HUMAN FACTORS ON BUSINESS STRATEGY FOR SUCCESSFUL ERP IMPLEMENTATION: A CASE STUDY IN VIETNAM

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Abstract— Today, ERP systems have become popular and are deployed in many enterprises of various sectors in the world. However, in the judgment of the consultant, ERP projects are often large scale, high cost, and low likelihood of success. But in Vietnam, enterprises are often small scale. They only just approach the information systems of enterprise in a short time, understanding of the implementation process is limited and the lack of financial resources.
This research, we learn about ERP model. Investigate, analyze and compare points of view of the target groups including ERP implementation consultants, enterprises which apply ERP, ERP researchers and academic on affecting factors. Investigate, evaluate and rank factors that have impact on strategies of enterprises with ERP implementation in Vietnam. Collection and analysis of ERP model was launched by the previous survey. Based on the data to make an assessment of the implementation of ERP in enterprises in Vietnam It is the basis for we offer effective solutions and analytical method for effective ERP. We will also highlight the research population and sample design. Learn and analyze the factors affecting ERP strategy and assess its impact.

Keywords— ERP (Enterprise Resource Planning) model, enterprises, factors, difficulties in the development of ERP in Vietnam, ERP solutions in Vietnam.

I. INTRODUCTION

ERP (Enterprise Resources Planning) is a vast information system that manages information about a company's products, customers, suppliers, employees, production facilities, financial balances, etc. It is used by every department in an organization and by most employees [1]. ERP will bring many benefits such as: interaction of information faster, reduce financing costs, improved inventory management, support interaction between customers and suppliers...
In the past few years, along with the development of information technology, ERP has developed very fast. It has become the solution of many companies in the country and foreign company.

But, the ERP system has not yet been strongly developed in Vietnam, the ERP modules must be constantly revised and supplemented. When applied to the enterprises so the price of ERP systems is very high. Therefore, it is not appropriate compared to pockets of a lot of small the enterprise in Vietnam. Therefore, the ERP enterprises under pressure about the staff working on ERP as: manpower is not enough knowledge, qualifications and adapt the process of ERP, investment costs to serve to small enterprises. Businesses are cautious in the investment in ERP, for reasons: ERP model is appropriate for their enterprise. The enterprises not understand the ERP should not dare to invest. If small businesses buy ERP, they can't use all the modules of ERP, so is a waste, instead they may choose to purchase separate solutions. And large enterprises, they will also consider when buying to avoid waste when the ERP solutions are not adequate, use a time and they will have to choose another solution.
This report, the research scope is related to a study on the situation of existing ERP system in Vietnam. The objective of this research is to examine the major factors which have influence on ERP implementation of enterprises in Vietnam through these specific tasks: Investigate, analyze and compare points of view of the target groups including ERP implementation consultants, enterprises which apply ERP, ERP researchers and academic on affecting factors. Investigate, evaluate and rank factors that have impact on strategies of enterprises with ERP implementation in Vietnam.

II. LITERATURE

We give the perspective on ERP of the experts, professionals in the country and abroad. Learn about model ERP and the implementation of ERP in Vietnam. The analytical method for effective ERP. The benefits of learning about ERP model for enterprise, ERP vendors and with all students (Those who need research on ERP).

1. Research on ERP in the world

ERP has been described in different ways depending on different viewpoints from researchers, business administrators and economists at different time from 1960 to now. An ERP system is "an organizational and management solution based on information technology towards challenges and problems in the business environment" (Laudon and Laudon, 1995). The ERP system is a business management software that enables enterprises to automate and integrate all

their business processes, share common data and practices across the entire enterprise, produce and access information in a real-time environment (Marnewick and Labuschagne, 2005).

ERP constantly updated information accurately and promptly about the status of company resources. ERP calculations and forecast the possibilities that may arise during the executive producer / trading company. For example, ERP helps calculate the correct plant planned supply of materials for each order based on the total demand for raw materials, schedule, productivity, availability ... This approach allows the company to always have enough materials for production, not for large inventory. The overall objective of this ERP system is to ensure that the appropriate resources of the business such as human resources, supplies, machinery and money, using the planning tools and planning

ERP has many benefits and they have been shown around the world. So, what factors affect the success of ERP? In this section, We offer two ERP models were analyzed in the world: Model by G. Premkumar*, Margaret Roberts (1997) and Model by James Y.L Thong (1999). Two models are quite adequate; they give the basic factors affecting the development of ERP.

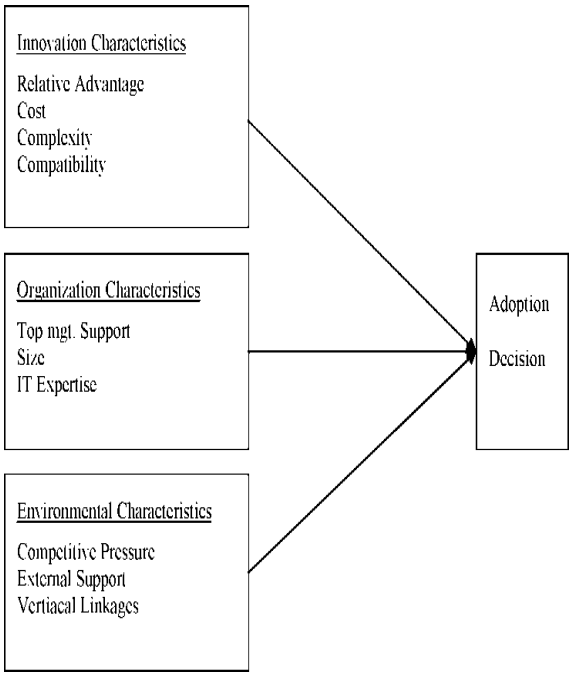


Figure 2.1. Model by G. Premkumar*, Margaret Roberts (1997)

In the Model by G. Premkumar*, Margaret Roberts (1997), there are three major groups of factors that affect the decision of applying new technologies in enterprises, including: Innovation characteristics (relative advantage, cost reduction, complexity, and compatibility), Organization characteristics (top management support, size, and IT expertise) and environmental characteristics (competitive pressure, external support and horizontal linkages of enterprises.

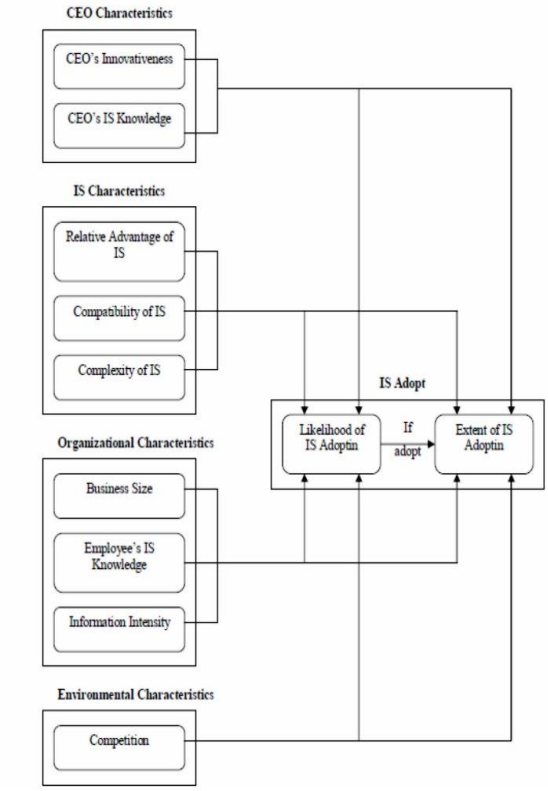


Figure 2.2. Model by James Y.L Thong (1999)

In the Model by James Y.L Thong (1999), there are four affecting factors, including: CEO characteristics (CEO's innovativeness and IS knowledge), IS characteristics (relative advantage, compatibility, and complexity of IS when applied in enterprises), Organizational characteristics (business size, employees' IS knowledge, and information intensity), Environmental characteristics (only one factor exists which is Competition but this factor does not have influence on the IS implementation of enterprises).

From factors of 2 models, we realize that: ERP is a component of the system, coupled with business processes, organizational structure, policy management, and networking hardware. They constitute a management information system of the enterprise. When implementing ERP need to consider adaptation and synchronization between these components together. To determine the status of management information systems. Beside, CEO make the main idea, the investment decision, the key personnel in the implementation process, provider business development strategy consulting for ERP solutions and the receivers and final evaluation the results of investment decisions as well as the ability to upgrade and expand.

2. Research on ERP in Vietnam

Currently, Vietnam market has the major ERP solutions: solutions for large enterprises (SAP, Oracle and Microsoft), solutions for small and medium enterprises (Microsoft, Baan, Epicor, Exact). In addition, a number of Vietnam company software has developed ERP software such as PYTHIS, EFFECT,

FAST, Lacviet and so on. According to customer needs, but customers are mainly small and medium enterprises. These products are usually edited from the ERP original to suit with the enterprise requirements.

Life cycle analysis of ERP project implementation success in Vietnam showed that: human resources contribute to determining the success of ERP project resources were involved in the system configuration (ERP project team), Consultant, Project Management. We also give views on ERP in Vietnam such as: A new technology integration model for Vietnamese enterprises (2006) by Lê Thế Giới, A model of e-commerce adoption (application) in Vietnamese enterprises (2004) by Le Van Huy, Building an e-enterprise management system (A summary report on scientific research studies (2005) by Lac Hong University).

3. Research approach

There are the specific approach research such as:

- The research on the installation and operation of the ERP system
- The research on information technology applications in business
- The research on the information system and information infrastructure in the enterprises
- The research on the ERP implementation which requires commitment by business leaders, resources and changes in the entire enterprise
- The research on ERP usage includes a study in problems generated in post ERP implementation stage

Important research methodology: social research methods are used in the previous research studies, mainly quantitative data collection.

Tools used for collecting data: questionnaires, in-depth interviews, and e-mail interviews. There are still limitations in applying the sample collection and processing method, scientific research techniques for the ERP implementation; so the statistical probability index of the study is not accurate enough to represent logic and objectivity. The data analysis method, SPSS software are also used to report significant figures.

Theories applied in the study of the ERP project: new and existing theories are applied in the above mentioned research studies; however, not much has been discussed and the approaches to these theories are not explained in detail.

III. METHODOLOGY

The purpose of the study is to identify the key factors affect the success of an ERP project. There are two steps to conduct this study in Dong Nai province such as qualitative research and quantitative research.

First, we find the information about the ERP, the main factor affect the success of an ERP project, ERP market Situation in Vietnam on the Website about ERP, journalism and research topics about ERP. The aim is to clarify the variables in the research model about the main factors affecting the success of ERP implementation projects and edit these variables to suit the conditions of Vietnam. In addition, we will also learn information about ERP implementation process in Vietnam. With this request, we learn SAP ERP implementation process in a number of large companies such as FPT on the Internet. Finally, we analyze the factors affect the success of ERP implementation project in Vietnam, the measurement variable. By discussing with consultants, interviewing project managers from a list of consulting / implementation of FPT (via email, phone or direct exchange).

Perform analysis on survey forms with Tools used for collecting data such as: questionnaires, in-depth interviews, and e-mail interviews. There are still limitations in applying the sample collection and processing method, scientific research techniques for the ERP implementation; so the statistical probability index of the study is not accurate enough to represent logic and objectivity. The data analysis method, SPSS software are also used to report significant figures. And we used regression analysis techniques and some basic statistical analysis through the use of SPSS statistical analysis software to find out research results step by step.

IV. COLLECTION AND ANALYSIS DATA

Up till now, many studies have been made on the successful model of the ERP system. Some research such as: Adoption of new information technologies in rural small businesses by G. Premkumar, Margaret Roberts (1997) and An Integrated Model of Information System Adoption in Small Businesses in the Singapore by James Y. L. Thong (1999).

In Vietnam, we have Model of e-commerce adoption (application) in Vietnamese enterprises (2004) by Lê Văn Huy and some other models. We choose this model because it is largely based on the above two models and have a few adjustments to suit. Beside that it is the similarity in content, cultural properties and the objects for prospecting. Through his research, Le Van Huy and his colleagues came up with a model of the main factors affecting the success of ERP deployments and measuring them in Vietnam with Characteristics as the Innovation, Organization and Environment. Following, we will introduce overview two models of G. Premkumar, Margaret Roberts (1997) and by James Y. L. Thong (1999), more detail analysis about the model of Le Van Huy.

1. Adoption of new information technologies in rural small businesses by G. Premkumar, Margaret Roberts (1997)

With this model, G. Premkumar and Margaret Roberts identified eleven variables by three groups: innovativeness characteristics, organization characteristics and environment characteristics. These

variables affect the decision-making procedures on implementing new technologies in enterprises.

Variable	Hypothesis	Online data access	E-mail	EDI	Internet
Relative Advantage	1	X	X	X	X
Cost	2				X
Compatibility	3	X			
Complexity	4	X			
Top mgt. Support	5	X	X		X
IT Expertise	6		X		
Size	7	X	X	X	
Competitive Pressure	8	X	X		X
External pressure	8	X		X	
Vertical linkages	9	X			X
External Support	10				

Table 3.2. Results from model appraisal by G. Premkumar, Margaret Roberts Summary table of significant variables

There three major groups of factors that affect the decision of applying new technologies in enterprises, including: Innovation characteristics, Organization characteristics and Environmental characteristics.

2. An Integrated Model of Information System Adoption in Small Businesses in the Singapore by James Y. L. Thong (1999)

With this model, James Y. L. Thong (1999) researched on the implementation of information systems in 1.200 small businesses in the Singapore.

Variables	F_value	Significates	Discriminant loadings
CEO characteristics			
CEO's Innovative	6.38	0.013*	0.347
CEO's IS Knowledge	12.92	0.001**	0.494
IS Characteristics			
Relative Advantage of IS	13.31	0.000**	0.502
Compatibility of IS			
Complexity of IS	6.24	0.014*	0.343
Organizational Characteristics			
Business Size	20.73	0.000**	0.626
Employee's IS Knowledge	12.13	0.001**	0.479
Information Intensity	2.48	0.118	0.216
Environmental Characteristics			
Competition	1.12	0.291	-0.146

***p<0.05; **p<0.01**

According to Thong's research findings, there are four affecting factors, including: CEO characteristics, IS characteristics, Organizational characteristics and Environmental characteristics.

3. A model of e-commerce adoption (application) in Vietnamese enterprises (2004) by Lê Văn Huy

In the model of e-commerce adoption (application) in Vietnamese enterprises (2004) by Lê Văn Huy, the author discusses business activities of 300 enterprises in Ho Chi Minh City, Da Nang and Ha Noi. Four main groups of factors affecting the e-commerce adoption (application) in Vietnamese enterprises are mentioned here, including organizational factors; manager-related factors; outside environmental factors; IT related factors. The author proposes sixteen factors, as follows:

(1) The group of organizational factors includes: products' characteristics, enterprises' scope, business types, business strategic orientation, and employees' knowledge of e-commerce, enterprise culture, and enterprises' resources.

(2) The group of manager-related factors are: managers' knowledge of information technology and e-commerce, managers' attitude towards innovations in their enterprises.

(3) The group of the outside environmental factors are: competition intensity in the sector, competitive pressure from technology providers or pressure from customers, e-commerce adoption experience from other enterprises in the same sector, supportive policies from the government, information technology infrastructure.

(4) The group of IT related factors are: awareness of related benefits, the complexity of e-commerce application, e-commerce compatibility with business activities and e-commerce application in Vietnamese enterprises.

According to model of e-commerce adoption (application) in Vietnamese enterprises (2004) by Lê Văn Huy (figure 2.2):

a) For the group with e-commerce implementation.

The relationship developed in the analysis is shown as below:

$Y_{implementation}$ = 1.374 + 0.227*size + 0.192*strategic planning + 0.149*employee's e-commerce knowledge + 0.349*enterprise resource + 0.281*CEO's innovativeness + 0.285*CEO's IT and e-commerce knowledge + 0.449*government's policies + 0.344*IT infrastructure + 0.223*awareness of related benefits + e

b) For the group with intention to implement e-commerce

The relationship developed in the analysis is shown as below:

$Y_{investigation}$ = 2.844 + 0.149*product characteristics + 0.23*size + 0.280* strategic planning + 0.240* employee's e-commerce knowledge + 0.388 *enterprise resource + 0.254 *CEO's innovativeness + 0.250 285*CEO's IT and e-commerce knowledge +

0.227* government's policies + 0.392* IT infrastructure +197* awareness of related benefits – 0.243*complexity of implementation + 0.211*relevance to enterprise + e

Table 3.1. Results from model appraisal by Le Van Huy: The group of enterprise with ERP implementation

Standardized coefficients	Unstandardized coefficients	Standard deviation	Coefficients	T-Student(3)
(Constant) Size	1.347	1.217	0.289	1.129
Strategic planning	0.227	0.090	0.283	2.504(*)
Employee's e-commerce knowledge	0.192	0.071	0.227	2.715(**)
enterprise resource	0.149	0.080	0.336	2,021(*)
CEO's innovativeness	0.349	0.177	0.363	2.044(*)
CEO's IT and e-commerce knowledge	0.281	0.109	0.290	2.576(*)
government's policies	0.285	0.127	0.513	2.237(*)
IT infrastructure	0.449	0.198	0.392	2.262(*)
awareness of related benefits	0.344	0.175	0.390	2.032(*)
	0.223	0.060		3.685(***)

(3)> Statistics t-Student: (*):P<0,05; (**):P<0,01; (***):P<0,001

The targeted enterprises of this research comprise of two groups, the first one are those who have been applying e-commerce and the other are those who have been launching exploration for implementation. Findings from the research show the differences in the relationships between affecting factors and decisions made by enterprises already with e-commerce implementation and those with intention to do.

V. DISCUSSION OF RESULTS

This research aims at connecting and analyzing ERP-related concepts in order to answer the questions about identifying factors that affect ERP strategic tool in enterprises in Vietnam industrial zones. This research focuses on applying a new approach in identifying affecting factors, which is an analysis based on model of "operating system" analysis for a more comprehensive and logical vision on the research topic. The findings of this research are aimed at analyzing and identifying new factors and a scale of factors which have impact on ERP strategy in Vietnam enterprises. This result will serve as the foundation for facilitating further development of researches on interactivity among factors.

The findings of this research can become useful reference material for managers of enterprises with deployment and implementation ERP. Consultants to develop plans for applying, utilizing as well as supervising ERP systems in the most relevant and effective ways. The findings of this research can be effectively used by business administrators. Moreover, this research is expected to make contribution to the development of training programs and content that are of higher relevance and quality.

The success of this research involves the development of a conceptual model and the implementation of appraisal methods in order to formulate practical models. However, there still exist limitations that require further investigation in the future such as:

Firstly, due to a number of objective conditions, research was conducted only in enterprises in Dong Nai Province's industrial zones. Research might possibly reach a higher level of generalization if repeated in other provinces and cities in Vietnam.

Secondly, currently there are a variety of factors which impose impact on a successful ERP implementation such as people and technological factors, organizational size, growth, IS/IT strategy, CIO, area/province, and so on. However, due to limited time allocation and budget, this research only focuses on three factors namely people, IS and processes. As a result, the level of generalization and comprehensiveness that represent characteristics, factors affecting ERP and their influence on business strategies of enterprises in Vietnam industrial zones is still low and cannot reflect the comprehensiveness in experimental scientific research.

Thirdly, sampling scale of this research is small and cannot cover all enterprises or enterprise categories. Therefore, the higher level of generalization will be obtained with a highly representative sampling and bigger sampling scale.

Fourthly, the comprehensiveness of this research could have been higher if a basic scale (approximately dozens of samples) had been developed to evaluate the importance of measurement variants of factors. In the next stage, a scale should have been formulated to investigate the current situation of surveyed enterprises (strong or weak, high or low, abundant or limited, etc.) according to measurement variants in order to have an insight of the impact created by current conditions on ERP implementation and intention of enterprises.

CONCLUSION

Basing on the model of Le Van Huy, Integrated Model of Information System Adoption in Small Businesses in the Singapore by James Y. L. Thong (1999) and Adoption of new information technologies in rural small businesses by G. Premkumar, Margaret Roberts (1997), we studied the factors that affect the success of ERP project. We have researched and identified four factor groups have affect the success of ERP projects in Vietnam include: the group of organizational factors, the group of manager-related factors, the group of the Environmental Factors and the group outside of IT related factors.

In the context of globalization, research and implementation of ERP in enterprise business play

the critical role in facilitating enterprises to standardize and integrate optimized business processes; share data of business procedures in the whole enterprise; provide consistent and timely information for decision-making processes and operational evaluation; enable the decentralization in enterprises; create sufficient time for leaders to develop strategies for enterprises; improve business proficiency and competitiveness of enterprises.

Among a variety of viewpoints and standards for the quality of information in an ERP environment, COBIT framework are selected to be applied in this research. The questions are whether viewpoints of implementation consulting groups, enterprises and ERP researchers and lecturers on ERP affecting factors are different. Which factors have impact on quality and their ranking of influence?

Research results have met the research objectives of topic, but mainly technical research, propose solutions. We would like to contribute a small detection helps managers, leaders have more evidence, important decisions when training, coaching ERP. See it is an important factor leading ERP deployment in enterprises and organizations in Vietnam.

This study has several limitations: Limited to data collection, the sample has not yet high representative. The nature and scale, the number of enterprises spread. Therefore, the results may not generalize most of the enterprises and organizations in Vietnam. Documentation and Research in Vietnam related to ERP are few and limited to I extracted the important evidences.

Through this study, it is the basis for proposing some recommendations for enterprises are intending to deploy ERP and consulting unit, ERP deployment in Vietnam as follows:

The enterprise intends to deploy ERP: Enterprises should implement pre-assessment include the selection of suitable ERP product and the selection of the consultant, deployment. In addition, enterprises need to create the readiness of human resources for the project implementation. Finally, enterprises should establish a detailed project plan, obviously.

The consultant unit, ERP implementation unit: Enterprises tend to limit risk when implementing ERP. They specify costs associated with deployment and the time to complete the project. Therefore, deployment units need to pay attention to the organization of ERP project team. Therefore, they work really well with the team of the enterprise ERP project. In addition, the contract between the two parties should be clear about the products should achieve the acceptance or change request. So, both parties will avoid conflicts when the project acceptance.

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