CRITICAL SUCCESS FACTORS FOR ERP IMPLEMENTATION OF MAIN INDUSTRIES IN THAILAND

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A THESIS SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR
THE DEGREE OF MASTER OF ENGINEERING
(INDUSTRIAL ENGINEERING)
FACULTY OF GRADUATE STUDIES
MAHIDOL UNIVERSITY
2011

Thesis
entitled

CRITICAL SUCCESS FACTORS FOR ERP IMPLEMENTATION OF MAIN INDUSTRIES IN THAILAND

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(Industrial Engineering)
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ACKNOWLEDGEMENTS

The success of this thesis can be succeeded by the attentive support from my major advisor, Asst. Prof. Dr. Thanakorn Naenna. I would like to express my appreciation and deeply thank him for the valuable advices and several suggestions reinforced my perception and knowledge to practice this research.

I would like to express my appreciation and deeply thank to Asst. Prof. Tuanjai Somboonwiwat, the external examiner of the thesis defense and Assoc. Prof. Walailak Atthirawong for their kindness in valuable suggestion and time sacrifice through this study. Special thanks to Dr. Tanawut Tantimongcolwat and Dr. Chanin Nantasenamat, my co-advisor for attentiveness and time sacrifice for this research.

Thank to my friends and staffs in Industrial Engineering department Mahidol University, for their help, kindness, support and cooperation during this study.

Finally, I am grateful to my family, especially my parents for unconditional support, entirely care, love and encouragement through my life. I would like to thank all of those who I have not listed above.

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ABSTRACT

Implementation of Enterprise Resource Planning (ERP) systems continues to drive change in organizations. We provide an overview of ERP research and its development and implementation in foreign countries. However, the effort is often considered a failure, partially because potential users resist change. Therefore, we examined the formation of readiness for change and its effect on the perceived technological value of ERP system leading to its use. Factors affecting ERP implementation are complex, and numerous researchers have identified a variety of factors that can be considered to be critical to the success of an ERP implementation. The importance of these factors was investigated within Thai factories using the questionnaire survey method. Firstly, we investigated the general picture of the current state of ERP utilization for industry in Thailand. For the survey results, there are three main parts which include (i) a profile of the industry respondents, (ii) the current status of ERP technology incidence and impacts which affect the implementation of ERP, and (iii) ERP technology used and methods of acceptance, management and policy to solve the ERP implementation problems of main industries in Thailand. We found that readiness for change was enhanced by two main factors: organizational commitment and perceived personal competence.

KEY WORDS: ERP / CRITICAL SUCCESS FACTORS / TAM

150 pages

การศึกษาปัจจัยที่มีผลต่อความสำเร็จในการนำเทคโนโลยี ERP มาใช้ในอุตสาหกรรมหลักในประเทศไทย

CRITICAL SUCCESS FACTORS FOR ERP IMPLEMENTATION OF MAIN INDUSTRIES IN THAILAND

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บทคัดย่อ

การนำเทคโนโลยี ERP มาประยุกต์ใช้ในการเปลี่ยนแปลงองค์กร ผู้วิจัยได้ทำการศึกษาภาพรวมของการพัฒนา การประยุกต์และการนำ ERP มาใช้ในงานวิจัยของต่างชาติ อย่างไรก็ตามพบว่าส่วนใหญ่การนำมาใช้ล้มเหลวเนื่องจากการต่อต้านการเปลี่ยนแปลงของตัวผู้ใช้เอง ดังนั้นจึงได้ทำการศึกษารูปแบบของความพร้อมในการเปลี่ยนแปลง และคุณค่าในการยอมรับ ERP มาใช้ ปัจจัยที่มีผลต่อการนำ ERP มาใช้นั้นยุ่งยากซับซ้อน และมีผู้วิจัยมากมายที่ระบุปัจจัยต่างๆที่มีผลต่อความสำเร็จในการนำ ERP มาประยุกต์ใช้ ความสำคัญของปัจจัยเหล่านี้เองที่นำมาศึกษาในอุตสาหกรรมต่างๆในประเทศไทยโดยใช้วิธีการออกแบบสอบถาม กล่าวคือ ศึกษาภาพรวมทั่วไปและสถานภาพปัจจุบันของอุตสาหกรรมในประเทศไทยที่นำ ERP มาใช้ในองค์กร สำหรับผลของการสำรวจนั้นจะแบ่งออกเป็นสามส่วน ดังนี้ คือ 1.ข้อมูลเบื้องต้นของโรงงานอุตสาหกรรม 2. สถานภาพปัจจุบันและผลกระทบจากการนำ ERP มาใช้ในองค์กร 3. ศึกษาการยอมรับในการใช้ ERP การจัดการ นโยบายการแก้ไขปัญหาอันเกิดจากการนำ ERP มาประยุกต์ใช้ในอุตสาหกรรมหลักในประเทศไทย ผลจากการศึกษาพบว่า ความพร้อมสำหรับการเปลี่ยนแปลงนั้นสามารถแบ่งออกเป็นสองปัจจัยหลัก คือ การยอมรับของตัวองค์กรนั้นๆ และการยอมรับของตัวผู้ใช้เอง

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CHAPTER I
INTRODUCTION

1.1 General Introduction

With the uncertainty of economic factors and severe competition nowadays, it is crucial for any business firm to be flexible and adjustable to such ever-changing conditions in order to survive. In addition, it is required to constantly develop itself as to meet the needs of the customers, because a large portion of its profit is relatively determined by how fast it can handle the change.

Many industries in Thailand have been implementing the value-add activities to each of department in the firm, and yet the outcome is the wastefulness of resource along with the lack of efficiency. Furthermore, its productivity is reduced as a consequence of long period implementation for such activities. Therefore, it is difficult to evaluate the performance of each department, thus impossible to manage the firm with the highest proficiency. The larger the firm grows, the more these value-add activities are increased, and the longer period each of them will be required. The complexity which occurs as a result can create a communication block between each department that cause the waste and delay of activities. When this happens, it is difficult for the executive section to acknowledge the underlying problem, thus the decisions and policy about the product and service are not made timely to fulfill customer satisfaction.

With all that said, it is an opportunity for the firm in any industrial sector to consider or implement the ERP (Enterprise Resource Planning) as a solution in management reformation and also as an alternative strategy to improve the efficiency of the firm.

In general, any business firm will be divided into many departments such as human resource, warehouse, financial department, etc. all of which operate by their own computer system in the department, and use their unique programs for the specific purpose. In that case, ERP system can be used to combine those programs into

one integrated program which operated through only one main database. As a result, each department then will be able to share their information and communicate to each other more conveniently. If used properly, such an integrated program will immensely benefit the firm.

For example, the old order-taking process which normally runs by passing out the order documents from one department to other departments all over the firm, that is a very slow system and requires a lot of repeated data entry, which always be the cause of many problems such as the lost of documents or the incorrect data entry. When these problems occur, though, it would be impossible to check whether the order from customer has successfully been responded or not, since each department is not able to access the database of the others, thus there is no way to acknowledge except to make a direct phone call for inquiry. In such case, ERP will solve the problem by automatically link the database of each department together, e.g. when the customer service agents receive an order from the customer, they can be promptly provided with a profile of that customer, both an order history and the rate of credit given. Also the information about warehouse and product transportation can be monitored through ERP system as well. Each department can acknowledge the process by logging in to the system from any computer in the firm, thus the process is accelerated, while any mistake is easily prevented

Nevertheless, ERP implementation is not merely to install an ERP solution to your computer system. If you are considering implement ERP in your firm, what you have to realize is that ERP is the system that requires varied constant developments and ever-upgrading method. Moreover, you have to determine to reform the structure of the firm, adjust the working process, and rebuild the security procedure. Not to mention about the training workshop for employee, since there will be a lot of knowledge that must be shared, such as setting the new base value, aborting the old legacy system, and most of all, the employee must be willing to accept the new culture in their workplace, as these changes could be uncomfortable at the initial stage.

According to what mentioned above, ERP seems to be the best solution for business implementation. Nonetheless, there have been many firms that use ERP and yet have an unsatisfactory result. The author, therefore, has acknowledged this issue and is encouraged by it to conduct a research about the critical success and failure

factor for ERP implementation in the firm, as it may help those firms to improve their efficiency and productivity.

In this research, the author aims specifically to the industry sectors in Thailand, from which textile, garments, plastic, automobile, and some other sectors are study from, in term of implementing the ERP including the training workshop for the head office as well as for the relevant department, which is the most significant factor of all, for if it fails, the consequence can be a severe damage to the firm. Again, ERP implementation requires more than installment of the ERP software, as more often than not, many users found that applying the ERP to their works does not always answer their questions.

The important step for the firm to consider before implementing ERP is whether the software will suit best to the firm or not, since there are reports that ERP was aborted halfway of the million-dollars project when the executives found that it cannot be applied to the key procedures of the firm, and when that happened, their options are twofold. They can either reconcile the key procedures of the firm to match with the software which will deeply affect the entire firm, or they can do the other way around, to edit the software as to match with their key procedures, which will postpone the expected outcome.

ERP implementation, thereof, is the delicate phrase in which the firm must be very concerning to many aspects such as a budget planning, a data gathering, a consulting team, a pros and cons prediction, etc. Underestimating those aspects can bring to a severe circumstance to the firm.

The researcher also includes in this research the comparable statistics of the success implementation between the industries in Thailand and those in abroad, in the hope that it will be a guide for potential development of the firm in the future. The technology Acceptance Model (TAM) is among the most influential and discussed theories in explaining and predicting in individual's acceptance of information technology. Several past studies have examined the relationship of perceive ease of use (PEOU), perceived usefulness (PU), attitudes, intention, and the usage of information technology (Lee et al, 1999) summarized the information system examined by TAM in 101 articles published by leading IS journals and conference from 1986-2003 into four different classes: communication system (20%), general

purpose system (28%), office system (27%), and specialized business.

1.2 Objectives

1.2.1 To analyze the critical factors of successful ERP implementation in Thailand industry sector.

1.2.2 To be a guide for improvement of ERP technology in the future.

1.2.3. To be compare in each industries in Thailand and foreign countries

1.3 Scope of research

Five target groups of industry sector in Thailand, i.e. Foods and Beverages, Textile and Garments, Plastics, Automotive parts and others.

Method of data analysis in this research, that is a surveying, both of which used to inquire below data;

- The current status and the future trend in implementing ERP
- Decision factors and motivation to use ERP
- The preparations, problems, and obstacles that determine the success of ERP implementation.

1.4 Research Model

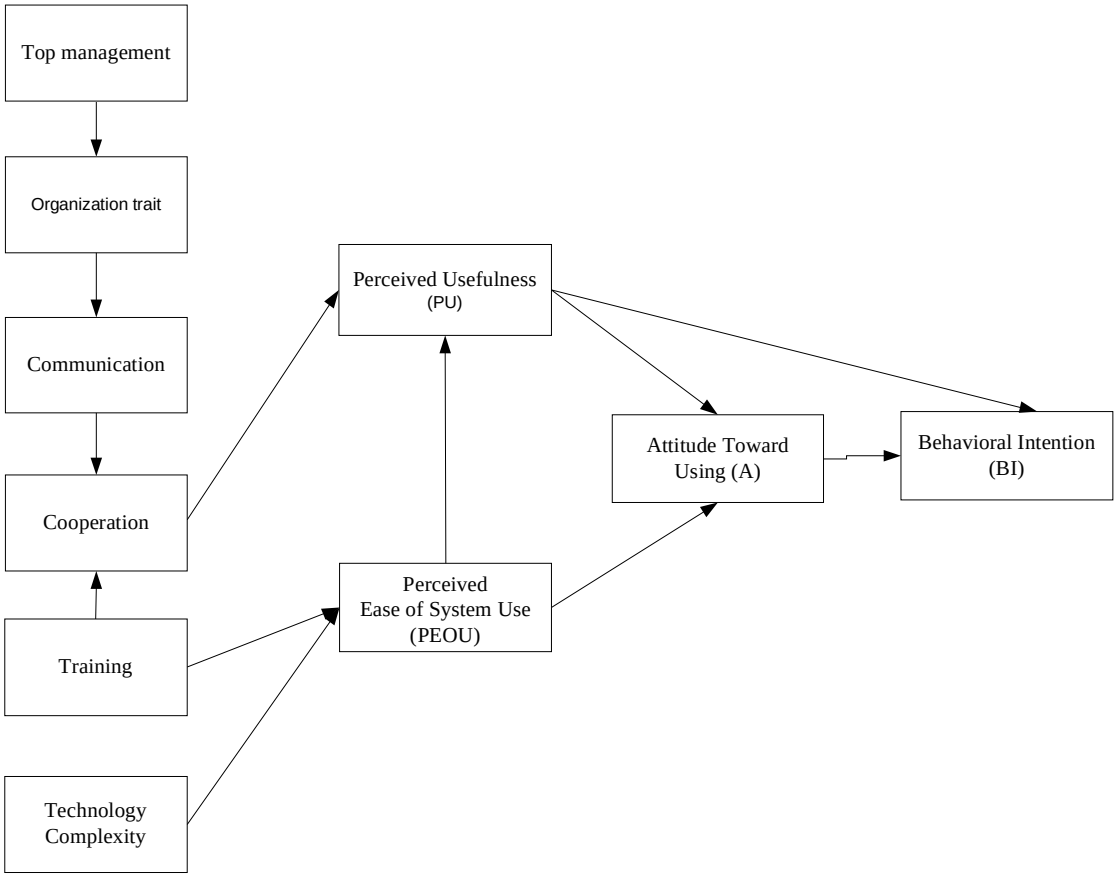


Figure 1.1 Research framework

1.5 Expected Outcome

1) To know exactly what is the crucial factors for successful ERP implementation.

2) To prepare for the solution if the problem in ERP is occurred.

3) The finding of this study will use as a guideline for government to develop the better in competition the global.

CHAPTER II
LITERATURE REVIEW

In this chapter, overview of literature and models are performed and related to the research problem present in the previous chapter. In this chapter, we will introduce enterprise resource planning in Thailand, Technology acceptance model (TAM), the DeLone and Mclean model of information system and the related research.

2.1 Enterprise Resource Planning Definition

ERP has been defined by various authors but with few differences. Kumar et al. (2000) define enterprise resource planning (ERP) systems as "configurable information systems packages that integrate information and information-based processes within and across functional areas in an organization"

The concept of Enterprise Resource Planning (ERP) started in 1990, in United States of America. It was developed from the Material Requirement Resource Planning (MRRP) and Manufacturing Resource Planning (MRP) system used at time in America industry. This chapter will focus on how and why ERP was developed, which hopefully will also help readers to understand its system and the process of its evolution at which the current stage is called the Extended ERP, and the next stage will become the Next Generation ERP. (Robert and Weston, 2007)

2.1.1 The Beginning of MRP – MRP was first introduced in early1960. MRP stands for Material Requirement Planning, which is a method in qualitatively and quantitatively selecting proper materials for a maximum productivity and accuracy, applying by Master Production Schedule system.

2.1.2 Closed Loop MRP – In early 1970, MRP developed the production data entry system in shop floor, and applied the capacity requirements planning concept into the process.

2.1.3 The development into MRP II – From a successful result of the Closed Loop MRP, then MRP II was invented in 1980. This new MRP stands for Manufacturing Resource Planning in which the resource planning and management strategy was applied to the material and productivity controlling system.

2.1.4 From MRP II to ERP - MRP II is the concept that widely used in manufacturing line. ERP, on the other hand, has developed this concept for implementing in various kinds of business firm, by integrating many diverse systems in the firm as one.

Enterprise Resource Planning (ERP) is the system that integrates every aspect of the organization and link their data together to be able to operate from the main software to make the work flow more efficient. There are many definitions of ERP as followings;

ERP aims to re-engineer the operation system and human resourcing in the organization to optimize the competency, by integrating the business strategy, information technology, and personnel to create the efficiency and productivity of organization. The method that the organization uses as a means to optimize the value chain in area of management, by installing this software overall the organization and enables every department to access the data, such as sales-order, equally and mutually, that will then proceed automatically to other aspects, from manufacturing, to inventory, to procurement, invoice, financial ledger, etc. Every part of the organization can be productive and has some value-add in it. It depends on how effectively we use this enterprise resource planning. This planning is required to apply through software to make it workable and able to manage the whole processes such as material procurement, sales-ordering from the customer, on-time delivery, etc. all of which must be accountancy calculated the cost, and integrates by ERP software into one accurate and unique accessible information linkage. (Preecha Pantumsinchai, 2004) The information system in the private enterprise organization that can integrate the core business process, such as procurement and employment, production, sales, accounting, and human resource management, together as one relative and linked system by real time (Itti and Kritsada, 2004)

2.1.1 Function of ERP

Generally, ERP aims to make the business reengineering, adjusting the firm to support its system, and it has four main function areas which are Marketing Sales, Production And Materials Management, Accounting And Finance, and Human Resource, all of which operated by business process consisting of various business activities, such as Invoice Providing, in which the whole process will be followed through until completed as a Computer Order management, which then again followed by the process of Marketing And Sale Concept. To sum it up, ERP is the software that integrates each part of the whole process to operate itself as one.

2.1.2 Strength and Weakness ERP

- **Strength**

ERP will provide the firm with an effective and distinct management system, which standardize the operation and implementation process. It will combine every single database and come out with some useful information to analyze the possible and dependable solution. Nevertheless, to distinguish whether any given system is ERP or not, also depends on many other factors such as:

1. Flexibility - ERP system must be flexible enough to support any reengineering in the firm

2. Fixable Proportion - ERP system should have an adjustable structure in it, that it can easily be easy modified, if necessary, without affect all other part of the whole.

3. Covering - ERP must be implemented and covered every aspect of the firm.

4. Beyond the firm - ERP should be linked to other supplementary system outside the firm.

5. Business Simulator - ERP software should have a capacity to demonstrate the visual model of any business using its feature.

- **Weakness**

1. High cost

2. Any firm that uses ERP software will be required to reengineer its original structure to some degree. Although in some case, the software can be modified to work according to the original structure of the firm, it would cost more than the first method.

3. ERP will be interconnected to every part of the firm, thus require at least 1-2 years for the full implementation to take place.

4. ERP is fairly complicated, and sometimes difficult to learn.

5. Some ERP are designed for the large industry firm, which might not be customized to suit with any smaller industry. Some have an accounting feature which might not support the manufacturing sector.

6. Some distributors of ERP might put their after-sell service and responsibility behind, thus uncompleted task makes it impossible for implementation.

2.1.3 ERP result in term of management has 2 main aspects as followings:

1. Structural Reengineering
2. Business Process Reengineering

Structural Reengineering
- Build the flexible structure that support and combine all the coordinate firms to work in unity.
- Build the necessary support system for the new section of business quickly and ready for its expansion.
- Handling the rapid growth and inevitable change of the firm.
- Develop the new form of business implantation that supports the real time data entry for stock inventory.
Business Process Reengineering
- Reduce the time required for manufacturing
- Business expansion as a result of renewed relationship between distributors and

manufacturers.
- Productivity increased from a mutual understanding and shared data between distributors and suppliers.
- Reduce the cost of stock inventory, increase the level of satisfaction from customer.
- Increase the efficiency of the wholesalers by upgrading the capacity to handle the order from many customers at once, thus deliver the product according to the actual request.
- Encourage the transparency of business by providing the data equally to the producer, transporter, off-shore distributor, and supplier, strengthening the key alliances.

2.1.4. Advantages of ERP for business

ERP is crucial to the improvement of any firm in term of technology, strategy, and work procedure, using the information technology as a back bone of the fundamental structure and supporting system, including the resource evaluation in every aspect. That said, ERP could be utilized to maximize the performance and potential of the firm.

The followings are 3 decision factors for ERP implementation:

- To integrate the financial data or budget from every department of the firm
- To standardize the manufacturing process by making it runs by one main operating system
- To set the standard for human resource data in every department, which may extremely varied in the large firm, by creating a channel for monitoring and communicating with every employee.

2.1.5 Value of ERP

Any organization that resorts to ERP implementation will be inevitably encountered with many structural reengineering, including hardware and computer network, which utilized by different specified functions in each department. Therefore, the cost of ERP implementation in this phrase may vary depends upon the kind of

projects ERP is implemented by. Nonetheless, at the average range, ERP will begin its yield after eight months of implementation.

ERP system has its complication and can encourage many changes in the firm, which will affect every part of the manufacturing, not just any single section. Therefore, high expectation comes from the executive who determines to use it as a solution and employees who in turn must be efficiently trained, lest this reengineering investment will proved worthless.

Critical Success factors have been cited in IT research. There are a great number of articles on CSF. In this literature review section the only focus is on the CSF in ERP implementation. The difficulties and high failure rate in implementing ERP systems have been widely cited in the literature (Davenport, 1998), but research on critical success factors (CSFs) in ERP implementation efficiency is still fragmented. Most literature combines the CSFs with different ERP characteristics. Here I choose some classic literature examples and review them by chronology.

Critical factor before implementing ERP

- Conceptual and planning phrase

1. Awareness Raising

It is difficult to raise the awareness and reform the attitude of employee to agree with the change in any organization. Part of the reasons are;

- The habitual attachment to the old circumstance

Many executives and employees are mentally and emotionally attached to the past outcome. This makes them refuse the change and reformation in any kinds before it even happened. Implementing ERP means that every worker must be willing to embrace any changes that come along for the better, with a mutual goal that might be discomfort to the individual at first.

- Local mindset

They will have to re-examine their mindset, whether it is a local or, if they want to compete in the international market, a global one. Anyone who is not willing to develop their mindset and think big enough, should consider to resign themselves before ERP is implemented.

- Data possession

ERP implementation means that every bit of data from every single department will be gathered and shared. This could create a tension and even hostility from some employee or even someone in the management position. If the employee is reluctant to be more transparent or rather see the ERP as a threat, the whole process could be held back.

2. Recognition from executives

It is very important that the executives see thoroughly how ERP would be their best bet, and how urgently it needs to be resorted to. Yet, most executives are those old-fashioned businessmen who are usually cynical to any modern invention.

3. Unclear strategy

If the executives have an unclear vision about their business, their policy will tend to be obscure that it is hard to apply with the ERP system. Thus missing the practical purpose of ERP and gain no reward in the long term.

4. Inability to think outside the box

ERP implementation will be best utilized only when the employee can leave their current routine behind and be willing to re-examine themselves, which for most people, just an idea of it can make them feel uncomfortable, thus protest against it either passively or aggressively.

5. Obstruction of optimizing

ERP implementation in terms of management is by no means about increasing efficiency of each unit separately. Rather, it is by all means about accelerate the overall performance of the firm. Therefore, it is inevitable that some departments of the firm will have to sacrifice some part of it, while on the other hand, some might have an advantage in the process. This can create a conflict or issue amongst them that, if left unaddressed, make the progression postpone.

6. ERP package does not guarantee the result

What is indispensable in implementing ERP is the ERP package itself. Nevertheless, bringing the ERP package from the outsource to renovate the information system in the firm and use it as a back bone system usually receive negative feedback from employee in general.

- Development Phrase

1. Difficulty in designing a business plan

The main operation of development phrase is to design the future business plan as expected by the executives of that firm. They want a quick fix and a shortcut to the solution, which can disappointing because the fact is that ERP implementation must utilize a great deal of information from various source in the firm to integrate them, and therefore require a long period of time before it bears the fruit.

2. Lack of skill

ERP package is the software that an inventor has set the standard and creates it out of that, therefore it is not easy for the user to study all of its tremendous content. This is one of the stumbling blocks for the user to adapt the software and optimize it for the best advantage of the firm.

3. Too hard to understand

ERP package includes many forms and strategy of various kinds of business. Any business that uses it must take a great deal of time to learn and choose the best strategy for its own firm. Therefore, the first and foremost actions for this phrase should be to attend the relevant seminar or training and meet with the expert to get some advice or support prior to that. It is not recommended, though, to study its content from the manual alone, since there are many questions that can arise in the meanwhile.

4. Lack of standard in working procedure

Since there is no standard method to theorize the work procedure in its simple term, therefore it is unlikely that the designed procedure will be accepted from the executives in presentation alone. Revision of the procedure will cost a lot more than its original one. Thus ERP is viewed as a waste of time and resource, leaving it uncompleted before the implementation begins. As a record, there was a company with whom ERP spend 40% of the total budget.

5. The cumbersome development

To make the ERP works in perfect align with the procedure of the firm is almost impossible, and to resolve this issue, the customization of ERP package was developed accordingly. Nonetheless, it usually takes more than once to customize the package before the result is satisfying for the user.

6. Ever-demanding customization

From the research and survey on the firm that has been using ERP for a short while, the researcher found that ERP package customization, or so called the Add-on development has cost over 30% of the project budget. This high cost has not yet included the upgrading cost of the system which will be followed sooner or later.

7. Management pitfall

ERP system development is the process of solving each and every single detail of the firm, and the success rate of implementation is rare. Many firms failed halfway of the project, while some were even failed at the beginning phrase due to the lack of sufficient budget. The reengineering of the firm, which demands less budget, however, is more difficult and risky than the customization method.

- Implementation and upgrading phrase

1. The difficulty in training

ERP implementation is succeeded by the process of training for awareness raising, designing, and planning, therefore it is very important to have an effective workshop or seminar that every user be well-trained and master all of ERP content. The critical point is to train each person to know the procedure of all every departments other than their own, because ERP is the software that combining the whole standard system of the firm. Knowing and acknowledging the procedure of other departments strengthen the skill of the user and help one realize his or her role in the firm.

2. The set back of ERP implementation cause by a lack of coordination

Since ERP resorts to the accounting system of database which contains a large sum of invaluable information and in-depth detail of entrepreneur, the restoration of the data and its security procedure must be created. Yet the balance must be maintained between keeping the distance and offer the coordination across the departments. Otherwise, the solid foundation amongst employee will not occur, and it will be the gap that prevents them from sharing knowledge and brainstorming creativity.

3. ERP maintenance

Generally, ERP support system should be advised by some experienced experts and let them in to investigate every aspect of the firm in its full detail, until finish the development phrase. Nevertheless, after the expert phrase out, there should be someone inside the firm, preferably some key person in the IT department who takes the role of maintenance the system. On the other hand, in the process of ERP development, there will be many important documents about the procedure that are neglected and overlooked, therefore the point is that after this phrase is over, there should be some concern on how to file these documents and arrange them systematically, that it can be easily access for further study in the future.

4. The difficulty of ERP Add-on

Currently, the concept of ERP Add-on that aims to continue the development in align with E-Business strategy is very popular. Yet, the rapid fluctuation of the management procedure makes it more difficult to achieve this

objective. The revision of this concept must be concerned all the time, in order to keep up with the fast pace of the strategy.

5. ERP concept expansion

ERP concept expansion is the activity chain that, unlike the old way of dealing only with insiders, reflects the large scale of the key stakeholder, the customer, distributor, and the supplier, which require more precision in making the decision from the executives.

Key Success Factor

This is what each business has to find out to create the conditions that they have some advantages over others in the market, by means of gaining more satisfaction from the customer, with the less cost. This is the competitive edge in which depend on different key success factors, such as;

1. Economy of scale: The discount store, for example, that main objective is to expand their size to create the negotiation power with their suppliers.

2. Innovation: This factor is important to every business sector, particularly IT company.

3. Service/Quality: Some business gain trust from the good delivery system that stems from the short and exact lead time according to air cargo schedule.

4. Location: There is an old maxim about commercial that the three most important things are, location, location, and location.

5. Value added: Some business has a very extreme competition, though they have very similar products. What distinguish or determine their victory is the public image of their products. Some marketer calls it a positioning.

6. Distribution: This key success factor is especially important for the soft drink industry that whoever can spread to wider range of retailers, will get more market share.

7. Diversification: Mobile communication business such as cellular phone and paging use a call center or contact center as a winning strategy.

With all that said, whatever key success factor is resorted to, every business has to hold the right key for each of its own specific goals.

Technology Acceptance Model

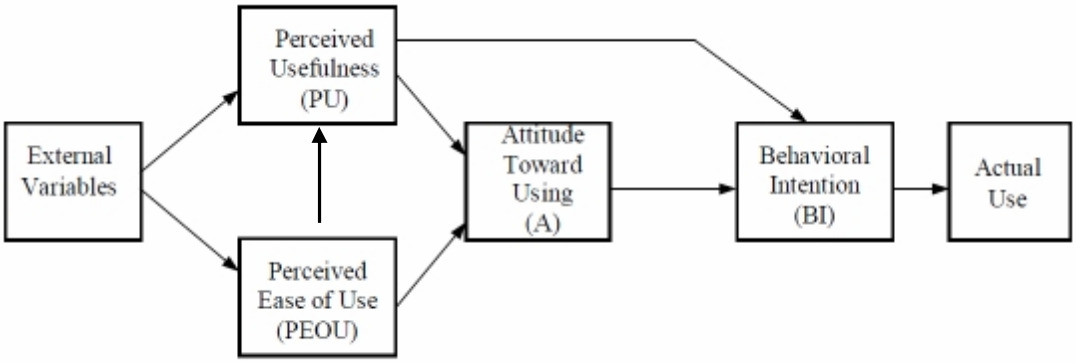


Figure 2.1 Technology Acceptance Model (TAM) (Davis, 1989)

There are many theories about 'technology acceptance', such as Innovation Diffusion Theory, Utilization Model, Social Cognitive Theory, Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Extended Technology Acceptance Model (TAM2), Theory of Planned Behavior (TPB), and the late Unified Theory of Acceptance and Use of Technology (UTAUT).

The Technology Acceptance Model (TAM) (first introduced by Davis, 1989; Davis et al., 1989), is a causal model that proposes user acceptance and usage of a technology is determined by two key attitudinal components (beliefs): perceived usefulness (PU) and perceived ease of use (PEOU). PU is the extent to which a person believes that using a particular technology will enhance their job performance. This instrumentality component is the most critical belief underlying the adoption and use of new technology (Davis, 1989; Davis et al., 1989; Taylor and Todd, 1995). PEOU is the extent to which a person believes that using a new technology will be free from effort (Davis, 1989). Patterson et al. (2003) said that technology acceptance was influenced by the size of the firm, the structure, potential, supply chain, Transaction Climate, a pressure from some suppliers, and other environmental factors. Scupola

(2003) has studied the model of technology acceptance, and concluded that there are 3 characteristics that determines the level of acceptance, Technological characteristics, Organizational characteristics and Environmental characteristics. Chieh-Yu Lin et al. (2007) too, has conducted a research and found that the acceptance which occurred as a way to increase a potential for China logistics industry rely on Technological factors, Organizational factors, and Environmental factors.

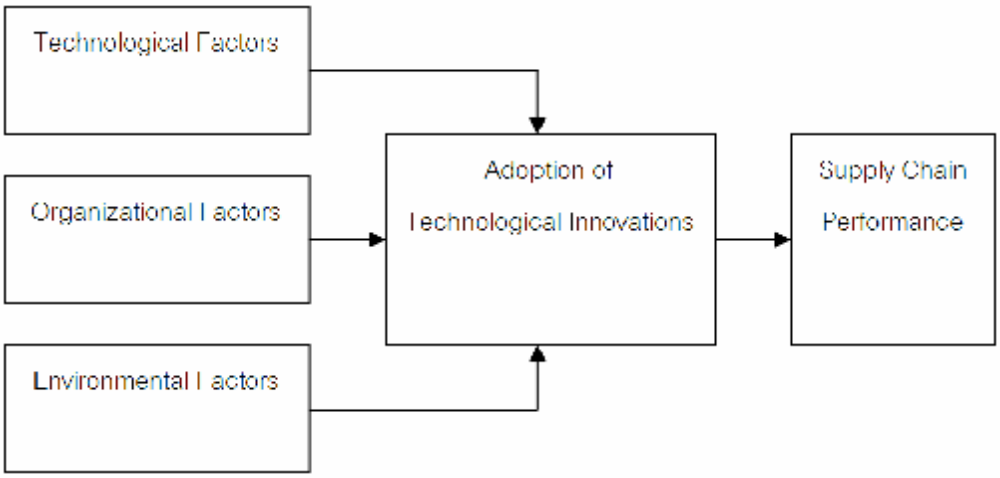


Figure 2.2 Technology Acceptance Factor of Chieh-Yu Lin et al. (2007)

Nevertheless, the conclusion that comes from any research should also weight some concerning on the theory about organization and individual behavior, such as TRA (Theory of reason action), TPB (Theory of Planned Behavior). (Patterson et al., 2003; Scupola, 2003; Chieh-Yu Lin et al., 2007)

Theory of Planned Behavior, Technology Acceptance Model, and (Unified Theory of Acceptance and Use of Technology are all inherited from Theory of Reason Action, which predict the organization behavior by Behavioral Intention (BI), the method that used for measuring the willingness to apply a certain technology or decision making by individual behavior such as followings:

Theory of Reasoned Action

Theory of Reasoned Action (TRA) indicates that any action occurs by a will or intention which related to individual characteristic and social norms, (see figure 2.3)

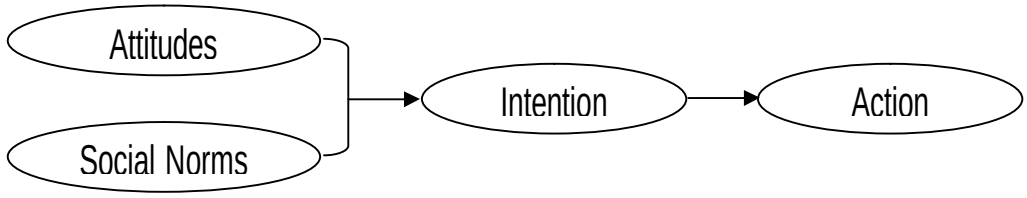


Figure 2.3 Model of Theory of Reasoned Action (TRA) (Rahul Khanna et al., 2009)

According to figure 2.3, TRA can be explained in terms of Attitudes, Intention, and Social norms, all of whom Rahul Khanna et al. (2009) referred that intention can be predicted by individual attitudes and Social norms, while attitude is the reflection of individual characteristic, and social norms or subjective norms is the pressure one receives from environment, society, as well as the person involved. TRA, therefore, does not concern about Perceive Behavioral Control (PBC) or any controllable factor, thus the two fold utilization of PBC which are major factor and minor factor. (see Figure 2.4 and Figure 2.5)

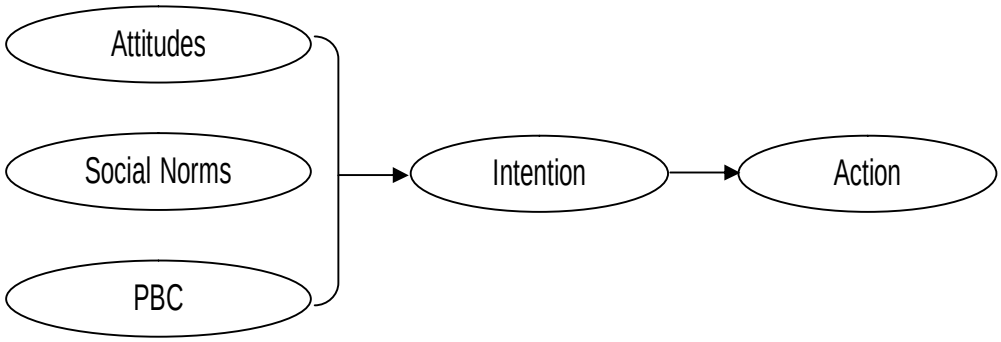


Figure 2.4 Model of Theory of Reasoned Action (TRA), using PBC as a major factor (Rahul Khanna et al., 2009)

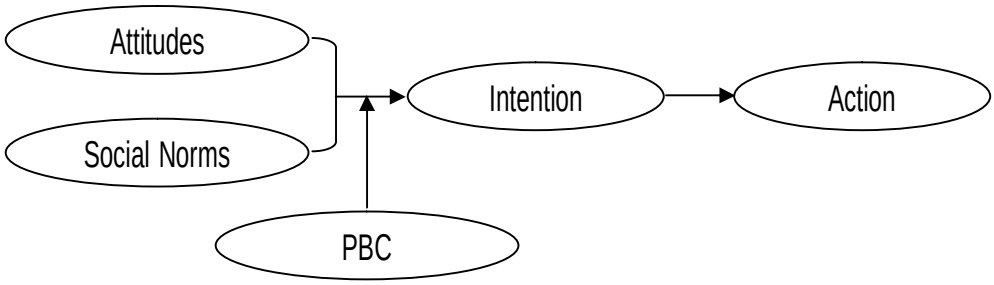


Figure 2.5 Model of Theory of Reasoned Action (TRA), using PBC as a minor factor (Rahul Khanna et al., 2009)

Theory of Planned Behavior

TRA was upgraded to Extended TRA, also known as Theory of Planned Behavior (TPB) by applying the Perceived Behavior Control which makes Individual behavior predictable by Behavioral Intention (BI), influenced by attitude, subjective norm, and perceived behavioral control.

Qian et al. (2007) has introduced TRA and TPB to conduct a research on smoking behavior of teenager by 3 methods (see figure 2.2, 2.3 and 2.4) by comparison. The result found that TRA and TPB are both effective in behavioral prediction, but setting PBC as a minor factor is better than using it as a major one, or

not using it at all. That said, there would be only slight variation in the result, if the behavior was manipulated. On the other side, Poulter et al. (2008) has used TPB to study the behavior of some truck drivers in United Kingdom, and said that the most reliable factor in behavioral prediction is the intention of individual.

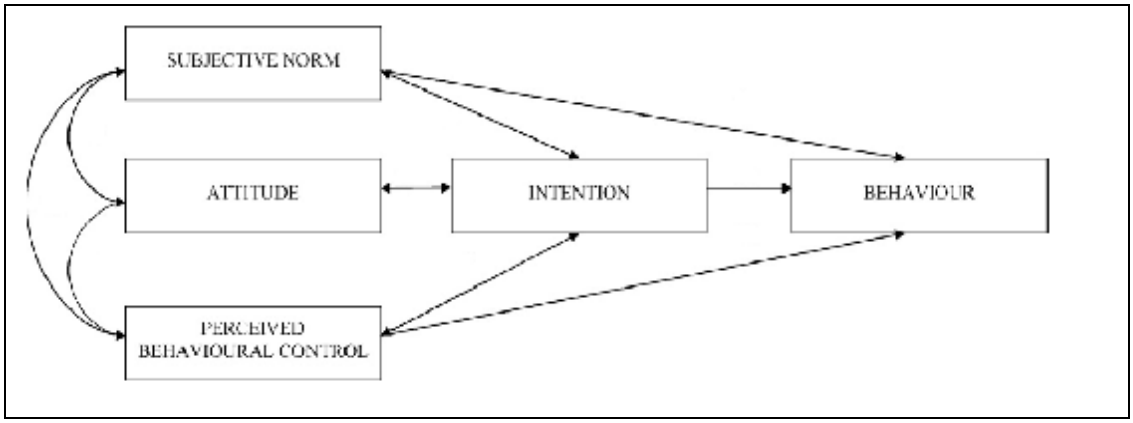


Figure 2.6 TPB Model for behavioral prediction of truck drivers by Poulter et al. (2008)

Besides the useful method for predicting the behavior, TRA and TPB are also useful for studying reversely, which is, study the main factor that determines such action. Sonja E. Formard (2009) conducted a research on dangerous driving behavior that explained the cause of some the hazards on the road.

Technology Acceptance Model

According to TAM, technology acceptance can be determined by User's perceived ease of use (PEOU) and Perceived usefulness (PU), which directly influences the attitude towards using technology (AT). While Behavioral Intention can be affected by AT and PU, which indicates the actual system use (see Figure2.7)

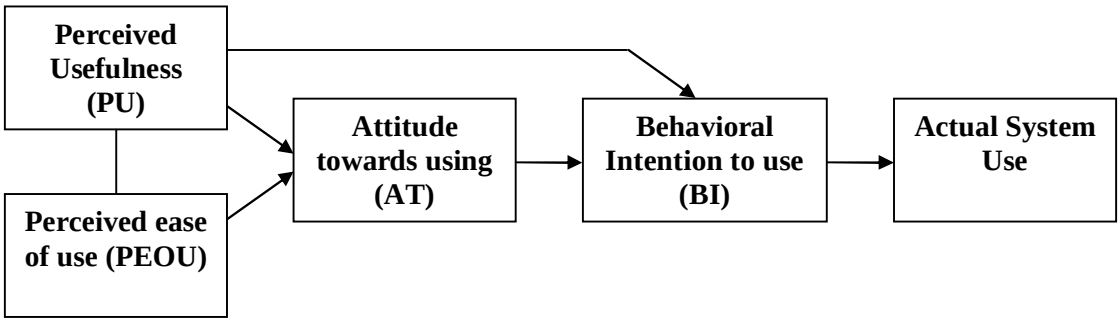


Figure 2.7 TAM Model (Davis et al., 1989)

In studying the influence of information technology on individual and marketing potential, Robert W. Stone and colleagues have applied it with TAM. He said that PU and PEOU are affected by Organizational (or Individual) Traits, Information and System (or Technology) Quality, Industry traits and tasks performed, as well as his mentions earlier that technology acceptance is affected by Organizational factors, Technological factors, Environmental factors.

Extended TAM (TAM2)

Like TRA, TAM model research still has no concern over controllable factor. That said, TAM assumes that technology user is totally controlled, and the behavior of technology acceptance will be unaffected by outside condition and the character of user itself, which is pragmatically unlikely. This is the weakness of TRA method.

Later on, TAM therefore was upgraded as Venkatesh and Davis (2000) have applied the concern about social and environment factors and named it Extended TAM or TAM2

The example of Extended TAM can be seen in S.A. Al-Somali et al. (2009) research on the acceptance of Online Banking in Saudi Arabia (see Figure 2.8), which concern about control variable factors such as PU and PEOU, i.e. Social Influence (SI) , Awareness of services (AW) , Self Efficacy (SE) , Quality of Internet Connection, including the factor that affects AT, i.e. Resistance to Change (RC),Trust (TR) , age , gender, education, income, etc.

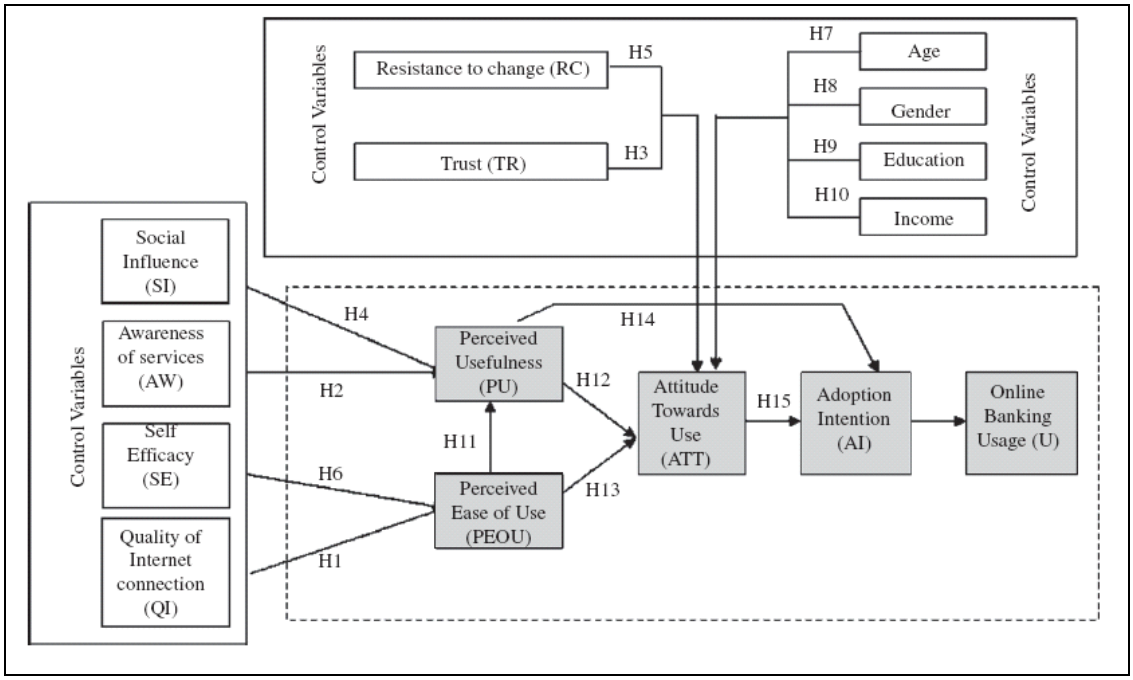


Figure 2.8 Example of Extended TAM in studying the acceptance of Online Banking system in Saudi Arabia (S.A. Al-Somali et al., 2009)

Although there are many theories that support the concept of technology acceptance, yet those theories have some strengths and weaknesses, varied from using different acceptance factor, thus there is no single absolute theory.

2.2 Competitive Benchmarking

The definition of 'Benchmarking' in term of management is the comparison measurement and study the object of product, service, process, and procedure of some organizations that excel in these areas, whether they are competitors or not, to apply the knowledge gained for the advantage of the user to be as excellence as they are. Nevertheless, whenever Benchmarking is concerned, there need to be some specific comparing measurement, i.e. what to compare, who to compare with, and at which level in so doing.

The concept of comparison analysis and competitor analysis are the basic framework for analyzing industrial data for the domination against other competitors in the same market or business field, to distinguish their strength and weakness, and

finally to hold as much market share as possible. This, however, requires the systematic and continual of measuring, comparing, and learning method.

Questionnaire Structure (Kittisak Chanwiset, Chanin Sujaritwong, and Traipoom Khatiphanjawan, 2001)

General questionnaire is divided into 3 categories as followed:

2.2.1 Cover Letter

This part is the letter or document that any respondent must read prior to the question, and the surveyor use it as a means to introduce and identify themselves, both of their objective as well as their intention. There are some significances for the cover letter such as;

- Introducing the surveyor, as who they, what they are researching, and why.
- Introduce the objective of research, the name of the project, purpose, and its use.
- Explain the reason why the questionnaire is given to a certain respondent, and how important their responses are.
- Guarantee that the information given by the respondent will be confidential.
- Tell the time and date or the deadline for the response, including where and how to send it back.

That said, cover letter is intrinsic to conducting a survey in that it determines whether the questionnaire will be responded or not. Therefore, it is recommended that there are name and surname of the respondent on the cover, if possible.

2.2.2 Information

This part is generally consisted of main description and its subscription. In the main part, there are the instructions as to what kind of question there are, and how to answer each part, including some examples. While the subscription part will be

used when there is a further remark or specific notification that requires an acknowledgement.

2.2.3 Questionnaire

This part is the main part of the surveying, consists of overall information and answer from the respondent. The details of this part in term of variable factor are as follows

- Dependent Variables
- Independent Variables
- Background of the target groups

2.3 Features of questionnaire (Sorachai Pisarnbutr, Saowaros Yaisawang, and Preecha Asawadechanukorn, 2006)

Generally, there are 3 kinds of the data used for the survey

2.3.1 Fact

This kind of data is the fact that is brought to analyze and research, both quantitatively and qualitatively

1) Quantitative data – This is the data that represented by the size, number, or any measurable information.

2) Qualitative data – This data is valuable, though intangible, but can be measured by means of frequency.

2.3.2 Opinion

This kind of data allows the respondent to put their subjective opinion as an indirect or variable factor, such as preference, feeling, willingness, and personal interests, etc. When resort to this kind of data, the surveyor must rate them by rank or scale. The higher rank or scale it is, the more significance it has.

2.3.3 Relative Reason

This kind of data is used to concern or distinguish the degree of truth in the answer given from the respondent. If the answer and the reason are not in align to each other, then that data should be reevaluated or abandoned.

2.4 The method of questionnaire (Sorachai Pisarnbutr, Saowaros Yaisawang, and Preecha Asawadechanukorn, 2006)

The basic steps are as follows:

2.4.1 Set the feature of the surveying form

There are 3 main features in general for every questionnaire:

1) The personal information of respondent, to whom the data is given, which is the target group or relevant to the object of survey.

2) Overall data given by the respondent that must be gathered and analyzed before put to use.

3) Relevant remark or notification that is also important in improving the method in the future.

2.4.2 Refine the essential question

2.4.3 Make the copy of those questions

2.4.4 Test the questionnaire

2.4.5 Edit and revise the questionnaire, then filter them before making the final draft.

2.4.6 Close-ended question that is not allowed the respondent to give free opinion, but instead, making the choice or option to be selected. The respondent must select a choice that they agree with the most. There are strength and weakness of the close-ended question as follows:

2.4.6.1 Strength (Joompol Sawadiyakorn, 1967; Charnchai Ajinsamajarn, 2007)

1) Quick and convenience to response

2) The object of each question is unlikely to be misunderstood.

3) Since the questionnaire is convenient to response, there is a higher chance of returning it to the surveyor.

4) The interpretation of answer can be prepared beforehand.

5) Easy to compare and analyze together.

6) The answer will be likely on the target.

7) Standard is set for each answer.

8) Best used for the simple question.

2.4.6.2 Weakness (Joompol Sawadiyakorn, 1967; Charnchai Ajinsamajarn, 2007)

1) The respondent are not allowed to give any opinion.

2) There is some bias from the answer provided, and sometimes there is not even the answer that close to the mind of respondents, yet force them to choose.

3) More often than not, there is some fault data due to the lack of attention and concentration in the process of responding.

4) Lack of some possible data, due to the limited choice given.

2.5 Quality testing for the questionnaire (Sorachai Pisarnbutr, Saowaros Yaisawang, and Preecha Asawadechanukorn, 2006)

Before any questionnaire is put to use, there should be testing at least for once, to make sure that that the information gathered will have high degree of validity and reliability.

2.5.1 Validity

This includes the completeness of the question as well as analysis method to filter the question that guarantees its rational and logical quality of the content. The short term for this process is called 'content validity', which consists of;

1) Using some analysis method to filter the answer that covers all the relevant objective of the question.

2) Analyzing by different method for each question

3) Considering the source of each data, in term of their reliability, convenience, consistency, to categorize them whether it can be gathered beforehand or not.

4) Rechecking whether the data above has been included in the questionnaire or not, for if it does, that questionnaire should be valid.

5) In case of lacking the necessary data that needed to be gathered before launching the questionnaire, it should be revised and edited.

If the process of content validity is conducted as mentioned above, the surveyor will be able to check the validity by themselves. Nevertheless, to make it more convenience, the surveyor can ask for some help in data gathering process from some experts. It should be strictly noted that if the questionnaire is not valid, it is better kept for revision than to carelessly launch to the respondents.

2.5.2 Reliability

The reliability is the incorrectness of the data gathered, which can be measured in one of two methods as follow:

1) The measurement of reliability for general data will use the method of repeat comparison of the data. If the data have a very slight variation, or has no variation at all, then they will be measured as reliable data. Nevertheless, this process can be very costly and require a great sum of expense, because it must be repeated over and over. There is another way to conduct this method, though the cost is not reduced, which is to test the questionnaire twice with the same respondents at the different times by the dual question form, for example, odd numbers form and even numbers form, which have the different question yet encourage the same interpretation from the respondent, then bring the result up by means of correlation coefficient. The closer the value to 1, the more reliable the questionnaire, and if the value is close 0.5 or 0, that means it has a medium and low level of reliability, respectively.

That said, this reliability testing method is not popularly conducted, since it requires much of the time and cost unnecessarily. Also it is quite a difficult method for some researcher or surveyor that have less experience and fundamental knowledge about statistic and variation, and their relative means.

2) The reliability testing method be means of rating scale such as level of satisfaction, level of opinion, level of preference, level of addressed issue, etc.

The rating scale method is measured by alpha coefficient value invented by Cronbach, which concern over the relative value between each question.

The alpha coefficient value that gets from the method will be ranged from 1 – 0 as well. The closer the value to 1, the more reliable the questionnaire, and if the value is close 0.5 or 0, that means it has a medium and low level of reliability, respectively.

2.6 The launching method (Kittisak Chanwiset, Chanin Sujaritwong, Traipoom Khatipanjawan, 2001)

There are technically 2 methods to launch out the questionnaire;

2.6.1 Direct submit

This method is not complicate. It only requires that the researcher or surveyor bring with them a questionnaire to meet the target group and can receive it back on the spot.

2.6.2 Mailing

This method is convenient and can save the cost, it is therefore widely used with a pattern as following;

- Design the template for each segment of questionnaire, so that it can be followed through later on time.
- Write or type the name, address, and post area for returning the questionnaire clearly.
- Attend to the respondents by their name and surname if possible, including their title.
- Enclose the stamp for the convenience of the respondents.

2.7 Strength and weakness of questionnaire (Charnchai Ajinsamajarn, 2007)

Questionnaire is the best tool to elicit the necessary data, though it has both strength and weakness as follow:

2.7.1 Strength

- Low cost

Questionnaire has a very low cost, save both the time, and spare work load, because it can be copied and launch immediately, with as much quantity as needed.

- Short time

Questionnaire requires only a short time to response, so it is appropriate for surveying those people in diverse area.

- Massive data gathering

Questionnaire can help gathering a massive amount of data within a short range of time, and better still, the data gathered can be easily interpreted.

- Same time operation

Questionnaire can be mailed or put on the stall for picking up, therefore it can be launched in many area at the same time.

- No extra training needed

Generally, questionnaire will be attached with the cover letter and explain itself with description, thus no need to train the field worker.

- Deliberate information

Questionnaire makes less pressure to the respondent, as they can take as long time as they want before putting in any answer.

- More comfortable

People in general loathe any forceful or manipulative behavior, and therefore try to avoid interaction in person. Questionnaire makes them feel more comfortable when giving an answer.

- Ability to compare the information

Questionnaire has some pattern in itself that makes it possible for the information comparability analysis.

- Lower mistake

Normally, questionnaire method will have nothing to do with any relationship between surveyor and respondents, and no interpersonal skill is needed. Thus, lower chance for the bias or prejudice to take place, if not at all.

2.7.2 Weakness

- Lower feedback

The very low chance of getting response from respondents is a severe weakness of questionnaire.

- Lack of motivation

For the respondent, questionnaire can lack some motivation in it to encourage or elicit the participation from them, as some question is the personal and sensitive topic that need some interaction in person to make them feel more open, in which mailing method is lacking.

- Not appropriate for the passive respondents

Many respondents are not active enough to participate any activity that is not their interests and do not feel obliged to response.

- Limited scope of question

Each question in the questionnaire is designed particularly to make it clear for the respondent to understand it. Therefore, any in-depth or profound question do not included, lest it is misunderstood or interpreted.

- Miss the clue

Mailing questionnaire can receive at most the cold answer or raw data from the respondents, but no chance for investigating some other relevant factor such as the attitude, feeling, and reaction from them, which can be equally valuable.

- Misunderstanding

In case of misinterpretation of the question, the data gathered can have the opposite effect or used as a fault information, which can affect the image or reliability of the researcher.

- No help offered

If there is any frustration in mind, the respondent can find no help or lip service form the surveyor.

- The complete variety of choices

It is almost impossible for the surveyor to gather all the possible choice for each question in the questionnaire, thus only limited information is taken.

- Difficult to guarantee the accuracy

- Dependent answer

Often times, when the respondent receive the questionnaire, they will tend to read every question until the last one before answering each question, thus makes the answer incline to be presupposed.

- Incomplete questionnaire

Besides the lower chance in getting the feedback from the respondent, this also couple with the negative chance that the questionnaire received back will be answered in every question.

2.8 Sampling (Sirichai Kanjanawasi, 2004)

Sampling is the method of searching for the sample target group of population that, if selected properly, will be the appropriate representatives for the objective of research.

Population is a group of people that the researcher must set both the element, size and, specific characteristics needed for the appropriate data searching, and may include the time frame to make the research finish on the proper time.

In the search for appropriate target group, the researcher must do the sampling with some element of population, using the list of population as a sampling frame.

2.8.1 Principles (Sirichai Kanjanawasi, 2004)

The objective of sampling is to find a certain sample group that can be a representativeness of population.

The principle to hold in mind when finding a sample group that has a representative quality of population, is the appropriateness and the proper size of the group.

The appropriateness of sampling means that the researcher has no bias or any prejudice against the sample group, but rather uses the principle of 'probability' sampling which will make each sample group equally eligible.

2.8.2 Methods (Sirichai Kanjanawasi, 2004)

There are basically 2 methods of sampling as follow:

2.8.2.1 Probability sampling - This method concern over the probability of the sample group that will be randomly select and then used as an inference before making the conclusion.

2.8.2.2 Non-probability sampling - This method does not give any concern over the probability of the sample group, but instead make a purposive sampling, which appropriate for the research that is unable to control the scope of population and has a very limit time frame or resource, and solely depend on the consideration of the researcher, such as the research of drug addicts, psychotics, or to select between classroom A and B, etc., thus use not an inference for population.

This literature itself use the non-probability sampling which again divided into many method as follows: (Pornsak Pongpaew, 1976)

1. Accidental Sampling

The sampling that survey any respondent who comes along on the spot such as the tourist that is checking out at the airport.

2. Quota Sampling

The researcher must has a certain amount and specific characteristics beforehand, then proceed with the quota sampling method, to filter the appropriate representatives for each group. Nevertheless, there are some pitfalls in this method that can happens such as;

The data that used a matrix table to describe requires the accuracy and up to date quality.

Although every value numbers in the matrix table is accurate, some bias can be variably happened depending on the behavior of surveyors.

3. Purposive sampling

Sometimes, the researchers select their own sample group in order to achieve the purpose of their research, which may not have much to do with the population at large, but rather have something to do with their questionnaire. Someone calls this process the 'Pre-test', instead of surveying, since the underlying purpose is to find some weakness in their questionnaire to re-correct.

In some case, researchers aims to study a minor group of population which is more convenience, while some study all prospects without enumeration, for example, the research on leadership of laborer leader, to whom the characteristics can be similarly compared with any kind of leader.

4. Convenience Sampling

Conducting by select a study group or aspect that is conveniently gathered such as the attitude of the passenger of air-conditioned bus, in which the researcher just buy a ticket and take a certain bus to make a survey on the spot, or the study about

the attitude of unemployed people, in which the researcher go out to the train station where there are many target respondents.

There are many researchers that use the classroom as avenue for launching the questionnaire which is very convenient and can save a lot of cost, and can introduce the questionnaire within a short period of time, thus appropriate for doing the pretest and eliciting the massive information at once.

5. Chain Sampling

Sometimes called 'snowball sampling' this method is very modern and getting more and more interests from the researcher nowadays. The process is to find the appropriate group in a proper size to do the questionnaire, and then encourage them to send forward the same questionnaire to their acquaintance, and so on, until reach the target amounts (like a snowball that gets bigger and bigger over time.

2.9 Related Research

“Adoption new technology for supply chain management” is a research of (Patterson, Grimm, and Corsi, 2003). The research was examined to find out the key factor influencing the adoption of supply chain technology. Accordingly, they found that a key factors about adoption new 13 technologies for supply chain management, also including Radio Frequency Systems. They revealed that many key factors have an impact on the adoption them in supply chain. They have also mentioned that the larger organization have financial and technology resources to invest in new technologies and absorb the associated risk. Conversely, the smaller organizations are more likely to be innovative as more flexible. However, they lack of resources technology adoption in small companies

The relationships between the success of ERP system adoption, extent of business process improvement (BPI), and organizational performance and investigated the associations between the outcomes of these initiatives and such organizational factors as strategic intent, senior management support, and the status of the IT function within a company. The result imply that adopters of ERP must devote sufficient

attention and try in the planning, deployment, and management of ERP systems. (Chuck C.H. and Eric, 2007)

Beretta (2002) research indicates that, in order to survive in the market, any business organization has to urgently adjust their strategy to compete with others, and one of the key strategy is ERP software that can be applied to develop the information technology system in the organization. This research also talks about other 10 factors that are crucial to the success of business re-engineering that were tested by many organizations in Malaysia, and conclude that the most significance factor of successful ERP implementation is the ability to support the management policy and the understanding of its goal.

The predominant characteristics of ERP is the ability to integrate overall aspects of the organization, including procurement, employment, production, sales and marketing, accounting, and human resourcing, into one main operative strategy, which affects the material flow and information flow, to make the best solution for each action and act as a trouble-shooter that makes any project or operation successful. (Lee A., 2000)

There were many organizations that re-engineer the information technology systems of their organization, one of which ERP application that was resorted and integrated to. Nevertheless, not every organization that has been mentioned earlier will gain a successful result, and therefore the potential dangerous as well as the success factor has been researched and concluded that the relevant network system and workplace culture are the positive catalyst for ERP implementation. This research also compared the ERP implementation of 4 organizations in different segments, which are A) drug company, b) shoes company, c) energy company, and d) automobile, in USA, in terms of these 3 phrases, i.e., 1) Pre-implementation or Setting-up phase, 2) Implementation phrase, and 3) Evaluation phrase, all of which will clarify the critical factor for both successful and failure implementation of ERP.

One of the earlier researchers, Ang et al. (1994) found that lack of training led to difficulties in MRP systems implementation. A thorough training program is necessary to make the user comfortable with the system. This factor is too often ignored. It is a challenge for a company implementing such a system to find an

appropriate plan for the training and education of the end-user therefore, is invaluable in this regard. (Motwani et al., 2005)

The effect of service employees' technology readiness on Technology acceptance (Rita Walczuch et.al, 2007). The results of the study reveal that the personality of the user as well as the characteristics of the technology; personality characteristics as measured in the TRI have a significant effect on technology adoption. Another point that needs attention is that TAM was intended to deal with a single technology.

The results of the study reveal that modifying the Technology Acceptance Model (Davis 1989, Davis et al. 1989), the DeLone and McLean (1992) model and Goodhue and Thompson's (1995) task-technology-individual fit proposal, this research empirically explored the organizational, individual, information, system, industry, and task traits that influence perceived organizational performance impacts from IT use mediated by ease of system use and perceived individual performance impacts, system satisfaction, and system use. It was found that through the diligent marshalling of technological, environmental, and human resources, management can enhance the impact IT has on perceived marketing organization performance.

CHAPTER III
RESEARCH METHODOLOGY

3.1 Research Methodology

In the research, it should consist of 10 operational procedures to achieve the objectives. They can be elucidated as displayed in figure 3.1. Their details of procedure, it are describing in topic 3.2 – 3.11.

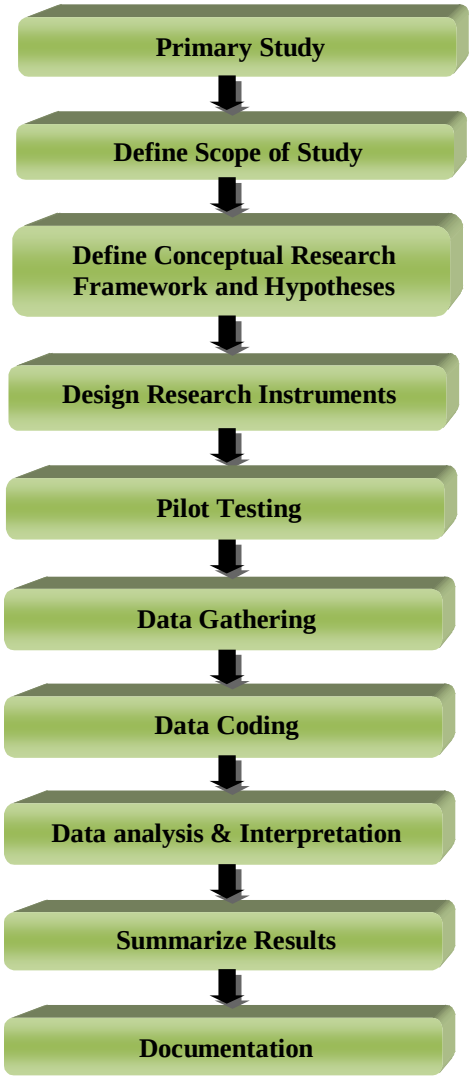


Figure 3.1 Research methodology

3.2 Preliminary Study

In order to accomplish a successful research, therefore, we study related documents in the research from both related domestic and foreign researches, such as, research papers, thesis, seminar papers, survey reports, other statistics reports, articles on the internet, and statics theories to identify the research model, sampling, and statics tool for hypothesis test. The core of research focuses on critical success factors for ERP technology can be utilized for implementation in main industries in Thailand as follows as follows;

- ERP utilization for activities in several industries of Thailand in present.
- Motivation factors that have influence on ERP adoption.
- Perceived benefit factors that have influence on ERP adoption.
- Barriers/challenges of ERP adoption
- Possible recommendations of widespread and successful ERP adoption

3.3 Scope of Study

3.3.1 Target Group

The population of this research is the main industries in Thailand. In this research I am interested in fives main of industries in Thailand as follows as

- Food and Beverage industry
- Automotive parts manufacturer companies in Thailand
- Plastic industry
- Clothing industry
- Other industry

And focus on the industries has a value of asset much more two millions from the regulation of Department of Industrial Promotion, Ministry of Industry and the industries had adopted ERP utilization.

;

3.3.2 Population and Sample Group

The population of this research is the main industries in Thailand. We would like to select the purposive sampling in the research. The sampling is the industries are implemented and utilized ERP already. We would like to use Cochran theoretical statistics by calculating size of sampling group are 385 samples from calculating as follows;

Cochran (1953) along with a 95% confident level (Z = 1.96) and a 5% precision level

$$N = P(1-P)Z^2/D^2$$
$$= (0.5 \times 0.5) \times (1.96)^2/(0.05)^2$$
$$= 384.15 \text{ samples}$$

Where n = Sample size
P = fraction of population
Z = confident level
D = Level of precision

Nevertheless, we are used to inquire primary data from related industries organizations, found that it is somewhat difficult to collect data from them. We thus send around 1,000 questionnaires. At the same time we will select sample group for deep-interviewing for supporting quantitative data. Number of sample group which will be interviewed, will be selected 6 companies. In this research I would like to receive the questionnaires for 400 samples for accuracy and appropriate for analyzing information.

Table 3.1 The number of Companies that reply questionnaires of the main industries in Thailand

Company	Number of companies	Percentage
Clothing industry	68	17.0
Plastic industry	24	6.0
Food and Beverage industry	130	32.5
Automotive parts manufacturer companies in Thailand	46	11.5
Other industries	132	33.0
Total companies	**400**	**100.0**

3.4 Conceptual Research Framework and Hypotheses

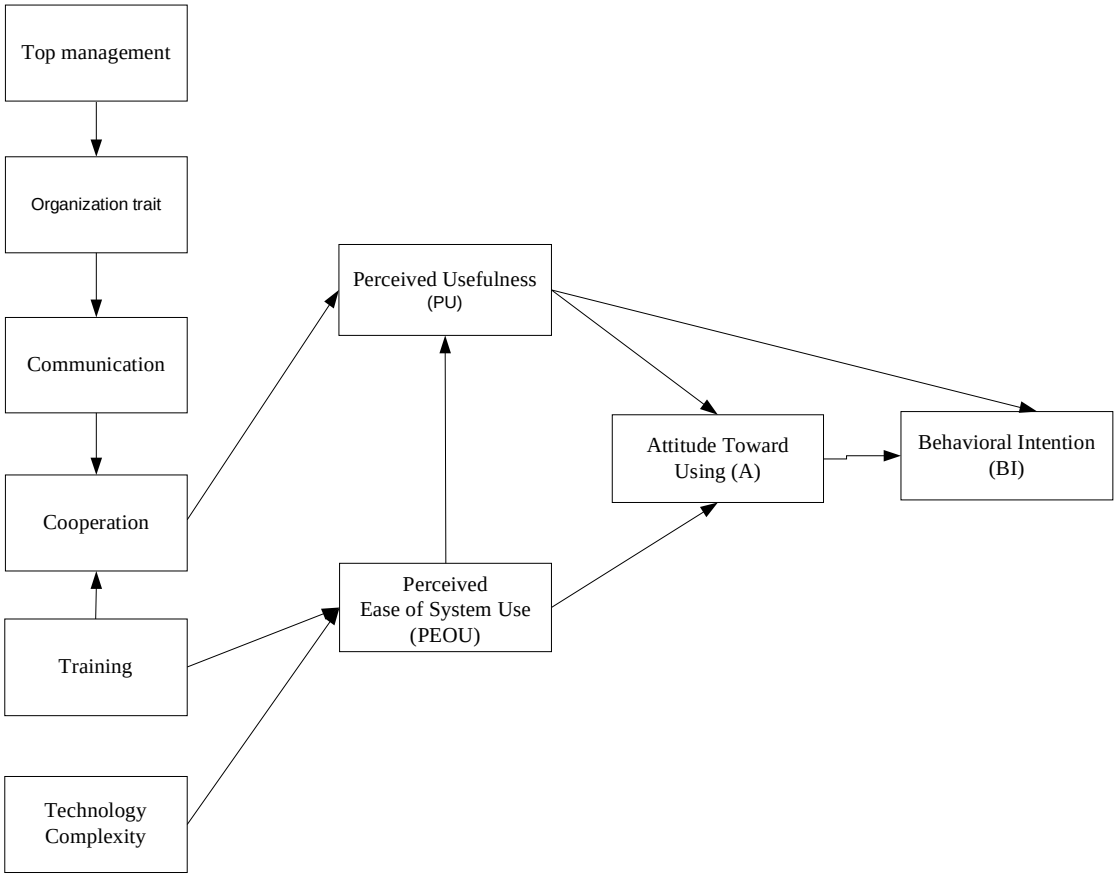


Figure 3.2 Research framework

Table 3.2 Operational definitions of Questionnaire construct

Constructs	**Definition**
Organization Traits	The degree to which the characteristics of the organization and the individual impact.

Table 3.2 Operational definitions of Questionnaire construct (cont.)

Constructs	**Definition**
Top management	Top management support as the active participation of organizational managers in the matters linked to IS implementation success This can be materialized through the development of communication activities.
Communication	Communication increases relationships of fluency between different functional areas and establishes bases for the resolution of conflicts. In this sense, communication promotes user trust toward the ERP systems, and consequently user acceptance.
Training	Training is recommended before, during and after the implementation. Also, training should be guided as much in technical aspects as in new generated processes
Cooperation	Internal and external cooperation provide synergies, give security to users and help to reach the expectations.
Technological complexity	Studies which analyze the CSFs from a technological point of view are identified. It is more useful to incorporate those ERP characteristics directly influencing their acceptance.
Perceived Ease of System Use	The degree to which an individual believes that using ERP technology would be free of physical and mental effort.

Table 3.2 Operational definitions of Questionnaire construct (cont.)

Constructs	**Definition**
Perceive Usefulness	The degrees of user' perceive benefits of the customer service technology.
Behavioral Intention to Use	The user's likelihood to use the ERP technology.
Attitude Toward Using The system	Individual preferences and interests via feelings and evaluations regarding the ERP technology.

The theoretical framework is summarized by a series of hypotheses that relate to both the general model displayed in Figure 3.2 and the empirical study. The research model for this study is TAM model plus external variables. These external variables have Organization Traits, Individual Traits, Information Quality, System/Service Quality and Task Perform. The researcher sets research hypotheses as follows:

The core concept of TAM is that a person's attitude toward using a technology is jointly determined by perceived usefulness and perceived ease of use. Technology usage is determined by behavioral intentions but differ from the theory of reasoned action in that usage is viewed as being mediated by the person's attitude toward using the technology. The attitude-behavioral intentions relationship represented in TAM implies that. To summarize the regularities expected based on core TAM.

TAM is used as the baseline model and results in the following hypothesized relationships.

Hypothesis 1 (H1). PEOU for ERP systems has a positive effect on PU.

Hypothesis 2 (H2). PU for ERP systems has a positive effect on ATU.

Hypothesis 3 (H3). PEOU for ERP systems has a positive effect on ATU.

Hypothesis 4 (H4). PU for ERP systems has a positive effect on BIU.

Hypothesis 5 (H5). ATU for ERP systems has a positive effect on BIU

Hypotheses of the acceptance predictor "external variables"

Hypothesis 6 (H6). Top management support has a positive effect on ERP system communication

Hypothesis 7 (H7). Organization Traits has a positive effect on the cooperation related to the ERP systems

Hypothesis 8 (H8). Communication has a positive effect on the cooperation related to the ERP systems.

Hypothesis 9 (H9). Training in ERP systems has a positive effect on cooperation related to ERP systems.

Hypothesis 10 (H10). Training in ERP systems has a positive effect on ERP systems' PEOU

Hypothesis 11 (H11). Cooperation has a positive effect on ERP systems' PU.

Hypothesis 12 (H12). The technological complexity of ERP systems has a negative effect on the PEOU of ERP systems

Organization types

A key factor about adoption ERP technologies for activities in industries has 26 critical success factors. (Sherry and Martin, 2007). It was found that many key factors have an impact on the adoption in supply chain. The larger organization has financial and technology resources to invest in new technologies and absorb the associated risk. Conversely, the smaller organizations are more likely to be innovative and more flexible. However, they lacks of resources technology adoption in small companies. The larger firms have many resources to invest in technologies and also have in-house IS support service (Premkumar and Roberts, 1999). On the other hand, small firms may manage without technologies and they may not feel the need for them. In addition, the organizational factors to the effectiveness of implementing information security management (ISM), they found that the size of organization has influence on a positive determinant of ISM (Chang and Ho, 2006). Moreover, the different sizes of organization will influence adoption of Supply chain technology (SCT) (Kamaruddin and Udin, 2009). A result of research discovered the rate of ERP system adoption is quite low among both micro and small firms, therefore the company size has effect on the adoption of ERP systems (Buonanno et al., 2005). In

the study of enterprise information portals (EIP) technology, was also found firm size has also an influence on a maturity and familiarity of information technologies particularly EIP (S.-M. Yang, Yang, and Wu, 2005). The result of research was exposed business size that are larger, and more likely to adopt IT (Thong and Yap, 1995). Since small-sized firms are characterized by serious constraints on resources, such as, finance and in-house technical expertise, adoption of IT representing a disproportionately large financial risk. It was insisted that firm size is the most important discriminator in determining the use of IT. Further, a study disclosed that the organizational size and IT innovation adoption were statistically significant, and a positive relationship (Lee and Xia, 2006). For example, a research of executive support systems (ESS) also recommended that large-sized companies are more probably to adopt executive information systems (EIS). Furthermore, one of the organizational characteristics that may affect ICT deployment, including large-sized firms are probably to implore a higher level of information and technology (Nilakanta and Scamell, 1990). Usage of IT is positively associated with the organizational size (Aguila-Obra and Padilla-Mele´ndez, 2006). A study also supported large companies are more inclined to adopt Advanced Manufacturing Technologies (AMTs) than the small or medium sized companies (Salaheldin, 2007). In addition, it was insisted that size of firm is crucial factor that has impact on IT adoption (Premkumar and Roberts, 1999). Size of firm, if the executive manager gave high importance for supporting activities of ERP adoption and its developing, it might be more successful in adoption it (Yuanfang and Jidong, 2007). It could be concluded that increasing organizational size is more inclinable to adopt AMTs measured by number of employees.

Accordingly, it was found that there are a significant correlation between company size and the initial investment in ERP project (Jaideep and Ram, 2005). Small firms had an initial ERP investment the lowest, while large firms had spent an initial ERP investment the highest. For this reason, this correlation is congruous among firm size and expenditures ERP. Notwithstanding, it was expected that organizational size might also influence degree of ERP technology adoption for supply chain management.

Motivation of ERP Adoption

Accordingly, the most important motivation for deployment of ERP is the internal improving processes efficiency through the supply chain (Fleisch, Ringbeck, stroh, Plenge, and Strassner, 2005). Additionally, requirements from laws are also greatly partial motivation for its deployment. There are important motivations which were focused on the warehouse reduction and inventory costs within the supply chain (Wamba, Lefebvre, & Lefebvre, 2006). Moreover, research of (White, Johnson, and Wilson, 2008), it was revealed that the responding to a customer mandate will positively determine whether organizations have progressed beyond a trial to operational deployment of ERP, therefore organizations with mandates are more likely to deploy ERP following trial. Costs of ERP technology was one of factors that influenced on the adoption and diffusion of ERP in the automotive industry (Schmitt et al., 2007).

3.5 Design Research Instruments

Thereafter, the conceptual research framework and research hypotheses are defined, we will design questionnaire for quantitative data gathering and interrogations for deep interviewing. The survey instrument developed from many research papers such as (Schot, 2007; The National Telecommunications Commission and National Electronics and Computer Technology Center (NECTEC), 2006; Vijayaraman and Osyk, 2006; White et al., 2008), and related researches.

3.5.1 Questionnaire Instrument

It is divided into 3 parts as displayed in table 3.3.

Table 3.3 Topic of Questionnaire

Part	Topic
1	Organizational characteristics and general company information
2	ERP technology utilization
3	Recommendation / guideline to encourage more widespread ERP utilization

Part 1: Organizational characteristics and general company information

This part will make to understand the company profile, such as, main type of enterprise, registration of business, company size, manufacturers type, and capital assets. In the section, we measure by a check-list item type in questionnaire which contains 5 items.

Part 2: ERP technology utilization

This part will help perceiving of current and trend status in ERP adoption of the main industries in Thailand; for example, acknowledgement with ERP implementation, degree of ERP adoption. Besides it makes to know of ERP adoption planning in the future for the observer entrepreneurs. Additionally, it helps grasping what the main motivations factors that have an influence on degree of ERP adoption and also included what the major perceived benefits have an influence on degree of ERP adoption. It also helps understanding what the biggest barriers/challenges of ERP adoption. In addition, we know the critical success factors for implementation ERP technology in main industries in Thailand. Including, acknowledgement of the future plans in ERP utilization to enhance the organization for competition in the future.

We measure by using on a check-list item type and five-point Likert-type scaled questions anchored at 1 (little adopt ERP) to 5 (adopt ERP in very high).

Highest level	5	points
High	4	points
Medium	3	points
Low	2	points
Lowest	1	points

Part 3: Recommendation guideline to encourage more widespread of ERP utilization

The last part is questions which are designed in order to find out the appropriated guideline of measurements for proliferating ERP adoption in the future. Thereby, the part will help knowing and perceiving appropriated recommendation concerning guideline or direction for utilizing for main industries in Thailand.

We measure by using five-point Likert-type scaled questions anchored at 1 (weakly agree) to 5 (strongly agree) which contains 1 large item and filling in the blank 1 item regarding problems and suggestion of ERP adoption for main industries in Thailand.

Highest level	5	points
High	4	points
Medium	3	points
Low	2	points
Lowest	1	points

This part will ask what important issues of realization adoption ERP technology in main industries in Thailand, concept about capability of ERP in a competitive market, and related questions.

3.6 Pilot Testing

Thereafter, the questionnaire and questions for interviewing had been already designed, we would have conducted to pre-test or pilot survey with four companies which were main industries in Thailand to check understanding of interrogations in questionnaire. The participants were asked to complete questionnaire and to provide comments in each part, especially in, easily understanding and unambiguity. Next, the survey instrument will be improved to be suitable for further gathering data.

3.7 Data Gathering

In this step, it is comprised of two sub-steps and two methods to gather data from sample group. Thereafter, data were gathered. Next step is reliability analysis of interrogations in questionnaire. We will first conduct to measure the scale of reliability analysis which described as follows;

3.7.1 Reliability and Validity Testing of The Instrument

Validity and reliability test were also conducted to measure the scale of reliability analysis in this study by Cronbach's alpha Co-efficient (α). The reliability of scale typically if Cronbach' coefficient has 0.7 scores or above, indicated that the reliability tests is reliable and suitable the internal consistency of scale (S.-M. Yang et al., 2005). Similarly, a research of (Lin, 2007) found that Cronbach's value is higher than 0.7, so it implies that the sampling results are reliability and validity.

3.7.2 Data Gathering Approaches

1.) Quantitative Data Gathering by Questionnaire Instrument

This method, questionnaires had been distributed approximately 1,000 copies to the main industries in Thailand by postal mail for 3 months in 2009. The research questionnaires were distributed to manager or supervisory such as logistics manager, distributed center manager, production control and planning manager, senior manager, general manager, factorial manager, IT manager, and production planning & warehouse manager, including related personnel specialist. In this approach, the researcher also attached an explanatory covering letter on the questionnaire that attached postage on returned envelope. The covering letter which appended in *Appendix A*, elucidated about the research, asked for the respondents' helping to complete the questionnaire following the suggestion and promised an instant copy of the result of research in order to encourage participation. However, if we gain small collaboration from them, we therefore need to stimulate them by random calling in order to get returned questionnaire. The questionnaire survey which is employed for quantitative data gathering, is happened in *Appendix B*.

3.8 Data Coding

After the questionnaires had been returned, data were screened and uncompleted answered were separated. The data was put in Microsoft Excel and coded into SPSS software (Statistical Package for the Social Science for windows) version 16.0 in order to further analyze raw data.

3.9 Data analysis and Interpretation

All responses are elucidated by descriptive statistics in each question. These measurements are described in general overview of main industries manufacturers' current status and trend of ERP utilization from surveyed raw data. Additionally, the research was studied about ERP adoption motivation factors that influenced on degree of ERP adoption. Many items of questionnaire were often categorical. The combination of questionnaire results and interviewing result will be used to analyze quantitative data by SPSS software version 17.0. It is suitable for statistical analyzing data. Data analysis consists of 2 large parts. The first part is involved in data analysis by descriptive statistics. The second part is data analysis by statistical inference. Both details of parts are explained as below;

3.9.1 Descriptive Statistics

In this part of data analysis, all of obtained responses are analyzed to describe as percentage, mean, standard deviation. The results are displayed in table, graph, and context description styles. The data analysis in each part, researcher explicate as follow;

Part 1: The part focuses on respondent's profile. All questions of the part which consist of seven items, are check-list item type. There are three items which can be replied one more answers. The checklist item type is used frequency and percentage approaches which are demonstrated results in table and graph styles.

Part 2: This part emphasizes on ERP utilization for implementation in main industries, such as, level of ERP understanding, top management awareness ERP importance, degree of ERP utilization. The most of questions in this part, they are check-list item type and rating scale. Therefore, the researcher uses frequency, percentage approaches and mean values ($\overline{X}$), Standard Deviation (SD.) approaches which are displayed results in table and graph styles respectively.

Part 3: This part is comprised of rating scale. Researcher uses mean values ($\overline{X}$) and Standard Deviation (SD.).

Each item was mean using 5 levels in Likert's scale, The perceptions were also interpreted for the five levels in Likert's scale (Silpjaru, 2007) the mean score as follows;

Point average	4.50 – 5.00	=	highest level
Point average	3.50 – 4.49	=	high level
Point average	2.50 – 3.49	=	medium level
Point average	1.50 – 2.49	=	low level
Point average	1.00 – 1.49	=	lowest level

3.9.2 Statistical Inference

Hypotheses testing which are proven in research, consist of three parts. The first part, the One-Way analysis of variance (ANOVA) was used to compare the means for test hypotheses. The result of hypotheses were shown in table.

Secondly, Lisrel Program analysis was use to analyzed the relationships between independent variables to test the hypotheses. The result of hypotheses were shown in table.

3.10 Summarize Results

Thereafter, data analysis was operated both quantitative and qualitative method. Next, we will glean all data analysis and results to summarize, discuss the results, and conclude final results and research limitations; including to recommend for the future research. This is final stage of research.

3.11 Documentation

This stage was continually conducted since the beginning step of research. We will carefully perform and inspect for the complete research.

Research Tools

Hardware:	CPU	:	Intel Core 2 Duo T6600
	Hard Disk	:	At least 2 GB
	RAM	:	2 GB
	Monitor	:	Wide Screen Flat Panel LCD
	Peripheral Devices	:	Mouse, Printer

Software:	Operating System	:	Microsoft window XP
	Statistical Program	:	SPSS V.17 (Statistical Analysis System)
	PDF View Tool	:	Adobe Acrobat 7.0 Professional
	Document Generator	:	Microsoft Word 2003

3.12 Research Schedule

Activities	Time (Months)											
	1	2	3	4	5	6	7	8	9	10	11	12
1. Preliminary Study	→											
2. Define scope of study			→									
3. Define Conceptual Research Framework and Hypotheses				→								
4. Design Research Instruments				→								
5. Pilot Testing					→							
6. Data Gathering						→						
7. Data Coding									→			
8. Data analysis & Interpretation										→		
9. Summarize Results												→
10. Documentation	→											

CHAPTER IV
RESULTS AND DISCUSSION

The main objective of this chapter is to propose the report of the survey to support discussion of results. This chapter is divided into two main parts.

Firstly, investigate the general picture of the current state of ERP utilization for industry in Thailand that was gathered from the questionnaires survey. For the survey results, there are three main parts which include (i) profile of the industry respondents, (ii) the current status of ERP technology incident and impacts which affect with implementation ERP, and the last one is (iii) ERP technology used and methods of acceptance, management and policy to solve the implementation ERP problems of main industry in Thailand.

The second part present the results of hypotheses testing that study the influences of factors on the ERP technology adoption and incidents of main industry in Thailand. The hypotheses testing used One-Way Analysis of Variance by Rank Test to test hypotheses which independent variable as norminal scale and dependent variable as more than ordinal scale. (National statistical office of Thailand, 2004)

4.1 The Survey Results

From the survey, the population in this research, respondences were received from 400 Thailand industries was used in this study. Table 4.1 illustrates illustrates the questionnaire respond rate by industrial sectors.

Table 4.1 The number of Companies that reply questionnaires of the main industries in Thailand

Company	Number of companies	Percentage
Clothing industry	68	17.0
Plastic industry	24	6.0
Food and Beverage industry	130	32.5
Automotive parts manufacturer companies in Thailand	46	11.5
Other industries	132	33.0
Total companies	400	100.0

1.) Basic company profiles of the respondents

Table 4.2 Types of business

Types of business	Number of companies	Percentage
Domestic manufacturer	262	53.5
Exporter	22	4.5
Wholesaler	46	9.4
Retailer	23	4.7
Wholesaler & Retailer	137	28.0
Total companies	400	100.0

Types of business

The percentage of 400 respondent companies by business type which can be divided into five main categories; (i.) domestic manufacturer, (ii.) exporter, (iii.) wholesaler, (iv.) retailer, (v.) wholesaler & retailer. A half of respondents are domestic manufacturer, 53.5%. There are 28.0% of Wholesaler & Retailer. The respondents of

wholesaler is 9.4%, the respondents of retailer and exporter have the lowest percentage of entrepreneurs' business type, 4.7%, 4.5%.

Table 4.3 Types of company

Types of company	Number of companies	Percentage
company limited	332	83.0
international companies	23	5.7
partnership limited	45	11.2
Total companies	400	100.0

From Table 4.3, it is found that 332 respondents are the largest percent of respondents' company type are company limited, 83.0 percent. Whereas, there is only a firm, the international companies is the smallest of respondents 5.7%.The rest of partnership limited comprise 45 (11.2%).

Table 4.4 Size of company

Almost half of a majority of size company participants which responded were medium-sized (51-200 employees) 240 (60%), Almost 40% of participants were large-size company 138 (34.5%) And the rest (21) is small-size organization, 5.5% as displayed in Table 4.4

Size of company	Number of companies	Percentage
small-size (1-50 employees)	22	5.5
medium-sized (51-200 employees)	240	60.0
large-size company (more than 200 employees)	138	34.5
Total companies	400	100.0

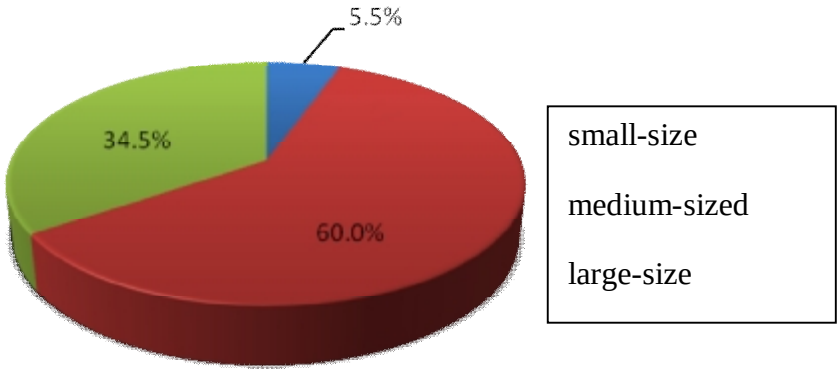


Figure 4.1 Size of company

Table 4.5 Types of manufacturing product

Types of manufacturing product	**Number of companies**	**Percentage**
Made to Order / Customized products	116	28.8
Assemble-to-order	46	11.4
Made-to-stock / Standard products	241	59.8
Total companies	400	100.0

More than 200 responses are “made to order”, (116) 28.8%. However, they composed of “assemble to order”, “made to stock” (46) 11.4%, (241) 59.8% respectively as shown in Figure 4.2.

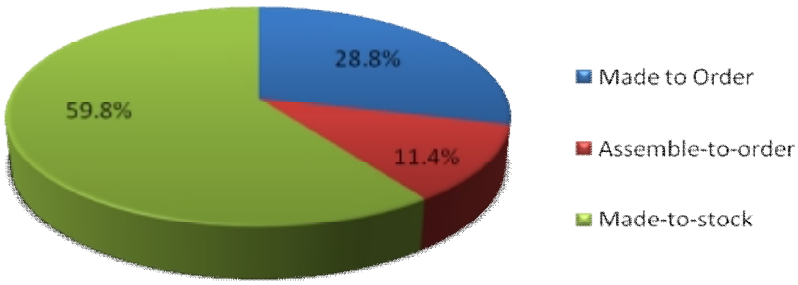


Figure 4.2 Types of manufacturing product

Table 4.6 Capital asset of company

Capital asset of company	Number of companies	Percentage
26-50 million baht	45	11.2
51-100 million baht	90	22.5
101-250 million baht	156	39.0
251-500 million baht	64	16.0
501-1000 million baht	45	11.2
Total companies	400	100.0

From Table 4.6 A majority of participants are companies which were registered in between 101-250 million baht of the capital asset, (156) 39.0 %. There are more than 250 million baht of the capital asset, (64) 16% and (45) 11.2%. And the rest of responses are the capital asset of below 100 million baht, (45) 11.2% and (90) 22.5%.

2.) Organizations' ERP usage and having ERP adoption planning

- **Level of knowledge / understanding ERP technology**

Table 4.7 Knowledge / understanding level in ERP technology

Knowledge / understanding level	Number	Percentage
Low level	60	15.0
Rather low	134	33.5
Medium	141	35.2
High	65	16.2
Total respondent	400	100.0

Respondents 35.2% have understanding and, or, knowledge about ERP technology in moderate level. The result of ERP understanding level are 33.5% have rather low level and 16.2 % , 15.0% in high level and low level respectively.

Table 4.8 Use other program before implement ERP in organization

Use Other Program	Number	Percentage
Have	45	11.2
No	355	88.8
Total respondent	400	100.0

Table 4.8 shows percentage of using other program before use ERP technology, the most reply that no use other program before implement ERP.

Table 4.9 Cause of your organization do not implement ERP

Cause	Number	Percentage
Lack of knowledge in ERP	20	5.0
Program that used is good	29	7.2
High cost	89	22.2
No interesting	71	17.8
Other	191	47.8
Total respondent	400	100.0

From table 4.9 The main cause of the organization do not implement ERP is high cost (22.2%) in this program and other reason (47.8%) such as the ERP stakeholders (ERP vendors , consultants and adopting organization) have not reached a high level of expertise and maturity in implementing ERP system.

Table 4.10 ERP importance level in department of industries

Department	Mean	Std. Deviation	Level
1. Manufacturing Management	4.22	.640	High
2.Accounting Management	4.33	.753	High
3. Logistics Management	2.78	1.133	Medium
4. Personnel Management	1.96	.915	Low
5. Maintenance Planning	2.11	1.092	Low

Within the overall image of ERP importance, accounting management is the highest mean (4.33) in high important level. Conversely, the personnel management is the lowest mean value (1.96), thus, it is low significant. The rest of mean values are manufacturing management (4.22), logistics management (2.78) and maintenance planning (2.11).

Table 4.11 ERP adoption status

ERP adoption status	Number	Percentage
Deployed ERP instead of existing system	69	17.2
Deployed ERP some instead of existing system	169	42.2
Trial currently underway (Pilot Testing)	93	23.2
Planning for a trial	45	11.2
No planning	24	6.0
Total respondent	400	100.0

From Table 4.11 The result is deployed ERP some instead of existing system 24 respondents from a total of and Deployed ERP instead of existing system ,trial currently underway (Pilot Testing) , Planning for a trial, No planning has less respectively.

Table 4.12 ERP annual budget planning

ERP annual budget planning	Number	Percentage
Yes	290	72.5
No	84	21.0
Depending on satisfaction	26	6.5
Total respondent	400	100.0

From table 4.12 ERP annual budget planning of a majority of respondents are ERP annual budget planning “Yes”, (290) 72.5%. There are 84 respondents who are “No”. A minority of participants have “Depending on satisfaction”, 6.5%. It means

they are neither “Yes” nor “No” concerning ERP annual budget. Since they will plan ERP budget when they want, therefore, it can be more flexible for them. The result to be in line with the result of Wang Chen, 2006 that ERP should support from administrative section, executive should interesting and provide for adequate resource to implement ERP that lead to success.

Table 4.13 Overview of available ERP status and planning of ERP implementation in Manufacturing Management

Planning of ERP implementation	Number	Percentage
Work-In-Progress Tracking (WIP)/Production Control		
No planning	24	6.0
implemented within 5 years	41	10.2
implemented within 1 years	246	61.5
Already implemented	89	22.2
Total respondent	400	100.0
Receipt/Shipment Control		
No planning	24	6.0
implemented within 1 years	161	40.2
Already implemented	215	53.8
Total respondent	400	100.0
Technical Information Control		
No planning	270	67.5
implemented within 5 years	22	5.5
implemented within 1 years	62	15.5
Already implemented	46	11.5
Total respondent	400	100.0
Outsourcing/Purchasing, Procurement		
No planning	69	17.2
implemented within 5 years	22	5.5
implemented within 1 years	107	26.8
Already implemented	202	50.5
Total respondent	400	100.0

Table 4.13 The result shown that available ERP status and planning of ERP implementation in Manufacturing found that Management Work-In-Progress Tracking: WIP)/Production Control implemented within 1 years Receipt/Shipment Control and Technical Information Control already implemented

Table 4.14 Overview of available ERP status and planning of ERP implementation in Logistics Management

Planning of ERP implementation	Number	Percentage
Logistic Requirement Planning		
No planning	203	50.8
implemented within 5 years	41	10.2
implemented within 2 years	23	5.8
implemented within 1 years	110	27.5
Already implemented	23	5.8
Total respondent	400	100.0
Import/Export		
No planning	172	43.0
implemented within 1 years	112	28.0
Already implemented	116	29.0
Total respondent	400	100.0
Warehouse Management		
No planning	66	16.5
implemented within 2 years	23	5.8
implemented within 1 years	134	33.5
Already implemented	157	39.2
Total respondent	400	100.0
Shipment/Transport Control		
No planning	288	72.0
implemented within 5 years	23	5.8
implemented within 2 years	26	6.5
implemented within 1 years	22	5.5

Table 4.14 Overview of available ERP status and planning of ERP implementation in Logistics Management (cont.)

Planning of ERP implementation	Number	Percentage
Already implemented	41	10.2
Total respondent	400	100.0

From Table 4.14 The result shown that available ERP status and planning of ERP implementation in Logistics Management ; Logistic Requirement Planning the most is no planning 50.8% , Import/Export the most is no planning 43.0%, 39.2% are implemented in Warehouse Management , Shipment/Transport Control the most is no planning 72.0%

Table 4.15 Overview of available ERP status and planning of ERP implementation in Accounting

Planning of ERP implementation	Number	Percentage
Accounting		
No planning	24	6.0
implemented within 2 years	23	5.8
implemented within 1 years	89	22.2
Already implemented	264	66.0
Total respondent	400	100.0
Administrative		
No planning	88	22.0
implemented within 2 years	23	5.8
implemented within 1 years	89	22.2
Already implemented	200	50.0
Total respondent	400	100.0

From Table 4.15 The result shown that available ERP status and planning of ERP implementation in Accounting, divided into two categories. First accounting; the most are implemented 66.0%. The last one; administrative the most is no planning 50.0%

Table 4.16 Overview of available ERP status and planning of ERP implementation in Personnel Management

Planning of ERP implementation	Number	Percentage
Personnel Management		
No planning	344	86.0
implemented within 1 years	50	12.5
Already implemented	6	1.5
Total respondent	400	100.0
Training		
No planning	400	100.0
Total respondent	400	100.0

From Table 4.16 The result shown that available ERP status and planning of ERP implementation in Personnel Management, Personnel Management the most is no planning 86.0 %. Training is no planning 100 %.

Table 4.17 Overview of available ERP status and planning of ERP implementation in Maintenance Control

Planning of ERP implementation	Number	Percentage
Maintenance Control		
No planning	400	100.0
Total respondent	400	100.0

From Table 4.17 The result shown that available ERP status and planning of ERP implementation in Maintenance Control is no planning 100 %.

Table 4.18 The level of ERP adoption by activities in industries

Activities	Mean ($\overline{X}$)	SD	Level
1. Manufacturing			
Work-In-Progress Tracking: (WIP) / Production Control (Work-In-Progress Tracking: WIP)	3.26	1.769	Medium
Receipt/Shipment Control	3.73	1.549	High
Technical Information Control	1.12	1.310	Low
Outsourcing/Purchasing, Procurement	3.29	1.960	Medium
2. Logistics Management			
Logistic Requirement Planning	1.12	1.448	Lowest
Import/Export Control	2.84	2.060	Medium
Warehouse Management	3.44	1.772	High
Shipment/Transport Control	0.53	1.128	Lowest
3. Accounting			
Finance	3.99	1.587	High
Administrative	3.79	1.818	High
4. Personnel Management			
Human Resource	0.21	.410	Lowest
Training	0.21	.410	Lowest
5. Maintenance Control			
Machine or tools maintenance	0.21	.410	Lowest

Table 4.18 The most activities of ERP technology adoption with Thailand's entrepreneurs is finance and administrative in high level ($\overline{X}$ = 3.99, $\overline{X}$ = 3.79) respectively. Receipt/Shipment Control activities ($\overline{X}$ = 3.73).

Table 4.19 The level of ERP adoption motivations

	Mean ($\overline{X}$)	**SD**	**Level**
1. Technological Use Concept			
ERP technology helps finding old-occurred problems in your organization.	4.30	.525	Highest
ERP supports the management of new type organizations.	4.20	.845	High
2. Leaders of Technology			
You use ERP while other businesses are not used yet.	2.56	1.418	Medium
Your organization is the first one using ERP.	2.86	1.687	Medium
Your organization is the leading organization in technology.	2.98	1.585	Medium
3. The Quality of Data			
Data are more real-time, more accurate & more reliable. The organizational system has up-to-date data all the time.	4.65	.586	Highest
Lack of integrated data.	4.83	.398	Highest
Data are more real-time	4.94	.233	Highest
Data in each section of the organization is clear and understandable.	4.94	.233	Highest
Working system of the organization provide sufficient data that meets the requirement.	4.75	.623	Highest
4. Easy in Using			
ERP technology is used easily.	3.64	1.596	High
When there is a mistake, it is easy to correct.	3.81	1.467	High
5. Quality of systems and services			
Maintenance and services are served by the provider immediately when required.	4.56	.497	Highest
Maintenance and services are full of quality.	4.44	.760	Highest

Table 4.19 The level of ERP adoption motivations (cont.)

	Mean ($\overline{X}$)	**SD**	**Level**
6. Technological experience of users			
You are understandable and knowledgeable on ERP technology.	2.99	1.374	Medium
Your organization has long use of technology.	2.40	1.458	Medium
7. Levels of satisfaction in the system.			
You are satisfied with technological systems that you are using at present.	3.66	1.238	High
Work of the organization is going well and comfortable.	4.22	1.044	Highest
You think that ERP technology, which you are using, is well suitable to your organization.	3.80	.946	High
8. Received benefits			
Develop internal working process The organization proceeds effectively.	4.48	.609	Highest
ERP technology increases working quality of the organization.	4.39	.599	Highest
9. Received quality of the organization			
The used technology will be effective when the organization is developed.	4.36	.679	Highest
ERP technology makes your organization successful.	4.43	.601	Highest
ERP technology leads you to higher quality work.	4.42	.768	Highest
You think that your organization will have more profits in the future.	3.63	.946	High

Table 4.19 The level of ERP adoption motivations (cont.)

	Mean ($\overline{X}$)	**SD**	**Level**
10. Working operation			
ERP technology assists communication systems in the organizations more effective.	4.41	.599	Highest
ERP technology assists your organization to communicate with customers effectively.	4.18	.853	High

From Table 4.19, the sample groups have levels of motivations, which are importantly influential to levels of ERP use. When analyzing, it is found that the first one is relevant to the quality of data. For you, you receive required data in real time and other sections in the organization also provide clear, understandable and quality data but lack integrated quality data. Allocating sufficient resources for the installation of ERP allows officials to have enough time in informing about the requirement to advisors and adjust communication systems at the phase of consultations. (Wang and Chen, 2006) And, it makes officials think positively to ERP systems and help adjusting working processes from the old one to the new continuously. (Thong et al., 1996: Thong, 2001) This factor is very important when there is strong resistance from users. Therefore, when there is support form the executives by ways of motivating or ordering, resistance from users decrease. (Wang and Chen, 2006) Support from executives assist in matters of providing advices by promoting positive attitudes to both users and advisors of ERP projects. This results in increasing more effectiveness and reducing conflicts. (Wang and Chen, 2006)

Table 4.20 Shows means and standard deviation and levels of problems or obstacles, which are important factors influential to levels of success when using ERP technology in an organization

Levels of main motivations/encouragement	$\overline{X}$	**S.D.**	**level**
1) Use ERP with no relevance to business process, which is used at present, and leads to no working revolution	2.81	1.136	Medium
2) Available system is not compatible with ERP/ lack of standard in linking data to current IT structure.	3.59	1.000	High
3) Budget used to install systems and the linking of ERP data with current IT structure is very high.	4.14	.899	High
4) Lack of clear understanding about targets and objectives of using ERP in an organization.	4.72	.670	Highest
5) Budget used for ERP of a company is limited.	3.28	.908	Medium
6) Lack of international standard leading to the hesitation by potential users of ERP.	3.25	1.063	Medium
7) Lack of cooperation form suppliers and details in bringing and sharing data	2.86	.563	Medium
8) Lack of support from state sectors.	2.75	.546	Medium
9) Users lack sufficient knowledge and understanding of ERP technology.	4.63	.483	Highest
10) Decision makers do not recognize the importance and essentiality of using ERP at an organization.	3.98	.770	High
11) System security and problems of personality.	3.03	.728	Medium
12) Long period of system development and high cost	4.27	.828	Highest

Table 4.20 Shows means and standard deviation and levels of problems or obstacles, which are important factors influential to levels of success when using ERP technology in an organization (cont.)

Levels of main motivations/encouragement	$\overline{X}$	S.D.	level
13) Low levels of efforts in acquiring effectiveness after use.	3.96	.976	High
14) The executive still uses the management process by using monthly data, while ERP data is real time.	4.28	.669	Highest
15) Communications between sections is not efficient enough.	4.08	1.089	High
16) Lack of support from high executives of the organization.	3.55	1.355	High
17) Personnel lack consciousness in reforming organizational cultures and ways.	4.38	.927	Highest
18) Difficulties in strategic development and management.	4.27	.826	Highest
19) Lack of personnel training in using ERP technology for having higher skills and expertise.	4.70	.574	Highest

Table 4.20 shows that sampling groups have levels of problems and obstacles, which are influential factors to levels of success in using ERP technology in an organization. When analyzing, it is found that the first one, which has the most level of factors, is to organize a training course of using ERP at an organization for personnel of all levels. For the most beneficial use, the special emphasis is for personnel of an operational level. The second most important factor is the lack of clear understanding about target and objectives of using ERP at an organization. And, the third one is the lack of training course for personnel of the organization in order to use ERP technology higher skill and expertise.

The project of installing and using ERP at an organization is about managing the organization, emphasizing flexibility and capability in adjusting a complex working process, which involves several units as a team. And, the conduct of any team is different in terms of capabilities, skills, and expertise. A team leader is

mediator in communicating or relaying all data, which need to be changed and developed. (Franck, Testa, & Winegardner, 1992; Shtub, Bard, & Gloverson, 1994)

As a result, in the project of installing and using ERP, an organization should create a rapidly flexible and adjustable structure. The project should have a supervising committee in order to achieve the planned targets and objectives. Administrating the project is a continuous process, starting from the beginning to the end of the project. The objective is to be able to manage, control, and administrate the project effectively with risk management. This is to make sure that project can be implemented with successful objectives in the planned period of time. (Sirikiat Bunworasate in Preecha Puntumasinchai and Uthai tanlamai, 2547)

The opportunity of success of an organization in installing and using ERP project is very high if project management proceeds systematically. That is there must be a project-steering committee, which comprises representatives from various units or key users, professional advisors, and high executives who have full authorities in making decisions. And, if there is any disagreement among system organizers, software developers, and users, the way of problem solving must comply with the initial objectives. Objectives must not change from the project progressive report and this helps the project to be finished as planned.

Stratman and Roth (2002) mention that project management is about to have personnel with knowledge and skills in coordinating and supervising all relevant works in using ERP. Implementing the project as planned and fulfilling the objectives, the project executives should impose clear objectives with achievable schedules and finding capable project managers. Project assessment must be constant in order to evaluate the project effectively. If the project is delayed because of ineffective personnel or advisors in the organization or lack of resources or low quality of software, solutions of the problems must be activated immediately. (Stratman and Roth, 2002) It is usual that ERP project is implemented with delay or the project budget is higher than planned because cost assessment and project planning is conducted with carelessness or the project scope is changed. Slevin and Pinto (1987) assert that for the success of project management, the project manager must have strategic and tactical capabilities. There are 10 factors influencing the success of the project. And, the strategic factors are the project mission, top management support,

and project plan. Similarly, tactical factors are client consultation, personnel recruitment, technical task, client acceptance, monitoring and feedback, communications, and troubleshooting.

Part 3: The result of data analysis about the comments about the suggested measures to use ERP implementation in the organization.

Table 4.21 Show average and standard deviation and reviews level and recommendations about measures that can push and encourage the application of ERP to use in the management processes within organizations

Reviews level	$\overline{X}$	S.D.	Result
1. Defined as a company policy	4.01	.731	High
2. The agreement or policy between the partners.	3.19	.392	Medium
3. Preparation of official documents for use ERP in detail	4.54	.607	Highest
4. To provide knowledge and understanding about the benefits of ERP implementation within the organization to all levels especially the operational level to make the most truly	4.75	.434	Highest
5. To provide specialist to take care and advice about specific technologies about ERP.	4.63	.485	Medium
6. By integrating with existing technology to be compatible with the ERP	4.01	.864	High
7. Government provides public hearing on the adoption of ERP to manage the process and industrial vehicles and spare parts.	3.59	.825	High

Table 4.21 Show average and standard deviation and reviews level and recommendations about measures that can push and encourage the application of ERP to use in the management processes within organizations (cont.)

Reviews level	$\overline{X}$	S.D.	Result
8. Provide for the conference only operators in the industry in technology ERP, the management processes in organizations and industry to share ideas together and will be ready for use in the future to exchange views on each other and be prepared for future use.	4.08	.823	High
9. Others	4.00	.000	High

Table 4.21 shown that sample level ideas with suggestions about measures that can push and encourage the application of ERP use the management processes in organizations. The analysis showed that the first rank of the factor level shown the highest level is training to provide knowledge and understanding about the benefits of ERP implementation in the organization to employee in an organization at all levels, especially the operational level to achieve maximum benefit. The second rank of the factor level shown the highest level is specialist to take care and advice about specific aspects of ERP technology. The third rank of the factor level shown the highest level is preparation of official documents for using ERP in detail.

The statement of Stratman and Roth (2002) separate out the factors the success of the project into two categories, all of which depend on the ability of the people, are technical factors and management and organizational factors. Technical factors and management consist of strategic of planning which is the executives have the vision to bring IT system suitable for use in business processes to increase their potential to the organization. Executive Commitment must have senior executives who have faith and willing to support ERP to use in an organization and are willing to allocate resources to make the project a true success. Project Management must have personnel with the knowledge and skills to coordinate and the follow-up related to the ERP system for use and in time schedule of the project. To achieve the objectives laid down, Executives should place the goals of the project plan to clearly define the

possible and find project manager of the company to measure project management on a regular basis that if the project is delayed the project manager must find the real cause of the delays that come from people within the organization or inefficient allocation of resources is not good enough or because their service. Consultant or the quality of the software is not good, anyway, and to find solutions. The final is IT Skills which is the ability to implement and maintain information systems that are essential to doing business. In addition to skills in an ERP system, then it should be capable of maintaining a database for an organization to use an ERP system continuously that management should be planned in this regard very carefully the number of staff and budget appropriately. (Kettinger et al., 1994; Wang and Chen, 2006) Organizational factors consist of business process skills such as understanding of business processes and measure the impact of the decision or action to the organization.

Training for users to have the ability to use the system actively and effectively in the work. Learning Competency of people to learn to understand and use various techniques in an ERP system is completely. Not that knowledge is derived from any internal or external. This knowledge has accumulated and the people can use ERP systems to solve problems related to various transactions. Change Readiness is strategic management of the executive to overcome resistance to change of personnel due to a change in work from the former system. ERP represents the organization must have personnel with skills in management and leadership skills in order to make a good ERP project is likely to accomplish more easily. Resistance to change may come from the increased volume of work and in the case of executives or consultants to understand the user that the increased work is the work in the past, but have never done. Making organizations are not effective enough moreover, against another type of change may come from the reduced workload due to a better system in this case, executives will need personnel to manage migration in a more useful point. This does not mean that we must lay off surplus staff in the department who decline the opportunity to migrate and experienced personnel to work in a new position in that organization would have to be high. (Preecha Phantusinchai, 2547)

As mentioned in Chapter 3, Factor Analysis was conducted to determinant the Critical Success Factor in implementation ERP in main industries and the segmentation base Factors from the data set.

Analyzing the indicator item loadings for each measured construct assessed convergent validity, In addition to the loading, weights are provided to understand the importance of the construct score. Weights are also considered to be the beta coefficients of multiple regression formula. A level of 0.30 absolute was considered acceptable to measure convergent validity (Chin, 1998: 1-3).

The important in develop business with ERP represents the level to which competitive in global. As shown in Table 4.22, construct loadings ate strong, ranging from 0.528 to 0.933, which demonstrates a strong level convergent validity.

Table 4.22 Factor Loading by important to business operations / business development in the organizational management of ERP technology

Important to business operations / business development in the organizational management of ERP technology	**Factor Loading**
1) Manufacturing Management	0.528
2) Accounting Management	0.573
3) Logistics Management	0.811
4) Personnel Management	0.933
5) Maintenance Planning	0.896

ERP adoption (ERP adoption in future) represents the level as shown in Table 4.23, construct loadings ate strong, ranging from 0.513 to 0.884, which demonstrates a strong level convergent validity.

Table 4.23 Factor Loading by ERP adoption in future

Factor Loading by ERP adoption	**Factor Loading**
1. Manufacturing Management	
a) Work-In-Progress Tracking: WIP)/Production Control) (Work-I Progress Tracking: WIP)	0.737
b) Receipt/Shipment Control	0.832
c) Technical Information Control	0.556

Table 4.23 Factor Loading by ERP adoption in future (cont.)

Factor Loading by ERP adoption	Factor Loading
1. Manufacturing Management (cont.)	
d) Outsourcing/Purchasing, Procurement	0.721
2. Logistics Management	
a) Logistic Requirement Planning	0.513
b) Import/Export Control	0.747
c) Warehouse Management	0.699
d) Shipment/Transport Control	0.530
3. Accounting Management	
a) Accounting	0.884
b) Administrative	0.697
4. Personnel Management	
a) Personnel Management	0.550
b) Training	0.564
5. Maintenance Control	
a) Machine or tools maintenance	0.590

ERP adoption represents the level to which ERP adoption as shown in Table 4.23, construct loadings ate strong, ranging from 0.515 to 0.893, which demonstrates a strong level convergent validity.

Table 4.24 Factor Loading by ERP adoption (plan to implement recently)

Factor Loading by ERP adoption	Factor Loading
1. Manufacturing Management	
a) Work-In-Progress Tracking: WIP / Production Control)	
(Work-In- Progress Tracking: WIP)	0.834
b) Receipt/Shipment Control	0.893
c) Technical Information Control	0.599

Table 4.24 Factor Loading by ERP adoption (plan to implement recently) (cont.)

Factor Loading by ERP adoption	Factor Loading
1. Manufacturing Management (cont.)	
d) Outsourcing/Purchasing, Procurement	0.813
2. Logistics Management	
a) Logistic Requirement Planning	0.674
b) Import/Export Control	0.814
c) Warehouse Management	0.700
d) Shipment/Transport Control	0.593
3. Accounting Management	
a) Accounting	0.893
b) Administrative	0.811
4. Personnel Management	
a) **Personnel Management**	0.515
b) Training	0.614
5. Maintenance Control	
a) Machine or tools maintenance	0.515

An ERP adoption motivation represents the level to which ERP adoption motivations as shown in Table 4.25, construct loadings ate strong, ranging from 0.512 to 0.935, which demonstrates a strong level convergent validity.

Table 4.25 Factor Loading by ERP adoption motivation

ERP adoption motivation	Factor Loading
10.1 Manufacturing Management	
a) This ERP technology to help find ways of solving old problems that occur in your organization.	0.541
b) This ERP technology is encourage you to how to manage organizations in the new format.	0.748

Table 4.25 Factor Loading by ERP adoption motivation (cont.)

ERP adoption motivation	Factor Loading
10.2 About the leadership in technology	
a) You use ERP technology while other organizations in the same business have not yet been adopted.	0.709
b) Your organization is the first organization in the perception of ERP technology	0.663
c) In default, your organization is a leader in technology while other organizations are still traditional.	0.598
10.3 About the quality of the data	
a) The system of the organization has the information always up date.	0.557
b) Lack of unity of the data.	-0.530
c) You receive timely information on demand to gravity (real time).	0.634
d) The information on each party's organization provides a clear and understandable.	0.634
e) System of organization to meet the demand data.	0.599
10.4 About the ease to use	
a) ERP technology is easy to use.	0.935
b) When have something wrong you can fix it easily.	0.731
10.5 About the quality of the system and quality of service	
a) Has been maintained and repaired by the company administrator when you need a timely manner.	0.574
b) Receiving maintenance and repair quality.	0.525
10.6 About the experience of technology's users	
a) You have a better understanding of ERP technology.	0.583
b) Your organization has used this technology for a long time.	0.551
10.7 About concerning satisfaction in the system	
a) You have the satisfaction in ERP technology that you're currently used.	0.638
b) The organization is working on a simpler and easier that ever.	0.681

Table 4.25 Factor Loading by ERP adoption motivation (cont.)

ERP adoption motivation	Factor Loading
10.7 About concerning satisfaction in the system (cont.)	
c) You think that you are using ERP technology is appropriate and good for your organization.	0.589
10.8 About relating to realize the benefits	
a) The various development processes within the organization to improve efficiency.	0.512
b) ERP technology can improve the quality of work in an organizatio	0.621
10.9 About perceptions about the effectiveness of the organizatio	
a) Technology is used effectively when they have to improve the organization.	0.645
b) ERP technology makes your organization successful.	0.855
c) ERP technology takes you to a higher quality of work.	0.653
d) You think the future of your organization will be more profitable.	0.582
10.10 About on performance	
a) ERP technology allows communication within an organization effectively.	0.580
b) ERP technology allows communication between your organization and customers more efficiently.	0.774

Problems or obstacles that influence the level of success in ERP technology implementation deployed in an organization represents the level to which problems or obstacles that influence the level of success in ERP technology implement in the organization. As shown in Table 4.26, construct loadings ate strong, ranging from 0.510 to 0.844, which demonstrates a strong level convergent validity.

Table 4.26 Factor Loading by problems or obstacles that influence the level of success in ERP technology implementation deployed in the organization

Problems or obstacles that influence the level of success in ERP technology implementation deployed in the organization	Factor Loading
1) ERP to be used by not going to interfere with the business process which is currently preventing the reform work.	0.731
2) Existing systems do not support the use the ERP system lack of standard data link to the IT infrastructure existing.	0.834
3) Budget at the installation and integration ERP system IT infrastructure with the existing high.	0.765
4) Lack of clear goals and objectives of ERP adoption in the enterprise.	0.510
5) Financial support of the ERP is limited.	0.532
6) Lack of a universal standard allowing those who will use the ERP of hesitation in bringing the fly.	-0.524
7) Lack of cooperation from suppliers and or retail vendors to retrieve and share information.	0.591
8) Lack of support from the government.	0.573
9) Personnel to have a better understanding of ERP technology is not adequate for use.	0.773
10) Decision makers are not aware of the important and need for ERP implementation in the organization.	0.547
11) Network security and privacy issues.	0.677
12) Period in the development of a long and costly.	0.844
13) Low effort in pursuit of continues effectiveness after the adoption.	0.818
14) Executives continue to use management model using data collected from the monthly summary. The data from the ERP would look real time.	0.537
15) Communications between departments are not performing well enough.	0.799
16) Lack of support from senior management of the organization.	-0.545

Table 4.26 Factor Loading by problems or obstacles that influence the level of success in ERP technology implementation deployed in the organization (cont.)

Problems or obstacles that influence the level of success in ERP technology implementation deployed in the organization	Factor Loading
17) Personnel lack awareness of culture and pace of corporate reform.	0.597
18) Difficulty in developing the strategic balance in accordance with the administration.	0.840
19) Lack of trained personnel training in the use of ERP technologies to achieve greater skills and expertise of the maintenance costs after the adoption high.	0.563

Beside on, a suggested measure to use ERP implementation in the organization represents the level to which an ERP implementation measures recommended to use in the organization. As shown in Table 4.27, construct loadings ate strong, ranging from 0.541 to 0.735, which demonstrates a strong level convergent validity.

Table 4.27 Factor Loading by suggested measures to use ERP implementation in the organization

Suggested measures to use ERP implementation in the organization	Factor Loading
1. Establish a company policy.	0.541
2. The agreement or policy between the partners.	0.735
3. Prepare documents for official use ERP in detail.	0.682
4. Trained to understand the benefits of implementing ERP in the organization to use personnel in an organization at all levels, especially the operational level to make the most truly.	0.541
5. A party specialist care and advice about specific aspects of ERP technology.	0.678

Table 4.27 Factor Loading by suggested measures to use ERP implementation in the organization (cont.)

Suggested measures to use ERP implementation in the organization	Factor Loading
6. By integrating the existing information technology systems compatible with the ERP.	0.700
7. The government held a public hearing for the adoption of ERP to the management processes in the organization and the industry of motor vehicles.	0.576
8. Provide for the conference only operators in the sector continued. ERP technology for process management. Various organization and industry in order to exchange opinions on each and with be ready to use in the future to exchange views on each other and will ready for future use.	0.669

As mentioned in Chapter 3, Reliability Analysis was conducted to determinant factors affecting successful ERP implementation use in the industry in Thailand and the segmentation base Factors from the data set.

The Reliability Analysis results for factors affecting the successful implementation ERP system used in the major of industry in Thailand were present in Table 7. In general, the Cronbach Alpha of 0.70 was acceptable (Cronbach, 1990: 204).The results show that all the factors for example. Critical to business operation and business development in organization management, ERP technology to use (or plan to take the ERP used in the future), level of ERP technology (or planning that will be used), motivation / stimulate main influence at bringing ERP to use, problems or obstacles that influence the level of success in bringing ERP technology used in an organization, and proposal of ERP implementation measures recommended to use the organization exceeded the 0.70.mark.

Table 4.28 Reliability Analysis by factors affecting successful ERP implementation used in the industry in Thailand

Factors affecting successful ERP implementation used in the industry in Thailand	Number of Item	Cronbach Alpha
Critical to business operations and business development in the management of ERP technology	5	0.7808
Application of ERP technology to use (or have plans to use ERP to take in the future).	13	0.8219
Level of use EPR technology (or planning to be active).	13	0.7876
Motivation and main stimulate influencing the level of ERP implementation to use.	27	0.7853
Problems or obstacles that influence the level of success in ERP technology implementation deployed in the organization.	19	0.8451
Suggested measures to use ERP technology implementation in the organization.	8	0.7470

Part 4: Hypotheses Testing

Hypotheses 1: The in formation about different organizations have affect to the level of use ERP technology difference

Hypotheses 1.1 Different characteristic of the industry, have effect to the level of use ERP technology difference.

Table 4.29 Analysis of differences between the type of the industry and the level of using ERP technology

Items		$\overline{X}$	S.D.	F	Sig.
Manufacturing management	Textiles and apparel industry	2.55	1.781	13.475*	.000
	Plastics industry	3.69	.255		
	Food and beverage industry	3.20	.595		
	Automotive industry	3.12	.631		
	Other	2.40	1.328		
Logistics management	Textiles and apparel industry	1.72	1.210	20.939*	.000
	Plastics industry	3.68	.306		
	Food and beverage industry	1.85	.859		
	Automotive industry	2.00	.505		
	Other	1.92	1.088		
Accounting and financial management	Textiles and apparel industry	3.70	1.885	29.366*	.000
	Plastics industry	4.95	.204		
	Food and beverage industry	4.66	.472		
	Automotive industry	4.25	.758		
	Other	2.89	2.015		
Personnel management	Textiles and apparel industry	.07	.262	12.191*	.000
	Plastics industry	.29	.464		
	Food and beverage industry	.17	.383		
	Automotive industry	.00	.000		
	Other	.37	.486		
Maintenance	Textiles and apparel industry	.07	.262	12.191*	.000
	Plastics industry	.29	.464		
	Food and beverage industry	.17	.383		
	Automotive industry	.00	.000		
	Other	.37	.486		

Table 4.29 Analysis of differences between the type of the industry and the level of using ERP technology (cont.)

Items		$\overline{X}$	S.D.	F	Sig.
Total	Textiles and apparel industry	1.62	1.004	13.372*	.000
	Plastics industry	2.58	.256		
	Food and beverage industry	2.01	.286		
	Automotive industry	1.87	.379		
	Other	1.59	.969		

Hypotheses 1.2 Size of the industry have effect to the level of use ERP technology difference.

Table 4.30 Analysis of differences between the size of the industry and the level of using ERP technology

Items		$\overline{X}$	S.D.	F	Sig.
Manufacturing management	Small (1-50 employees)	1.00	.000	99.940*	.000
	Medium (51-200 employees)	2.93	1.194		
	Large (> 200 employees)	3.16	.565		
Logistics management	Small (1-50 employees)	1.00	.000	71.841*	.000
	Medium (51-200 employees)	1.90	1.145		
	Large (> 200 employees)	2.43	.257		
Accounting and financial management	Small (1-50 employees)	1.00	.000	57.690*	.000
	Medium (51-200 employees)	3.78	1.824		
	Large (> 200 employees)	4.52	.501		

Table 4.30 Analysis of differences between the size of the industry and the level of using ERP technology (cont.)

	Items	$\overline{X}$	**S.D.**	**F**	**Sig.**
Personnel management	Small (1-50 employees)	1.00	.000	3.312*	.037
	Medium (51-200 employees)	.23	.423		
	Large (> 200 employees)	.21	.408		
Maintenance	Small (1-50 employees)	1.00	.000	3.312*	.037
	Medium (51-200 employees)	.23	.423		
	Large (> 200 employees)	.21	.408		
Total	Small (1-50 employees)	.20	.000	81.599*	.000
	Medium (51-200 employees)	1.81	.807		
	Large (> 200 employees)	2.10	.300		

Hypotheses 1.3 Different of number investments have effect to the level of use ERP technology difference.

Table 4.31 Analysis of differences between the capital asset and the level of using ERP technology

	Items	$\overline{X}$	**S.D.**	**F**	**Sig.**
Manufacturing management	26-50 million baht	1.91	1.895	8.262*	.000
	51-100 million baht	2.99	.765		
	101-250 million baht	2.92	1.363		
	251-500 million baht	3.00	.618		
	501-1000 million baht	3.01	.505		

Table 4.31 Analysis of differences between the capital asset and the level of using ERP technology (cont.)

Items		$\overline{X}$	S.D.	F	Sig.
Logistics management	26-50 million baht	1.27	1.263	7.829*	.000
	51-100 million baht	2.10	.680		
	101-250 million baht	1.93	1.339		
	251-500 million baht	2.14	.417		
	501-1000 million baht	2.36	.379		
Accounting and financial management	26-50 million baht	3.04	2.022	9.964*	.000
	51-100 million baht	3.63	1.705		
	101-250 million baht	3.76	1.812		
	251-500 million baht	4.68	.467		
	501-1000 million baht	4.51	.505		
Personnel management	26-50 million baht			17.458*	.000
	51-100 million baht	.21	.410		
	101-250 million baht	.26	.444		
	251-500 million baht				
	501-1000 million baht	.53	.504		
Maintenance	26-50 million baht			17.458*	.000
	51-100 million baht	.21	.410		
	101-250 million baht	.26	.444		
	251-500 million baht				
	501-1000 million baht	.53	.504		
Total	26-50 million baht	1.24	1.036	10.245*	.000
	51-100 million baht	1.83	.689		
	101-250 million baht	1.83	.870		
	251-500 million baht	1.96	.236		
	501-1000 million baht	2.19	.324		

Hypotheses 2: The in formation about difference organizations have affect to the level of motivation / major stimulate that influence the company's ERP application level to use.

Hypotheses 2.1 Different characteristic of the industry, have effect to the level of motivation / major stimulate that influence the company's ERP application level to use.

Table 4.32 Analysis of differences between the type of industry and the level of major motivation influencing ERP implementation in company

Items		$\overline{X}$	S.D.	F	Sig.
The idea of using new technology	Textiles and apparel industry	3.66	.238	45.806*	.000
	Plastics industry	4.50	.000		
	Food and beverage industry	4.37	.644		
	Automotive industry	4.00	.000		
	Other	4.48	.411		
Technology leadership	Textiles and apparel industry	2.69	1.248	19.752*	.000
	Plastics industry	4.87	.612		
	Food and beverage industry	2.89	1.269		
	Automotive industry	2.00	1.011		
	Other	2.66	1.561		
Quality of the data	Textiles and apparel industry	4.80	.163	91.022*	.000
	Plastics industry	5.00	.000		
	Food and beverage industry	4.84	.177		
	Automotive industry	4.47	.121		
	Other	4.90	.100		
Ease of use	Textiles and apparel industry	3.36	1.700	16.123*	.000
	Plastics industry	4.85	.714		
	Food and beverage industry	3.39	1.400		
	Automotive industry	3.00	2.022		
	Other	4.28	.805		

Table 4.32 Analysis of differences between the type of industry and the level of major motivation influencing ERP implementation in company (cont.)

Items		$\overline{X}$	S.D.	F	Sig.
Quality of systems and service	Textiles and apparel industry	4.16	.235	32.539*	.000
	Plastics industry	5.00	.000		
	Food and beverage industry	4.31	.687		
	Automotive industry	5.00	.000		
	Other	4.57	.457		
Experience of technology users	Textiles and apparel industry	2.52	1.229	54.614*	.000
	Plastics industry	4.87	.612		
	Food and beverage industry	3.17	1.198		
	Automotive industry	2.00	.505		
	Other	2.15	.707		
Satisfaction with the system	Textiles and apparel industry	2.64	1.255	89.267*	.000
	Plastics industry	4.02	.136		
	Food and beverage industry	4.57	.448		
	Automotive industry	3.83	.505		
	Other	3.85	.566		
The perception of benefits	Textiles and apparel industry	4.32	.471	39.857*	.000
	Plastics industry	4.04	.204		
	Food and beverage industry	4.86	.224		
	Automotive industry	4.00	.000		
	Other	4.29	.759		
The perception of organizational performance	Textiles and apparel industry	4.15	.720	8.432*	.000
	Plastics industry	4.03	.153		
	Food and beverage industry	4.40	.475		
	Automotive industry	4.00	.505		
	Other	4.14	.421		

Table 4.32 Analysis of differences between the type of industry and the level of major motivation influencing ERP implementation in company (cont.)

Items		$\overline{X}$	S.D.	F	Sig.
Operation	Textiles and apparel industry	3.99	.409	21.223*	.000
	Plastics industry	3.56	.306		
	Food and beverage industry	4.56	.776		
	Automotive industry	4.50	.505		
	Other	4.24	.567		
Total	Textiles and apparel industry	3.63	.282	55.479*	.000
	Plastics industry	4.47	.113		
	Food and beverage industry	4.14	.270		
	Automotive industry	3.68	.209		
	Other	3.96	.403		

Hypotheses 2.2 Differences between the size of industry have effect to the motivation level / major stimulate that influence the company's application-level ERP

Table 4.33 Analysis of differences between the size of industry and the level of major motivation influencing ERP implementation in company

Items		$\overline{X}$	S.D.	F	Sig.
The idea of using new technology	Small (1-50 employees)	3.50	.000	25.724*	.000
	Medium (51-200 employees)	4.30	.559		
	Large (> 200 employees)	4.29	.454		
Technology leadership	Small (1-50 employees)	1.00	.000	31.170*	.000
	Medium (51-200 employees)	2.66	1.548		
	Large (> 200 employees)	3.31	1.006		

Table 4.33 Analysis of differences between the size of industry and the level of major motivation influencing ERP implementation in company (cont.)

Items		$\overline{X}$	S.D.	F	Sig.
Quality of the data	Small (1-50 employees)	4.60	.000	27.348*	.000
	Medium (51-200 employees)	4.80	.213		
	Large (> 200 employees)	4.89	.132		
Ease of use	Small (1-50 employees)	1.00	.000	51.028*	.000
	Medium (51-200 employees)	3.89	1.360		
	Large (> 200 employees)	3.87	1.298		
Quality of systems and service	Small (1-50 employees)	4.50	.000	16.419*	.000
	Medium (51-200 employees)	4.61	.495		
	Large (> 200 employees)	4.28	.630		
Experience of technology users	Small (1-50 employees)	1.00	.000	63.337*	.000
	Medium (51-200 employees)	2.46	1.025		
	Large (> 200 employees)	3.37	1.168		
Satisfaction with the system	Small (1-50 employees)	4.00	.000	15.760*	.000
	Medium (51-200 employees)	3.69	1.044		
	Large (> 200 employees)	4.23	.694		
The perception of benefits	Small (1-50 employees)	5.00	.000	48.800*	.000
	Medium (51-200 employees)	4.22	.615		
	Large (> 200 employees)	4.70	.380		

Table 4.33 Analysis of differences between the size of industry and the level of major motivation influencing ERP implementation in company (cont.)

Items		$\overline{X}$	S.D.	F	Sig.
The perception of organizational performance	Small (1-50 employees)	5.00	.000	31.433*	.000
	Medium (51-200 employees)	4.17	.454		
	Large (> 200 employees)	4.13	.564		
Operation	Small (1-50 employees)	4.50	.000	6.414*	.002
	Medium (51-200 employees)	4.20	.616		
	Large (> 200 employees)	4.42	.763		
Total	Small (1-50 employees)	3.41	.000	52.646*	.000
	Medium (51-200 employees)	3.90	.402		
	Large (> 200 employees)	4.15	.250		

Hypotheses 2.3 The capital asset differences have effect to the motivation level / major stimulate that influence the company's application-level ERP

Table 4.34 Analysis of differences between the capital asset and the level of major motivation influencing ERP implementation in company

Items		$\overline{X}$	S.D.	F	Sig.
The idea of using new technology	26-50 million baht	3.50	.000	47.884*	.000
	51-100 million baht	4.12	.216		
	101-250 million baht	4.42	.521		
	251-500 million baht	4.56	.675		
	501-1000 million baht	4.25	.274		

Table 4.34 Analysis of differences between the capital asset and the level of major motivation influencing ERP implementation in company (cont.)

Items		$\overline{X}$	S.D.	F	Sig.
Technology leadership	26-50 million baht	2.02	1.011	9.348*	.000
	51-100 million baht	2.48	1.657		
	101-250 million baht	3.26	1.475		
	251-500 million baht	2.71	1.133		
	501-1000 million baht	2.68	1.011		
Quality of the data	26-50 million baht	4.70	.101	34.603*	.000
	51-100 million baht	4.68	.241		
	101-250 million baht	4.91	.129		
	251-500 million baht	4.83	.200		
	501-1000 million baht	4.89	.101		
Ease of use	26-50 million baht	2.53	1.516	14.964*	.000
	51-100 million baht	3.73	1.661		
	101-250 million baht	4.16	1.100		
	251-500 million baht	3.27	1.570		
	501-1000 million baht	4.02	1.011		
Quality of systems and service	26-50 million baht	4.24	.252	8.614*	.000
	51-100 million baht	4.75	.432		
	101-250 million baht	4.47	.622		
	251-500 million baht	4.38	.589		
	501-1000 million baht	4.48	.505		
Experience of technology users	26-50 million baht	1.76	.758	19.204*	.000
	51-100 million baht	2.24	.562		
	101-250 million baht	2.85	1.297		
	251-500 million baht	3.35	1.407		
	501-1000 million baht	3.02	1.011		

Table 4.34 Analysis of differences between the capital asset and the level of major motivation influencing ERP implementation in company (cont.)

Items		$\overline{X}$	S.D.	F	Sig.
Satisfaction with the system	26-50 million baht	2.46	1.516	75.689*	.000
	51-100 million baht	3.75	.437		
	101-250 million baht	3.96	.694		
	251-500 million baht	4.84	.167		
	501-1000 million baht	3.99	.337		
The perception of benefits	26-50 million baht	4.48	.505	35.293*	.000
	51-100 million baht	4.24	.432		
	101-250 million baht	4.20	.674		
	251-500 million baht	5.00	.000		
	501-1000 million baht	4.74	.252		
The perception of organizational performance	26-50 million baht	4.61	.379	25.697*	.000
	51-100 million baht	3.93	.450		
	101-250 million baht	4.18	.544		
	251-500 million baht	4.51	.440		
	501-1000 million baht	3.99	.252		
Operation	26-50 million baht	3.98	.505	25.336*	.000
	51-100 million baht	4.50	.502		
	101-250 million baht	4.13	.585		
	251-500 million baht	4.84	.365		
	501-1000 million baht	3.97	1.011		
Total	26-50 million baht	3.43	.022	49.855*	.000
	51-100 million baht	3.84	.421		
	101-250 million baht	4.05	.327		
	251-500 million baht	4.23	.341		
	501-1000 million baht	4.00	.031		

Hypotheses 3: Critical to business operations / business development in the management of different organizations have effect the level of use ERP technology difference

Hypotheses 3.1 Critical to business operations / business development in the management of different organizations have effect the level of use ERP technology difference

Table 4.35 Analysis of differences between the importance of operation/business development in organizational management and the level of using ERP technology

	Items	$\overline{X}$	**S.D.**	**F**	**Sig.**
Manufacturing management	Less important	2.81	1.511	4.071*	.018
	Moderately important	3.04	.687		
	Important	2.64	1.355		
Logistics management	Less important	1.40	1.184	33.973*	.000
	Moderately important	2.39	.722		
	Important	1.98	1.028		
Accounting and financial management	Less important	3.89	1.562	4.619*	.010
	Moderately important	4.15	1.405		
	Important	3.57	1.891		
Personnel management	Less important	.10	.311	63.900*	.000
	Moderately important	.04	.207		
	Important	.49	.501		
Maintenance	Less important	.10	.311	63.900*	.000
	Moderately important	.04	.207		
	Important	.49	.501		
Total	Less important	1.66	.827	4.050*	.018
	Moderately important	1.93	.517		
	Important	1.83	.937		

Hypotheses 4: Critical to business operations / business development in the management of different organizations have affect to the level of motivation / major stimulate that influence the level of ERP implementation

Hypotheses 4.1 Critical to business operations / business development in the management of different organizations have affect to the level of motivation / major stimulate that influence the level of ERP implementation to use different

Table 4.36 Analysis of differences between the importance of operation/business development in organizational management and the level of major motivation influencing ERP implementation in company

	Items	$\overline{X}$	**S.D.**	**F**	**Sig.**
The idea of using new technology	Less important	4.28	.597	.361	.697
	Moderately important	4.25	.615		
	Important	4.22	.371		
Technology leadership	Less important	2.10	1.388	19.654*	.000
	Moderately important	3.07	1.389		
	Important	3.05	1.344		
Quality of the data	Less important	4.70	.254	38.597*	.000
	Moderately important	4.84	.164		
	Important	4.90	.100		
Ease of use	Less important	2.83	1.861	45.653*	.000
	Moderately important	3.73	1.179		
	Important	4.45	.831		
Quality of systems and service	Less important	4.90	.200	53.168*	.000
	Moderately important	4.29	.647		
	Important	4.40	.454		
Experience of technology users	Less important	2.00	.716	37.487*	.000
	Moderately important	3.19	1.297		
	Important	2.67	1.131		

Table 4.36 Analysis of differences between the importance of operation/business development in organizational management and the level of major motivation influencing ERP implementation in company (cont.)

	Items	$\overline{X}$	**S.D.**	**F**	**Sig.**
Satisfaction with the system	Less important	4.05	.440	3.424*	.034
	Moderately important	3.91	1.330		
	Important	3.73	.624		
The perception of benefits	Less important	4.37	.487	2.867	.058
	Moderately important	4.52	.479		
	Important	4.37	.746		
The perception of organizational performance	Less important	4.34	.496	23.315*	.000
	Moderately important	4.31	.507		
	Important	3.97	.470		
Operation	Less important	4.48	.449	13.810*	.000
	Moderately important	4.35	.672		
	Important	4.06	.740		
Total	Less important	3.81	.356	13.682*	.000
	Moderately important	4.05	.434		
	Important	3.98	.312		

Hypotheses 5: Time to implement different have effect the level of ERP technology difference

Hypotheses 5.1 Differences between the manufacturing management have effect the level of ERP technology difference

Table 4.37 Analysis of differences between the manufacturing management and the level of using ERP technology

Items		$\overline{X}$	S.D.	F	Sig.
Manufacturing management	No planning	1.00	.000	123.652*	.000
	implemented within 5 years	2.50	.000		
	implemented within 2 years	2.39	1.403		
	implemented within 1 years	3.73	.147		
	Already implemented	3.13	.638		
Logistics management	No planning	1.00	.000	60.886*	.000
	implemented within 5 years	2.11	.631		
	implemented within 2 years	1.73	1.055		
	implemented within 1 years	2.72	.593		
	Already implemented	1.82	.941		
Accounting and financial management	No planning	1.00	.000	158.153*	.000
	implemented within 5 years	3.74	.252		
	implemented within 2 years	2.92	1.891		
	implemented within 1 years	5.00	.000		
	Already implemented	4.59	.493		
Personnel management	No planning	1.00	.000	25.750*	.000
	implemented within 5 years	.022	.149		
	implemented within 2 years	.34	.476		
	implemented within 1 years	.40	.493		
	Already implemented	1.00	.000		
Maintenance	No planning	1.00	.000	25.750*	.000
	implemented within 5 years	.02	.149		
	implemented within 2 years	.34	.476		
	implemented within 1 years	.40	.493		
	Already implemented	.00	.000		

Table 4.37 Analysis of differences between the manufacturing management and the level of using ERP technology (cont.)

Items		$\overline{X}$	S.D.	F	Sig.
Total	No planning	.00	.000	131.369*	.000
	implemented within 5 years	1.68	.195		
	implemented within 2 years	1.54	.919		
	implemented within 1 years	2.45	.223		
	Already implemented	1.91	.194		

Hypotheses 5.2 Differences between the logistics management have effect the level of ERP technology difference

Table 4.38 Analysis of differences between the logistics management and the level of using ERP technology

Items		$\overline{X}$	S.D.	F	Sig.
Manufacturing management	No planning	1.21	1.852	65.144*	.000
	implemented within 5 years	2.94	.670		
	implemented within 2 years	3.49	.572		
	implemented within 1 years	3.27	.504		
	Already implemented	3.20	.628		
Logistics management	No planning	.00	.000	336.448*	.000
	implemented within 5 years	2.05	.546		
	implemented within 2 years	2.65	.196		
	implemented within 1 years	2.50	.000		
	Already implemented	2.76	1.130		
Accounting and financial management	No planning	1.84	2.135	62.974*	.000
	implemented within 5 years	3.74	1.474		
	implemented within 2 years	4.75	.430		
	implemented within 1 years	4.52	.504		
	Already implemented	5.00	.000		

Table 4.38 Analysis of differences between the logistics management and the level of using ERP technology (cont.)

Items		$\overline{X}$	S.D.	F	Sig.
Personnel management	No planning			18.118*	.000
	implemented within 5 years	.39	.490		
	implemented within 2 years	.19	.400		
	implemented within 1 years				
	Already implemented	.17	.380		
Maintenance	No planning			18.118*	.000
	implemented within 5 years	.39	.490		
	implemented within 2 years	.19	.400		
	implemented within 1 years				
	Already implemented	.17	.380		
Total	No planning	.61	.793	111.292*	.000
	implemented within 5 years	1.90	.590		
	implemented within 2 years	2.26	.307		
	implemented within 1 years	2.05	.201		
	Already implemented	2.26	.435		

Hypotheses 5.3 Differences between the accounting and financial management have effect the level of ERP technology difference

Table 4.39 Analysis of differences between the accounting and financial management and the level of using ERP technology

Items		$\overline{X}$	S.D.	F	Sig.
Manufacturing management	No planning			122.875*	.000
	implemented within 5 years				
	implemented within 2 years	2.63	.560		
	implemented within 1 years	2.50	1.530		
	Already implemented	3.43	.577		

Table 4.39 Analysis of differences between the accounting and financial management and the level of using ERP technology (cont.)

Items		$\overline{X}$	S.D.	F	Sig.
Logistics management	No planning			52.937*	.000
	implemented within 5 years				
	implemented within 2 years	1.67	.338		
	implemented within 1 years	2.05	1.194		
	Already implemented	2.32	.945		
Accounting and financial management	No planning			159.285*	.000
	implemented within 5 years				
	implemented within 2 years	3.04	1.574		
	implemented within 1 years	3.76	1.644		
	Already implemented	4.78	.415		
Personnel management	No planning			19.547*	.000
	implemented within 5 years				
	implemented within 2 years	.47	.502		
	implemented within 1 years	.22	.419		
	Already implemented	.12	.325		
Maintenance	No planning			19.547*	.000
	implemented within 5 years				
	implemented within 2 years	.47	.502		
	implemented within 1 years	.22	.419		
	Already implemented	.12	.325		
Total	No planning	.00	.000	104.017*	.000
	implemented within 5 years	.00	.000		
	implemented within 2 years	1.65	.593		
	implemented within 1 years	1.75	.945		
	Already implemented	2.15	.346		

Hypotheses 5.4 Differences between the personnel management management have effect the level of ERP technology difference

Table 4.40 Analysis of differences between the personnel management and the level of using ERP technology

Items		$\overline{X}$	S.D.	F	Sig.
Manufacturing management	No planning	2.79	1.272	122.875*	.000
	implemented within 5 years	3.27	.504		
	implemented within 2 years	2.50	.000		
	implemented within 1 years	.00	.000		
	Already implemented	.00	.000		
Logistics management	No planning	1.91	1.111	52.937*	.000
	implemented within 5 years	2.50	.000		
	implemented within 2 years	1.75	.000		
	implemented within 1 years	.00	.000		
	Already implemented	.00	.000		
Accounting and financial management	No planning	3.82	1.729	159.285*	.000
	implemented within 5 years	4.52	.504		
	implemented within 2 years	2.50	.000		
	implemented within 1 years	.00	.000		
	Already implemented	.00	.000		
Personnel management	No planning	.22	.421	19.547*	.000
	implemented within 5 years	.00	.000		
	implemented within 2 years	1.00	.000		
	implemented within 1 years	.00	.000		
	Already implemented	.00	.000		

Table 4.40 Analysis of differences between the personnel management and the level of using ERP technology (cont.)

Items		$\overline{X}$	S.D.	F	Sig.
Maintenance	No planning	.22	.421	19.547*	.000
	implemented within 5 years	.00	.000		
	implemented within 2 years	1.00	.000		
	implemented within 1 years	.00	.000		
	Already implemented	.00	.000		
Total	No planning	1.79	.823	104.017*	.000
	implemented within 5 years	2.05	.201		
	implemented within 2 years	1.75	.000		
	implemented within 1 years	.00	.000		
	Already implemented	.00	.000		

Hypotheses 6: Time to implement different have effect the level of motivation / major stimulate that influence the level of ERP implementation to use different

Hypotheses 6.1 Differences between the importance of operation/business development in organizational management and the level of major motivation influencing ERP implementation in company

Table 4.41 Analysis of differences between the importance of operation/business development in organizational management and the level of major motivation influencing ERP implementation in company

Items		$\overline{X}$	S.D.	F	Sig.
The idea of using new technology	No planning	4.00	.000	9.249*	.000
	implemented within 5 years	4.25	.274		
	implemented within 2 years	4.06	.573		
	implemented within 1 years	4.30	.401		
	Already implemented	4.45	.680		

Table 4.41 Analysis of differences between the importance of operation/business development in organizational management and the level of major motivation influencing ERP implementation in company (cont.)

Items		$\overline{X}$	S.D.	F	Sig.
Technology leadership	No planning	2.66	.000	56.001*	.000
	implemented within 5 years	1.32	.337		
	implemented within 2 years	2.24	1.611		
	implemented within 1 years	4.00	.669		
	Already implemented	2.72	1.339		
Quality of the data	No planning	4.80	.000	8.341*	.000
	implemented within 5 years	4.69	.303		
	implemented within 2 years	4.80	.128		
	implemented within 1 years	4.86	.189		
	Already implemented	4.85	.194		
Ease of use	No planning	5.00	.000	97.157*	.000
	implemented within 5 years	1.97	1.011		
	implemented within 2 years	3.50	1.361		
	implemented within 1 years	5.00	.000		
	Already implemented	3.03	1.309		
Quality of systems and service	No planning	4.00	.000	20.252*	.000
	implemented within 5 years	5.00	.000		
	implemented within 2 years	4.39	.380		
	implemented within 1 years	4.60	.492		
	Already implemented	4.39	.739		
Experience of technology users	No planning	1.00	.000	87.892*	.000
	implemented within 5 years	1.74	.252		
	implemented within 2 years	2.10	.673		
	implemented within 1 years	3.70	.875		
	Already implemented	2.98	1.250		

Table 4.41 Analysis of differences between the importance of operation/business development in organizational management and the level of major motivation influencing ERP implementation in company (cont.)

Items		$\overline{X}$	S.D.	F	Sig.
Satisfaction with the system	No planning	3.00	.000	76.796*	.000
	implemented within 5 years	4.33	.000		
	implemented within 2 years	3.34	1.291		
	implemented within 1 years	3.60	.390		
	Already implemented	4.77	.156		
The perception of benefits	No planning	3.00	.000	202.883*	.000
	implemented within 5 years	4.48	.505		
	implemented within 2 years	4.58	.495		
	implemented within 1 years	4.10	.200		
	Already implemented	4.93	.163		
The perception of organizational performance	No planning	3.75	.000	57.988*	.000
	implemented within 5 years	4.37	.126		
	implemented within 2 years	4.33	.517		
	implemented within 1 years	3.80	.432		
	Already implemented	4.54	.400		
Operation	No planning	3.50	.000	209.498*	.000
	implemented within 5 years	5.00	.000		
	implemented within 2 years	4.19	.520		
	implemented within 1 years	3.70	.401		
	Already implemented	4.90	.291		
Total	No planning	3.47	.000	57.587*	.000
	implemented within 5 years	3.71	.254		
	implemented within 2 years	3.75	.427		
	implemented within 1 years	4.16	.234		
	Already implemented	4.16	.293		

Hypotheses 6.2 Difference Logistics management have effect the level of major motivation influencing ERP implementation in company

Table 4.42 Analysis of differences between the importance of operation/business development in organizational management and the level of major motivation influencing ERP implementation in company

Items		$\overline{X}$	S.D.	F	Sig.
The idea of using new technology	No planning	4.13	.611	3.474*	.008
	implemented within 5 years	4.18	.445		
	implemented within 2 years	4.37	.423		
	implemented within 1 years	4.39	.664		
	Already implemented	4.28	.716		
Technology leadership	No planning	1.60	.807	40.897*	.000
	implemented within 5 years	2.41	1.461		
	implemented within 2 years	3.26	1.035		
	implemented within 1 years	4.08	.147		
	Already implemented	3.53	1.733		
Quality of the data	No planning	4.79	.160	4.559*	.001
	implemented within 5 years	4.79	.188		
	implemented within 2 years	4.88	.209		
	implemented within 1 years	4.79	.139		
	Already implemented	4.86	.251		
Ease of use	No planning	2.75	1.754	20.164*	.000
	implemented within 5 years	3.45	1.491		
	implemented within 2 years	4.51	.861		
	implemented within 1 years	4.17	.889		
	Already implemented	4.01	1.237		

Table 4.42 Analysis of differences between the importance of operation/business development in organizational management and the level of major motivation influencing ERP implementation in company (cont.)

Items		$\overline{X}$	S.D.	F	Sig.
Quality of systems and service	No planning	4.46	.410	20.916*	.000
	implemented within 5 years	4.49	.469		
	implemented within 2 years	4.74	.436		
	implemented within 1 years	3.96	.698		
	Already implemented	4.67	.628		
Experience of technology users	No planning	1.30	.463	92.054*	.000
	implemented within 5 years	2.44	.793		
	implemented within 2 years	2.88	.741		
	implemented within 1 years	3.95	1.221		
	Already implemented	3.90	1.300		
Satisfaction with the system	No planning	3.83	.692	24.625*	.000

Hypotheses 6.3 Time to implement different have effect the level of motivation / major stimulate that influence the level of ERP implementation to use different.

Table 4.43 Analysis of differences between the accounting and financial management and the level of major motivation influencing ERP implementation in company

Items		$\overline{X}$	S.D.	F	Sig.
The idea of using new technology	No planning	4.00	.000	28.131*	.000
	implemented within 5 years	.00	.000		
	implemented within 2 years	4.34	.405		
	implemented within 1 years	3.87	.428		
	Already implemented	4.42	.574		

Table 4.43 Analysis of differences between the accounting and financial management and the level of major motivation influencing ERP implementation in company (cont.)

Items		$\overline{X}$	S.D.	F	Sig.
Technology leadership	No planning	2.66	.000	33.487*	.000
	implemented within 5 years	.00	.000		
	implemented within 2 years	1.70	1.182		
	implemented within 1 years	2.67	1.527		
	Already implemented	3.35	1.290		
Quality of the data	No planning	4.80	.000	19.434*	.000
	implemented within 5 years	.00	.000		
	implemented within 2 years	4.69	.177		
	implemented within 1 years	4.84	.165		
	Already implemented	4.86	.201		
Ease of use	No planning	5.00	.000	13.609*	.000
	implemented within 5 years	.00	.000		
	implemented within 2 years	3.36	1.522		
	implemented within 1 years	3.25	1.481		
	Already implemented	3.94	1.372		
Quality of systems and service	No planning	4.00	.000	10.830*	.000
	implemented within 5 years	.00	.000		
	implemented within 2 years	4.37	.426		
	implemented within 1 years	4.61	.419		
	Already implemented	4.55	.642		
Experience of technology users	No planning	1.00	.000	10.830*	.000
	implemented within 5 years	.00	.000		
	implemented within 2 years	2.39	.988		
	implemented within 1 years	2.12	.740		
	Already implemented	3.28	1.169		

Table 4.43 Analysis of differences between the accounting and financial management and the level of major motivation influencing ERP implementation in company (cont.)

Items		$\overline{X}$	S.D.	F	Sig.
Satisfaction with the system	No planning	3.00	.000	34.163*	.000
	implemented within 5 years	.00	.000		
	implemented within 2 years	3.97	.520		
	implemented within 1 years	3.30	1.376		
	Already implemented	4.22	.673		
The perception of benefits	No planning	3.00	.000	100.811*	.000
	implemented within 5 years	.00	.000		
	implemented within 2 years	4.35	.404		
	implemented within 1 years	4.74	.440		
	Already implemented	4.50	.484		
The perception of organizational performance	No planning	3.75	.000	14.398*	.000
	implemented within 5 years	.00	.000		
	implemented within 2 years	4.10	.510		
	implemented within 1 years	4.43	.325		
	Already implemented	4.21	.572		
Operation	No planning	3.50	.000	26.939*	.000
	implemented within 5 years	.00	.000		
	implemented within 2 years	4.00	.731		
	implemented within 1 years	4.48	.621		
	Already implemented	4.43	.577		
Total	No planning	3.47	.000	72.455*	.000
	implemented within 5 years	.00	.000		
	implemented within 2 years	3.73	.251		
	implemented within 1 years	3.83	.454		
	Already implemented	4.17	.275		

From Table 4.43 Differences between the accounting and financial management and the level of major motivation influencing ERP implementation in company ,The idea of using new technology, Technology leadership, Quality of the data, Ease of use, Quality of systems and service, Experience of technology users, The perception of benefits, The perception of organizational performance, Operation have effect the level of motivation major stimulate of companies influencing the level of ERP implementation to use different

Hypotheses 6.4 Differences between the personnel management and the level of major motivation influencing ERP implementation in company to use different.

Table 4.44 Analysis of differences between the personnel management and the level of major motivation influencing ERP implementation in company

Items		$\overline{X}$	S.D.	F	Sig.
The idea of using new technology	No planning	4.22	.513	8.055*	.000
	implemented within 5 years	4.39	.664		
	implemented within 2 years	5.00	.000		
	implemented within 1 years	.00	.000		
	Already implemented	.00	.000		
Technology leadership	No planning	2.64	1.441	30.757*	.000
	implemented within 5 years	4.08	.147		
	implemented within 2 years	1.00	.000		
	implemented within 1 years	.00	.000		
	Already implemented	.00	.000		
Quality of the data	No planning	4.82	.202	.759	.469
	implemented within 5 years	4.79	.139		
	implemented within 2 years	4.80	.000		
	implemented within 1 years	.00	.000		
	Already implemented	.00	.000		

Table 4.44 Analysis of differences between the personnel management and the level of major motivation influencing ERP implementation in company (cont.)

Items		$\overline{X}$	S.D.	F	Sig.
Ease of use	No planning	3.66	1.523	2.714	.068
	implemented within 5 years	4.17	.889		
	implemented within 2 years	3.50	.000		
	implemented within 1 years	.00	.000		
	Already implemented	.00	.000		
Quality of systems and service	No planning	4.57	.489	30.992*	.000
	implemented within 5 years	3.96	.698		
	implemented within 2 years	4.50	.000		
	implemented within 1 years	.00	.000		
	Already implemented	.00	.000		
Experience of technology users	No planning	2.52	1.098	37.372*	.000
	implemented within 5 years	3.95	1.221		
	implemented within 2 years	2.00	.000		
	implemented within 1 years	.00	.000		
	Already implemented	.00	.000		
Satisfaction with the system	No planning	3.74	.928	37.550*	.000
	implemented within 5 years	4.84	.168		
	implemented within 2 years	4.66	.000		
	implemented within 1 years	.00	.000		
	Already implemented	.00	.000		
The perception of benefits	No planning	4.36	.595	21.136*	.000
	implemented within 5 years	4.87	.221		
	implemented within 2 years	5.00	.000		
	implemented within 1 years	.00	.000		
	Already implemented	.00	.000		

Table 4.44 Analysis of differences between the personnel management and the level of major motivation influencing ERP implementation in company (cont.)

Items		$\overline{X}$	S.D.	F	Sig.
The perception of organizational performance	No planning	4.16	.520	8.962*	.000
	implemented within 5 years	4.42	.455		
	implemented within 2 years	4.75	.000		
	implemented within 1 years	.00	.000		
	Already implemented	.00	.000		
Operation	No planning	4.22	.668	18.305*	.000
	implemented within 5 years	4.80	.404		
	implemented within 2 years	4.00	.000		
	implemented within 1 years	.00	.000		
	Already implemented	.00	.000		
Total	No planning	3.89	.362	51.580*	.000
	implemented within 5 years	4.42	.228		
	implemented within 2 years	3.92	.000		
	implemented within 1 years	.00	.000		
	Already implemented	.00	.000		

Hypotheses 7: Motivation level / major stimulate that influence the level of ERP implementation to use different have effect the level of use EPR technology difference.

Hypotheses 7.1 Motivation level / major stimulate that influence the level of ERP implementation to use different have effect the level of use EPR technology difference.

Table 4.45 Analysis of differences between the level of major motivation influencing ERP implementation in company and the level of using ERP technology

	Items	$\overline{X}$	**S.D.**	**F**	**Sig.**
Manufacturing management	Important	2.55	1.267	78.281*	.000
	Very important	3.66	.328		
Logistics management	Important	1.64	.995	159.493*	.000
	Very important	2.92	.490		
Accounting and financial management	Important	3.53	1.766	61.918*	.000
	Very important	4.89	.307		
Personnel management	Important	.15	.366	19.838*	.000
	Very important	.36	.482		
Maintenance	Important	.15	.366	19.838*	.000
	Very important	.36	.482		
Total	Important	1.61	.769	115.403*	.000
	Very important	2.44	.314		

Hypotheses 8: Factors affecting the success of different have effect the level of ERP technology different

Hypotheses 8.1 Factors affecting the success of different have effect the level of ERP technology different

Table 4.46 Analysis of differences between the success factor and the level of using ERP technology

Items		$\overline{X}$	**S.D.**	**F**	**Sig.**
Manufacturing management	Moderately	3.79	.095	59.959*	.000
	Agree	2.94	1.204		
	Extremely agree	2.02	1.059		

Table 4.46 Analysis of differences between the success factor and the level of using ERP technology (cont.)

Items		$\overline{X}$	S.D.	F	Sig.
Logistics management	Moderately	2.58	.190	19.788*	.000
	Agree	1.96	1.172		
	Extremely agree	1.60	.916		
Accounting and financial management	Moderately	5.00	.000	26.679*	.000
	Agree	3.83	1.810		
	Extremely agree	3.25	1.405		
Personnel management	Moderately	.17	.381	1.391	.250
	Agree	.24	.429		
	Extremely agree	.17	.380		
Maintenance	Moderately	.17	.381	1.391	.250
	Agree	.24	.429		
	Extremely agree	.17	.380		
Total	Moderately	2.34	.210	32.720*	.000
	Agree	1.84	.832		
	Extremely agree	1.44	.655		

Hypotheses 9: Factors affecting the success of different have effect the level of motivation level / major stimulate of the major companies influencing the level of ERP implementation to use different

Hypotheses 9.1 Factors affecting the success of different have effect the level of motivation level / major stimulate of the major companies influencing the level of ERP implementation to use different

Table 4.47 Analysis of differences between the success factor and the level of major motivation influencing ERP implementation in company

Items		$\overline{X}$	S.D.	F	Sig.
The idea of using new technology	Moderately	4.16	.628	8.201*	.000
	Agree	4.35	.395		
	Extremely agree	4.11	.694		
Technology leadership	Moderately	3.44	.633	25.092*	.000
	Agree	2.94	1.543		
	Extremely agree	2.04	1.268		
Quality of the data	Moderately	4.78	.202	7.822*	.000
	Agree	4.85	.180		
	Extremely agree	4.77	.207		
Ease of use	Moderately	4.66	.474	91.886*	.000
	Agree	4.04	1.408		
	Extremely agree	2.39	1.055		
Quality of systems and service	Moderately	4.66	.474	4.336*	.014
	Agree	4.48	.500		
	Extremely agree	4.42	.681		
Experience of technology users	Moderately	2.66	.237	23.783*	.000
	Agree	2.99	1.415		
	Extremely agree	2.06	.762		
Satisfaction with the system	Moderately	2.77	1.295	117.488*	.000
	Agree	3.93	.658		
	Extremely agree	4.55	.303		
The perception of benefits	Moderately	4.00	.000	85.971*	.000
	Agree	4.33	.641		
	Extremely agree	4.93	.166		

Table 4.47 Analysis of differences between the success factor and the level of major motivation influencing ERP implementation in company (cont.)

Items		$\overline{X}$	S.D.	F	Sig.
The perception of organizational performance	Moderately	4.08	.428	278.443*	.000
	Agree	3.94	.366		
	Extremely agree	4.87	.139		
Operation	Moderately	3.83	.237	46.311*	.000
	Agree	4.24	.738		
	Extremely agree	4.71	.392		
Total	Moderately	3.90	.382	4.527*	.011
	Agree	4.01	.426		
	Extremely agree	3.88	.271		

From all above testing hypotheses, it is obviously summarized the results of all supposed hypotheses to be supported or unsupported or partially supported as displayed in Table 4.48.

Table 4.48 Summary of hypotheses

Hypotheses	Results	Statistical methods
H1.1: Organizational characteristic affects degree of ERP technology adoption	Accepted	ANOVA
H1.2: Organizational size affects degree of ERP technology adoption	Accepted	ANOVA
H1.3: Initial investment budget of ERP implementation positively associates with degree of ERP adoption.	Accepted	ANOVA
H2.1: Different characteristic of the industry, have effect to the level of motivation / major stimulate that influence the company's ERP application level to use	Accepted	ANOVA
H2.2: Differences between the size of industry have effect to the motivation level / major stimulate that influence the company's application-level ERP	Accepted	ANOVA

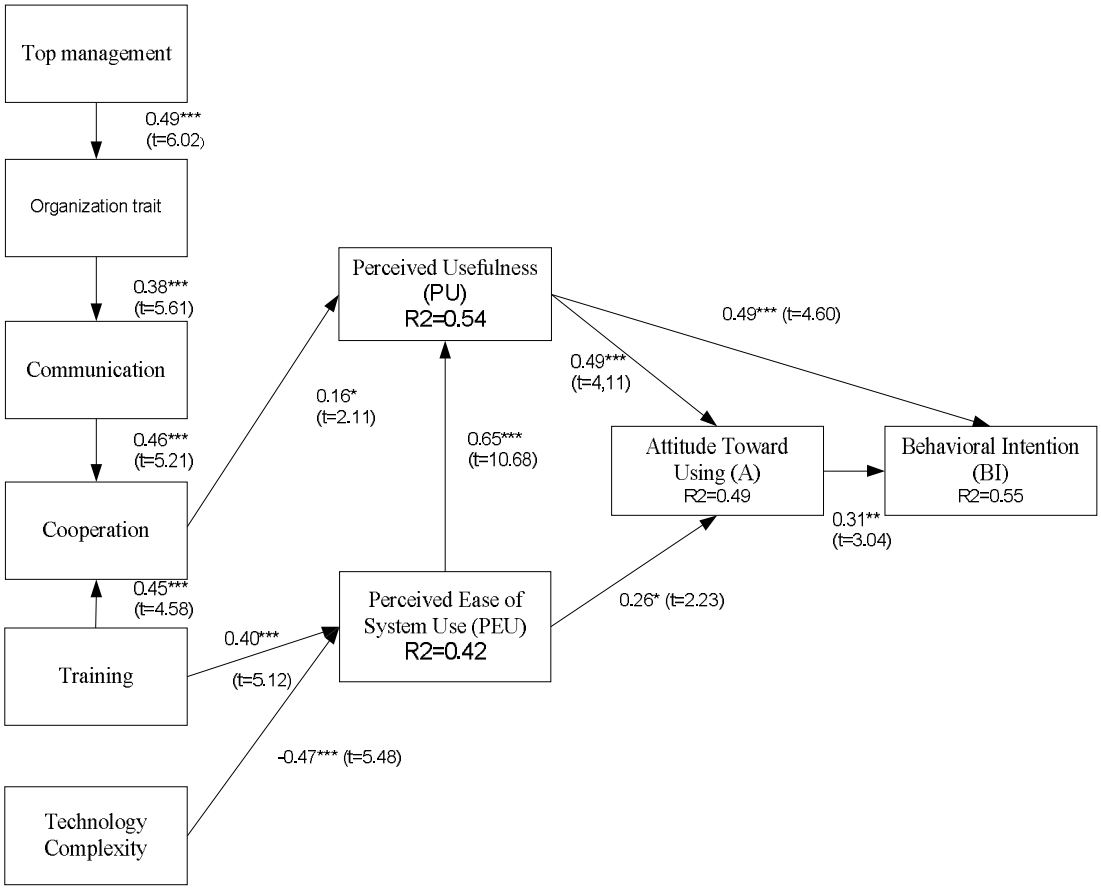
Table 4.48 Summary of hypotheses (cont.)

Hypotheses	Results	Statistical methods
H2.3: The capital asset differences have effect to the motivation level / major stimulate that influence the company's application-level ERP	Accepted	ANOVA
H3.1: Critical to business operations / business development in the management of different organizations have affect to the level of motivation / major stimulate that influence the level of ERP implementation to use different	Accepted	ANOVA
H4: critical to business operations / business development in the management of different organizations have affect to the level of motivation / major stimulate that influence the level of ERP implementation to use different	Accepted	ANOVA
H5.1: Differences between the manufacturing management have effect the level of ERP technology difference	Accepted	ANOVA
H5.2: Differences between the logistics management have effect the level of ERP technology difference	Accepted	ANOVA
H5.3: Differences between the accounting and financial management have effect the level of ERP technology difference	Accepted	ANOVA
H5.4: Differences between the personnel management management have effect the level of ERP technology difference	Accepted	ANOVA
H6.1: Differences between the importance of operation/business development in organizational management and the level of major motivation influencing ERP implementation in company	Accepted	ANOVA
H6.2: Difference Logistics management have effect the level of major motivation influencing ERP implementation in company	Accepted	ANOVA
H6.2: Difference Logistics management have effect the level of major motivation influencing ERP implementation in company	Accepted	ANOVA

Table 4.48 Summary of hypotheses (cont.)

Hypotheses	Results	Statistical methods
H6.3: Time to implement different have effect the level of motivation / major stimulate that influence the level of ERP implementation to use different	Accepted	ANOVA
H6.4: Differences between the personnel management and the level of major motivation influencing ERP implementation in company to use different	Accepted	ANOVA
H7: motivation level / major stimulate that influence the level of ERP implementation to use different	Accepted	ANOVA
H8: Factors affecting the success of different have effect the level of ERP technology different	Accepted	ANOVA
H9: Factors affecting the success of different have effect the level of motivation level / major stimulate of the major companies influencing the level of ERP implementation to use different	Accepted	ANOVA

4.2 Result Lisrel from TAM Model



***** 0.05 significance level. ** 0.01 significance level. *** 0.001 significance level.

Chi-Square=8.68, df = 5, P-value=0.12238, RMSEA=0.043

Figure 4.3 Model Testing Results

Hypotheses Testing

Paths	Standardized coefficient	T-values	Outcome
TAM related hypothesis			
Hypothesis 1 (H1). PEU for ERP systems has a positive effect on PU.	0.65	10.68	Supported

Hypotheses Testing (cont.)

Paths	Standardized coefficient	T-values	Outcome
Hypothesis 2 (H2). PU for ERP systems has a positive effect on ATU.	0.49	4.11	Supported
Hypothesis 3 (H3). PEU for ERP systems has a positive effect on ATU.	0.26	2.23	Supported
Hypothesis 4 (H4). PU for ERP systems has a positive effect on BIU.	0.49	4.60	Supported
Hypothesis 5 (H5).ATU for ERP systems has a positive effect on BIU	0.31	3.04	Supported
Hypothesis 6 (H6). Top management support has a positive effect on ERP system communication	0.49	6.02	Supported
Hypothesis 7 (H7). Organization Traits has a positive effect on the cooperation related to the ERP systems	0.38	5.62	Supported
Hypothesis 8 (H8). Communication has a positive effect on the cooperation related to the ERP systems.	0.46	5.21	Supported
Hypothesis 9 (H9). Training in ERP systems has a positive effect on cooperation related to ERP systems.	0.45	4.58	Supported
Hypothesis 10 (H10). Training in ERP systems has a positive effect on ERP systems' PEU	0.40	5.12	Supported
Hypothesis 11 (H11). Cooperation has a positive effect on ERP systems' PU.	0.16	2.11	Supported
Hypothesis 12 (H12). The technological complexity of ERP systems has a negative effect on the PEU of ERP systems	-0.47	5.48	Supported

4.3 Comparison of difference countries

To compare the results of ERP – survey in Thailand's Industries with different countries. This research studies the earlier reports and tries to compare with our results in aspects.

Summary of review paper

National differences cause ERP technology success or failure in foreign countries. (Ein-Dor et al.)

Category of national differences	Impacts on implementation practices
1. Culture/language	• Technical problems in entering data • Cultural resistance • Communication barriers between facilities due to • different languages • Localized implementations • Alteration of training programs in different site
2. Management Style	• Differences in priority setting • Implementation style: either "big bang" or "piecemeal" approach to the implementation • Project duration
4.Regulations / legal requirements	• Difficulty in developing standardization or requirements universalization due to difference in forms, tax policy, • procedures and others • Substantial customization of ERP packages

Summary of review paper (cont.)

Category of national differences	Impacts on implementation practices
5. Internal technical Regulations/legal requirements	• Difficulty in exercising decentralized ERP implementation due to lack of local personnel resources • Alteration of training programs in different sites • Complexity into training and use support
6. Geography/time	• Complexity and technical problems in ERP adaptation .

Barriers to ERP adoption

Thailand

Thailand industry still utilizes ERP in low level, since the most important ERP adoption barrier is high cost. Similarly, an inadequacy of knowledge and understanding. Besides, there are many ERP barriers, such as, very high budget of ERP implementation, non-existing support system on ERP system, and top management unawareness of ERP adoption. Thailand emphasizes on obtaining benefits from ERP using: time saving (fastness) in high level more than other benefits. The state of definition, order, optimization, and documentation of ERP processes in enterprises in Asia is similar to, to some degree, the state of the processes with the same attributes in Thailand enterprises. For both, intense work is required before the selection and implementation of an ERP system. The Chinese culture, the enterprise managers are not used to utilizing systematic information to perform their functions; rather than that, they followa tradition of experience and intuition. This also looks very similar to the Mexican environment because tradition is still a salient characteristic among CEOs and entrepreneurs, especially those from medium and small enterprises.

Europe

With regard to Europe's main ERP adoption barriers, they are, namely, obviously inadequate return on investment (ROI), high costs, interoperability concerns regarding compatibility with existing systems, lack of ERP global standard, and complexity of implementation and IT integration. Europe's main adoption perceived benefits are, namely, improving product and service quality,

United States

On the part of the United States, perceived benefits from ERP adoption are as follows; improving operational efficiency, increased visibility, better management of inventory, reducing cost, and better information accuracy. Its perceived benefits from ERP adoption emphases on the most improving operational efficiency, but it is very low level. On the part of the United States' ERP adoption barriers, they were ranked as follows, high cost, technical issues, standard issues, data integration.

CHAPTER V
CONCLUSION AND RECOMMENDATIONS

The chapter is composed of 3 main parts as follows: the first part is the final summary results of ERP usage which involves current status and trend in the future, application, budget for implementation, total time using, ERP adoption motivations, ERP perceived benefits obtained from utilization, including, ERP adoption barriers. The second part is research limitations. The final one is comprised of suggestions and guideline of ERP utilization for in industrial sector and future research.

5.1 Conclusion

Nowadays, most Thai industry entrepreneurs lack of ERP technology knowledge and understanding, in particular, ERP utilization and ERP perceived benefits adoption. In summary, both of ERP non-planner and non-adopters 'main reasons of negative ERP adoption are unawareness and lack of understanding.

They reason that ERP adoption in industry sector has to highly invest. In addition, they have consider that it is unnecessary for deployment, since it is inessential to their businesses and to increase higher operational cost, includingly, ERP adoption is not imposed in policy by their board committees. Additionally, ERP adoption is unsuitable for some product types. For example, low-priced products, small volume of product, uncomplicated production process of product, and business type. Thereby, ERP technology is not worthwhile to be invested and adopted by some industry entrepreneurs. With regard to Thai manufacturers' ERP knowledge and understanding level, large firms are acknowledged and understand ERP more than medium-small firms, however; it is still low level. The next step, the researcher conducts to prove hypothesis testing whether organizational size that is different and

ERP implementation budget is also different. The result reveals that organization size is different, ERP implementation budget is different.

This research aims to analyze what factors that affect success and what factors impede the adoption of ERP technology systems come with industry in Thailand, to study the benefits and disadvantages of implementing an ERP system technology using with industry in Thailand. To propose ways to improve and correct problems that occurred after the implementation of ERP system technology used in the industry sector. The use of survey quantitative research by collecting data from the questionnaire survey on the implementation of ERP system technology use in organization. The sample consisted of industrial operators in Thailand, which is divided into four groups: Group of food and drink industrial, Group of textiles industrial, Group of plastic industrial and the other group industries results are summarized as follow:

The results about information of the organization of the respondents were a group of other industries, subordinate followed by Group of food and drink industrial, Group of textiles industrial, Automotive industrial and of plastic industries most costumers within the country produced. Business registration as a limited company (public) investment in a number of registration samples with the highest 101-250 million baht to medium-sized organization 51-200 persons, most of the production for made to stock / standards product.

The information about technology Enterprise Resource Planning (ERP) found that level's knowledge medium about EPR technology. Most other programs are not used prior to the adoption of EPR technology in the organization because this technology is expensive. Levels of significance of EPR technology on business management / business development in organization management the management of Accounting Management, Manufacturing Management, Logistics Management. Most of the EPR technology implementation to replace the old system in some areas already. Companies that are planning / have plans to try to use the EPR technology to manage organization in the process of installation budget planning EPR technology has led to use EPR technology in the areas of production management (Manufacturing) to track the progress of work in process. Logistics Management to improve the Logistic Requirement Planning, Management Accounting to improve the

financial accounting system, Personnel Management in order to manage human resources and aspects of maintenance is no plant to implement. Level of the EPR technology to use to manage processes in the industry when analyzed by side of Management Accounting in the statement of financial accounting management in parts of management production (Manufacturing) system of inventory control (Receipt/Shipment Control). Motivation level / major stimulate that influence the company's EPR technology application level to use when the analyzed was based on a ranking factor are the level at the highest level, namely the quality of the data. You receive timely information on demand to gravity (real time) with the data in each party organizations that provide clear and understandable, about the quality of the data; lack of unity of the data about the quality of data in the system of the organizations to meet the demand data. Conclusion with analyzed by ANOVA.

The main of assumptions 1: the in formation about different organizations have affect to the level of use EPR technology difference was the nature of industry, size of the industry, different of number investments have effect to the level of use EPR technology difference.

The main of assumptions 2: the in formation about difference organizations have affect to the level of motivation / major stimulate that influence the company's ERP application level to use and found that the nature of the industry, size of the industry, different of number investments have effect to the motivation level / major stimulate that influence the company's application-level ERP.

The main of assumptions 3: critical to business operations / business development in the management of different organizations have effect the level of use EPR technology difference were critical to business operations business development in the management of different organizations have effect the level of use EPR technology difference.

The main of assumptions 4: critical to business operations / business development in the management of different organizations have affect to the level of motivation / major stimulate that influence the level of ERP implementation to use different found critical to business operations / business development in the management of different organizations have effect the level of motivation major stimulate of companies influencing the level of ERP implementation to use different.

The main of assumptions 5: time to implement different have effect the level of EPR technology difference found production management, logistic management, Accounting management and difference of the personal management have effect the level of EPR technology difference.

The main of assumptions 6: time to implement different have effect the level of motivation / major stimulate that influence the level of ERP implementation to use different found production management, logistic management, Accounting management and difference of the personal management have effect the level of motivation major stimulate of companies influencing the level of ERP implementation to use different.

The main of assumptions 7: motivation level / major stimulate that influence the level of ERP implementation to use different have effect the level of use EPR technology difference found motivation level / major stimulate that influence the level of ERP implementation to use different have effect the level of use EPR technology difference.

The main of assumptions 8: factors affecting the success of different have effect the level of ERP technology different found factors that affect the success of different have effect the level of ERP technology different.

The main of assumptions 9: factors affecting the success of different have effect the level of motivation level / major stimulate of the major companies influencing the level of ERP implementation to use different factors that affect the success of different have effect of motivation level / major stimulate of the major companies influencing the level of ERP implementation to use different.

5.2 Recommendations

5.2.1 Limitations in the research

Problems encountered in this research is the problem of storage due to the understanding of the user's query. Some users, especially users of the system core (Key users) or operational staff do not understand that the system is running in an organization is that the ERP system and the ratio of respondents collected are used ERP system in large corporations to 30 percent, which may be affect the analysis of the factors make up that does not reflect factor that affect real of business. Therefore, sampling by means of questionnaires sent by e-mail may not fit as they should because some respondents may have no clear understanding of the query. Should be proportional to the size of the organization to take the survey obtain the appropriate number of samples. However, business in Thailand bringing to an ERP system will use most of the large and medium-sized business is already quite large. Should take into account the fraction of the number of samples, sizes and types of these business and how to determine the proportion of samples because the criteria for determining the features of different business depending on the type of business value of fixed assets and employment in the business.

5.2.2 Suggestions for research

This research is useful, help to know the models of various factors affecting the installation and implementation of ERP implementation in the business in Thailand to success. This will be useful in the development of other factors which may cause the business to include consulting and other related agencies to plan and install the updates, and project management ERP that is used in the business successfully.

The benefits of this research is to determine how each factor can affect the installation and implement of ERP to use more success. This research has shown that in terms of sharing that knowledge, factor-level knowledge of consultants in the most important factor but environment and corporate environment, the users has a similar focus. The three factors, which factors such as co-factors that encouraged knowledge sharing during ERP implementation of the project if any one factor is lack of factors may lead to knowledge sharing is not successful as hoped.

In addition, knowledge sharing it can also affect to the performance of the users more efficient, accuracy and speed even more by installing an ERP system as a starting point for the sharing of knowledge arising from the use of common data the same time. As a result, users were satisfied to use an ERP system all the more impact the individual.

In terms of impact on the individual, in addition to the factors and knowledge sharing there are other factors that affect the quality of such a system, which is the most important factor, environment of the users and organizational environment. Therefore, the ERP implementation should be considered in the quality of the system first.

If you look in terms of impact on the organization already, the most important factor is impact on individuals and second is ti share knowledge. However, the two factors above mentioned factors are the result of four factors follow: Organization Environment, User Environment, ERP Vendor Ability and System Quality, which were as a result environment and quality of the user of the system affects the impact of the organization is extremely. Next, the corporate environment and level of knowledge ERP systems consulting, respectively.

So if you want to bring any business to use the ERP system already, should focus on issues of environment and quality of the user of the system before the primary. If resources are quite limited, whether it is the time, money and personnel as a factor affecting the successful installation and implementation of ERP in the organization then focus on the other factors later. Such as the environment of the organization followed obtaining support from the leaders, whether it is financial support and other resources targeted to clear the ERP implementation to use in organization and use communication with all parties involved to understand the benefits of implementing ERP to help reduce the resistance that may occur. The related government sectors should support and encourage by allocating workshop training budget concerning ERP system utilization without fee. They may also provide ERP technology experts to analyze a break even point of practicable ERP applicability to company with free fee. Secondly, the government sectors should deeply study about ERP utilization to enable practicable deployment, In addition, they should cooperate together to be cluster and establish trading alliance for enabling reducing ERP cost.

Concurrently, perceived benefits of ERP adoption and entire SCM should be obviously elucidated. In addition, they should play important role to determine ERP cost. Additionally, top executive managements ought to be aware and encourage ERP adoption emphasis by their visions. Otherwise, if it is possible, their ERP adoption emphasis visions should be imposed to be main policy of companies. Similarly, they should be leader in scoping regulatory or related law and tax incentives of ERP technology .From all above mentioned, these principles may also be conducted on pilot project. These are more likely to help enlightening more interest of private sector. Finally, if several related organizations strongly cooperate together, ERP adoption for activities in industries, will be the most useful direction and management to entrepreneurs.

5.2.3 Suggestions for future research

The results of this research, researchers have suggestions for future research is the result of factors based forecasting models that can be successfully installed and the ERP system in use of the business in this time in Thailand. The future research should study the causes of levels; ability of the consultant does not affect the impact on individuals. Study of additional factors that may be related to the factors that are useful to predict the impact of the individual which will result in impacts to the organization or the successful installation and implementation of ERP use in business. Stages if the research methodology, the researcher should determine the sample size each group to get the ratio of accepted or trusted to make the data more suitable for analysis will provide the appropriate data were reliable, that is to be analyzed to test hypotheses. In addition, because the ratio of the system's ERP business in Thailand is very low compared to the total business in Thailand, bring ERP to use as well as businesses in Thailand bring an ERP system to use most of it as large and medium-sized quite large already. Factors should be broken down by type of business size to be factors affecting the successful installation and implementation of ERP in each business type, size of business properly.

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APPENDIX

QUESTIONNAIRE

<u>คำชี้แจง</u> แบบสอบถามผู้ประกอบการอุตสาหกรรมต่างๆ

<u>เรื่อง</u> "การศึกษาการใช้เทคโนโลยี อี อาร์ พี Enterprise Resource Planning (ERP) สำหรับการบริหารจัดการกระบวนการต่างๆในองค์กรของอุตสาหกรรมหลักในประเทศไทย"

แบบสอบถามฉบับนี้เป็นส่วนหนึ่งของการทำวิทยานิพนธ์ในระดับปริญญาโท สาขาวิชาวิศวกรรมอุตสาหการ คณะวิศวกรรมศาสตร์ มหาวิทยาลัยมหิดล โดยมีวัตถุประสงค์เพื่อจะศึกษาการประยุกต์ใช้เทคโนโลอี อาร์ พี Enterprise Resource Planning (ERP) ในการบริหารจัดการกระบวนการต่างๆในองค์กรของอุตสาหกรรมหลักในประเทศไทย ผลการวิจัยครั้งนี้ จะทำให้ทราบและเข้าใจข้อมูลเกี่ยวกับสถานภาพปัจจุบันและแนวโน้มการใช้งานเทคโนโลยี ERP สำหรับการบริหารจัดการกระบวนการต่างๆในองค์กรของอุตสาหกรรมหลักในประเทศไทย ตลอดจนสามารถใช้เป็นแนวทางในการวางแผนการนำเทคโนโลยี ERP มาใช้สำหรับการบริหารจัดการกระบวนการต่างๆในองค์กรของอุตสาหกรรมอื่น ๆ ที่มีลักษณะคล้ายคลึงกันต่อไป ซึ่งผู้วิจัยได้ตระหนักและเล็งเห็นว่าข้อมูลที่ท่านให้นั้นน่าจะเป็นประโยชน์ต่อกลุ่มอุตสาหกรรมของประเทศไทย และสถาบันหน่วยงานต่าง ๆ ที่เกี่ยวข้อง ตลอดจนผู้ที่ให้ความสนใจโดยทั่วไป คำตอบของท่านมีคุณค่าอย่างยิ่งต่องานวิจัย ดังนั้น ผู้วิจัยจะเก็บข้อมูลที่ได้รับจากท่านไว้เป็น**<u>ความลับอย่างดีที่สุด</u>** โดยจะนำไปใช้เพื่อวิเคราะห์ข้อมูลและสรุปผลการวิจัย**<u>ทางการศึกษาเท่านั้น</u>** ข้อมูลที่ตรงกับความจริงและสมบูรณ์จะช่วยให้การวิจัยดำเนินไปด้วยความถูกต้อง ผู้วิจัยจึงใคร่ขอความอนุเคราะห์จากท่าน โปรดตอบแบบสอบถามตามความคิดเห็นของท่านอย่างเป็นลำดับด้วยความรอบคอบและครบทุกข้อตามคำแนะนำที่ผู้วิจัยได้ระบุไว้แบบสอบถาม

แบบสอบถามนี้แบ่งออกเป็น 3 ตอน มีจำนวนทั้งหมด 8 หน้า

ตอนที่ 1 เป็นแบบสอบถามข้อมูลเกี่ยวกับ*<u>ข้อมูลองค์กร/บริษัท</u>*ของผู้ตอบแบบสอบถาม ลักษณะเป็นแบบตรวจสอบรายการ (Check-List) มีจำนวน 6 ข้อ

ตอนที่ 2 เป็นแบบสอบถามข้อมูลเกี่ยวกับ*<u>เทคโนโลยี ERP และ ปัจจัยที่มีผลต่อความสำเร็จในการนำเทคโนโลยี ERPมาใช้งานใน องค์กร</u>*ของผู้ตอบแบบสอบถาม มีจำนวน 13 ข้อ

ตอนที่ 3 เป็นแบบสอบถามข้อมูลเกี่ยวกับ*<u>ความคิดเห็นข้อเสนอแนะมาตรการกระตุ้นการนำเทคโนโลยีERPมาใช้งาน</u>*ของผู้ตอบ แบบสอบถาม ลักษณะเป็นแบบมาตราส่วนประเมินค่า (Rating Scale) มีจำนวน 1 ข้อ และคำถามปลายเปิด จำนวน 1 ข้อ

<u>หมายเหตุ:</u>
- เวลาโดยเฉลี่ยที่ใช้ในการตอบแบบสอบถาม (Estimated Time) ประมาณ 15-20 นาที
- แบบสอบถามฉบับนี้ได้มีการพัฒนามาจากงานวิจัยของมหาวิทยาลัย……ประเทศ…… มหาวิทยาลัย……ประเทศ…… และมหาวิทยาลัย……ประเทศ……
- หากท่านมีข้อสงสัยหรือประสงค์จะสอบถามข้อมูลเพิ่มเติม โปรดติดต่อ……..... ที่หมายเลขโทรศัพท์…… E-mail: ……

หลังจากที่ท่านได้ตอบแบบสอบถามฉบับนี้แล้ว กรุณาพับแบบสอบถามใส่ซองที่ได้จัดเตรียมไว้ แล้วส่งไปรษณีย์กลับมาตามที่อยู่ที่ผู้วิจัยได้จ่าหน้าซองและติดแสตมป์ไว้ให้เรียบร้อยแล้ว *<u>ภายในวันที่</u>*……และขอขอบพระคุณในความกรุณาของท่านที่ได้สละเวลาอันมีค่ามา ณ โอกาสนี้ด้วย และ<u>หากประสงค์จะรับแบบสอบถามฉบับภาษาอังกฤษ โปรดติดต่อกลับ</u>ที่อยู่ ……

ขอขอบพระคุณในความกรุณาของท่านมา ณ โอกาสนี้

นางสาวศรีวรัตน์ อภิเวสสะ
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หมายเลขแบบสอบถาม [ ] [ ] [ ] [ ]

แบบสอบถามเพื่อการวิจัย

<u>ตอนที่ 1</u> ข้อมูลเกี่ยวกับองค์กร

<u>คำชี้แจง</u> กรุณาใส่เครื่องหมาย ✓ ลงใน ☐ หน้าคำตอบที่ตรงกับสภาพความเป็นจริงเพียง 1 ข้อ ถ้าไม่ได้มีการระบุไว้เป็นอย่างอื่น และหากท่านเลือกคำตอบที่ระบุว่า <u>อื่นๆ</u> กรุณาระบุรายละเอียดเพิ่มเติมในช่องว่าง

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1. องค์กรของผู้ตอบแบบสอบถามประกอบอุตสาหกรรม

☐ อุตสาหกรรมสิ่งทอและเครื่องนุ่งห่ม ☐ อุตสาหกรรมอาหารและเครื่องดื่ม

☐ อุตสาหกรรมพลาสติก ☐ อุตสาหกรรมยานยนต์และชิ้นส่วน

2. ประเภทของธุรกิจ (ตอบได้มากกว่า 1 ข้อ)

☐ 1.) ผลิตให้ลูกค้าภายในประเทศ ☐ 4.) ผลิตและเป็นผู้ค้าปลีก (Retailer)

☐ 2.) ผลิตให้ลูกค้าต่างประเทศ (Exporter) ☐ 5.) ผลิตและเป็นผู้ค้าส่งและปลีก (Wholesaler & Retailer)

☐ 3.) ผลิตและเป็นผู้ค้าส่ง (Wholesaler) ☐ 6.) อื่นๆ (โปรดระบุ) .....

3. การจดทะเบียนธุรกิจ

☐ 1.) บริษัทจำกัด (มหาชน) ☐ 4.) ห้างหุ้นส่วนจำกัด (หจก.)

☐ 2.) บริษัทจำกัด ☐ 5.) อื่น ๆ (โปรดระบุ) .....

☐ 3.) บริษัทจำกัดต่างชาติที่มีหลายสาขาในต่างประเทศ

4. ขนาดของบริษัท (จำนวนบุคลากร/คน)

☐ 1.) ขนาดเล็ก (1-50 คน) ☐ 2.) ขนาดปานกลาง (51-200 คน) ☐ 3.) ขนาดใหญ่ (มากกว่า 200 คน)

5. สินค้าของบริษัทจัดอยู่ในประเภทใด?

☐ 1.) ผลิตตามใบสั่งซื้อ Made to Order / สินค้าตามความต้องการของลูกค้า (Customized products)

☐ 2.) ผลิตเพื่อเป็นแบบประกอบชิ้นส่วนต่าง ๆ ตามใบสั่งซื้อ (Assemble-to-order) / สินค้าตามความต้องการของลูกค้า

☐ 3.) ผลิตเพื่อเป็นสินค้าคงคลังเพื่อรอจำหน่าย (Made-to-stock) /สินค้ามาตรฐาน (Standard products)

☐ 4.) อื่น ๆ (โปรดระบุ).....

6. จำนวนเงินลงทุนในการจดทะเบียน

☐ 1.) น้อยกว่า 5 ล้านบาท ☐ 4.) 51-100 ล้านบาท ☐ 7.) 501-1,000 ล้านบาท

☐ 2.) 5-25 ล้านบาท ☐ 5.) 101-250 ล้านบาท ☐ 8.) มากกว่า 1,000 ล้านบาทขึ้นไป

☐ 3.) 26-50 ล้านบาท ☐ 6.) 251-500 ล้านบาท

<u>ตอนที่ 2</u> ข้อมูลเกี่ยวกับเทคโนโลยี Enterprise Resource Planning (ERP)

<u>คำชี้แจง</u> กรุณาใส่เครื่องหมาย ✓ลงใน ☐ หน้าคำตอบที่ตรงกับสภาพความเป็นจริงเพียง 1 ข้อ ถ้าไม่ได้มีการระบุไว้เป็นอย่างอื่น และหากท่านเลือกคำตอบที่ระบุว่า <u>อื่นๆ</u> กรุณาระบุรายละเอียดเพิ่มเติมในช่องว่าง

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1. ท่านมีความรู้ความเข้าใจเกี่ยวกับเทคโนโลยี ERP ในระดับใด

☐ 5.) มาก ☐ 4.) ค่อนข้างมาก ☐ 3.) ปานกลาง ☐ 2.) ค่อนข้างน้อย ☐ 1.) น้อย

2. องค์กรของท่านได้มีการใช้โปรแกรมตัวอื่นก่อนหน้าที่จะมีการนำเทคโนโลยี ERP มาใช้ในองค์กรหรือไม่

☐ มี (โปรดระบุ) ..... ☐ ไม่มี

3. คุณไม่ใช้เทคโนโลยี ERP ในองค์กรของคุณเพราะเหตุใด

☐ ไม่มีความรู้เรื่องเทคโนโลยี

☐ ขาดเงินลงทุน

☐ ระบบเดิมที่ใช้ดีอยู่แล้ว

☐ ระบบเทคโนโลยีมีราคาแพง

☐ ไม่มีความสนใจ

☐ อื่นๆ (โปรดระบุ) .....

4. ท่านคิดว่าเทคโนโลยี ERP มีความสำคัญต่อการดำเนินธุรกิจ/การพัฒนาธุรกิจในการบริหารจัดการองค์กร ในระดับใด

- สำคัญมาก หมายถึง บริษัทคงไม่สามารถทำงานให้สำเร็จได้ ถ้าบริษัทไม่มีการนำเทคโนโลยี ERP มาใช้
- สำคัญ หมายถึง ถ้าบริษัทไม่มีการนำเทคโนโลยี ERP มาใช้ บริษัทคงดำเนินงานไปด้วยความลำบากจึงจะสำเร็จได้
- สำคัญปานกลาง หมายถึง ถ้าบริษัทไม่มีการนำเทคโนโลยี ERP มาใช้ บริษัทยังสามารถดำเนินงานให้สำเร็จได้ แต่ถ้ามีการนำมาใช้ในบางกระบวนการก็อาจช่วยทำให้บริษัทมีการดำเนินงานได้มีประสิทธิภาพยิ่งขึ้น
- สำคัญน้อย หมายถึง แม้ว่าไม่มีการนำเทคโนโลยี ERP มาใช้ บริษัทยังคงสามารถดำเนินงานได้สำเร็จได้ด้วยดี
- ไม่สำคัญ หมายถึง ไม่มีความจำเป็นที่จะนำ ERP มาใช้ และ ERP ไม่มีส่วนสำคัญใด ๆ ต่อการดำเนินธุรกิจของบริษัท

	สำคัญมาก 5	สำคัญ 4	สำคัญปานกลาง 3	สำคัญน้อย 2	ไม่สำคัญ 1
1.) การบริหารจัดการการผลิต (Manufacturing Management)	☐	☐	☐	☐	☐
2.) การบริหารจัดการบัญชีการเงิน (Accounting Management)	☐	☐	☐	☐	☐
3.) การบริหารจัดการ โลจิสติกส์ (Logistics Management)	☐	☐	☐	☐	☐
4.) การบริหารจัดการบุคคล (Personnel Management)	☐	☐	☐	☐	☐
5.) การบริหารจัดการการบำรุงรักษา (Maintenance Planning)	☐	☐	☐	☐	☐

5. ปัจจุบันสถานะการนำเทคโนโลยี ERP มาใช้งานในการบริหารจัดการองค์กร หรือของบริษัทอยู่ในสถานะใด

☐ 1.) นำไปใช้งานแล้วในทุกส่วนงานขององค์กร

☐ 2.) นำไปใช้งานแทนที่ระบบเดิมในบางส่วนแล้ว

☐ 3.) นำไปใช้งานควบคู่กับระบบเดิม

☐ 4.) ทดลองใช้แล้ว ได้ผลสำเร็จ แต่ไม่ได้นำมาใช้งาน

☐ 5.) ทดลองใช้แล้ว ได้ผลสำเร็จบางส่วน แต่ไม่นำมาใช้งาน

☐ 6.) ทดลองใช้แล้ว ไม่ได้ผลสำเร็จ และไม่นำมาใช้งาน

☐ 7.) กำลังทดลองใช้งานอยู่ในปัจจุบัน (Pilot Testing)

☐ 8.) กำลังวางแผน/มีแผนการที่จะทดลองใช้งาน **(ต่อข้อ 7)**

☐ 9.) ไม่มีแผนการใด ๆ ที่จะนำมาลองใช้งาน เนื่องจาก **(โปรดระบุเหตุผลและกรุณาต่อข้อ 15, 17 และคำถามตอนที่ 3)**

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6. จากข้อ 5 บริษัทที่กำลังวางแผน/มีแผนการที่จะทดลองนำ ERP มาใช้งานในการบริหารจัดการองค์กร อยู่ในขั้นใด

☐ 1.) อยู่ระหว่างการศึกษาและรวบรวมข้อมูล/ความเป็นไปได้

☐ 2.) อยู่ระหว่างกำหนดงบประมาณที่จะใช้

☐ 3.) อยู่ระหว่างการขออนุมัติโครงการ/งบประมาณ

☐ 4.) อยู่ระหว่างการจัดซื้อจัดจ้าง

☐ 5.) อยู่ระหว่างการเลือกผู้จำหน่าย (Vendor)

☐ 6.) อยู่ระหว่างดำเนินการติดตั้งระบบ

7. บริษัทมีการวางแผนงบประมาณสนับสนุนเทคโนโลยี ERP เพื่อการบริหารจัดการองค์กร ประจำปีหรือไม่

☐ 1.) มี ☐ 2.) ไม่มี 3.) ตามความพอใจ (เฉพาะกิจ)

8. บริษัทได้นำเอาเทคโนโลยี ERP มาใช้งาน (หรือมีแผนการจะนำเอา ERP มาใช้ในอนาคต) เพื่อการบริหารจัดการกระบวนการต่างๆในอุตสาหกรรม ใน**<u>ด้านใดบ้าง</u>** ***(เลือกตอบได้มากกว่า 1 ข้อ)*** และ **<u>ภายในระยะเวลาเท่าใด</u>** นับจากนี้

	ถูกนำไปใช้แล้ว	วางแผนว่าจะนำมาใช้ภายใน 1 ปี นับจากนี้	วางแผนว่าจะนำมาใช้ภายใน 2 ปี นับจากนี้	วางแผนว่าจะนำมาใช้ภายใน 5 ปี นับจากนี้	ไม่มีแผนการที่จะนำไปใช้
8.1 การบริหารจัดการการผลิต (Manufacturing Management)					
a.) ติดตามความก้าวหน้าของการทำงานในกระบวนการผลิต (Work-In-Progress Tracking: WIP)/Production Control) (Work-In-Progress Tracking: WIP)	☐	☐	☐	☐	☐
b.) ระบบการควบคุมสินค้าคงคลัง (Receipt/Shipment Control)	☐	☐	☐	☐	☐
c.) การออกแบบ (Technical Information Control)	☐	☐	☐	☐	☐
d.) การจัดซื้อ (Outsourcing/Purchasing, Procurement)	☐	☐	☐	☐	☐
8.2 การจัดการโลจิสติกส์ (Logistics Management)					
a.) Logistic Requirement Planning	☐	☐	☐	☐	☐
b.) การควบคุมสินค้านำเข้าและส่งออก (Import/Export Control)	☐	☐	☐	☐	☐
c.) การจัดการคลังสินค้า (Warehouse Management)					
d.) การควบคุมการขนส่ง (Shipment/Transport Control)	☐	☐	☐	☐	☐
8.3 การบริหารจัดการบัญชีการเงิน (Accounting Management)					
a.) บัญชีการเงิน	☐	☐	☐	☐	☐
b.) บัญชีการบริหาร	☐	☐	☐	☐	☐
8.4 การบริหารบุคคล (Personnel Management)					
a.) การจัดการทรัพยากรบุคคล	☐	☐	☐	☐	☐
b.) การจัดการทางด้านแรงงาน, การฝึกงาน (Training)	☐	☐	☐	☐	☐
8.5 การบำรุงรักษา (Maintenance Control)					
a.) การบำรุงรักษาเครื่องจักรและอุปกรณ์ต่างๆ	☐	☐	☐	☐	☐

9. บริษัทมีระดับการใช้งานเทคโนโลยี ERP (หรือกำลังวางแผนว่าจะนำมาใช้งาน) เพื่อบริหารจัดการกระบวนการต่างๆในอุตสาหกรรม แต่ละด้านอยู่ในระดับใด

	ระดับการนำเอาเทคโนโลยี ERP มาใช้งาน					
	มากที่สุด (5)	**มาก (4)**	**ปานกลาง (3)**	**น้อย (2)**	**น้อยมาก (1)**	**ไม่มีใช้ / ไม่เคยใช้ (-)**
9.1 การบริหารจัดการการผลิต (Manufacturing Management)						
a.) ติดตามความก้าวหน้าของการทำงานในกระบวนการผลิต (Work-In-Progress Tracking: WIP)/Production Control) (Work-In-Progress Tracking: WIP)	☐	☐	☐	☐	☐	☐
b.) ระบบการควบคุมสินค้าคงคลัง (Receipt/Shipment Control)	☐	☐	☐	☐	☐	☐
c.) การออกแบบ (Technical Information Control)	☐	☐	☐	☐	☐	☐
d.) การจัดซื้อ (Outsourcing/Purchasing, Procurement)	☐	☐	☐	☐	☐	☐
9.2 การจัดการโลจิสติกส์ (Logistics Management)						
a.) Logistic Requirement Planning	☐	☐	☐	☐	☐	☐
b.) การควบคุมสินค้านำเข้าและส่งออก (Import/Export Control)	☐	☐	☐	☐	☐	☐
c.) การจัดการคลังสินค้า (Warehouse Management)	☐	☐	☐	☐	☐	☐
d.) การควบคุมการขนส่ง (Shipment/Transport Control)	☐	☐	☐	☐	☐	☐
9.3 การบริหารจัดการบัญชีการเงิน (Accounting Management)						
a.) บัญชีการเงิน	☐	☐	☐	☐	☐	☐
b.) บัญชีการบริหาร	☐	☐	☐	☐	☐	☐
9.4 การบริหารบุคคล (Personnel Management)						
a.) การจัดการทรัพยากรบุคคล	☐	☐	☐	☐	☐	☐
b.) การจัดการทางด้านแรงงาน, การฝึกงาน (Training)	☐	☐	☐	☐	☐	☐

	ระดับการนำเอาเทคโนโลยี ERP มาใช้งาน					
	มากที่สุด (5)	มาก (4)	ปานกลาง (3)	น้อย (2)	น้อยมาก (1)	ไม่มีใช้ / ไม่เคยใช้ (-)
9.5 การบำรุงรักษา (Maintenance Control)						
a.) การบำรุงรักษาเครื่องจักรและอุปกรณ์ต่างๆ	☐	☐	☐	☐	☐	☐

10. ท่านคิดว่าปัจจัยใดบ้างต่อไปนี้ที่เป็น**<u>แรงจูงใจ/สิ่งกระตุ้นหลัก</u>**ที่สำคัญของบริษัทที่มีอิทธิพลต่อระดับการนำ ERP มาใช้งาน (ข้อมูลเกี่ยวกับปัจจัยที่มีผลต่อการตัดสินใจในการใช้เทคโนโลยี)

ปัจจัยแรงจูงใจ / สิ่งกระตุ้นหลัก	ระดับความสำคัญของแรงจูงใจ				
	มากที่สุด (5)	มาก (4)	ปานกลาง (3)	น้อย (2)	น้อยมาก (1)
10.1 เกี่ยวกับความคิดในการใช้เทคโนโลยีใหม่					
a.) เทคโนโลยี ERP นี้ช่วยให้พบวิธีทางแก้ปัญหาเดิมๆที่เกิดขึ้นในองค์กรของคุณ					
b.) เทคโนโลยี ERP นี้สนับสนุนให้คุณลองวิธีการจัดการองค์กรในรูปแบบใหม่					
10.2 เกี่ยวกับความเป็นผู้นำทางด้านเทคโนโลยี					
a.) คุณใช้เทคโนโลยี ERP ในขณะที่องค์กรอื่นๆในธุรกิจเดียวกันยังไม่ได้มีการนำมาใช้					
b.) องค์กรของคุณเป็นองค์กรแรกๆในการรับรู้เกี่ยวกับเทคโนโลยี ERP					
c.) โดยปกติแล้วองค์กรของคุณเป็นผู้นำทางด้านเทคโนโลยีในขณะที่องค์กรอื่นๆยังคงรูปแบบเดิม					
10.3 เกี่ยวกับคุณภาพของข้อมูล					
a.) ระบบการทำงานขององค์กรมีข้อมูลที่ทันสมัยตลอดเวลา					
b.) การขาดความเป็นอันหนึ่งอันเดียวกันของข้อมูล					
c.) คุณได้รับข้อมูลตามความต้องการอย่างทันทวงที่ (real time)					

ปัจจัยแรงจูงใจ / สิ่งกระตุ้นหลัก	ระดับความสำคัญของแรงจูงใจ				
	มากที่สุด (5)	มาก (4)	ปานกลาง (3)	น้อย (2)	น้อยมาก (1)
10.3 เกี่ยวกับคุณภาพของข้อมูล (ต่อ)					
d.) ข้อมูลในแต่ละฝ่ายขององค์กรให้ข้อมูลที่ชัดเจนและ เข้าใจง่าย					
e.) ระบบการทำงานขององค์กรให้ข้อมูลเพียงพอต่อความต้องการ					
10.4 เกี่ยวกับความง่ายในการใช้งาน					
a.) เทคโนโลยี ERP มีความง่ายต่อการใช้งาน					
b.) เมื่อมีความผิดพลาดเกิดขึ้นคุณสามารถแก้ไขได้อย่างง่ายดาย					
10.5 เกี่ยวกับคุณภาพของระบบและคุณภาพของการให้บริการ					
a.) ได้รับการดูแลรักษาและการซ่อมแซมจากบริษัทผู้ดูแลระบบอย่างทันท่วงทีเมื่อคุณต้องการ					
b.) ได้รับการดูแลรักษาและการซ่อมแซมที่มีคุณภาพ					
10.6 เกี่ยวกับประสบการณ์การใช้เทคโนโลยีของผู้ใช้งาน					
a.) คุณมีความรู้ความเข้าใจในการใช้เทคโนโลยี ERP					
b.) องค์กรของคุณมีการใช้เทคโนโลยีนี้มาเป็นระยะเวลานาน					
10.7 เกี่ยวกับความความพึงพอใจในระบบ					
a.) คุณมีความพึงพอใจในระบบเทคโนโลยี ERPที่คุณใช้อยู่ในปัจจุบัน					
b.) การทำงานในองค์กรเป็นไปอย่างง่ายและสะดวกขึ้นกว่าเดิม					
c.) คุณคิดว่าเทคโนโลยีERPที่คุณใช้อยู่นั้นเหมาะสมและดีต่อองค์กรของคุณ					
10.8 เกี่ยวกับการรับรู้ถึงประโยชน์ที่ได้รับ					
a.) เป็นการพัฒนาปรับปรุงกระบวนการทำงานต่าง ๆ ภายในองค์กรให้ดำเนินไปอย่างมีประสิทธิภาพดีขึ้น					

ปัจจัยแรงจูงใจ / สิ่งกระตุ้นหลัก	ระดับความสำคัญของแรงจูงใจ				
	มากที่สุด (5)	มาก (4)	ปานกลาง (3)	น้อย (2)	น้อยมาก (1)
10.8 เกี่ยวกับการรับรู้ถึงประโยชน์ที่ได้รับ (ต่อ)					
b.) เทคโนโลยี ERP นี้สามารถเพิ่มคุณภาพการทำงานในองค์กร					
10.9 เกี่ยวกับการรับรู้ถึงประสิทธิภาพขององค์กร					
a.) เทคโนโลยีที่นำมาใช้นั้นจะมีประสิทธิภาพก็ต่อเมื่อมีการปรับปรุงองค์กร					
b.) เทคโนโลยี ERP ทำให้องค์กรของคุณประสบความสำเร็จ					
c.) เทคโนโลยี ERP นำคุณไปสู่คุณภาพของงานที่สูงกว่า					
d.) คุณคิดว่าอนาคตข้างหน้าองค์กรของคุณจะได้รับผลกำไรมากขึ้น					
10.10 เกี่ยวกับการปฏิบัติงาน					
a.) เทคโนโลยี ERP ช่วยให้การติดต่อสื่อสารภายในองค์กรเป็นไปอย่างมีประสิทธิภาพ					
b.) เทคโนโลยี ERP ช่วยให้การติดต่อสื่อสารระหว่างองค์กรคุณกับลูกค้าเป็นไปอย่างมีประสิทธิภาพ					
g.) อื่น ๆ (โปรดระบุ.....)					

11. ท่านคิดว่า **<u>ปัญหาหรืออุปสรรคใดบ้างต่อไปนี้</u>** เป็นปัจจัยสำคัญที่มีอิทธิผลต่อ**<u>ระดับความสำเร็จ</u>**ในการนำเอาเทคโนโลยี ERP มาใช้งานในองค์กร

ปัจจัยที่มีผลต่อความสำเร็จ	ระดับความคิดเห็น				
	เห็นด้วยอย่างยิ่ง	เห็นด้วย	ปานกลาง	ไม่เห็นด้วย	ไม่เห็นด้วยอย่างยิ่ง
1.) นำ ERP มาใช้โดยไม่ไปยุ่งเกี่ยวกับ business process ซึ่งใช้อยู่ในปัจจุบันทำให้ไม่เกิดการปฏิรูปการทำงาน					
2.) ระบบที่มีอยู่ไม่รองรับกับการใช้งานระบบ ERP / ขาดมาตรฐานการเชื่อมโยงข้อมูลเข้ากับโครงสร้างระบบ IT ที่มีอยู่เดิม					

ปัจจัยที่มีผลต่อความสำเร็จ	ระดับความคิดเห็น				
	เห็นด้วยอย่างยิ่ง	เห็นด้วย	ปานกลาง	ไม่เห็นด้วย	ไม่เห็นด้วยอย่างยิ่ง
3.) งบประมาณที่ใช้ติดตั้งระบบและการเชื่อมโยงระบบ ERP เข้ากับโครงสร้างระบบ IT ที่มีอยู่เดิมสูง					
4.) ขาดความรู้ความเข้าใจอย่างชัดเจนถึงเป้าหมายและวัตถุประสงค์ของการนำ ERP มาใช้ในองค์กร					
5.) การสนับสนุนงบประมาณด้าน ERP ของบริษัทมีจำกัด					
6.) ขาดมาตรฐานที่เป็นสากล จึงทำให้ผู้ที่จะนำมาใช้เกิดความลังเลใจในการนำ ERP มาใช้งาน					
7.) ขาดความร่วมมือจากผู้จัดหาวัตถุดิบ (Supplier) และหรือผู้ค้ารายย่อยในการดึงและแชร์ข้อมูล					
8.) ขาดการสนับสนุนจากภาครัฐ					
9.) บุคลากรยังมีความรู้ความเข้าใจในการใช้เทคโนโลยี ERP ไม่เพียงพอสำหรับการใช้งาน					
10.) ผู้มีอำนาจในการตัดสินใจยังไม่ตระหนักถึงความสำคัญ และความจำเป็นในการนำ ERP มาใช้ในองค์กร					
11.) ความปลอดภัยของระบบและปัญหาสิทธิส่วนบุคคล					
12.) ระยะเวลาในการพัฒนาระบบนานและใช้ต้นทุนสูง					
13.) มีความพยายามต่ำในการแสวงหาประสิทธิผลต่อเนื่องหลังจากมีการนำมาใช้					
14.) ผู้บริหารยังคงใช้รูปแบบการบริหารโดยใช้จากข้อมูลที่รวบรวมสรุปรายเดือน ซึ่งข้อมูลจาก ERP จะมีลักษณะ real time					

ปัจจัยที่มีผลต่อความสำเร็จ	ระดับความคิดเห็น				
	เห็นด้วยอย่างยิ่ง	เห็นด้วย	ปานกลาง	ไม่เห็นด้วย	ไม่เห็นด้วยอย่างยิ่ง
15.) การติดต่อสื่อสารระหว่างแผนกยังไม่มีประสิทธิภาพที่ดีพอ					
16.) ขาดการสนับสนุนจากผู้บริหารระดับสูงขององค์กร					
17.) บุคลากรยังขาดจิตสำนึกในการปฏิรูปวัฒนธรรมและวิถีขององค์กร					
18.) ความยากในการพัฒนาต่อยอดให้สอดคล้องกับยุทธศาสตร์การบริหารธุรกิจ					
19.) ขาดการฝึกฝนอบรมบุคลากรในการใช้เทคโนโลยี ERP เพื่อให้เกิดทักษะและความชำนาญมากขึ้นต้นทุนของการดูแลรักษาหลังจากการนำมาใช้สูง					
20.) อื่นๆ (โปรดระบุ) …… ……					

<u>ตอนที่ 3</u> ข้อมูลเกี่ยวกับข้อคิดเห็นเกี่ยวกับข้อเสนอแนะมาตรการกระตุ้นการนำ ERP มาใช้งานในองค์กร

<u>คำชี้แจง</u> กรุณาใส่เครื่องหมาย ✓ ลงใน ☐ หน้าคำตอบข้อที่ตรงกับความคิดเห็นของท่านมากที่สุด และหากท่านเลือกคำตอบที่ระบุว่า <u>อื่นๆ</u> กรุณาระบุรายละเอียดเพิ่มเติมในช่องว่าง

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1. ท่านมีความคิดเห็นอย่างไรกับข้อเสนอแนะเกี่ยวกับมาตรการต่าง ๆ ที่จะสามารถผลักดันและกระตุ้นให้มีการนำเอา ERP มาใช้ในการบริหารจัดการกระบวนการต่างๆในองค์กร ให้มีประสิทธิภาพและประสบผลสำเร็จมากยิ่งขึ้น

ข้อคิดเห็นของผู้ประกอบการ	ระดับความคิดเห็น				
	มากที่สุด	มาก	ปานกลาง	น้อย	น้อยที่สุด
	(5)	(4)	(3)	(2)	(1)
1. กำหนดเป็นนโยบายของบริษัท	☐	☐	☐	☐	☐
2. กำหนดเป็นข้อตกลงหรือนโยบายระหว่างบริษัทคู่ค้า	☐	☐	☐	☐	☐
3. จัดทำคู่มือเอกสารประกอบการใช้งาน ERP อย่างละเอียด	☐	☐	☐	☐	☐
4. จัดอบรมให้ความรู้ความเข้าใจเกี่ยวกับประโยชน์ของการนำ ERP มาใช้ใน องค์กรให้แก่ บุคลากรในองค์กรทุกระดับโดยเฉพาะระดับปฏิบัติการเพื่อให้เกิดประโยชน์สูงสุดอย่างแท้จริง	☐	☐	☐	☐	☐
5. มีฝ่ายผู้เชี่ยวชาญดูแลและให้คำปรึกษาเฉพาะด้านเกี่ยวกับเทคโนโลยี ERP ของบริษัท	☐	☐	☐	☐	☐
6. มีการรวมเอาระบบเทคโนโลยีสารสนเทศที่มีอยู่มาเข้ากันกับระบบ ERP	☐	☐	☐	☐	☐
7. ภาครัฐจัดให้มีประชาพิจารณ์ต่อการประกาศใช้ ERP เพื่อการบริหารจัดการกระบวนการ ต่างๆในองค์กรและในภาคอุตสาหกรรมยานยนต์และชิ้นส่วน	☐	☐	☐	☐	☐
8. จัดให้มีการประชุมสัมมนาเฉพาะกลุ่มผู้ประกอบการในภาคอุตสาหกรรมอย่างต่อเนื่องในด้านเทคโนโลยี ERP ในการบริหารจัดการกระบวนการ ต่างๆในองค์กรและในภาคอุตสาหกรรม เพื่อที่จะแลกเปลี่ยนความคิดเห็นต่อกัน และจะได้เตรียมพร้อมในการใช้งานในอนาคตที่จะแลกเปลี่ยนความคิดเห็นต่อกัน และจะได้เตรียมพร้อมในการใช้งานในอนาคต	☐	☐	☐	☐	☐
9. อื่นๆ (โปรดระบุ) ……..	☐	☐	☐	☐	☐

2. ปัญหาและข้อเสนอแนะอื่น ๆ เกี่ยวกับการนำเอาเทคโนโลยี ERP มาใช้เพื่อการบริหารจัดการกระบวนการต่างๆในองค์กรและในภาคอุตสาหกรรมของผู้ประกอบการ

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ขอขอบพระคุณผู้ตอบแบบสอบถามทุกท่านสำหรับการสละเวลาอันมีค่าของท่านเป็นอย่างยิ่ง และ หากท่านประสงค์ที่จะรับสำเนาผลการวิจัย

กรุณาใส่ชื่อ-นามสกุล และรายละเอียดของท่านด้านล่างนี้

ชื่อ-นามสกุล: _____

ตำแหน่ง : _____

ชื่อบริษัท : _____

โทรศัพท์ : _____โทรสาร: _____

E-mail : _____

BIOGRAPHY

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