

EDI 구축 성공에 영향을 미치는 파트너십과 EDI 수용태도

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Partnership and EDI Adoption Attitude affecting on EDI Implementation Success

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The fact that EDI is the IT system between partners implies the importance of studying the affecting factors associated with partnership in EDI. But there are few researches about the inter-organizational factors related to the relationship between partner firms, so called partnerships, influencing the implementation of EDI. Therefore our research is to investigate the relationship between partnership and EDI implementation with inter-organizational perspective. Additionally, we investigate the moderating role of EDI adoption attitude when the companies are divided into two groups, proactive attitude and reactive attitude.

As a result, first, we found the positive relationships between the partnership factors about partnerships among trading partners and the degree of EDI implementation. Second, we expected that proactive firms have stronger significant relationships than reactive firms, but only the relationships between interdependence and integration, interdependence and utilization and trust and integration were proved to be significant among ten relationships. Third, we found positive relationships between EDI adoption attitude and EDI implementation.

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1. Introduction

Electronic Data Interchange (EDI) is an application of information technology that allows business partners to send, receive, and process commercial documents electronically from computer to computer instead of by writing and mailing them [Bergeron and Raymond, 1997]. Therefore EDI is defined as an IT(Information Technology) system between trading partners for the cooperative objective. The formation of partnerships between firms is becoming an increasingly common way for firms to find and maintain competitive advantage [Mohr and Spekman, 1994]. There have been many researches about EDI on both technological issues and non-technological issues. Especially for non-technological issues, researchers have studied the factors influencing the implementation, adoption, and diffusion of EDI. The factors that were made manifest mainly are organizational factors, technological factors, and environmental or infra-structural factors [McGowan, 1994; Grover, 1991]. Implementing EDI has a significant effect on the business relationship between the partners [Premkumar, *et al.*, 1994]. And collaboration often occurs on an inter-organizational basis as partnerships with suppliers and customers are considered increasingly important [Finnegen, *et al.*, 1998].

Although the fact EDI is the IT system between partners implies the importance of studying the affecting factors associated with partnership in EDI, there are few researches about the inter-organizational factors related to the relationship between partner firms, so called partnerships, influencing the implementation of EDI. Therefore, our research purpose is to

investigate the relationship between partnership and EDI implementation with inter-organizational perspective.

Additionally, one organization's decision to adopt EDI has implications for other organizations' decision to adopt EDI. There can be two types of EDI trading partners classified by the attitude for adoption of EDI. In an Inter-Organizational System (IOS), invariably, one firm proactively initiates the action for adoption of IOS with another firm, and the other firm reactively decides to adopt the IOS based on the proactive firm's initiatives [Premkumar and Ramamurthy, 1995]. Because EDI is a subset of IOS [Premkumar, *et al.*, 1994], we can apply the facts related to IOS to EDI. It can be implied that firms adopting EDI may have the decision attitude divided by proactive attitude and reactive attitude and this kind of attitude for EDI adoption will have an impact on EDI implementation result.

Proactive firms display greater adaptation, more connectivity with their trading partners, and better integration of EDI with internal IS applications compared with firms that reactively adopt EDI [Ramamurthy and Premkumar, 1995]. Therefore, our research purpose is to analyze the relationship between EDI adoption attitude and EDI implementation with the relationship between partnership factors and EDI implementation. And we can expect the relationship difference between partnership factors of EDI trading firms and EDI implementation due to the EDI adoption attitude. And we need investigate the influence of EDI adoption attitude to EDI implementation.

In this paper, we have three research purpose. First, we investigate the important factors

between partnership and EDI implementation with inter-organizational perspective. Second, we investigate the moderating role of EDI adaption attitude. Third, we investigate the relationship between EDI adaption attitude and EDI implementation success in the real world.

II. Literature Review

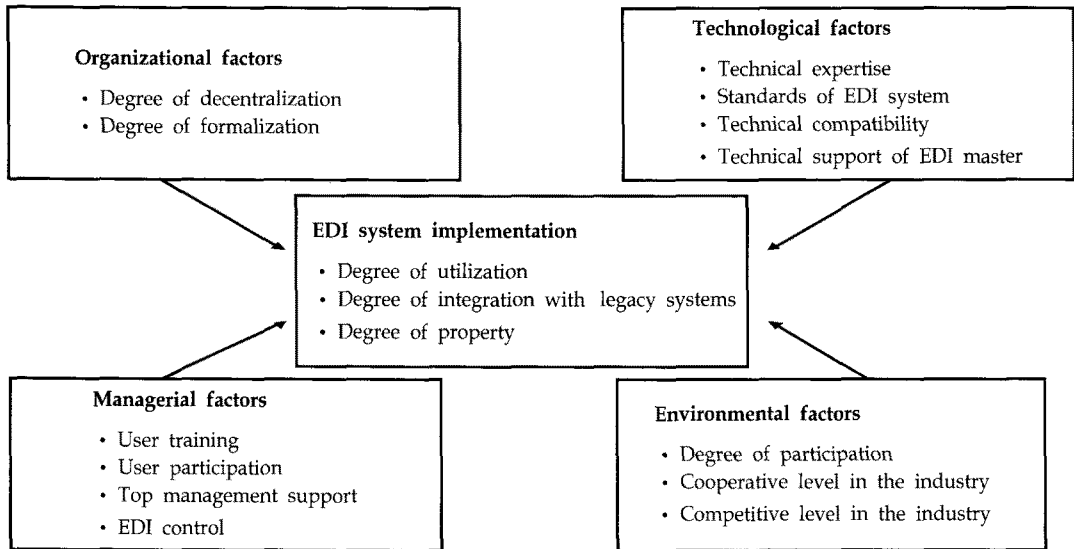
2.1 EDI Implementation

Finnegen, *et al.* [1998] investigated the success factors of EDI focused on non-technological aspects. Those factors they found are planning, top management support, ownership of EDI system, managing trading partnership relations, structural integration, education and training, and staffing the implementation team. Among these factors, we can notice the issues related to 'managing trading partnership relations'. This means that an important component of successful EDI is the existence of trust among the

trading partners. He measured EDI implementation success as the degree to which the systems met their objectives, financial feedback, degree of integration with existing systems, and degree to which EDI is accepted within the organizations. We can infer that the measure of EDI implementation success he used may include the concept of integration and utilization.

Hwang, *et al.*'s research analyzed the factors influencing the EDI system implementation and variables for degree of EDI implementation [1991]. He found that the induction period, the size of the firm that implements EDI and technological capability are important factors in EDI system implementation.

Lee and Han [1999] used degree of integration and degree of utilization as measures for EDI implementation to examine the impact of EDI controls on EDI implementation. The concept of integration is similar to the EDI depth suggested by Massetti [1991], which indicates the extent to which a firm's business is inter-



<Figure 1> Research model of the antecedent factors of EDI implementation

<Table 1> Summary of the determinants or antecedents of EDI implementation success

Organizational factors	Scale	[Grover, 1991], [Grover, 1993], [McGowan, 1994], [Hwang, <i>et al.</i> , 1991]
	Decentralization	[Grover, 1991], [Grover, 1993], [McGowan, 1994],
	Formalization	[Grover, 1991], [McGowan, 1994], [Coopers and Zmud, 1990]
	Risk management	[Grover, 1993], [McGowan, 1994], [Hwang, <i>et al.</i> , 1991]
	Education and training	[Finnegeen, 1998], [Grover, 1993], [McGowan, 1994], [Hwang, <i>et al.</i> , 1991], [Ramamurthy and Premkumar, 1995]
	User participation	[Grover, 1993], [McGowan, 1994], [Hwang, <i>et al.</i> , 1991]
	Top mgmt support	[Finnegeen, 1998], [Ramamurthy and Premkumar, 1995], [Riggins, 1994]
Technological factors	EDI system standards	[Benjamin, <i>et al.</i> , 1990], [Kym, 1991], [Hwang, <i>et al.</i> , 1991], [Premkumar, <i>et al.</i> , 1994]
	Technical compatibility	[Premkumar and Ramamurthy, 1995], [McGowan, 1994], [Bergeron and Raymond, 1997]
	Technical support	[Grover, 1990], [Holland and Lockett, 1994], [McGowan, 1994]
	Technical specialty	[Emmelheinz, 1988], [McGowan, 1994]
EDI implementation	Integration	[Premkumar, <i>et al.</i> , 1994], [Lee and Han, 1999], [Premkumar and Ramamurthy, 1995], [Finnegeen, 1998]
	Utilization	[Premkumar, <i>et al.</i> , 1994], [Lee and Han, 1999], [Premkumar and Ramamurthy, 1995], [Finnegeen, 1998]

wined with those of its trading partners through EDI connections. The measure of utilization indicates the proportion that a company used EDI in the applications that can be processed through other means.

Hart and Saunders [1998] studied relationships among customer power, supplier dependence, supplier commitment, supplier trust and EDI use. In their study, Ramamurthy and Premkumar [1995] found that two inter-organizational variables, competitive pressure and exercised power, are related to reactive adoption of EDI, whereas two organizational variables, internal need and top management support, are related to proactive adoption of EDI. They verified that there exists the positive re-

lationships between supplier dependence and customer power, customer power and volume of EDI use, supplier commitment and supplier trust, supplier trust and diversity of EDI use, customer power and diversity of EDI use, and supplier trust and volume of EDI use.

Premkumar, *et al.* [1994] examined the relationship between various innovation characteristics and attributes of EDI in organizations. In his research EDI, a subset of IOS, providing a structured form of communication, has become a very popular vehicle for electronic transfer of information in purchase orders, sales invoice, shipping, billing and other tasks from one firm to another [Ferguson and Hill, 1988]. In our research we use the degree of diffusion

as a measure for EDI implementation. So we need to focus on the diffusion characteristics of EDI.

The determinants of EDI implementation success in the previous researches is summarized in <Figure 1> and in <Table 1>. As shown in <Figure 1> and in <Table 1>, we can induce that although EDI is the inter-organizational system, the factors of many researches just include are organizational factors and technological factors on EDI implementation except inter-organizational factors including the partnership.

2.2 Our research perspective in EDI implementation

When we assemble the existing researches about the influencing factors on EDI implementation, we can conclude the research perspectives and characteristics of the factors found. <Figure 2> shows the position of our research compared to other researches. We can find two kinds of research perspectives such as information system implementation perspective and innovation diffusion perspective that considers EDI implementation not only technology sys-

<p>C: Inter-organizational factors on IS implementation perspective</p> <ul style="list-style-type: none"> • Previous literature: [Benjamin, et al., 1990], [Kym, 1991], [Hwang, et al., 1991], [Premkumar, et al., 1994] • Security • Ensuring that the enabling technology is in place • Integrating EDI technology • Documenting the implementation • Technical expertise • Standards of EDI system • Technical compatibility • Cooperative level in the industry • Competitive level in the industry 	<p>D: Inter-organizational factors on Innovation Diffusion perspective</p> <ul style="list-style-type: none"> • Previous literature : None • Participation of trading partner • Commitment • Coordination • Interdependence • Trust <p>: Our research perspective</p>
<p>A: Intra-organizational factors on IS implementation perspective</p> <ul style="list-style-type: none"> • Previous literature : [Premkumar, et al., 1994], [Grover, 1991] • Planning • Top management support • Ownership of EDI • Structural integration • Education and training • Staffing the implementation team 	<p>B: Intra-organizational factors on Innovation Diffusion perspective</p> <ul style="list-style-type: none"> • Previous literature : [McGowan, 1994], [Lee and Han, 1999] • Degree of decentralization • Degree of formalization • User training • User participation • Top management support • EDI control

<Figure 2> Matrix of researches about influencing factors on EDI implementation by research perspectives and characteristics

tem implementation but also process innovation that can change the organizational environmental structure. And we can largely divide the influencing factors into intra-organizational factors and non-organizational factors based on the internal managerial ability. So we divide the EDI implementation researches to four groups using 2 by 2 matrix.

The X-axis of <Figure 2> means the left side is more leaned on Information system implementation perspective and the right side is more leaned on innovation diffusion perspective. The lower part of Y-axis is focused on intra-organizational factors and the upper part is focused on inter-organizational factors in EDI system implementation.

We can summarize the variables as influencing factors on EDI implementation categorized by research perspective and whether they are intra-organizational or not. The detailed explanation of four group variables is followed in the next paragraph. The significant position of our research in EDI implementation is positioned at D: Inter-organizational factors on Innovation diffusion perspective. To inspect the aspects of innovation diffusion perspective of EDI system, we adapted the six stage model of Cooper and Zmud [1990], who described the adoption and diffusion in terms of six stage; initiation, adoption, adaptation, acceptance, routinization, and infusion. Our research uses the stage model concept to measure the degree of EDI implementation.

2.3 Partnerships in trading firms

Mohr and Spekman [1994] studied how to better manage relationships between partners. In

their research, partnerships were defined as purposive strategic relationships between independent firms which share compatible goals, strive for mutual benefits, and acknowledge a high level of mutual interdependence. Partnerships can afford a firm access to new technologies or markets. They proved that more successful partnerships, compared with less successful partnerships, exhibit higher levels of attributes of partnership such as commitment, coordination, interdependence, and trust. And the communication behavior such as communication quality, information sharing, and participation in planning are deterministic factors in partnership success.

The use of IT has acted as an enabler to sustain the cooperative mood of the partnerships in inter-organizational network [Kumar and Dissel, 1996]. Considering this fact, we can know the importance of partnerships in IT system.

Lee and Kim [1999] studied how to enhance the existing knowledge about outsourcing partnership by distinguishing the components of partnership quality from the variables that influence it. They used the fact of McFarlan and Nolan [1995] which described that the partnership allows an organization to leverage a key part of the value chain by bringing in a strong partner that complements its skill. They found as determinants of partnership quality, organizational factors such as age of relationship, coordination, culture similarity, joint action and power imbalance, and human factors such as communication quality, information sharing, participation and top management support. Partnership quality may be expressed as how well the outcome of partnership delivered

matches the participants' expectations. The measured items of partnership quality are benefit and risk share, business understanding, commitment, conflict, mutual dependency, and trust. And he focused that there is a positive relationship between partnership quality and outsourcing success. His research contributed to the importance of partnership between firms in information system and information technology usage.

2.4 EDI adoption

Premkumar and Ramamurthy [1995] examined the role of inter-organizational and organizational factors on the decision attitude for adoption of IOS in the specific context of EDI. His study also evaluated the differences between proactive firms and reactive firms on implementation outcomes. In his study, power and dependence relations between IOS partners have a significant impact on IOS adoption decision [Baber, 1991]. He found that in an IOS, invariably, one firm proactively initiates the action for adoption of IOS with another firm, and the other firm reactively decides to adopt the IOS based on the proactive firm's initiatives. And it is also possible that proactive firms have linked up with more trading partners, and to that extent have a greater proportion of their first application on EDI. Reactive firms, on the other hand, may still be using the traditional attitude with other trading partners. Since proactive firms implement EDI to gain significant benefits from EDI, they appear to have better integrated their EDI application with other internal information systems to derive full benefits from EDI. He proved that the

firms subjected to higher competitive pressure for EDI are more likely to be reactive in their decision to adopt EDI and the firms with a champion for EDI are more likely to be proactive in their decision to adopt EDI. And he found that proactive firms are found to have greater extent of adaptation, more external connectivity with trading partners, and better integration of EDI information in their internal IS applications.

Some studies have attempted to provide the mechanisms to assist small businesses to adopt EDI based on the premise that small business acquire and use computer technology to increase market share, gain strategic advantage and promote customer and inter-organizational relationships. But he proved that most small businesses tend to acquire and use computer technology with the aim of improving the day to day running of the business rather than the reasons above. Finally he concluded that most EDI small business as use are forced to use the technology by larger trading partners.

III. Research Model and Hypotheses

Drawing the previous section, our research model is exhibited in <Figure 3>. There are Five independent factors, one moderating factor, and two dependent factors in our research model.

This research analyzes three types of relations between research variables.

First, we analyze the relation between partnership factors as independent variables and EDI implementation as dependent variables with the correlation analysis.

Second, we will specify the different signif-

icance level of the relation between partnership factors and EDI implementation when the companies are classified by the EDI adoption attitude with the correlation analysis.

Finally, we analyze the relation between EDI adoption attitude as an independent variable and EDI implementation as dependent variables with the t-test analysis.

Following section exhibits the operational definition of our research factors.

3.1 Participation of trading partner

From the social perspective, participation is described as a remedy when there is conflict, frustration, and vacillation present in the group. We can suppose that active participation of the trading partner will play a positive role in the information system implementation. The participants have the willingness to openly communicate, to fairly share the benefit and risks, and to sustain long-standing relationship.

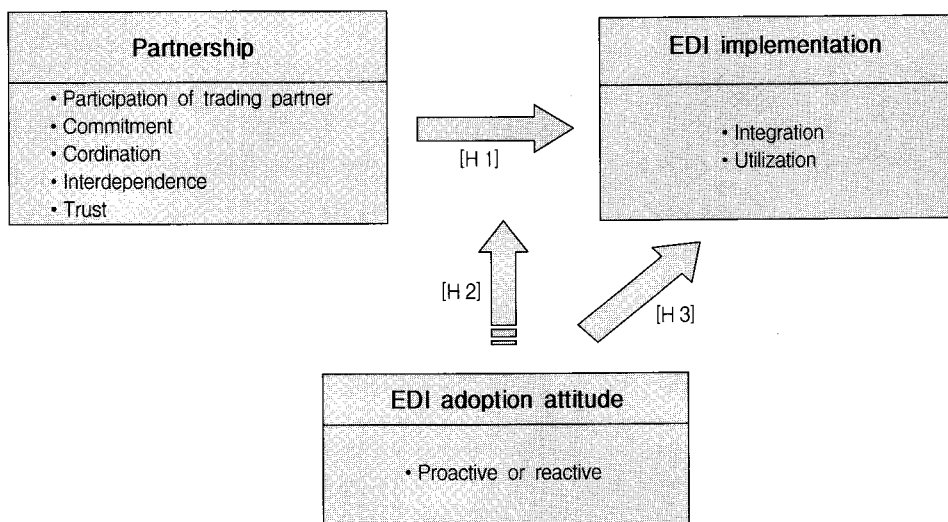
Actually there are many cases that companies link through supplier-customer relationships and client-server relationships.

3.2 Commitment

According to Moorman, *et al.*'s definition, commitment is an enduring desire to maintain a valued relationship [1992]. And according to Dwyer, *et al.* [1987], the notion of commitment can be measured by three criteria; high level of inputs to the association, durability that requires the willingness of the participants to make adjustments over time, and consistency of participants to maintain the relationship. A high level of commitment provides the context in which both parties can achieve individual and joint goals without raising the specter of opportunistic behavior [Cummings, 1984].

3.3 Coordination

Coordination is related to boundary defini-



<Figure 3> Research Model of partnership factors in EDI implementation

tion and reflects the set of tasks each party expects the other to perform. Without high levels of coordination, any planned mutual advantages cannot be achieved [Mohr and Spekman, 1994]. Coordination is needed to maintain stability between participants in dynamic environment [Bensaou and Venkatraman, 1995].

3.4 Interdependence

Results from a relationship in which any loss of autonomy will be compensated through the expected gains [Cummings, 1984]. Both partners recognize that the advantages of interdependence provide benefits greater than either could attain singly [Mohr and Spekman, 1994]. Lee and Han [1999] analyzed mutual dependency instead of interdependency as the extent to which a firm will have influence over and be influenced by its partner. Dependency between organizations results from a relationship in which participants perceive mutual benefits from interactions [Bensaou and Venkatraman, 1995; Mohr and Spekman, 1994].

3.5 Trust

Trust in a working relationship and its implications for a firm's actions is defined as the firm's belief that another company will perform actions that will result in positive outcomes for the firm, as well as not take unexpected actions that would result in negative outcomes for the firm [Anderson and Narus, 1990]. In general, trust is conceptualized as two dimensions; confidence and willingness [Lee and Han, 1999]. Moorman, *et al.* [1993] defines trust as a willingness to rely on an exchange

partner in whom one has confidence.

3.6 EDI adoption attitude

Typically, a firm based on certain internal and external motivations proactively initiates the action for adopting IOS for inter-organizational transactions with its trading partner and the trading partner reactively responds to the request based on its own set of internal and external factors. In Premkumar's study [1995], he proved that firms subjected to higher competitive pressure for EDI are more likely to be reactive in their decision to adopt EDI and firms with a champion for EDI are more likely to be proactive in their decision to adopt EDI. These facts helped our research make measuring items for EDI adoption attitude. Riggins [1994] noticed that firms that initiate EDI with their trading partners must take into consideration the facts that inter-organizational systems projects are inherently more risky. And an initiator whose trading partners decide to participate in the IOS relationship may experience implementation risk, because it cannot control how the trading partners implement the system inside their own facilities. So it can be expected that when companies decide to adopt EDI, they may act EDI usage proactively or reactively whether the reason to adopt EDI is trading partner's requirement

3.7 Integration

EDI integration with legacy systems evolves from an initial state when EDI is first adopted, through later stages as the organization adds functions and partners [Bergeron and Raymond,

1997]. Integration is defined by the extent to which EDI data can be directly processed within applications without human intervention [Lee, *et al.*, 1999].

3.8 Utilization

The measure for utilization indicates the proportion that a company use EDI in the applications that can be processed using other complementary means such as e-mail or fax. It is measured as the proportion to which a firms' information exchange and processing are handled through EDI [Lee and Han, 1999]. In our research the measure for EDI utilization indicates the proportion that a company use EDI in the applications that can be processed using other complementary means such as e-mail or fax. Utilization can be divided to internal utilization that means the level of user's usage, and external utilization that means the diffusion and usage in the trading network companies.

In summary, the research variables we will use in our research model are exhibited in <Table 2>.

3.9 Research Hypotheses

We classify three kinds of hypotheses in the research model.

H1: There is a positive relationship between partnership factors and EDI implementation.

H1-1. There is a positive relationship between partnership factors and EDI utilization.

H1-2. There is a positive relationship be-

tween partnership factors and EDI integration.

H2: The EDI adoption attitude can play a moderating role in the relationship between partnership factors and EDI implementation.

H2-1. The relationship between partnership factors and EDI utilization in proactive firms is stronger than that in reactive firms.

H2-2. The relationship between partnership factors and EDI integration in proactive firms is stronger than that in reactive firms.

H3: There is a positive relationship between EDI adoption attitude and EDI implementation.

H3-1. Proactive firms will have a greater extent of utilization compared to reactive firms.

H3-2. Proactive firms will have a high level of integration compared to reactive firms.

To verify our hypotheses, we use the correlation analysis and the t - test. Before performing these method, we performed factor analysis to find a meaningful or interpretable grouping of the variables

IV. Results

This study used a survey based on field study of companies that use EDI system mainly focused on Value Added Network Electronic Data Interchange. This research methodology has been used in the majority of previous studies in this area. [Bergeron and Raymond, 1997;

<Table 2> Research variables and descriptive statistics

Factor	Variable	Operational definition	MEAN	S.D.
Participation	P 1	• Degree of positive attitude in EDI usage togethe.	3.62	1.09
	P 2	• Easiness for getting feedback about EDI system performance.	3.34	0.99
Commitment	O 1	• Degree of expectation to last a relationship.	4.33	0.79
	O 2	• Degree of keeping a relationship associated to the EDI performance.	4.11	0.91
	O 3	• Degree of satisfaction about trading partner's task performance.	3.75	0.79
Coordination	C 1	• Degree of supporting the resources for EDI implementation.	2.92	1.21
	C 2	• Degree of sharing in the business style and information of EDI system usage.	2.92	1.00
Interdependence	I 1	• How many customers/ suppliers the company has about the same product.	3.60	1.01
	I 2	• Positive attitude with partner in EDI system usage.	3.75	1.06
	I 3	• How to solve exceptional problems by EDI system togethe.	3.73	0.96
Trust	T 1	• The honesty and accuracy of deadlines set by the trading partner.	3.82	1.04
	T 2	• The willingness of the trading partner to share information.	3.23	1.06
	T 3	• The degree of close relationship through EDI system.	3.72	0.98
Adoption attitude	D 1	• Positive attitude about using EDI as much as possible.	3.30	1.07
	D 2	• Proactive attitude in EDI system usage.	2.81	0.82
	D 3	• EDI adoption by trading partner's requirement.	2.44	1.00
	D 4	• Positive attitude in conversion of work styles by EDI adoption.	3.39	0.87
	D 5	• Not Reactive attitude about EDI adoption compared to the trading partner.	3.36	1.07
Integration	N 1	• Internal integration: reflects the variety of the value chain functions interconnected through EDI within the organization.	2.88	1.10
	N 2	• External integration: refers to the variety of trading partners with which the organization interacts through EDI.	2.97	0.96
	N 3	• Degree of EDI development for integration with the legacy system.	3.08	1.13
Utilization	U 1	• Breadth of usage: number of market partners with which a firm exchanges EDI documents.	3.07	1.11
	U 2	• Internal diffusion.	3.13	1.11
	U 3	• External diffusion.	2.89	0.90

Finnegen, et al., 1998]

4.1 Data collection

We developed the questionnaire based on the related literature and the author's experi-

ence in the Korean industry. All operational definitions of measuring items for variables are summarized in <Table 2>.

We arranged the questionnaires to 900 companies that used EDI system by mail. And the returned questionnaires used in testing after

filtering unconscious responses were 69. The returned rate was so low because some of the participants might not take the time to read the questionnaires or might not have a complete knowledge about some of the questions. Even though the response rate was low, the number of sample was enough to perform a statistical test.

Characteristics of samples companies are shown below. Even though the number of companies that use Web EDI is increasing, the ratio of sample companies that use VAN EDI is still 90% rather larger than 10% of Web EDI.

<Table 3> The coordination ratio of business type & the coordination ratio of industry

Business type	Ratio (%)	Industry	Ratio (%)
Manufacturing	71	Electronics	30
Service	14	Heavy	1
Public service	9	Car	3
Others	6	Steel	5
		Electricity	12
		Construction	9
		Clothing	7
		Others	33

<Table 4> Result of Factor analysis and Reliability test

	Factor	Item Number	Factor Analysis	Reliability Test	Cronbach α
Independent Variables	Coordination	2	2	2	0.890
	Trust	3	3	3	0.876
	Commitment	3	3	3	0.811
	Interdependence	3	3	3	0.894
	Participation	2	2	2	0.875
Dependent Variables	Integration	3	3	3	0.633
	Utilization	3	3	3	0.729
Moderate Variables	EDI adoption attitude	5	4	4	0.730

The coordination ratio of business type and the coordination ratio of industry are in <Table 3>.

4.2 Validity and Reliability test

Before verifying our hypotheses, we performed an exploratory factor analysis of the 13 variables of independent variables, the 6 variables of dependent variables and the 5 variables of EDI adoption attitude variables. We examined the orthogonal varimax model for fit and interpretation. The solution with five factors yields more meaningful results, as well as a good fit based on the residual correlations. The result of factor analysis is presented in <Table 4>.

And the reliability of the scales was determined. For each composite scale, Cronbach alpha coefficient for standardized variables was calculated. The reliability of the responses to all instruments was assessed primarily by the mean value of the Cronbach alpha reliability coefficient.

As described below in <Table 4>, Cronbach alpha coefficients vary from 0.600 to 0.894. Cron-

bach alpha reliability coefficient of EDI adoption attitude can be increased through deletion of one item.

4.3 Results of Testing the hypotheses

We investigate the correlation coefficients among the independent variables included in the partnership factors and dependent variables included in the EDI implementation for H1 testing.

And we investigate the correlation coefficients divided to two groups, proactive attitude and reactive attitude by EDI adoption attitude for H2 testing.

4.3.1 Hypothesis 1 testing

H1 is about the existence of a relationship between partnership factors and EDI implementation. <Table 5> presents the results of testing the hypotheses which consider the relationship among the variables.

When we summarized the results above, we can conclude that we will partially accept H1 that explains the relationship between partnership factors including commitment, trust, interdependence, participation except coordination, and EDI implementation including integration and utilization.

According to the correlation analysis, if the correlation coefficient value is over 0.4 ($\gamma \geq 0.4$), the variables have a strong relationship. Therefore, among the five factors, trust was found as the most important one for EDI implementation. This means that if they trust in each other, company integrated EDI systems into their legacy systems, and utilized EDI sys-

tems for their business. The other factors, such as commitment, interdependence and participation are less related with EDI implementation. Finally, coordination results not to be significant.

<Table 5> Pearson's Correlation coefficients of variables

Variables	Integration	Utilization
Coordination	0.198 (0.101)	0.182 (0.134)
Trust	0.472 (0.000)***	0.319 (0.007)***
Commitment	0.247 (0.040)**	0.281 (0.019)**
Interdependence	0.291 (0.015)**	0.269 (0.024)**
Participation	0.393 (0.001)***	0.233 (0.054)*

Note) * Significant at $p < 0.10$
 ** Significant at $p < 0.05$
 *** Significant at $p < 0.01$, number = 69

4.3.2 Hypothesis 2 testing

H2 is that the EDI adoption attitude can play a moderating role in the relationship between partnership factors and EDI implementation. To test H2, we need to investigate the correlation coefficients divided to two groups, proactive attitude and reactive attitude by EDI adoption attitude. The result is presented at <Table 6>.

In <Table 6>, we conclude that we will partially accept H2. First, the positive relationship between trust of trading partner and EDI integration and the positive relationship between trust of trading partner and utilization level in proactive firms are stronger than those in reac-

<Table 6> Summary of correlation coefficients in two groups

Variables	Decision attitude	Number	Pearson coefficient	
			Integration	Utilization
Coordination	Total	69	0.198(0.101)	0.182(0.134)
	Reactive	30	0.236(0.200)	0.281(0.124)
	Proactive	39	0.103(0.530)	-0.107(0.516)
Trust	Total	69	0.472(0.000)***	0.319(0.007)***
	Reactive	30	0.494(0.004)***	0.347(0.055)*
	Proactive	39	0.581(0.000)***	0.418(0.008)***
Commitment	Total	69	0.247(0.040)**	0.281(0.019)**
	Reactive	30	0.362(0.045)**	0.384(0.032)**
	Proactive	39	0.529(0.000)***	0.182(0.265)
Interdependence	Total	69	0.291(0.105)**	0.269(0.024)**
	Reactive	30	0.447(0.011)**	0.100(0.590)
	Proactive	39	0.363(0.023)**	0.118(0.471)
Participation	Total	69	0.393(0.000)***	0.233(0.054)*
	Reactive	30	0.453(0.010)**	0.287(0.117)
	Proactive	39	0.289(0.073)*	0.216(0.185)

Note) * Significant at $p < 0.10$

** Significant at $p < 0.05$

*** Significant at $p < 0.01$, number = 69

tive firms respectively. Second, the positive relationship between commitment of trading partner and EDI integration level in proactive firms is stronger than that in reactive firms

On the other hand, if we investigate the correlation between the rest variables and integration and utilization, the coefficients are not significant or the result is reverse. From this result, we can infer that there is no relation between the rest variables and integration and utilization in divided attitude, proactive and reactive.

In detail, if we investigate the correlation coefficient between commitment and integration, that in proactive attitude is higher and more

significant than that in reactive attitude as expected in our hypotheses. We presume that the EDI integration level with legacy systems will be better in the firms that adopted EDI proactively in spite of the risks we said in section 2.4 because they will try to last better relationship with trading partner through implementation of new costly system. But if we investigate the coefficients between commitment and utilization, that in reactive attitude is higher than that in proactive attitude on the contrary of our hypotheses and the result is not significant. The reason is that the influence level of commitment on EDI utilization in reactive firms can be stronger than that in proactive firms

<Table 7> T-test of variables classified by EDI adoption attitude

Variables	Mean		F-value: Test of equal variances	T - value
	Reactive attitude (n = 30)	Proactive attitude (n = 39)		
Integration	2.92	3.09	1.59	0.934(0.353)
Utilization	2.82	3.25	1.78	2.283(0.026)**

Note) * Significant at $p < 0.10$

** Significant at $p < 0.05$

*** Significant at $p < 0.01$, number = 69

because they would use EDI system actively when they feel the commitment level is important with their partners.

If we investigate the correlation coefficient between participation and integration, that in proactive attitude is lower on the contrary and more significant than that in reactive attitude. We can expect the reason is if the firms that adopted EDI reactively feel the participation of trading partner positively, they would try to implement EDI more actively because of the partner's stimulus. In the case of utilization we can find the similar result, but they are not significant.

4.3.3 Hypothesis 3 testing

H3 is that there is a relationship between EDI adoption attitude and EDI implementation. Now we can divide sample companies into two groups, proactive firms and reactive firms, and examine the difference level between two groups using t-test method. Using t-test we can prove that there is a difference of degree of implementation between two groups. From the result shown in <Table 7>, we can conclude that there is a significant difference of EDI utilization according to the EDI adop-

tion attitude and there is not a significant difference of EDI integration according to the EDI adoption attitude.

In detail, the proactive company has a higher level of EDI utilization than the postactive one. This implies that the earlier they received EDI system, the more they utilized EDI systems for their business.

V. Conclusion

This study has two contributions in real company's successful EDI implementation and theoretical development.

First, as we mentioned in introduction, although the fact that EDI is the IT system between partners implies the importance of studying the factors associated with partnerships on EDI system usage, there were few researches about those factors for EDI implementation. We highlighted the positioning of this research by the diagram with two axes that are research perspectives and organizational or non-organizational characteristics. We filled the area of the innovation diffusion perspective and non-organizational factors on EDI implementation.

Second, this research shows the role of information technology to develop a value adding

partnerships, especially focused on EDI implementation. The result of our study notices that companies must consider the partnership with trading partner as a necessary component for EDI implementation and perform the proactive EDI adoption attitude for the efficient EDI system usage.

The limitation of our research is as follows.

First, we had received little questionnaires. And the number of sample companies for questionnaires was not enough to divide two groups and more than 80% of total sample companies were small companies. Most companies more than 90% used VAN EDI even though the use of Web EDI is increasing because of the economical aspects and easiness. We could find the fact that the ratio of Web EDI compared to VAN EDI still was low. But we can expect the contrary condition due to the expansion of Internet usage in real companies after a few years.

Second, we need to inspect the influencing factors that include not only partnership factors of our research but also the other proved

factors for EDI implementation together. Because there can be the inter-relational effects among the influencing factors. We expect that it is meaningful the relationships between all the categorized influencing factors and EDI implementation are examined at the same level. Additionally, we need the more variables to perform factor analysis.

Third, to add the exactness and suitability, we can perform other effective and advanced statistical methods for the right analysis. And we can supplement the questionnaire items for the research variable to be fitted better in Korean culture. The items of each variable were not exact, and the items of EDI integration and the items of EDI adoption attitude were not completely adaptable.

A promising area for future research is the comprehensive and extended development and validation of our research model by enough sample collection with various industries and scales. And it will be also interesting to extend this research in supply chain management environment.

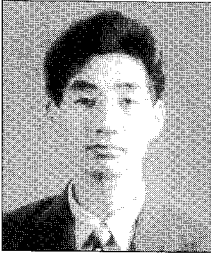
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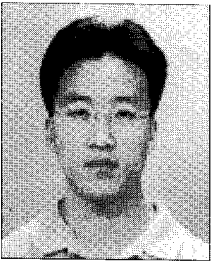
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◆ 저자소개 ◆



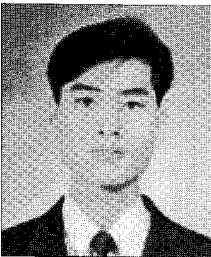
김재경 (Kim, Jae Kyeong)

현재 경희대학교 경영대학 부교수로 재직중이다. 서울대학교 산업공학과를 졸업하고, 한국과학기술원 산업공학과에서 석사 및 박사학위를 취득하였다. 주요 연구분야로는 Data Mining, e-CRM, e-Business 전략이다. Applied Artificial Intelligence, Computers and Industrial Engineering, Computers and Operations Research, Electronic Commerce Research and Application, European Journal of Operational Research, Expert Systems with Applications, Group Decision and Negotiation, Intelligent Systems on Finance, Management and Accounting, International Journal of Human-Computer Studies (International Journal of Man-Machine Studies), Journal of Decision Systems 등의 외국 학술지 및 다수의 국내 학술지에 논문을 게재하였다.



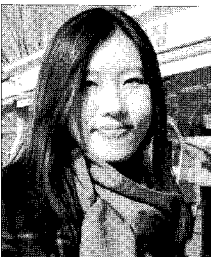
이상철(Lee, Sang Chul)

현재 경희대학교 사회과학연구원 정보센터에서 책임연구원으로 재직중이다. 경희대학교 대학원 경영학과에서 석사학위를 받고(1998), 동 대학원에서 박사학위를 수료하였다(2002). 주요 관심분야로는 e-Business 전략, 품질경영, MSEM 등이다.



이재광 (Lee, Jae Kwang)

한국과학기술원에서 산업공학(학사), 경영정보학으로 석사 및 박사학위를 받았으며 현재, (주)SK 마케팅 부서에서 근무하고 있다. 주요 관심분야로는 DSS, Business Intelligence, CRM 등이다.



이정은 (Lee, Jeong Eun)

한국과학기술원에서 전산학으로 학사 및 경영공학으로 석사학위를 받았으며 현재 Accenture에서 Business Consultant로 근무하고 있다. 주요 관심분야는 SCM, e-Business Design 등이다.

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