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PREVIEW

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**An empirical study of factors influencing interorganizational
information systems implementation: A case of the real estate
industry**

Whang, Jaehoon, Ph.D.

The University of Nebraska - Lincoln, 1992

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PREVIEW

**AN EMPIRICAL STUDY OF FACTORS INFLUENCING
INTERORGANIZATIONAL INFORMATION SYSTEMS IMPLEMENTATION:
A CASE OF THE REAL ESTATE INDUSTRY**

by

Jaehoon Whang

A DISSERTATION

**Presented to the Faculty of
The Graduate College in the University of Nebraska
In Partial Fulfillment of Requirements
For the Degree of Doctor of Philosophy
Major: Interdepartmental Area of Business**

Under the Supervision of Professor Sang M. Lee

Lincoln, Nebraska

December, 1992

PREVIEW

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DISSERTATION TITLE

An Empirical Study of Factors Influencing Interorganizational

Information Systems Implementation: A Case of the Real Estate Industry

BY

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AN EMPIRICAL STUDY OF FACTORS INFLUENCING
INTERORGANIZATIONAL INFORMATION SYSTEMS IMPLEMENTATION:
A CASE OF THE REAL ESTATE INDUSTRY

Jaehoon Whang, Ph.D.
University of Nebraska, 1992

Adviser: Sang M. Lee

Dramatic advances in the information technology (IT), coupled with drastic cost reductions in computer hardware and software, have enabled the emergence and rapid advances of interorganizational information systems (IOS) during the last decade. Attempting to develop a conceptual framework, many publications have addressed the effective use of IT. However, there has been little empirical research that investigated the critical implementation factors in the context of IOS.

This study explored the factors affecting successful implementation of an IOS. The multiple listing services (MLS) system in the real estate industry was studied as an IOS. A field survey methodology was employed to conduct this research. Six sets of variables were examined: (1) system-intrinsic characteristics; (2) implementation process characteristics; (3) user satisfaction with the system; (4)

information quality; (5) system usage; and (6) user performance.

According to the results of a statistical analysis of one-hundred and forty valid questionnaires, four system-intrinsic characteristics (relative advantage, image, compatibility, and ease of use) were found to be significantly associated with IOS success while two implementation process characteristics (intermediary support and user training) were statistically supported as critical implementation factors. Specifically, relative advantage, image, and intermediary support accounted for 42.3% of the variance in user satisfaction while relative advantage, intermediary support, and image accounted for 32.5% of the variance in information quality. Almost 30 percent of the variance in use was explained by ease of use, user training and compatibility. User performance was positively associated with relative advantage, intermediary support and image, accounting for 31 percent of the total variance. These results provide useful guidelines and a framework for the system professionals at the adoption/development stage of information technology and for future research in a promising area of interorganizational information systems.

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CHAPTER 1

INTRODUCTION

Organizations, as open systems, must react to the external forces associated with environmental change in order to survive (Katz and Kann, 1978). The competitive turbulence and technological transitions characteristic of the current business environment inherently connote potential organizational change (Scott Morton, 1990). Recent advances in information technology (IT) offer an opportunity for organizations to react to these disruptive forces in a constructive and proactive manner.

Information technology can be utilized to build and capitalize upon special competences or comparative advantages of an organization as well as efficiency and effectiveness of individuals. Suitable characteristics of IT applications that either facilitate or drive the user's performance/satisfaction and the organization's goals must be identified. Such applications must be developed and implemented in a timely and cost-effective manner to fully capitalize on their potential benefits to the organization.

One of the primary reasons for the consideration of IT-based applications as a potential source of competitive or cooperative advantage lies in the capability for electronic integration among a set of firms that could potentially

change the basis of competition or cooperation in a marketplace (Barrett and Konsynski, 1982; Cash and Konsynski, 1984; Johnston and Vitale, 1988).

One of the most potentially powerful uses of information technology involves networks that transcend company boundaries (McFarlan, 1984). IT has been successful in linking organizations in the same or different industries, particularly in the form of interorganizational information systems (IOS) that link the customer and the supplier. More recently, such IOS are increasing in number and functionality as business processes are modified so that corporations can respond to new opportunities as well as to the constant pressure for greater responsiveness to the needs of customers or trading partners.

Though IOS or electronic linkages have a great potential for both operational and strategic benefits, just purchasing or adopting information technology does not mean an automatic achievement of such desires. Moreover, considering the different characteristics of IOS from traditional distributed data processing systems, the increasing importance of "how to implement and manage IOS" is obvious. However, research in the use of IT to date has been dominated by conceptual frameworks and detailed case studies of successful IT applications (such as American Airlines' *SABRE* and United Airlines' *Apollo* reservation systems, McKesson's *Economost* system, and American Hospital

Supply's ASAP system) (Clemons and Row, 1988; Copeland and McKenney, 1988; Neo, 1988).

1.1 STATEMENT OF THE PROBLEM

Expenditure on computer resources now amounts to nearly 40 percent of the annual capital investment made by U.S. business, and more than one-half trillion dollars has already been spent on information systems (*Business Week*, October 12, 1987). Such heavy investment in IT is of course based upon the expectation of various kinds of benefits, with the overall goal being enhanced organizational performance.

In spite of an increasing amount of recent attention to information technology, because of the relative newness of the field, there is only limited existing research concerning interorganizational application of such technology. Published research on IOS is not rigorous; indeed, the majority is based on anecdotes and personal opinions and experiences rather than systematic studies. In particular, there is a marked lack of empirical research focusing on the critical factors for successful implementation of such systems. Thus, a formal, empirical assessment of the implementing factors of IOS is necessary and timely.

This study intends to help answer the following questions: (1) what are the problems in implementing and

managing IOS? (2) what are the factors that influence the successful implementation of IOS in the real estate industry? (3) how do organizations operate for the successful implementation of IOS? and (4) how should those factors be handled in an initial adoption stage?

1.2 KEY DEFINITIONS

1.2.1 Information Technology

Today, as the world has shrunk by virtue of information technologies, the notion of a global business community has become reality. Information technology (IT) incorporates a very broad scope of technologies. What would constitute IT? There are several ways of answering this question, and we need a brief orientation for this study.

Straub and Wetherbe (1989) survey the opinion of information management experts with their list of 29 information technologies, and group the technologies into five primary areas in a rank order of their perceived impact on organizations (see Appendix A.). The first three selected areas are: 1) human interface technologies, 2) communication technologies, and 3) system support technologies with indirect impacts.

Scott Morton (1990) defines information technology as a powerful collection of six elements (hardware, software, telecommunications networks, workstations, robotics, and smart chips), each of which is undergoing substantial change

while experiencing increasingly broad and significant applicability. He states that IT will continue to change over the next decade at an annual rate of at least 20 to 30 percent, and this will lead to not only greater shrinkage of time and distance effects, greater interconnectedness, but also better organizational memory with greater capture of organization "rules" heuristics.

The operational definition of IT for this study is "the acquisition, processing, storage, and dissemination of vocal, pictorial, textual, and numeric information by a micro-electronics-based combination of computing and telecommunications" as proposed by the U.K. Department of Industry (Nutt, 1987). Considering today's IT nature and scope, IT is expected to reshape work, and consequently the reconfiguration will deeply influence the distribution of workers across occupations and firms, and the skills that employees are supposed to bring to the workplace.

1.2.2 Interorganizational Information Systems

The term interorganizational information systems (IOS), was first introduced by Barrett and Konsynski (1982). As in any new field, however, academic researchers have offered a range of slightly different terms and definitions for the systems that are creating electronic linkages between firms. Electronic Data Interchange (EDI), Interorganizational Information Systems (IOS), Electronic Linkages, and

Electronic Integration are among the more common usages in recent literature, with some authors distinguishing among these terms more conscientiously than others. The following sample of selected definitions of interorganizational electronic information communication systems illustrates the diversity of terminology that has been put forth in recent years.

Interorganizational information sharing system is a general term referring to systems that involve resources shared between two or more organizations (Barrett and Konsynski, 1982).

Interorganizational information systems (IOS) are defined as automated information systems shared by two or more companies. These uses of information systems technology involve networks that transcend company boundaries (Cash and Konsynski, 1985).

They are called channel systems because they are meant to cure headaches for people in a company's distribution channels - commercial customers and key middle men ... In all cases, by helping the customer solve a problem the company supplying the computer system stands to increase sales or otherwise benefit (Petre, 1985).

New information technologies are allowing closer integration of adjacent steps on the value-added chain through the development of electronic markets and electronic hierarchies (Malone, Yates, and Benjamin, 1986).

Electronic data interchange (EDI) is the computer-to-computer exchange of business information electronically, in a structured format, between business trading partners. EDI is basically defined by three architectural components: standards, translation software, and value-added networks (Ferguson, Hill, and Hansen, 1990).

... interorganizational information system that allows the participating buyers and sellers

to exchange information about prices and product offerings (Bakos, 1991).

Venkatramann and Zaheer (1990) define electronic integration as the integration of business processes of two or more independent organizations through the exploitation of the capabilities of computers and communication technologies. They distinguish electronic integration from both electronic data interchange (EDI) and interorganizational information systems (IOS). According to them, EDI provides the technical platform rooted in a set of standards for informational exchange among participants in a marketplace; IOS builds on these common EDI standards (when necessary) to design and deploy different functionalities that interconnect multiple organizations.

Bakos (1991) classifies IOS into two types based on the economic functionality: information links and electronic marketplaces. An information link is a type of IOS at the interface of the value-added chains of the supplier and the customer in a vertical market: thus, it represents an investment in bilateral integration. On the other hand, an electronic marketplace is a type of IOS that allows the participating buyers and sellers to exchange information about market prices and product offerings: thus, it represents an investment in multilateral information sharing. The key distinction is that the former exists in a bilateral setting where a relationship between the supplier

and the customer has already been established, while the latter functions in a multilateral setting with the goal to establish bilateral buyer-seller relationships.

Benjamin et al. (1990) offer a two dimensional typology of interorganizational electronic linkages based on the task routinity and systems application area, whether in electronic hierarchies or in electronic markets (see Figure 1-1.). According to them, the computer-based multiple listing service (MLS) systems being used in the real estate industry belong to the category of Task Support/Electronic Markets (Cell 4); such systems create a marketplace for multiple buyers and sellers trying to complete non-routine transactions or tasks. This kind of system provides an electronic network that allows real estate agents to search for listings that meet the needs of their customers. The system also provides a wide range of capabilities which can qualify buyers, calculate closing costs, and perform various analyses such as investment analysis, residential analysis, and depreciation analysis.

For this study, Benjamin et al.'s two dimensional typology is employed because it presents a clear category of the system being used in the real estate industry and provides a meaningful base for analysis.

Figure 1-1

Two Dimensional Typology of IOS

(Interorganizational Electronic Linkages)

	Electronic Hierarchies	Electronic Markets
Transaction Processing	Cell 1	Cell 2
Task Support	Cell 3	Cell 4