A New Framework for Interorganizational Systems based on Interorganizational Relationships

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Abstract

Upon the pressure of increasing market competition, interorganizational relationships are increasingly critical to the survival and development of the organizations. Interorganizational Systems (IOS) becomes an important technological force behind the improvement of interorganizational relationships. Thus, a better comprehension of IOS is required to improve its applications. This paper provides some insights into the strategic alignment between the IOS and interorganizational relationships. It proposes a new framework to classify IOS based on two dimensions – participants’ competition in interorganizational relationships and strategic importance of interorganizational relationships. Furthermore, the paper also analyzes potential advantages and disadvantages of each category.

Keywords: IOS, Interorganizational Relationships, Strategic Alignment

1. Introduction

With the increasing market competition, especially the globalization of the commerce world, interorganizational relationships become more crucial to the survival and development of organizations. Information Technology, as the most powerful vehicle to support and enable the business improvement and innovation, is applied into the field of interorganizational relationship to facilitate efficient and effective communication between organizations. With its assistance, more and more organizations are transcending their organizational boundaries. Today, cross-organization information transferring and business transactions are popular phenomena in the business world. Information systems designed to this requirement – interorganizational systems (IOS) also attract more and more researchers in IS field.

It is well-accepted to researchers and practitioners that how well the information systems fit into organizations is one of the key factors to the success of IS application. From this perspective, IOS should be tailored to organizations’ unique characteristics. However, how to design IOS that is well-suited to individual business still poses a big problem to practitioners. Although there are many researches on the IOS, few target these problems. And most researches on the matching problem focus on the information systems within organization. They do not include all factors of IOS have that should have been recognized. To address these problems, this paper proposes a new framework of classification for IOS from the perspective of interorganizational relationships. It also analyzes each category – the strengths and the weaknesses it may bring to the organizations.
2. Interorganizational Relationships and IOS

Organizations can not live alone in today’s market. Interorganizational relationships are in a critical position and will bring great values to the organizations, so the organizations are making great efforts to improve the relationships. Different interorganizational relationships are of different importance and values to the organizations (Barringer et al. 2000). Generally speaking, the more tightly coupled the two organizations are the more important and valuable the relationship is; meanwhile, brings more risk and negative effects.

With the rapid progress of information technology, IS is increasingly used in the business world and shows its unmatchable capability in supporting and enabling business initiative. Information system is more suitable for interorganizational relationships which include information sharing internationally. Thus, IS is introduced and becomes popular in interorganizational application. The term IOS (interorganizational systems) was born in early 1980s, as Barret and Konsynski used the term “inter-organizational information sharing system”. Then the term IOS was coined to refer to automated IS shared by two or more organizations (Cash et al. 1985). So IOS is defined as network-based IS that extend beyond traditional enterprise boundaries. With the help of IOS, organizational boundaries are redefined and even extend to the redefinition of firms’ value chain.

The value of IOS is proved by many researchers (Bakos 1991; Hong 2002). So the choice to most organizations is not in whether do or not to do, but rather how to do – how to choose and design suitable IOS. But, the evidences from many countries show that the success rates of IS planning and implementation are extremely low, especially when cross-organization. What kind of IOS is suitable to add value to organizations and why similar technology, even the same system, will bring out completely different outcomes become puzzling problems to researchers for a long time. To address the problem, researchers gave out many valuable theories. Among them, the most influential one is Henderson and Venkatraman’s Strategic Alignment Theory. They contend that inability to realize value from IT investment is in part due to the lack of alignment between business strategy and IT strategy. When an information system is aligned with business strategy it will have an important role in achieving business goals. So when one is planning IS he should regard system as business-driven – based on the organization’s business position and internal infrastructure and processes.

IOS, cross organizational boundaries, is more complicated to implement and control. Strategic alignment between IOS and business strategy is more complex for it involves not only the factors inside the firms, but also interorganizational strategy. Since the direct reason for implementing IOS is to support interorganizational relationships, the alignment between IOS and relationships is necessary to better explore systems to obtain strategic advantages. Which should be emphasized here is that alignment between them means not just interorganizational relationships are decisive to IOS; it also implies IOS may influence and shape relationships by expanding or reducing cooperative areas and strengthening or weakening the coordinative ways. They interact with each other.

As discussed above, IOS and interorganizational relationships should be aligned to each other. To better achieve the alignment, we should first define the categories of IOS and analyze the characteristics of each category. Many articles attempted to classify IOS from various aspects: five levels of participation (Barret et al. 1982), relationship between sponsoring organization and participants, information function of system (Johnston et al. 1988), competitive
advantage or strategic necessity system bring, whether or not adjunct to primary product (Meier 1995), and value activity linkage (Hong 2002). They do provide organizations some insights into IOS. However, there are very few recent papers about the taxonomy of IOS and most of them are too complex to be readily applicable to IOS planning. Furthermore, few researchers have regarded the positioning of interorganizational relationships as a way to support the selection and device of IOS. In order to supply the gap, this paper introduces a new framework to classify IOS based on two dimensions – participants’ competition in interorganizational relationships and strategic importance of interorganizational relationships.

3. Framework for Interorganizational Systems

3.1 Participants’ Competition in Interorganizational Relationship

Based on Porter’s five forces model we describe organization’s living environments as shown in figure 1. It summarizes main interorganizational relationships. Those outside organizations which influence and compete with central organization are also the main participants of its IOS. The following paper will discuss it from vertical and horizontal dimensions.

![Fig.1 Participants’ competition in interorganizational relationships](image)

On vertical dimension is the traditional form of interorganizational relationships. It links upstream and downstream organizations. Though from Porter’s theory their relationships contain competitive factors like bargain, the dominant relationship appears as cooperation. Interorganizational relationship on horizontal dimension exists in a homogeneous group of organizations. Since the positioning of organizations is alike, these firms conflict intensively in market, resource and so on. The relationship is competition as a whole. Recent years this pure competitive relationship changes to cooperation to some extent. It is a kind of adaptation and adjustment to the increasing competitive and rapid changing market. This dimension includes competitive firms, trade associations, research institutes and colleges.

3.2 Strategic Importance of Interorganizational Relationship

The most widely accepted classification of IS is hierarchical model. It classifies IS based on the depth IS involving in business which can also be looked as degree of importance IS to organization’s business strategy. As discussed in section 2, in assessing strategic alignment between IOS and interorganizational business strategy, relationship is the crucial aspect of the interorganizational business strategy. From this perspective the following categorizes IOS into three layers according to the relative importance of participants’ interorganizational relationships to organization’s business strategy, as shown in figure 2.
Interorganizational Relations

Strategy layer

Process Layer

Data & Info Layer

Low

Medium

High

Fig. 2 IOS and interorganizational relationships

Data and information layer involves only data and information exchanging between organizations. It has little impact on organizations’ internal business operation so loosely related firms can also use it. And because of the low influence, organizations commonly put limited importance to this kind of interorganizational relationship.

Process Layer IOS involves business operation and usually happens in relatively tightly coupled organizations. To apply this kind of IOS, organizations would have to transfer their business process to some extent to fully exploit system capability. So only when interorganizational relationships are more important, organizations will implement this IOS.

The organizations participate in strategy layer are mostly business partner and strategic alliance. Their relationships are among the key factors of organizational business strategy.

To summarize, the higher layer involves more in business and has greater impact on organizations, so it will need more support and assurance from organizations' operational and decisive level. As a result, organizations will attach more importance to the relationships and also pay more attention to the IOS. And here we should emphasize that as the original hierarchical model means, the lower layer of IS is the foundation of the higher layer; higher layer is only mirage without basic layer. Like interorganizational relationships, higher layer of IOS is riskier and harder to realize, meanwhile may bring more strategic advantages.

3.3 Six Categories of IOS

Synthesizing two dimensions discussed above we get the framework as figure 3.

Vertical data and information layer marked as ① is elementary functions of IOS. It links upstream and downstream organizations and processes communications between them. Because involving little in business process, it is relatively easy to achieve and is applied in wide extent even when two organizations have nothing in common except for business deal, e.g., entry of order by EDI or Internet. Organizations utilizing this IOS will benefit from decreasing communication cost and convenient and fast information exchanging. Main obstacles of its implementation are security risk and difficulty to achieve the standardization.

② exists among competitors and other similar functional organizations (defined as horizontal in this paper). The representative of this IOS is e-marketplace. In e-marketplace, by uniting competitors in bidding or ordering, buyers will be more powerful to bargain with providers. Covisint founded by G.M., Ford and Daimler Chrysler falls under this category. They cooperate by forming common information depository and control the price as dominant customers union. The competitive organizations in e-marketplace are not necessarily tightly connected. The advantage of this kind of IOS is that the union of customers poses impact and control over providers to benefit every firms participating.
③ is IOS of vertical process layer. The typical system of this category is automated supply chain system. By communication technology and coordinative improvement of workflows cross-organization, organizations linked by this IOS can trigger some operational processing automatically. For example, system linking downstream organization can place order automatically when finding stock is below security level. Then after the order accesses the system of suppliers through IOS of ①, the partner suppliers’ system will set a new production plan or adjust the old plan voluntarily. Because this IOS involves not only data but participants’ processes, it demands participants to open part of business processes. So the participants relate more closely than that of ①, as partners based on transactional cooperation which is relatively more strategically important to organizations. By applying this kind of IOS, the organizations can decrease stock level, shorten lead time and reduce operational cost to have favorable effect on operation. It can also make organizations more flexible to adapt to market demand to better fulfill customers’ requirement. However, it will bring the problems of private information loss when open processes (Hamel 1991) and the large switch cost because of dependence to partners (Bleeke et al. 1995). Furthermore, sharing information system and process brings complexity and risk in management and control (Culpan 1993).

IOS of ④ – horizontal process layer is rare. The reason may be competitors tend to keep processes as secret from each other because processes are value-adding course to products. The processes of rivals are conflicting instead of cooperation. However, when competitors have close relationships and their positions of markets are not totally overlapped, there is possibility of cooperation in certain part of process. From the strategic consideration, which means their relationship is usually of strategic importance, to repel other opponents or potential entrants, competitors might cooperate in producing – dividing the manufacturing of parts by specialty to assemble the whole product. When this happens, the system link these organizations will trigger each others process to perform fluently.

The impact of ⑤ is not just restricted in routine data and operational process; instead, it is enhanced to the decision and strategy level. So the participants are tightly coupled partners and strategic alliance firms who are very important to the existence and development of the organization. New form of corporation alliance like Networks falls into this category. The
representative organization is Dell Computer. It introduces group decision and organizational learning to IOS. Because this kind of IOS involves organizations extensively and profoundly, it needs mutual trust and dependence among participants to share risk and cost. This layer can bring great competitive advantages to organizations, including acceleration of organizational experience and knowledge, improvement of products or services, rapidity of speed to market. Moreover, with the assistance of this IOS, the organizations in strategic alliance can access to each other’s competitive resources, such as knowledge, technology, brand, to form collective competitive advantages to pose greater than individual power to block adversaries and potential entrants (Harrigan 1988). Though there are attractive values, it is hard to implement because of the great influence to organizations. Even when system is established, organizations may suffer from the loss of proprietary information, partial loss of decision autonomy (Garcia-Canal 1996) and clash from partners’ culture (Culpan 1993). And if there is powerful player, it may take most of benefits such as knowledge and experience accumulated by system, and furthermore, it will pose control over the weak organizations with the aid of system (Omar 2001). The weak participants may get nothing at all in the end. The interorganizational relationship of participants in \( \text{⑥} \) is strategic alliance and also competitors. The usual cause of this IOS is to neutralize or block other powerful adversaries or to conquer big problems in industry (Koh et al. 1991). When individual is not capable to solve the problem, organizations may cooperate with others for some time from their own strategic consideration, by pooling knowledge, experience, specialists, capital and other wide-distributed resources. The familiar form is cooperative R&D for some important and complex product. For example, Apple, IBM and Motorola form an alliance to produce PowerPC chip opposing to Intel’s monopoly. 10 companies including HP, IBM and Intel establish sematech to promote research and development in semiconductor area. However, they are competitors after all; this kind of IOS usually is not long-term and always involves just a part of total business. Values it may bring to organizations are gaining access to some particular resources, sharing risk and cost, speeding the development of new products or services, blocking other competitors and potential entrants by collective force.

### 3.4 Summary
Every category has advantages and disadvantages. The higher layer may bring more benefits, however with more risks and problems. There is no perfect category of IOS, only suitable one. So the organizations should make choice of IOS based on interorganizational relationships, with the clear comprehension of participants’ competition in relationships and also status of interorganizational relationships in firms’ business strategy. And we should emphasize again here, IOS will also interact to interorganizational relationships as mentioned above.

### 4. Conclusion and Discussion
The paper proposes a new framework to categorize IOS in two dimensions: participants’ competition in relationships and their interorganizational relationships’ importance to the business strategy. In addition, it analyzes potential value and weakness of each category. By classification and analysis, the paper want to provide some theoretically guidance to organizations who are or are being to plan and implement IOS. The framework in this paper needs to be tested by other empirical research. The main
hypothesis here is that the more interorganizational relationship and IOS is aligned – which is described in the framework as each relationship going with one category of IOS – the more successful IOS will be. To prove it, we should investigate organizations with IOS in system design and interorganizational relationship the systems aim to support, as well as the success of the system. So the research we are going to do is case study and survey to test the relationship between alignment and system success. By empirical research, we also wish to improve the framework and classification of IOS in more detail. The final target of research is to find out ready-to-application method of selecting, positioning and planning IOS.

References