher(s) was solely restricted to making observations, structuring on-going discussions and providing management with analytical, theory-based material regarding the issues that were being discussed. The research methodology adopted during this first phase was to undertake longitudinal case studies aimed at tracking the introduction of IOS over time, from the early decision-making stage to implementation. The methodology in other words, was intended to reveal the complex mechanisms behind implementing IOS in terms of power and interest rather than taking a single snap shot in time. In the next section the data from two of these case study organizations is presented (case 7,8). Both case studies can be considered as illustrative examples of companies that are in the process of introducing an IOS and facing barriers in doing so.

Phase 2 of the data collection process involved three mini-cases (case 1,4,6). In these cases, the research period was more condensed and included the gathering of data by means of a restricted number of interviews, applying open resources and a more strict focus on the model presented in the previous sections. The mini-cases, in other words, aimed at predicting similar results regarding the implementation and usage of IOS and the specific role power and interest play during these processes. To a certain extent, it can be argued that the three mini-cases focused on literal replication, while the five in-depth case studies concentrated on producing contrasting results for predictable reasons (theoretical replication).

In all cases, data was gathered by studying internal reports, attending and observing meetings, distributing questionnaires, and conducting (semi-) structured interviews. In each organization, the employees who were interviewed were working at the lower, middle and higher management levels. In doing so, the research team aimed at collecting a broad perspective on the different issues related to the introduction and usage of IOS. There is no reason to suspect any systematic distortion in this study, and we feel that the possibility of random distortion was reduced in many cases by multiple interviewing.

Clearly, the unit of analysis in our case studies is the IOS rather than the organizations, since an IOS typically covers more than one organization. For each IOS we described the assessment of power and interest from the perspective of (at least) two organizations. Although we acknowledge that we did not intend right from the beginning to conduct this study from a power and interest perspective, all the data gathered were carefully reassessed starting from the model depicted in the previous section. In some cases additional data was gathered, justifying the ex-post analysis of the cases presented below. Based on the model presented in the previous section and recognizing the role of power and interest in IOS implementation, several clusters of items were addressed in the empirical part of our study. Those relevant to the concerns of this article related to:

- the IOS infrastructure being adopted;
- the role of IOS parties involved in the decision-making process;
- the sources of power of the IOS-parties (*cf.* table 2);
- the perceived interests of the IOS-parties (*cf.* table 1).

All the data gathered was reported to the main stakeholders involved in the projects by means of meetings, written reports and oral presentations. Furthermore, issues addressed in the interviews mirrored and further probed the observations, in particular regarding the role and influence of power and perceived interests of the IOS parties involved in the project. The semi-structured interviews and data from the observations provided the research team with crucial information about these issues and this triangulation permitted a much fuller interpretation of the project-reports written by the companies and data gathered by means of the questionnaire.

Table 3 presents an overview of the eight IOS cases in terms of parties involved, assessment of the parties' perceived interest, assessment of the parties' power to realize an effective IOS, some very brief analyzing comments and a characterization of the IOS in terms of the model. Using the framework of power and interest, the next sections will include a discussion of some of the lessons learned. Clearly, this includes questions such as: "could the projects have

been more effective if the power and interest framework was used more deliberately”, “were important developments of IOS reflected by the framework during the dissemination of IOS”, and: “might a more conscious application of the framework have led to more appropriate interventions”. In the next section, two of the cases (case 7,8) are discussed in more detail in order to show how the dimensions of power and interest may have played a role in specific situations. This is followed by an overall analysis of the case studies including a discussion of some of the lessons learned.

### **Flower Auction (FA) case <sup>1</sup>**

At the end of the 1990s, the Flower Auction decided to implement an IOS to link the flower auction directly to retailers and super markets. The Flower Auction is one of the biggest auctions in the world. An average of 20 m. flowers and 2 m. plants change hands every day. These flowers and plants are supplied by around 7000 growers worldwide, and sold to more than 2000 wholesalers and exporters. The Flower Auction uses an area of 1 m. sq. for collecting the floricultural products from the growers, organizing the auction and distributing the products to the buyers.

Within the value chain of flowers and plants, growers are the initial suppliers. Demand comes from exporters, importers, wholesalers, cash & carries and retailers. Within this chain, auctions play the role of a mediator between growers and wholesalers. This role primarily consists of the collection and distribution of flori-cultural products as well as the determination of prices. In some cases, these prices have the status of world market prices, since many parties throughout the world use them as important indicators for price setting. The Flower Auction has a strong position in this value chain due to its size and its seemingly irreplaceable link between growers on the one side and the very refined and complicated system of distribution channels on the other side. However, the management of the auction perceived the rise of the Internet as a possible threat if this development was ignored by FA and used in innovative ways by new entrants. Management also believed that a proactive and strategic use of the Internet could enable FA to strengthen its position and power in the value chain even further. To realize such a use, FA developed an IOS application named FlowerSystem (see figure 5).



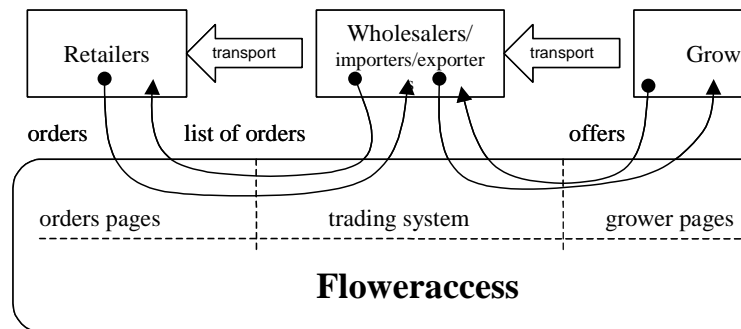


Figure 5 Flow of activities of FlowerSystem

This application consisted of an ordering system directed at retailers. It had to enable retailers to place online orders to exporters and wholesalers to be passed on to growers. The growers, in their turn, were to transport the products to the wholesalers who would then collect the orders and take them to the retailer, e.g. the florist. By using FlowerSystem, wholesalers would receive the accumulated supply of all FlowerSystem growers and could offer this supply to the buyers. Based on the information generated by the system, growers were able to adjust their supply to the demand of the retailers. Until then, FA had had no direct business relations and information exchange with retailers. Therefore, the introduction of FlowerSystem can be interpreted as an attempt to redefine the value chain. Full adoption of the IOS-system should lead to a stronger position of FA and make the auction even more the leader and orchestrator of the value chain. In case of full use, all formal communication concerning ordering, planning and market projections could be exchanged by this system.

The main challenge, however, was to attract retailers and wholesalers to use the system. In case of a high adoption by retailers, wholesalers would be urged to use FlowerSystem, but in case of a low adoption, they could ignore it. During the first years after implementation, only 20% of the 1200 connected retailers made regular use of FlowerSystem; with regard to the returns, the share of FlowerSystem was not more than 1%. This means that FlowerSystem did not lead to the realization of the initial objectives. Many wholesalers and retailers seemed not to be prepared or willing to start using the new system. Wholesalers seemed to be reluctant to become too dependent on the systems of the auction, because they provided FA insight into profit margins and other sensitive business information. Besides, many retailers preferred to look and smell flowers prior to purchase. Many of them still prefer cash & carry outlets to buy their flowers and plants. It also enables them to maintain personal contacts with colleagues, who also provide them with important market information. Only in Denmark and

<sup>1</sup> In order to maintain anonymity, the names of the firms are not revealed in this paper.

Switzerland, which have few purchasing channels for these products, FlowerSystem is relatively successful. Because of this low degree of adoption, FlowerSystem has mainly led to a cost increase for the auction, due to the development and maintenance of the system.

In terms of the model, the auction had a high interest in the system. Full adoption should have led to lower transaction costs and to more dependency of partner organizations on FA. The auction also assumed that it possessed a high degree of power to get the system implemented and used. Initially, it wrongfully assumed that the partner organizations would have either a high degree of interest or a low degree of power or both. At that time, it was mainly focused on the technical realization of the system because it believed that its business partners would use what was offered anyway.

After the introduction of the system, it seemed to be very difficult to convince the retailers to start using the system. Retailers had never had business relations with the auction before and most of them were not used to using the Internet to order their products. Many retailers also appreciated their relations with wholesalers, which were highly based on trust and personal and informal contacts. Actually, FA had not assessed the willingness of retailers to adopt the system in a realistic way. Many retailers proved to have the power to ignore the system; they did not see many advantages in it. So the actual position towards the system can be depicted as follows. It can be assessed as IOS type 9 (see figure 2 and figure 6), which is highly unbalanced.

**Interest in IOS**

		low	high
<b>Power</b>	low		<i>FlowerAuction</i>
	high	<i>Retailers</i>	

*Figure 6 Assessment of the relevant parties towards the system*

In the current value chain, FA may have been a big and strong party but it did not have the power to change behaviors of buyers in other and unknown parts of the value chain.

Based on the experiences of the low adoption of the FlowerSystem system, FA later developed IOS systems which were more aimed at their traditional partners in the value

chain, namely the growers and wholesalers. A more collaborative approach directed at mutual advantage led to more successful interorganizational systems.

### **Wholesaler - Superstore case<sup>2</sup>**

At the end of the 1990s, after a long period of discussions and informal meetings, Wholesale Corp. decided to initiate a feasibility study on the design and implementation of an Inter-organizational Information system. Wholesale Corp. is a purchasing organization representing independent retail formulas in the Netherlands. By means of joint purchasing, Wholesale Corp. is able to achieve substantial financial benefits for its members, e.g. supermarkets and retailers. Wholesale Corp. covers about 20% of the entire food market in the Netherlands. At the moment, Wholesale Corp. represents 17 affiliated members, including Superstore Corp. Superstore Corp. is a medium-sized chain of supermarkets consisting of three distribution centers and 26 stores. The company has a turnover of €200 million and employs about 2000 employees. Although many products are bought via Wholesale Corp., a direct and intense relationship exists between Superstore Corp. and the suppliers of both food and non-food products. Almost all products are directly shipped from the suppliers to the stores and distribution centers. As a consequence, Superstore Corp. directly orders the products to be delivered from the suppliers and only financial information is exchanged via Wholesale Corp.

In 1997, Wholesale Corp. conducted a study on designing and implementing an IOS. Five driving forces, which still seem to be valid nowadays, triggered this study:

- high volumes characterize the exchange of data between Wholesale Corp. and its affiliated members;
- the food market is under high pressure to reduce costs;
- many supermarkets and retailers experience decreasing profit margins;
- supermarkets are confronted with a high competitive market forcing Wholesale Corp. to be more efficient;
- the aspect of 'time' is crucial in the ordering-process of food and retail products.

The feasibility study mainly focused on the technical aspects of the IOS and included issues, such as IOS-software, the protocols to be used, the necessary technological changes to be made and the costs associated with implementing an overall IOS standard between Wholesale Corp. and its members. In 1998, Wholesale Corp. started with implementing an electronic procurement system which linked the ordering systems of the supermarkets and retailers to a

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<sup>2</sup> In order to maintain anonymity the names of the firms are not revealed in this paper.

central database. A substantial reduction of transaction costs, a further optimization of internal processes and increased service delivery levels were expected to be the main benefits of the IOS.

The implementation of the IOS between Superstore Corp. and Wholesale Corp. was confronted with numerous problems. Although some of these problems seemed to be of a technical nature, Wholesale Corp. also faced a number of organizational difficulties in its communication with Superstore Corp. Project meetings were often canceled, information was not provided in time and pilot projects were often severely delayed. At the end of 2000, only a few functionalities of the IOS had been implemented and it was only partly used by Superstore Corp. In 2001, both Superstore Corp. and Wholesale Corp. concluded that the costs associated with implementing the IOS had outweighed the benefits to a great extent. Therefore, it was decided to reassess the functionalities of the IOS and to re-design the administrative procedures between Superstore Corp. and Wholesale Corp. At the same time though, the implementation and usage of the IOS among Wholesale Corp. and some large supermarket chains was apparently a great success. The leading three supermarkets were all successfully linked to Wholesale Corp. by means of a sophisticated IOS. During the period 1998-2001, the IOS became the subject of much discussion at Superstore Corp. At the end of 2001, Superstore Corp. conducted a study aimed at evaluating the ongoing process of adopting the IOS. From this study it was concluded that technical barriers as well as a miss-fit between organizational procedures prevented both IOS parties to successfully implement the IOS. At this point in time, Superstore Corp. decided to more or less continue the IOS-project at a very low profile.

Clearly, many aspects have contributed to the low degree of success and many different perspectives can be applied in trying to explain the barriers that arose during the implementation of the IOS between Superstore Corp. and Wholesale Corp. Starting from our model depicted in figure 2, the initial IOS relationship between Superstore Corp. and Wholesale Corp. can be categorized as a nr. 4 IOS. In a way, with respect to the IOS, both parties possess important sources of power. At the start of the project, the interdependence between Wholesale Corp. and Superstore Corp. was strongly related to the company goals of Wholesale Corp. In fact, when buying products from suppliers, Wholesale Corp. was expected to represent the interests of its affiliated members, including Superstore Corp. As a consequence, Wholesale Corp. strongly favored the development and implementation of an IOS, which was reinforced and stimulated by an informal strategic alliance between Wholesale Corp. and some large supermarket chains. The ability to develop and maintain a complex and sophisticated IOS as well as control an influential IOS alliance consisting of

Wholesale Corp. and some large chains of supermarkets can be considered as the main sources of power of Wholesale Corp. It is tempting to classify the IOS situation of Superstore Corp. in 1997 as a low power situation. Superstore Corp. is one of the smaller affiliated members and lacks a substantial influence on the policy and decision-making processes of Wholesale Corp., which is dominated by the above-mentioned alliance. However, an in-depth analysis of the procurement situation of Superstore Corp. shows that in 1997, Superstore Corp. considered to renounce the procurement cooperation with Wholesale Corp. due to some very attractive alternatives. Moreover, Superstore Corp. informally decided that remaining independent of Wholesale Corp. would be of vital importance for the company to be competitive in the long term.

At the start of the project, both Wholesale Corp. and Superstore Corp. were convinced of the benefits of implementing an IOS. It was expected that the IOS would be helpful in optimizing the internal processes of both companies and that it would significantly contribute to a reduction of the transaction costs. The initial IOS situation for both parties can therefore be categorized as being one of high power and high interest (see figure 3). However, in the course of the project, Superstore Corp. was confronted with an increase in costs related to the IOS. At the same time, the technical specifications of the IOS changed in favor of the large supermarkets and the dominant coalition. As a result, Superstore Corp. was not only confronted with expensive hardware investments but also with a very complicated organizational adoption process. The administrative procedures, for instance, were assumed to be related to scanning data from the stores. However, to Superstore Corp., this process was highly complicated because of the relative independent character of the stores and a lack of co-ordination between the ordering processes of the different stores. At the end of the project, Superstore Corp. was convinced that the benefits of the IOS did not outweigh the costs. Consequently, the initial IOS situation of Superstore Corp. changed from a *high power, high interest* situation to a *high power, low interest* situation (see figure 7).

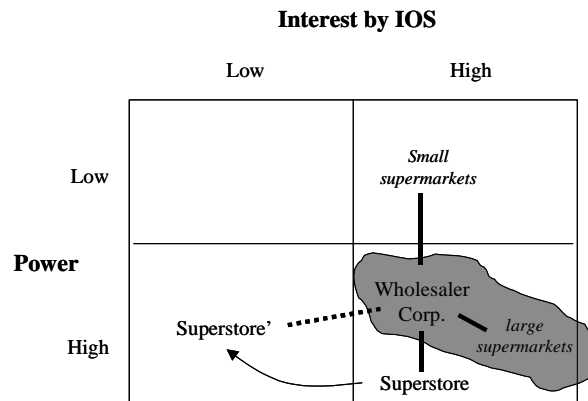


Figure 7 Changing perceptions of power and interest at the Superstore - Wholesale Corp. case

It is interesting to observe that the IOS relationship between Wholesale Corp. and Superstore Corp. can only partly be isolated from the IOS relationship which Wholesale Corp. had with its other members. Clearly, there was a change from a balanced IOS to an unbalanced IOS. This is because the IOS was closely related to the dominant alliance between Wholesale Corp. and some large supermarket chains. During the project, Superstore Corp. realized that this dominant coalition in fact dictated the technical standards and protocols as well as the organizational context of the IOS which was to be implemented. In 1998, a steering committee consisting of line managers and representatives of the board of directors of Superstore Corp. concluded that:

- designing and establishing an IOS ought to be linked to a long-term relationship with existing suppliers;
- Superstore Corp. should focus on following a differentiating leadership strategy and for this reason potential benefits of the IOS need to be re-assessed;
- the supermarkets forming part of the dominant coalition were considered to be a serious threat for Superstore Corp.

At this point in time, Superstore Corp. was confronted with two options regarding the shaping of the IOS. Option one was to slowly shift to a *'shared advantage but different power'* situation. In this case, Superstore Corp. would be forced to comply with IOS requirements defined by the dominant coalition of the procurement partnership which would probably result in a loss of power. Clearly, Superstore Corp. opted for becoming more independent of Wholesale Corp. and in doing so, it decided to comply with the disadvantage of participating in the IOS-relationship on only a very small scale.

## **Discussion**

The two case studies described in the previous section as well as the overview of the projects presented in table 3 outline the complexity and interlinked nature of implementing and using IOS. In this section, the case studies described above will be analyzed from two different perspectives. First, there is the apparent role of power and interest in shaping and using IOS. Starting from the model described in the previous sections, our analysis of the case studies aims at deepening our understanding of the implementation and use of IOS and of the key-barriers which companies have to face. Following this first part of our analysis, the second part will look more closely at the model and address the strengths and weakness of the power and interest perspective suggested in this paper.

Our model suggests that, based on the interest and power dimension, ten archetypes of IOS can be distinguished which can be grouped in balanced, unbalanced and unlikely inter-organizational systems. Clearly, table 1 reflects this categorization by addressing both balanced and unbalanced IOS. It is interesting to notice, though, that different sources of interest and power seem to exist in the company studies. It is suggested by our case studies however, that the main source of power in relation to IOS is closely related to technological supremacy and market dominance. At the same time, power is also connected to the degree of interdependence among IOS parties regarding whether or not to implement and use the IOS. In almost all case studies, these two sources played an important role in the implementation of the IOS examined. In other words, the process of implementing and using IOS seems to imply a process of IOS parties deliberately entering into situations where they become dependent on each other. In some cases, the wish of co-operating parties to avoid a situation of mutual dependence appeared to be an important reason for not implementing or using the IOS. This also explains an insufficient performance of the IOS. The low degree of success in the Wholesale Corp. case, for instance, was mainly because Superstore Corp. was not willing to become dependent on Wholesale Corp. Similar to the power dimension, the interest dimension also appears to be heavily dominated by two specific reasons. From table 3 it can be derived that all companies strongly believed that IOS could contribute to the optimization of internal processes and the reduction of transaction costs. Apparently, optimizing internal processes and reducing transaction costs can therefore be considered to be the main stimulating reasons for companies to introduce and apply an IOS.

Furthermore, the data of our case studies suggest that during the implementation and use of IOS several aspects gradually interacted. Especially in unbalanced situations (cf. figure 3), negotiations between the parties involved showed to be of a very complex and dynamic

nature. In other words, our case studies indicate that the outcomes of the IOS projects are often the result of negotiation processes rather than of a rational and linear implementation process. The interaction atmosphere between the parties involved in setting up and applying an IOS proves to be a central issue in the case of unbalanced situations. In fact, IOS in unbalanced situations are characterized by contradictory interests or at least by contradictory *perceptions* of interest. Our case studies show that in these cases implicit and explicit negotiation processes may dominate the development and implementation process. The dual concern model is nowadays a broadly accepted model that describes four different styles of negotiation behavior: problem solving, contending, yielding, and avoiding (Pruitt and Carnevale, 1993; Rubin et al., 1994). Problem solving occurs when negotiation parties are concerned with both their own and others' goals. They openly exchange information and search for mutually satisfactory solutions in an active and creative way. Contending, on the other hand, is the effort of one party to impose its preferred solution upon the other party. Clearly, in those cases where one of the IOS parties has the ability to wield power, contending is an often-applied strategy. Yielding means adjusting to the demands of the other party. Avoiding means a (temporal) withdrawal from the conflict issue. During the implementation and setting up of the IOS, both the interest dimension and the power dimension heavily dictated the negotiation processes. Not only the situation of The Flower Auction but also the Wholesale Corp. case illustrates that during the adoption of the inter-organizational Information system, different negotiation processes took place. This observation appears to be of particular importance because in literature, the political dimension of the introduction of information systems is often neglected (Boonstra, 2003). While examining the decision-making processes during the implementation of IOS, its political nature was revealed in at least five of the cases studied (2,3,5,7,8) and there are some strong indications that in unbalanced IOS negotiation behavior is the most important issue.

Theory suggests that many different barriers exist regarding the introduction and use of (inter-organizational) information systems. These barriers are often categorized in strategic, processual, human and technical barriers. However, categorizing barriers into four distinctive groups appears to be an oversimplified reflection of reality which only partly corresponds with the observations made in our case studies. In the case of Wholesale Corp. for instance, the company faced numerous technological barriers when trying to introduce the IOS. The same holds for case 2 and case 3. However, in all these situations, technological barriers appeared to be the result of both miscommunication and the fact that parties were not prepared to exchange crucial information or change organizational processes in favor of the IOS introduced. In fact, technological shortcomings were often used as an alibi and a means to exert power and to influence the other IOS party. In other words, the development of



boundary-spanning information systems, especially in the case of unbalanced situations, is not only the outcome of power and political processes, in fact, power and politics is the main issue here. Apparently, the development of IOS tends to have a dual character which is closely related to the ability of IOS parties to influence behavior and outcomes.

Analyzing the IOS from a power and interest perspective also indicates that both the dimension of power and the dimension of interest can develop in time. The situation which IOS-parties find themselves in is no static phenomenon but is of a dynamic nature due to changing circumstances and shifting perceptions of the parties involved. Sometimes, these changes are the result of a well-defined and explicit decision-making process. Superstore Corp. for instance, deliberately moved its position from a high interest, high power situation towards a low interest, high power situation (cf. figure 7). However, the dynamic character of the IOS-situation is often the result of rather implicit processes. Changing market circumstances (case 1), a dominant influence of the supply chain network with which parties fund themselves (case 6) as well as technological evolutions, such as the rise of the internet (case 1, 5) often contribute to a shift in positions and complicate the development and use of IOS. As a consequence, barriers to IOS may vary in nature and intensity during successive episodes. In other words, the process of developing, implementing and using IOS appears to be not always neat or necessarily well thought out. Moreover, the above mentioned cases indicate that in some situations, the implementation strategy appears to be ruled by emergent processes driven by perceptions of power and interest and environmental forces which are hard to influence rather than by a pattern of rational decision-making.

## **Conclusions**

As information systems are increasingly applied to support links outside the organization, it becomes more and more crucial for management to focus on these external users. In the rush to implement a new system, which is sometimes driven by cost issues or other pressures on various parts of the organization, the interests and power of external users, such as customers, suppliers or other parties, are easily ignored. The danger is that the interests, needs or power of these groups are taken for granted, misunderstood or ignored which may lead to system failure, troubled relations with external parties, or other undesirable effects.

Using the model outlined in this paper may help to make interests and power of relevant parties explicit and it may lead to rectify and change initial system specifications in order to improve the degree of use and the chance for success. The model may also help practitioners to discuss IOS-initiatives in non-technical terms: only if there is a sustainable basis in

strategic, economical and social terms, an IOS appears to be viable. Diagnosing IOS initiatives and trying to divide benefits among powerful parties prior, during and after implementation may prevent failure and disappointment. From this point of view, the model can help practitioners to be vigilant and to shift from a one dimensional, technological and linear approach to system implementation to a multiple perspective assessment. Approaching factors, such as limitations and constraints, from different perspectives may help organizations to affect them and to stimulate more favorable conditions for the successful deployment of an IOS.

Applying the model also shows that implementing IOS is often a long time-scale process of learning and adaptation. Interest and power positions of participants may change, and so may new technologies and adoption rates of these technologies as well as the competitive environment. Because of this, the model should be used on a more continuous basis to describe and assess positions of parties with respect to inter organizational change processes, including IOS.

We would also like to mention some limitations of this study and directions for further research. A limitation of this study is that it is based on a limited set of case studies. More in-depth studies as well as industry specific studies may provide more insight into the specific interests (and degrees of interest) of parties in an IOS as well as into the means of power to promote, ignore or obstruct IOS initiatives of business partners. A further operationalization of the concepts of interest and power in relation to IOS could improve the model and make it more useful to academics as well as practitioners. Further research in the motives to start, ignore or obstruct IOS, especially motives that go beyond management rationalism, could deepen our insights into the interests that are affected by IOS. Another direction for further research can be found in the question how companies deal with stagnating IOS and how power and interest blocks can be overcome.

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