Chapter III

Research Methodology

This study employed quantitative analysis to investigate the user acceptance process of mandated IS implementation. ERP implementation is chosen to be the context of the study since it presents a unique environment where users are required to use a system in order to perform their routines and to proceed along the business process (Brown et al., 2002; Marnewick and Labuschagne, 2005; Nah et al., 2004). Quantitative research methodology is employed to empirically test the conceptual model proposed in this study.

The objectives have been set forth in chapter 1; this chapter is organized as follows. The following section discusses the research methodology used to reach these goals. The proposed research framework is recapitulated, after which the research method and sampling frame are described. Finally, the research instruments are defined.

3.1 Proposed Research Framework

The research framework proposed in this study represents the interplay between user acceptance and user resistance in a mandatory-use context. All the hypothesized relationships are presented in Figure 9. Relationships between perception and attitude are examined. The linkage between user acceptance and user resistance is tested. In addition to that, the effect of the two phenomena on job satisfaction is assessed. There are 16 hypotheses derived from this proposed framework listed in Table 3. The next section will describe the research methodology undertaken in this study to test this proposed framework.

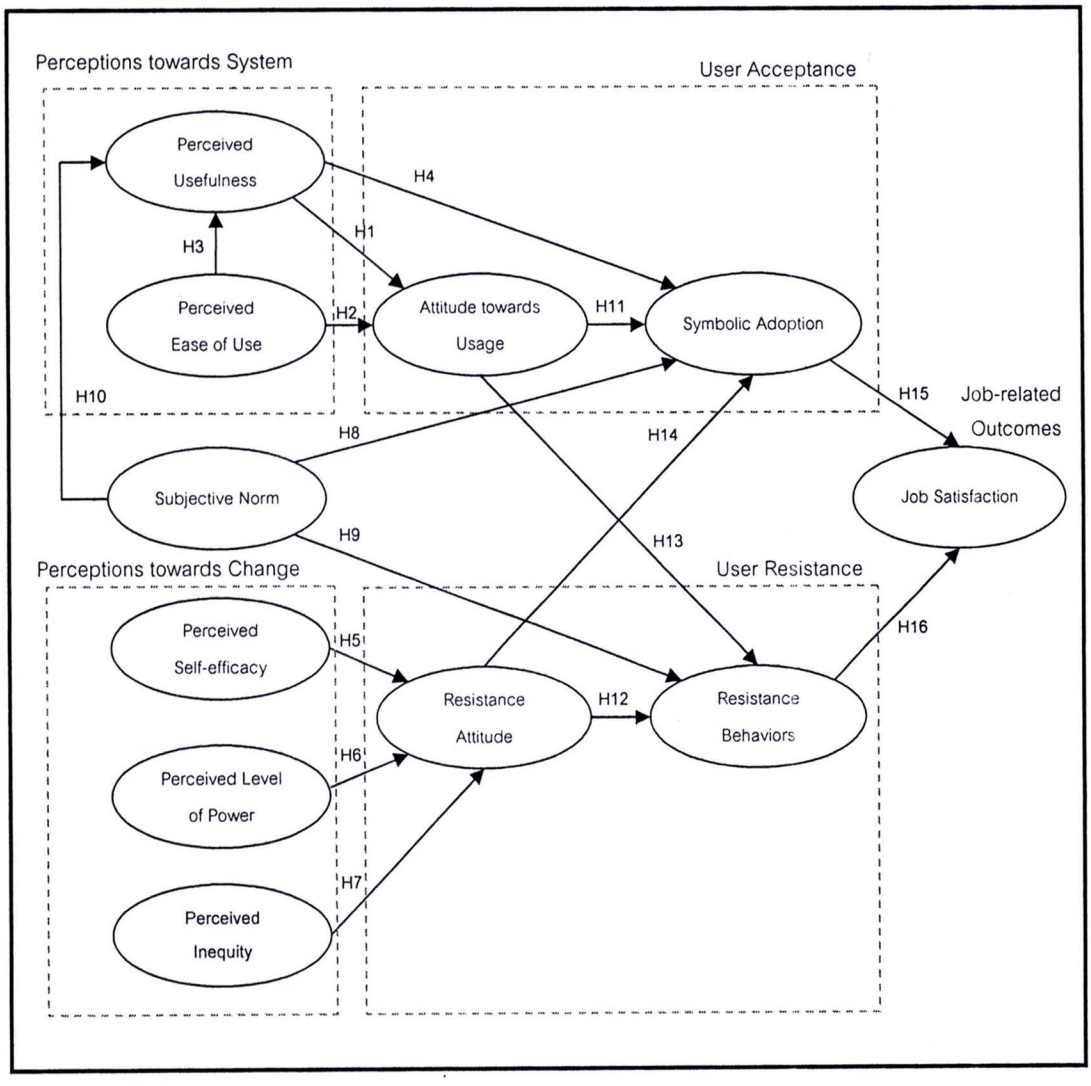


Figure 9 The proposed research framework

Table 3 List of hypotheses

Hypothesis	Description
H1	Perceived usefulness will have a positive direct effect on attitude towards usage
H2	Perceived ease of use will have a positive direct effect on attitude towards usage
H3	Perceived ease of use will have a positive direct effect on perceived usefulness
H4	Perceived usefulness will have a positive direct effect on symbolic adoption
H5	A high level of self-efficacy will have a negative direct effect on resistance attitude
H6	A high level of power in an organization will have a positive direct effect on resistance attitude
H7	Perceived inequity will have a positive direct effect on resistance attitude
H8	A high level of subjective norm will have a positive direct effect on symbolic adoption
H9	A high level of subjective norm will have a negative direct effect on resistance behaviors
H10	A high level of subjective norm will have a direct effect on perceived usefulness
H11	A high level of user attitude towards usage will have a direct effect on symbolic adoption
H12	Resistance attitude will have a direct effect on Resistance behaviors
H13	A high level of attitude towards usage will have a negative direct effect on resistance behaviors
H14	Resistance attitude will have a negative direct effect on symbolic adoption

Hypothesis	Description
H15	A high level of symbolic adoption will have a positive direct effect on job satisfaction
H16	Resistance behaviors will have a negative direct effect on job satisfaction

3.2 Research Methodology

This section describes the details of the research methodology for the current research. Since this research emphasizes the nature of user acceptance and resistance to change in the ERP implementation process, the unit of analysis is at the individual level. A case study is employed to gain insightful information (Chen and Lou, 2002; Eisenhardt, 1989). A case study allows researchers to have access to a real natural setting (Benbasat, Goldstein, and Mead, 2002). Thus, researchers can study how the relationship between factors was established, and then pursue further possible explanations of the relationship (Gillham, 2000).

Kaplan and Duchon (1988) presented examples of how quantitative and qualitative research methods can be employed together in case study research. The combination of the two research approaches can prompt researchers to potential errors as well as lead to new insights. Mingers (2001) provided practical guidelines derived from published works in the IS literature that adopted a pluralist methodology. In principle, it can be any type of research design. The current study follows this pluralist methodology as the predominant research design. Quantitative and qualitative research methods are considered to be sound and reasonable to test existing beliefs. In the exploratory stage of the research, qualitative data allow the researcher to understand the background of the ERP implementation and the organization where the ERP is implemented. Quantitative data are used to test hypothesized relationships in the proposed research framework. A fair amount of previous research has adopted the quantitative approach in studying TAM with a relative degree of validity and reliability

(Jackson, Chow, and Leitch, 1997; Karahanna, 1999; Legris et al., 2003; Rai, Lang, and Welker, 2002; Venkatesh and Davis, 2000).

Although most research on resistance to change tends to employ qualitative methodology (Diego Maria, Maria Rita, and Fabiola, 2002; Labianca et al., 2000; Lapointe and Rivard, 2005; Markus, 1983 ; Trader-Leigh, 2002), survey has proved to help researchers understand the relationship between resistance to change with other variables (Bovey and Hede, 2001a, 2001b; Oreg, 2006; Stanley, Meyer, and Topolnytsky, 2005). Hypotheses are tested with empirical data. Survey is used for data elicitation instead of experiments. The reason is that this research attempts to examine individuals' attitudes which could be disguised under experimental settings. People tend to behave differently if they are being studied. For example, in the Hawthorne experiment, subjects under this experiment performed differently because they knew that they were experimental subjects (Franke and Kaul, 1978). With the nature of attitudes that are not directly observable, survey is seen to be appropriate for this research by assuming attitudes as hypothetical construct (Zikmund, 2002). In addition to quantitative data, qualitative data were also used in the current study to provide insights into each case. Informants were asked for consent, were informed about the objectives of the study, and were assured of their anonymity. They were asked about the background of a project in general and questions related to the questionnaire survey. These qualitative data were used to explore the background of each case

Yin (1984) suggested four types of case study designs based on the number of cases and the number of units of analysis. A study can be single-case or multiple-case design depending on the nature of the case. The single-case design seems to be appropriate for a critical case, an extreme or unique case, or a revelatory case. On the other dimension of case study design, if a case study involves only one unit of analysis, it is called a holistic case study design. A study with multiple units of analysis is called an embedded case study design. From the literature, the nature of user acceptance and resistance in the ERP context tends to be prevalent. This current study follows a holistic multiple-case design.

Of the four phases of ERP implementation identified earlier, data were collected from three phases by combining the first two phases as one single phase: selection/definition phase, implementation phase and operation phase. This is because the selection phase and definition phases are somewhat alike in terms of impacts of a change on users because the first two phases involve high-level activities. It appears to impact users only a little. Users start to discern the change brought about by the implementation in the implementation phase.

Three organizations in Thailand known to implement the ERP system were chosen as the three cases with ERP users as the unit of analysis. Three cases appear to be adequate to pursue three different patterns of user acceptance and resistance to change. These three organizations comprised a large state-owned enterprise providing services to a large area. This large organization had a considerable number of business units employing numerous human resources. One organization was at the beginning of the implementation, a second organization had begun to implement ERP but was facing the delay of the project, and the third organization had finished the ERP implementation and continued to use it for a certain period. These three are thus titled: POSTAL, ENERGY, and WATER, respectively. Each is described in greater detail below.

POSTAL is a large organization with the total of approximately 20,000 employees and workers. Its services include postal and monetary services covering areas nationwide. The structure of the organization consists of seven departments: Marketing and Business Development, Finance and Accounting, Administration and Property Management, Human Resources, Information System, Operations, and International Affairs. POSTAL planned to commence the ERP implementation before the end of year 2008, but unfortunately, it suffered from the cancellation of three bid solicitations. The implementation project was thus delayed. The fourth bid was announced during the middle of 2010 which is the time when data were collected.

ENERGY is the largest power producer in Thailand, including various business operations. Currently, there are eight command lines:1) Policy and Planning, 2)

Account and Finance, 3) Administration, 4) Development, 5) Generation, 6) Fuel, 7) Transmission System, and 8) System Control. Work procedures in ENERGY appear to be decentralized. This presented a challenge for the ERP implementation. Although the number of employees was approximately 24,000 headcounts, not all of them were intended to become ERP users. Encountering many obstacles, the progress of the implementation was behind the original plan. It was in the process of the integration test to be followed by user trainings, at which time ERP users would be identified. During the final training sessions around the mid of 2009, data were collected.

WATER is another state-owned enterprise providing water supply to residences, businesses, and industries in Bangkok, Nonthaburi, and Samut Prakan. There are six departments including 1) Aministration, 2) Finance, 3) Planning, 4) Engineering, 5) Services, and 6) Distribution. ERP had been implemented and was in operation since 2001. The number of personnel was approximately 4,000. Data were collected at the beginning of 2010.

Data were collected using questionnaire survey at different phases; a selection/definition phase, an implementation phase, and an operation phase as illustrated in Figure 10. Data from the three organizations can be compared and thus provide a vista of the user acceptance throughout the ERP implementation process. Although it is hard to argue that data collection based on this research methodology would be prospective by nature, data captured at the point where it actually happened can be seen to reflect close to what truly occurred in that period. Moreover, data acquired from different time frames can be compared to provide a better understanding.

There were data collection methods in the present study. Interviews were conducted to explore the case background and learn about the ERP implementation at each particular organization. Number of ERP users was obtained by asking representative of each organization. This sets as a sampling frame for this study. Questionnaires were distributed to the organization members related to ERP implementation.

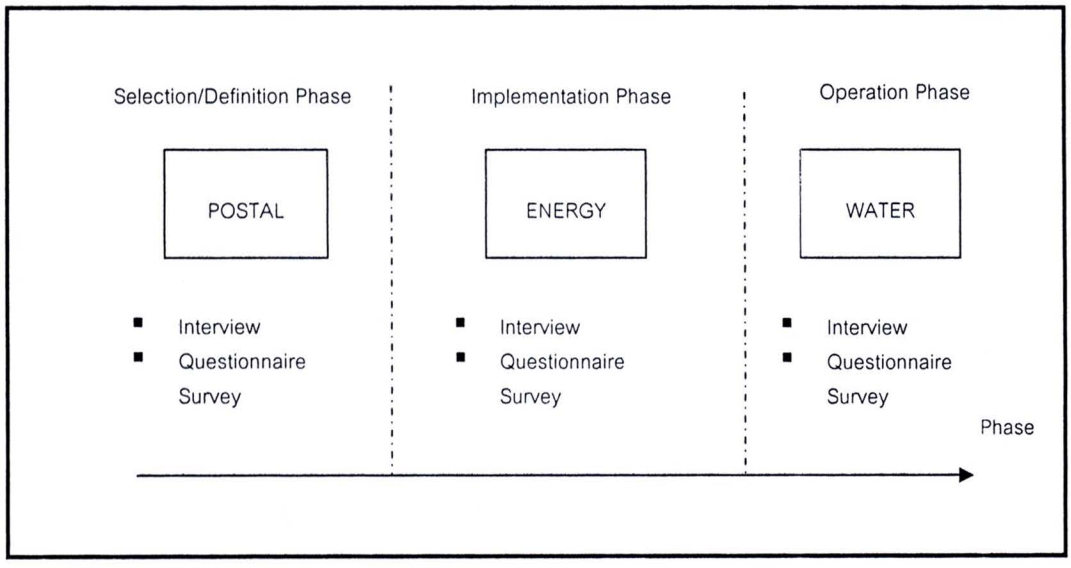


Figure 10 Data collection strategy

3.3 Survey Instruments

Survey instruments were developed based on previous research. The language used in the questionnaires was Thai, after which the method of back translation was used. In greater detail, the researcher translated all items from English to Thai, and then a well-known English teacher in Thailand translated it back to English. The translations were checked with the original items to ensure that there would be no discrepancies. Questionnaires were rephrased to match a phase of implementation for each case.

3.3.1 Perceived Usefulness (PU)

Original items of perceived usefulness were adopted from Davis (1989), as shown below. This set of items had been used by previous studies (Chau, 1996; Dishaw and Strong, 1999; Szajna, 1996; for instance). The selected items of PU were found have an acceptable level of internal consistency (greater than 0.90). A 5-point Likert scale was used to measure this construct, from Totally disagree (+1) to Totally agree (+5). The items included:

1. Using ERP in my job would enable me to accomplish tasks more quickly.
2. Using ERP would improve my job performance.
3. Using ERP in my job would increase my productivity.
4. Using ERP would enhance my effectiveness on the job.
5. I would find ERP useful in my job.
6. Using ERP improves the quality of work I do.

3.3.2 Perceived Ease of Use (PE)

Legris et al. (2003) summarized the items used to measure PEU in the TAM studies. There were four common items and Davis (1989) later included two more items to build a solid measurement for PEU. The items were measured using a 5-point Likert scale, from Totally disagree (+1) to Totally agree (+5).

1. Learning to operate ERP would be easy for me.
2. I would find it easy to get ERP to do what I want it to do.
3. My interaction with ERP would be clear and understandable.
4. I would find ERP to be flexible to interact with.
5. It would be easy for me to become skillful at using ERP.
6. I would find ERP ease to use.

3.3.3 Subjective Norm (SN)

Items measuring subjective norm followed items cited in Venkatesh et al. (2003) using a 5-point Likert scale, Totally disagree (+1) to Totally agree (+5). The items included:

1. People who influence my behavior think that I should use ERP.
2. People who are important to me think that I should use ERP.

3.3.4 Perceived Self-efficacy (PSC)

Items measuring self-efficacy, developed by Compeau and Higgins (1995b) and used in estimating UTAUT (Venkatesh et al., 2003), were used to assess the degree to which users perceived the level of their self-efficacy. A 5-point Likert scale was used to measure the items, from totally disagree (+1) to totally agree (+5).

1. I could complete a job or task using ERP if there is no one around to tell me what to do as I go.
2. I could complete a job or task using ERP if I could call someone for help if I get stuck.
3. I could complete a job or task using ERP if I have a lot of time to complete the job for which ERP is provided.
4. I could complete a job or task using ERP if I have just the built-in help facility for assistance.

3.3.5 Perceived Level of Power (PP)

Items measuring perceived threats stemming from the impact of power distribution alteration followed the items recommended by Greenhalgh and Rosenblatt (1984) and Ashford et al. (1989). The respondents were asked to indicate the level of power which they perceived from a new job using ERP. Items were measured using a 5-point Likert scale, from Totally disagree (+1) to Totally agree (+5).

1. I have enough power in this organization to control events that might affect my job.
2. In this organization, I can prevent negative things from affecting my work situation.
3. I understand this organization well enough to be able to control things that affect me.

3.3.6 Perceived Inequity (PI)

Perceived threats from the loss of equity were measured by perceived inequitable employment relationship items used in Geurts (1999) and previous studies (Schaufeli, Van Dierendonck, and Van Gorp, 1996; Van Dierendonck, Schwartz, and Buunk, 1996). Items were also measured using a 5-point Likert scale, from Totally disagree (+1) to Totally agree (+5).

1. I invest more in my work than I get out of it.
2. I exert myself too much considering what I get back in return.
3. For the efforts I put into the organization, I get much in return. (reversed)
4. If I take into account my dedication, the organization ought to give me a better practical training.
5. In general, the benefits I receive from the organization outweigh the effort I put into it (reversed).

3.3.7 Attitude towards Usage (ATU)

Items for measuring attitudes towards system usage were adopted from Venkatesh et al. (2003). All items were also measured using a 5-point Likert-scale, from Totally disagree (+1) to Totally agree (+5).

Cognitive Attitude towards Usage (ATUC):

1. I think that using ERP is a good idea.
2. I think that using ERP is a wise idea.

Affect Cognitive Attitude towards Usage (ATUA):

1. I like the idea of using ERP.
2. Using ERP is pleasant.

3.3.8 Intention to Use (IU)

Although intention to use is not of interest in this study, it was used to compare TAM in two different versions of a dependent variable: an intention to use and symbolic adoption. Items for measuring intention to use were adopted from Venkatesh et al. (2003). All items were also measured using a 5-point Likert scale, from Totally disagree (+1) to Totally agree (+5).

1. I intend to use the system.
2. I predict I would use the system.
3. I plan to use the system.

3.3.9 Symbolic Adoption

Symbolic adoption was measured using the scales used in the study conducted by Nah et al. (2004). Items measuring an intention to use were adopted from Venkatesh et al. (2003). All items were also measured using a 5-point Likert scale, from totally disagree (+1) to totally agree (+5).

1. I am enthusiastic about using ERP.
2. I am excited about using ERP in my workplace.
3. It is my desire to see the full utilization and deployment of ERP.

3.3.10 Resistance Attitude (RTA)

Items for measuring resistance attitude including cognitive and affective elements were adopted from Oreg's (2006). All items were also measured using a 5-point Likert scale, from Totally disagree (+1) to Totally agree (+5).

Cognitive Resistance Attitude (RTAC):

1. I believe that ERP implementation would harm the way things are done in the organization.
2. I think that it is a negative thing that we are going through ERP implementation.
3. I believe that ERP implementation would make my job harder.

Affective Resistance Attitude (RTAA):

1. I am afraid of ERP implementation.
2. I have a bad feeling about ERP implementation.
3. ERP implementation makes me upset.
4. I am stressed by ERP implementation.

3.3.11 Resistance Behaviors (RTB)

Items measuring resistance behaviors were adopted from Oreg's (2006). These items were measured using a 5-point Likert scale, from Totally disagree (+1) to Totally agree (+5).

1. I look for ways to prevent ERP implementation.
2. I protest against ERP implementation.
3. I complain about ERP implementation to my colleagues.
4. I present my objections regarding ERP implementation to management.
5. I speak rather highly of ERP implementation to others.

3.3.12 Job Satisfaction (JS)

There have been various sets of job satisfaction items used, such as the Happock Job Satisfaction Scale, the Job-in-General Faces Scale, Job Descriptive Index, Minnesota Satisfaction Questionnaire (MSQ) and so forth. Among these, MSQ appears to cover a broader content area (Scarpello and Campbell, 1983). Therefore, a short version of MSQ was used to measure satisfaction of a user's new job using ERP. There were 20 items covering a broad range of content including: Ability Utilization, Achievement, Activity, Advancement, Authority, Company Policies, Compensation, Co-workers, Creativity, Independence, Security, Social Service, Social Status, Moral Values, Recognition, Responsibility, Supervision—Human Relations, Supervision—Technical, Variety, and Working Conditions - as shown in the following. Respondents were asked to indicate how satisfied they were with a new job using ERP based on 5-point scale, Very dissatisfied (+1), Dissatisfied (+2), Neither dissatisfied nor satisfied (+3), Satisfied (+4), and Very satisfied (+5).

On my new job using ERP, this is how I feel about ...

1. Being able to keep busy all the time
2. The chance to work alone on the job
3. The chance to do different things from time to time
4. The chance to be "somebody" in the community
5. The way my boss handles his/her workers
6. The competence of my supervisor in making decisions
7. Being able to do things that don't go against my conscience
8. The way my job provides for steady employment
9. The chance to do things for other people
10. The chance to tell people what to do
11. The chance to do something that makes use of my abilities
12. The way company policies are put into practice
13. My pay and the amount of work I do
14. The chances for advancement on this job

15. The freedom to use my own judgment
16. The chance to try my own methods of doing the job
17. The working conditions
18. The way my co-workers get along with each other
19. The praise I get for doing a good job
20. The feeling of accomplishment I get from the job

3.4 Data Collection

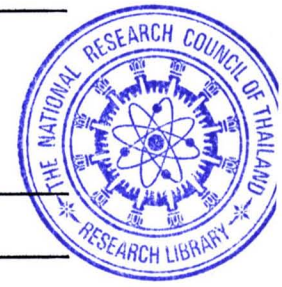
The data collection process was planned to follow the ERP implementation plan of each organization chosen as a case. To verify the phase of ERP implementation in each organization, the researcher contacted IT directors/managers to inform them of the objectives of the research and inquire about their progress of the ERP implementation project. At the time of the contact, November 2008, each organization was in the phase of ERP implementation according to the plan of the research methodology described in the earlier section. POSTAL had announced a bid solicitation for ERP software and implementation and was in the process of bidding. ENERGY was in the phase of implementation and already faced a delay. WATER had been using ERP for almost 10 years. Even though there was a plan to upgrade the current system, it was still not finalized. These organizations, POSTAL, ENERGY, and WATER, thus represent the three phases of ERP implementation: Selection/Definition phase, Implementation phase, and Operation phase, respectively.

Number of ERP users were identified by asking IT directors/managers or ERP implementation team. Nevertheless, the exact number of ERP users could not be determined from any organization. In order to identify the frame of this study, the estimated number of ERP users was determined instead. The number of ERP users of POSTAL, ENERGY, and WATER was estimated to be 250, 700, and 200 respectively. Survey questionnaires were sent to each organization and distributed internally to ERP-related personnel. The number of returned questionnaires were 107, 483, and 100 from

POSTAL, ENERGY, and WATER respectively as provided in Table 4. Details of data collection at each organization are provided in the following section.

Table 4 Estimated No. of ERP users and No. of Returned Questionnaires

	Estimated No. of ERP Users	No. of Returned Questionnaires	Response Rate
POSTAL	250	107	42.8%
ENERGY	700	483	69.0%
WATER	200	100	50.0%
Total	1,150	690	60.0%



3.4.1 Data Collection at POSTAL

Shortly after the verification of the ERP implementation progress, the researcher contacted POSTAL in order to acquire permission to collect data. The request was denied because data collection was seen to affect the vendor selection process. A few months later, the ERP project was postponed. However, the plan for the next bid solicitation was scheduled for 4-6 months after the last bid was called off. The researcher was asked to wait until the bid solicitation was completed before data collection could be conducted. During this period there was a plan to find other organizations for substitution but there were no organizations with culture and size similar to the other two cases in the progress of an ERP implementation. After ten months, the bid was announced and later cancelled with the plan to re-bid within six months.

After the long period of waiting, POSTAL finally announced the official procurement plan of an ERP implementation. With several attempts of a request for permission to collect data, the researcher finally obtained an informal approval. The researcher sent the official letter to the president of POSTAL asking for permission to collect data and the request was approved. Even though the result of ERP bid solicitation was not officially announced, it was assumed that users were aware and learned about the forthcoming implementation and had adequate understanding about

the ERP system. This is because users had been through a long period of postponements. They had learned about the new ERP system from several bidding processes, for instance, from meetings, internal communication, or system demonstrations.

The letter was sent to the department of secretary for official approval. Questionnaire distribution was facilitated by the department of secretary. The approval letter was sent along with a set of questionnaires to departments related to ERP. A secretary of each department was informed about the objectives of the research and given questionnaire instructions. The number of questionnaires was determined by the department to be 250 based on the headcount and the appropriateness. A total number of 107 questionnaires were returned (42.8% approximately). The case background was acquired from eight interview sessions with ERP users. The data collection spanned 19 months. This makes POSTAL the last organization from which data were completely collected.

3.4.2 Data Collection at ENERGY

After the phase of ERP implementation in each organization was verified to conform to the research methodology, the researcher requested permission to collect data. ENERGY was the first organization to permit the researcher to conduct a survey and interviews. The permission was approved without much effort because the researcher had conducted a longitudinal study with another researcher there since the early phase of the implementation. The data collection to be taken was the continuing stream of data collection of a larger research project.

The ERP Change management team was assigned to facilitate the researcher in collecting data. A questionnaire was sent to this team to verify the content. Questions were checked to ensure that respondents would have correct understanding. No major revision was requested. Questionnaire distribution was scheduled during the period of user training. However, the plan for the system to go ahead was delayed from

the original timeframe for approximately 6 months due to the delay of the implementation. The survey was temporarily suspended.

At the same time, interviews were conducted to collect qualitative data. The change management team helped to identify key persons in the ERP implementation project to serve as informants. A total of 28 key users and 9 consultants representing all 14 modules were interviewed. Questions related to the research framework, and informants were asked to provide information about the background to the implementation project. In addition to interviewing data, there were company documents, news and informal interviews that were included to enhance the researcher's understanding about the case.

After the suspension period of the survey, questionnaires were distributed to ERP users in the meeting before the system was officially deployed. The change management team instructed users to answer the questionnaires. Even though the total number of users was estimated to be around 2,000 at the beginning, the actual number of end users at the time of data collection was reduced to around 700 users. This was because the number was overestimated and there were budget constraints due to ERP user licenses. A total of 700 questionnaires were distributed with 483 questionnaires returned (69% response rate).

3.4.3 Data Collection at WATER

WATER was the second organization from which data were collected. The researcher contacted the IT department to obtain permission to conduct the research and to learn about ERP usage in the organization. ERP was implemented only in core financial modules. In order to begin collecting data, an official letter stating the purpose of research objectives was set to the IT director for approval. The letter was approved and the data collection process began. A secretary of the IT director helped in facilitating the questionnaire distribution. Secretaries of each department were given a set of questionnaires for distribution. They were informed about the research objectives and were given questionnaire instructions.

A total number of ERP users were estimated to be 200. Questionnaires were first distributed to staff working at headquarter. A total of 60 questionnaires were returned. The number of respondents from WATER differed from that of ENERGY because of the scope of ERP implementation. Unlike ENERGY, WATER chose to implement only core module. Another reason was that some users were not located at the head office. The researcher attempted to gain permission to collect more data from users in different branches located around Bangkok. A total of 40 questionnaires were returned. Thus, the total number of returned questionnaires is 100. With limited access to data collection, a case background was learned by interviewing eight users.

3.5 Characteristics of Survey Respondents

This section provides the details of the 690 returned survey questionnaires from POSTAL, ENERGY, and WATER (107, 483, and 100, respectively). The characteristics of all respondents from the three organizations are summarized in Tables 5 to 11.

As evident in Table 5, the number of respondents of ENERGY is much higher than that of the other two cases because of the larger scope of the implementation, as previously mentioned. The majority of the respondents from ENERGY had worked for their organization for more than 10 years (66.23%). Respondents from POSTAL and WATER were mixed, with different periods of years working for their organizations.

Table 5 Characteristics of respondents: Number of years working for the organization

	< 5 years	5 to 10	10 to 20	>20	N/A	Total
POSTAL	22	19	23	22	21	107
	20.56%	17.76%	21.50%	20.56%	19.63%	100.00%
ENERGY	41	24	152	213	53	483
	8.49%	4.97%	31.47%	44.10%	10.97%	100.00%
WATER	37	11	25	22	5	100
	37.00%	11.00%	25.00%	22.00%	5.00%	100.00%
Total	100	54	200	257	79	690

Table 6 shows that the age of the respondents was rather high, i.e., the majority of being over 40 years accounted for 57.75%. Respondents from POSTAL were distributed almost equally in different age groups. In the case of ENERGY, the distribution is skewed to the high age portion, while the age of WATER respondents was distributed normally.

Table 6 Characteristics of respondents: Age (Years)

	20 - 29	30 - 39	40 - 49	>50	N/A	Total
POSTAL	28	32	25	16	6	107
	26.17%	29.91%	23.36%	14.95%	5.61%	100.00%
ENERGY	43	77	168	140	55	483
	8.49%	4.97%	31.47%	44.10%	10.97%	100.00%
WATER	15	41	26	13	5	100
	15.00%	41.00%	26.00%	13.00%	5.00%	100.00%
Total	86	150	219	169	66	690

Table 7 presents the distribution of level in an organization. The three organizations used different career level systems. Thus, the comparison seems to be inapplicable.

Table 7 Characteristics of respondents: Level in an organization

Level	POSTAL		ENERGY		WATER		Total
	n	%	n	%	n	%	
1	23	21.50%	40	8.28%	27	27.00%	90
2	12	11.21%	23	4.76%	19	19.00%	47
3	17	15.89%	40	8.28%	26	26.00%	76
4	15	14.02%	102	21.12%	5	5.00%	143
5	8	7.48%	89	18.43%	1	1.00%	102
6	1	0.93%	46	9.52%			47
7	1	0.93%	36	7.45%			37
8			6	1.24%			6
9			2	0.41%			2
10	1	0.93%			1	1.00%	2
11	1	0.93%					1
N/A	28	26.17%	99	20.50%	21	21.00%	148
Total	107	100.00%	483	100.00%	100	100.00%	690

From Table 8 to Table 11, it is clear that most respondents were working with the modules related to accounting and finance. The respondent profiles of POSTAL and WATER are similar to the majority of respondents from the accounting and finance modules. Respondents from ENERY cover the large area of modules from financial modules to modules related to engineering.

Table 8 Characteristics of POSTAL respondents: Department

Department	N	%
Accounting	43	40.19%
Finance	35	32.71%
Procurement	2	1.87%
Others	20	18.69%
N/A	7	6.54%
Total	107	100.00%

Table 9 Characteristics of ENERGY respondents: Department

Department	N	%
Planning	9	1.87%
Accounting and Finance	71	14.70%
Management	33	6.83%
Development	106	21.95%
Engineering	124	25.67%
Fuel	11	2.28%
Logistics	63	13.04%
Control	6	1.24%
N/A	60	12.42%
Total	483	100.00%

Table 10 Characteristics of WATER respondents: Department

Department	N	%
Planning	2	3.28%
Finance	45	73.77%
Management	5	8.20%
N/A	9	14.75%
Total	61	100.00%

Table 11 Characteristics of respondents: Module (Multiple Response)

Module	POSTAL		ENERGY		WATER	
	N	%	N	%	N	%
Budgeting and Planning	12	11.21%	66	13.66%	19	27.54%
Account Payable	51	47.66%	19	3.93%	0	0.00%
Account Receivable	29	27.10%	4	0.83%	2	2.90%
Asset Management	8	7.48%	3	0.62%	0	0.00%
Finance	6	5.61%	15	3.11%	0	0.00%
Managerial Accounting	7	6.54%	7	1.45%	9	13.04%
Human Resource Management	0	0.00%	48	9.94%	6	8.70%
Supplier Relationship Management	1	0.93%	20	4.14%	3	4.35%
Inventory Management	1	0.93%	22	4.55%	2	2.90%
Production Management	1	0.93%	7	1.45%	0	0.00%
Project Management	0	0.00%	52	10.77%	2	2.90%
Maintenance	5	4.67%	102	21.12%	16	23.19%
Sales and Distribution	2	1.87%	18	3.73%	4	5.80%
Executive Information System	3	2.80%	12	2.48%	6	8.70%

3.6 Qualitative Data Collection

Qualitative data were also solicited by interviewing organization members experienced with the ERP implementation. In-depth interviews were used to collect qualitative data from key informants. Interviews were semi-structured. The questions were phrased to match with the phases of implementation. Questions used in the interview process are as follows.

1. What do you think about ERP implementation?
2. How do the ERP implementation progress?
3. Do you agree with the idea of ERP adoption? Why?
4. Are there any obstacles found during the implementation process?
5. What factors contribute to the success of the implementation? Why?
6. How do you feel about using ERP?
7. Is there be any change brought by the ERP implementation?
8. Are these changes affecting you and your job? What are the effects? To what extent?
9. Have you ever resist to the idea of using ERP? Why? Or Why not?
10. Is there any person resisting to the ERP implementation? Or Is there any resistance when the ERP is implemented?
11. How do you feel about your job and your organization after the implementation?

In order to obtain a broad range of stories and information from the entire implementation process, the key informants should represent the entire population. Informants were selected to cover key players in the ERP implementation, as mentioned previously.

The researcher contacted three organizations during the period of survey data collection to gain permission for interviewing ERP users. After permission was granted, informants were identified by the contact person of each organization. In addition, chain referral sampling or snowball sampling, a technique well-suited for social research (Biernacki and Waldorf, 1981), was used. This technique was used to identify additional key informants that could provide in-depth information, for instance: the

progress of a new implementation at POSTAL, the direct experiences of end users at ENERGY, the history of the implementation at WATER, the resistance experiences, and so forth. Table 12 presents the profiles of informants who participated in the in-depth interviews.

Table 12 Informant profile

Organization	Role	No. of Informants	Key Characteristics
POSTAL	Prospect users	5	Current staff who were to be ERP users. They were currently working with an old version of ERP. Most of them had been working with POSTAL for a long time.
	Working team	2	Current staff who participated in developing business requirements and setting the scope of the implementation. The team consisted of young generation.
	IT team	1	IT team did not involve much in the process of the scope definition. The role of the team was to support during the operation phase. External consultants would be responsible for the implementation.
ENERGY	Key users	28	Selected groups of people who were responsible for providing business requirements to the ERP implementer. They were highly in contact with prospect users and the implementers.
WATER	Original users	3	Current ERP users who participated in the implementation project and had been using ERP since the system was deployed.

Organization	Role	No. of Informants	Key Characteristics
	New users	3	New staff who recently joined WATER. They had no direct experiences about the ERP implementation.
	IT team	2	IT team who took charge of supporting the ERP system.

Each interview session began with the researcher explaining the objectives of the study and assuring the interviewee regarding the anonymity and the confidentiality of the information, that is, the interviewees were specifically informed that their names would be kept confidential and that the information acquired from the interviews would be used for academic research purposes solely. Then, interview questions listed previously were asked. Recorders and short notes were used to capture the information. The results of the interview were concluded shortly after each interview session in order to ensure integrity of the information acquired. Interview sessions lasted from 15 minutes to one and a half hours.

3.7 Summary of Chapter III

This chapter has described the research methodology employed in the current study. Quantitative and qualitative research methods were used to empirically validate the proposed theoretical framework. With the extensive efforts to collect data, the total 690 questionnaires were returned along qualitative data acquired from 44 interview sessions. The results of data analysis will be provided in the next chapter.