

# An Empirical Study on Situational Factor of ERP Introduction

Ki Heung Yim<sup>1)</sup>, Min-Yeong Chong<sup>2)</sup>, Jong-Hei Ra<sup>3)</sup>

## : Abstract

In today's dynamic and turbulent business environment, in order to become globally competitive, many companies are trying to get closer to the customer and deliver value added product and services in the shortest possible time which demands integration of business processes of an enterprise. Enterprise Resource Planning (ERP) is such a strategic tool, which helps the company to gain competitive edge by integrating all business processes and optimizing the resources available. This paper throws light on how ERP evolved, what makes up an ERP system and what it has to offer to the industries. The paper includes the role of ERP, perception of ERP value, ERP plan and direction. The author also argues checkpoints as a preview to ERP introduction.

**Key Words** : ERP, ERP value, ERP system, Situational Factor, ERP introduction

## Contents

- I. Introduction
- II. Important Issues In ERP
- III. Research Setting and Instruments
- IV. ERP Introduction and Checkpoint
- V. Conclusions and Implications

## I. Introduction

In today's fiercely competitive business environment, there has to be much greater interaction between the customers, manufacturers and suppliers. This means that, in order to produce goods tailored to customer requirements and provide faster deliveries, the enterprise must be closely linked to both suppliers and customers. In order to achieve this improved delivery performance, decreased lead times within the enterprise and improved efficiency and effectiveness, manufacturers need to have efficient planning and control systems that enable

1) Kwangju Women's University, Dept. of Secretary&Management, Professor, khyim@mail.kwu.ac.kr 2) Kwangju Women's University, Dept. of Educational Media, Professor, mychong@mail.kwu.ac.kr 3) Gwangju University, Dept. of e-Business, Professor

very good synchronization and planning in all the processes of the organization. Today, however, the challenge is intense and requires a strong integration across the value chain. Enterprise Resource Planning is such a strategic tool, which equips the enterprise with the necessary capabilities to integrate and synchronize the isolated functions into streamlined business processes in order to gain a competitive edge in the turbulent business environment.

## II. Important Issues in ERP

ERP attempts to integrate the suppliers and customers with the manufacturing environment of the organization. The essence of ERP is the fundamental premise that the whole being greater than the sum of its parts. The traditional application systems, which the organizations generally employ, treat each transaction separately.

They are built around the strong boundaries of specific functions that a specific application is meant to cater. For an ERP, it stops treating these transactions separately as stand alone activities and considers them to be the part of the inter linked processes that make up the business.<sup>4)</sup>

Today, ERP also is being implemented in almost all types of organizations irrespective of their mode and spread of operation such as manufacturing, distribution, finance, service

and maintenance, transportation etc. An ERP system should be sufficiently versatile to support different manufacturing environments like make to stock, assemble to order and engineer to order. The customer order decoupling point (CODP) should be flexible enough to allow the co existence of these manufacturing environments within the same system. It is also very likely that the same product may migrate from one manufacturing environment to another during its produce life cycle.<sup>5)</sup>

There are various ERP vendors available today such as SAP AG, Oracle, BaaN, Infosystems, People Soft etc. which offer slightly different features in their products. Some important points to be kept in mind while evaluating an ERP software include: 1) functional fit with the company's business processes 2) degree of integration between the various components of the ERP system 3) flexibility and scalability 4) complexity; user friendliness 5) quick implementation; shortened ROI period 6) ability to support multi site planning and control 7) technology; client/server capabilities, database independence 8) availability of regular upgrades 9) amount of customization required 10) local support infrastructure 11) availability of reference sites 12) total costs, 13) Security(Data and System) including cost of license, training, implementation, maintenance, customization and hardware requirements.<sup>6)</sup>

The success of an ERP solution depends on

---

4) Kumar, Kuldeep and Jos van Hillegersberg, ERP Experiences and Evolution, Communications of the ACM, Vol.43, No.4,2000, pp.23-26. 5) Light, Ben, Christopher P. Holland, Karl Wills, "ERP and Best of Breed: a Comparative Analysis," Business Process Management Journal, Vol.7, No.3,2001,pp. 216-224. 6) Willcocks, L. P. and R. Sykes, "The role of the CIO and IT Function in ERP," Communications of the ACM, Vol.43, No.4,2000,pp.32-38.

〈Table 1〉 The Research Method and Important Issues of Researcher

Researcher	Research Method	Important issues
Chung&Snyder(2000) <sup>8)</sup>	Field Survey	facilitated achieving compatibility between task characteristics and technology characteristics
Light et al.(2001) <sup>9)</sup>	Field Survey	Importance to find out ERP system that is suitable for companies.
Bernroider and Koch (2000)	Delphi method	Found out that a total of 29 different ERP selection criteria and explored that differences in the weights attributed to 12 criteria between small to medium sized and large organizations
Everdingen et al. (2000) <sup>10)</sup> & Sprott (2000) <sup>11)</sup>	Field Survey	Focus on product characteristics rather than on characteristics of the ERP supplier of the product and the way in which most organizations select and manage applications is on the basis of business features and functionality
Montazemin et al. (1996) <sup>12)</sup> Willcocks and Sykes <sup>13)</sup> (2000)	Field Survey	the participation of the people, project initiator, decision maker might have influence on software package assessment and adoption.
Willcocks and Sykes (2000) <sup>14)</sup>	Field Survey	Chief Information officer (CIO) and the Information Systems (IS) department had to transform themselves in dealing with the challenges of adopting enterprise-wide systems like ERP to the specific needs of their organization. and effective IT-based innovations require a high level support and a project champion.

how quick the benefits can be reaped from it. This necessitates rapid implementations, which lead to shortened ROI periods. Traditional approach to implementation has been to carry out a Business Process Re engineering exercise and define a “TO BE” model before the ERP system implementation. This led to mismatches between the proposed model and the ERP functionality, the consequence of which was customization, extended implementation time frames, higher costs and loss of user confidence.<sup>7)</sup> Table 1 is suggested important issues and research

method according to researcher.

### III. Research Setting and Instruments

To identify the purposes and the checkpoints in firms purchasing ERP S/W, The population for the survey consisted of participations who were in charge of IT related department and might be able to influencing on ERP project decision in companies in Korea. Target survey company were identified from the Directory of Korean Business Firms in 2001. A survey was conducted in the

7) Sprott, David, "Componentizing the Enterprise Application Package," Communications of the ACM, Vol.43, No.4,2000,pp.63-69. 8) Chung, S.H., Snyder C.A., "ERP adoption: a Technological evolution approach", International Journal of Agile Management Systems,2000,pp24-32. 9) Light, Ben, Christopher P. Holland, Karl Wills (2001), "ERP and Best of Breed: a Comparative Analysis," Business Process Management Journal, Vol.7, No.3, pp. 216-224. 10) Everdingen, Y., J. Hillegersberg, and E. Waarts (2000), "ERP Adoption by European Midsize Companies," Communications of the ACM, Vol.43, No.4, pp.27-231. 11) Sprott, David (2000), "Componentizing the Enterprise Application Package," Communications of the ACM, Vol.43, No.4, pp.63-69. 12) Montazemi, A. R., D. A. Carmeron, and K. M. Gupta (1996), "An empirical Study of Factors Affecting software Package Selection, Journal of Management Information Systems, Vol.13, No.1, pp.89-106. 13) Willcocks, L. P. and R. Sykes(2000), "The role of the CIO and IT Function in ERP," Communications of the ACM, Vol.43, No.4, pp.32-38. 14) Willcocks, L. P. and R. Sykes(2000), "The role of the CIO and IT Function in ERP," Communications of the ACM, Vol.43, No.4, pp.32-38.

summer of 2002.

questionnaires accompanied by a presentation letter were mailed to 978 firms of sampling population. 232 firms from sampling population responded for this study.

The firms were asked to answer the ERP checkpoint in categories, including ERP value, plan, direction, and the size of investment. The purposes and the checkpoints were measured on a 5 point scale.

The survey excluded financial firms and companies under supervision. The sample presents a variety of industry groups and size of firms as shown in Table 2 and Table 3.

<Table 2> Respondent Classification Type of Business (%)

Food & Beverage	Chemical	Machinery	Electronics	Logistics	Construction
5.2	20.7	34.5	8.6	20.7	10.3

<Table 3> Number of Full time Employees (%)

Less than 49 (Small Firms)	50 to 299 (Medium Firms)	300 or more (Large Firms)
20.7	24.1	55.2

89.4% of the surveyed firms are currently using LAN and WAN to communicate. Most of the companies (85.4%) are interested in the computerization of management and using telecommunication network.

To find out firms' needs of support, data obtained was analyzed by a computer statistical package. Especially to analyze the roles of supporting organizations, this paper used frequency and chi square analysis. Statistics are presented for exploratory and descriptive purpose rather than hypothesis testing.

## IV. ERP Introduction and Checkpoint

### 1. ERP Introduction

Many business firms are interested in ERP introduction as a tool for strengthening industrial competitiveness and improving process efficiency. As a result, most of them are actively driving ERP project now.

#### 1) Perception of ERP Value

Table 4 shows the degree of recognition on ERP and its performance. According to a survey of 232 companies, the values are higher than mid point of 2.5, which means lots of firms recognized on ERP very well.

<Table 4> Degree of ERP recognition(5 point scale)

	ERP recognition	ERP performance recognition
Mean(s.d.)	4.04(0.84)	3.93(0.86)

#### 2) Source of Information on ERP

In most of the firms, information on ERP was gathered from ERP related organization (38.2%) and ERP consulting company(32.7%), with 18.2% and 10.9% getting ERP information from newspaper and broadcasting and professional books respectively. What this means is that many firms are having in dept knowledge on ERP.

<Table 5> Source of Information on ERP(%)

Newspaper and Broadcasting	Professional Books	ERP-related Organization	ERP Consulting Company
18.2	10.9	38.2	32.7

#### 3) ERP Introduction Plan

51.4% of the respondents are planning to use

outsourcing to build ERP, with another 32.4% saying that they have plans to purchase only ERP package when they propel ERP project. Only 16.2% said that they are going to develop ERP solution themselves. It shows that they don't want to take risk in the process of building ERP, in which much funds and manpower are needed and long lead time to operation are taken.

〈Table 6〉 ERP Introduction Plan (%)

Eln-house Development	Outsourcing	Purchasing only ERP Package
16.2	51.4	32.4

#### ① Investment in ERP

Table 7 shows the size of investment funds in ERP. Surprisingly, 22.9% of firms are willing to invest more than US\$500,000 in ERP. It means many firms are willing to investment funds in ERP.

〈Table 8〉 Direction of ERP Introduction(%)

Economic point of view	Practical Usability	Speedy Implementation	Total Optimization
36.51	33.33	22.22	7.94

#### ② Direction of ERP Introduction

Not to fail to operate ERP, it is necessary to set the right direction of ERP introduction. Table 7 shows that many firms emphasize on economic point of view(36.51%), practical usability(33.33%), and speedy implementation(22.22%) when they introduce ERP. Only 7.94% of the respondents pointed out total optimization.

〈Table 7〉 The Size of Investment in ERP(%)

Less than US\$50,000	US\$50,000 -100,000	US\$50,000 -100,000	More than-US\$500,000
25.7	25.7	25.7	22.9

## 2. Checkpoints

〈Table 9〉 Checkpoints

Checkpoints	Mean Values	Standard deviations
Performance of Introduction	4.50	0.80
Main References Sites	4.31	0.78
Availability of Current Resource	4.22	0.67
Easiness of Introduction	4.06	0.62
Operation System	3.97	0.90
Past Records of Supply	3.81	0.81
Market Share	3.72	0.87
Vendor Size	3.69	0.88

Many companies check several points when they introduce ERP. Table 9 lists checkpoints in sequence based on the mean values that provide indications of the relative importance. We see that the most important checkpoints were performance, main reference sites, and availability of current resource. Of all the checkpoints, the two that received the least attention were vendor size and market share.

Table 9 presents the checkpoints in purchasing ERP S/W for Organization Characteristics. Medium sized firms identified the Suitability as the most important checkpoint. When project team propels ERP project, they considered Easiness & Performance and Vendor as the most important checkpoint

## V. Conclusions and Implications

Many business firms are interested in ERP introduction as a tool for strengthening industrial competitiveness and improving process efficiency. As a result, most of them are actively driving ERP

project now.

The degree of recognition on ERP and its performance in lots of firms recognized on ERP very well. Also, In most of the firms, information on ERP was mainly gathered from ERP related organization and ERP consulting company. What this means is that many firms are having in dept knowledge on ERP. And many firms are planning to use outsourcing to build ERP. It shows that they don't want to take risk in the process of building ERP, in which much funds and manpower are needed and long lead time to operation are taken. Also, many firms are willing to investment funds in ERP and emphasize on economic point of view, practical usability, and speedy implementation. The results shown in this paper has strong implications for ERP vendors. We see that the most important checkpoints are performance, main reference sites, and availability of current resource. Of all the checkpoints, the two that received the least attention were vendor size and market share.

## References

1. Appleton, E., "How to survive ERP", *Datamation*, Mar, Vol.43, No.3, 1997, pp.619-641
2. Baldredge, J.B. and Burnham, R.A., "Organizational Innovation: Individual, Organization, and Environmental Impacts", *Administrative Science Quarterly*, 20, June 1975, pp.165-175.
3. Boynton, A.C. and Zmud, R.W., "An Assessment of Critical Success Factor", *Sloan Management Review*, Summer 1984, pp.17-27
4. Bullen, Christine V. and Rockart, John F., "A Primer on Critical Success Factors", *CISR Sloan WP NO.69*, June, 1981, pp.1220-81
5. Cragg Paul B. and Malcolm King, "Small?Firm Computing: Motivators & Inhibitors," *MIS Quarterly*, Vol.17, No.1, Mar. 1993, pp.47-57.
6. Chung, S.H., Snyder C.A., "ERP adoption: a Technological evolution approach", *International Journal of Agile Management Systems*, 2000, pp.24-32.
7. DeLone, W. H. "Determinants of Success for Computer Usage in Small Business," *MIS Quarterly*, Vol.12, No.1, Mar. 1988, pp.51-61.
8. Duncan B. Robert, "Characteristic of organizational Environments and Perceived Environmental Uncertainty", *Administrative Science Quarterly*, 19, 1972, pp.313-327
9. Edelman, Franz, "Manager, Computer Systems and Productivity", *MIS Quarterly*, 5, 3, September 1981, pp.1-20
10. Everdingen, Y., J. Hillegersberg, and E. Waarts, "ERP Adoption by European Midsize Companies", *Communications of the ACM*, Vol.43, 2000, No.4, pp.27-231.
11. Kumar, Kuldeep and Jos van Hillegersberg, ERP Experiences and Evolution, *Communications of the ACM*, Vol.43, No.4, 2000, pp.23-26.
12. Lees, J. D. and Lees D. D., "Realities if Small Business Information System Implementation," *Journal of Small Business Management*, Vol.38, No.1, Jan. 1987, pp.6-13.
13. Light, Ben, Christopher P. Holland, Karl Wills, "ERP and Best of Breed: a Comparative Analysis," *Business Process Management Journal*, Vol.7, No.3, 2001, pp. 216-224.
14. Markus, M. L., and D. Robey, "Information Technology and Organizational Change: Casual Structure and Theory and Research", *Management Science*, 1988, pp.583-598.
15. Montazemi, A. R., D. A. Carmeron, and K. M. Gupta, "An empirical Study of Factors Affecting software Package Selection, *Journal of Management Information Systems*, Vol.13, No.1, 1996, pp.89-106.

16. Montazemi, A. R. "Factors Affecting Information Satisfaction in the Context of the Small Business Environment," MIS Quarterly, Vol.12, No.2, June 1988, pp.239-256.
17. Nazem, S.M., "Source of Software and Levels of Satisfaction for Small Business Computer Application." Information and Management, Vol.19, 1990, pp.95-100.
18. Raymond Louis, "Organizational Characteristics and MIS Success in the Context of the Small Business," MIS Quarterly, Vol.9, No.1, March 1985, pp.37-52.
19. Raymond Louis, "Validating and Applying User Satisfaction as a Measure of MIS Success in Small Organizations, Information and Management, Vol.12, 1987, pp.173-179.
20. Sprott, David, "Componentizing the Enterprise Application Package," Communications of the ACM, Vol.43, No.4, 2000, pp.63-69.
21. Tavakolian, H., "Linking the Information Technology Structure with Organizational Competitive Strategy", MIS Quarterly, 13, 3 (September 1989), pp.309-317
22. Willcocks, L. P. and R. Sykes, "The role of the CIO and IT Function in ERP," Communications of the ACM, Vol.43, No.4, 2000, pp.32-38.