Chapter 3

Research Methodology

This chapter explains the methodology used in this study. It is organized into three parts. The first part deals with research design. The second part deals with the development of measures to be studied, and the third part describes data collection procedures.

1. Research Design

Industry selection

The electronics industry is selected because of the following reasons. First, this industry had the highest export value in 1997-1998. Thus, it plays the important role in the Thai economy. See Table3.1. Second, according to Subcommittee for the Improvement of Thailand's Competitiveness, the electronics industry is one of those receiving the Thai Government's supports and promotions to upgrade its technology. Third, the electronics industry is an industry of the future, having a high growth potential and being the future success of Thailand. It has advanced rapidly globally and has become one of the largest industry in Thailand. Electronics has globally grown to be one of the largest industries. World electronics production was US$ 703 billion in 1990 and US$ 947 in 1995, while Thai electronics production was US$ 3.99 billion in 1990 and US$ 11.50 billion in 1995 which accounted for 0.56% and 1.2% of world production in 1990 and 1995 respectively (Das, 1998). Even though Thai electronics production was accounted at low percentage of world production, the growth rate of Thai electronics production was about 37.6% annually from 1990 to 1995. Fourth, the technology of the electronics industry has advanced at a rapid pace and its applications have spread fast. Therefore, the electronics industry is suitable for the study relating to innovation and productivity which are measures of competitive advantage. Finally, the electronics industry has the highest number of international

companies. Since this study is to investigate international strategy and human resource management practices of multinational corporations, the electronics industry is appropriate for the context of this study..

Table 3.1: Export Figures of Electrical and Electronics Products (Million baht)

Export figure	1997	1998
Integrated circuits	75,837.7	93,833.3
Radios, television receivers and parts	43,578.8	58,058.8
Video recorders and parts	21,685.7	23,444.7
Telephone sets and parts	6,862.1	12,057.0
Television picture tubes	5,159.0	5,747.7

Source: Thailand showcase: the international hotline between global buyers and reputable Thai manufacturers 1999

The electronics industry comprises three principle sectors, namely industrial electronics; electronics components and parts; consumer electronics. (See Figure 3.1). Therefore, the electronics industry includes firms that are in business of electronic integrated circuit, air conditioner, refrigerator, washing machine, television receiver, computer, and electric wire, telephone set, electrical product, electrical equipment, and semiconductor.

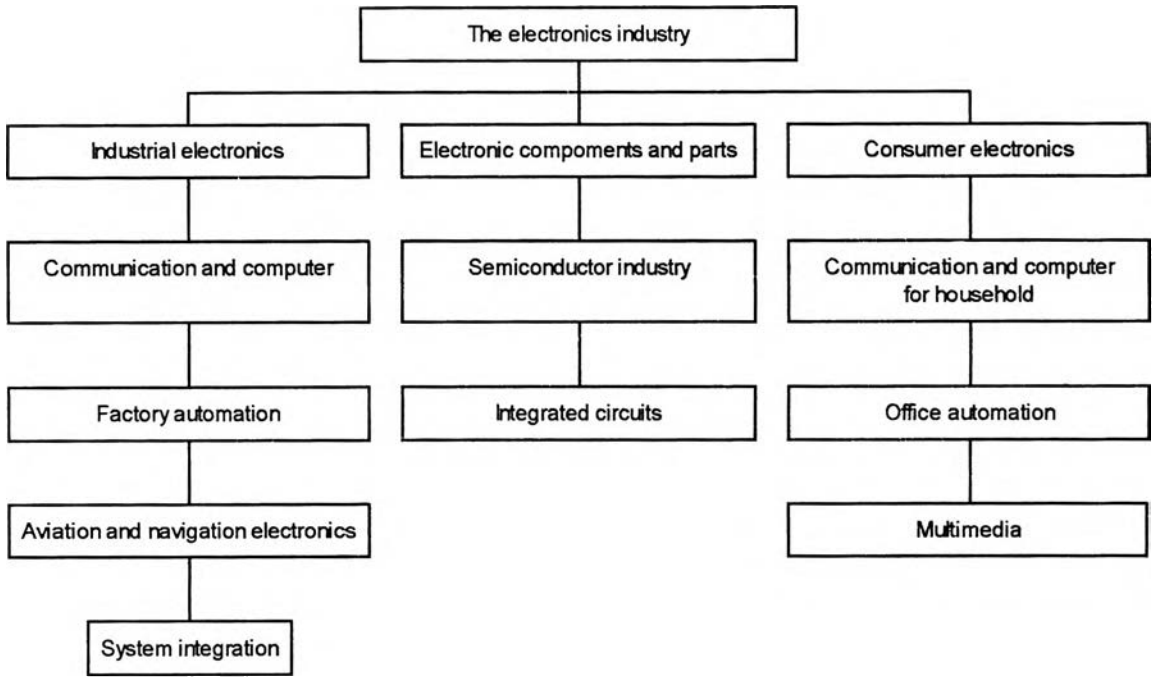
Industrial electronics is the largest sector in term of production value. Of the US$ 947 billion value of world production in 1995, this sector accounted for two thirds (Das, 1998). Electronic components and parts is the second largest sector, while consumer electronics is the smallest. To date, most Asian countries have been more active players in the second and third sectors rather than in the industrial electronics sector. However, Korea and Taiwan now start producing some items in the industrial electronics sector. The strong growth in the industrial electronics sector is from the new developments and growth of computers, the creation of network communication and computer technologies, and the innovation in system integration.

Electronic components and parts sector consists of semiconductor industry, electrical parts, and integrated circuits. Semiconductor industry is composed of memories and

microprocessors. Dynamics random access memory (DRAM) is in the category of memories products.

Consumer electronics are now entering maturing stage of product life cycles. However, with some major innovation in this sector, newly emerging high-technology products such as laser disc players show the high expansion of markets.

Figure 3.1: The Structure of The Electronics Industry



Source: Das (1998)

Sample selection

Because the study is to investigate international strategy of international companies in the Thai electronics industry, the selected companies include joint ventures and foreign wholly-owned subsidiaries (Rugman, Lecraw, and Booth, 1985). Thus, the whole population of

international companies that include joint venture companies and foreign wholly-owned subsidiaries in the electronics industry in Thailand are selected for this study. Wholly-owned Thai electronics companies are excluded from this study because this present research is to study international strategy of multinational corporations in Thailand. Sources of population are from ASEAN supporting industry database (ASID) and Thailand investment 1998-1999: a directory of companies promoted by the Board of Investment. Both sources are more suitable than other sources because they provides targeted companies with percentage of major shareholders. Such information can help save time and budget in data collection process. The total number of international electronics companies in Thailand in production category is 380 companies from ASEAN Supporting Industry Database (ASID) and 390 companies from Thailand investment 1998-1999: a directory of companies promoted by the Board of Investment. Lists of companies from both scurces are cross-checked to reduce repeated companies. Eventually, the total number of the population is 390 international companies in the Thai electronics industry.

2. Development of Measures

Measurement development

Measurement development process should be employed to generate items or questions used to measure constructs in the research in order to gain higher construct validity and content validity (Peter and Churchill, 1986; Bollen, 1989). Measurement development of human resource management practices, international strategy, and competitive advantage are proceeded in several steps. First, selection of measures in this study is based on academic literature on human resource management practices, international strategy, and competitive advantage as well as comments from both advisors. Second, relevant measures are modified and adapted to provide the basis of new measurements of human resource management

practices, international strategy, and competitive advantage. Third, expert interviews are employed 1) to define the scope and content of the measures; 2) to do pretest; 3) to develop survey questionnaire of this study; and 4) and to get experts' opinion about format of the survey questionnaire as well as clarity about questionnaire. Churchill (1995) suggests that expert interview can verify the content validity as well as construct validity. In August - November, 1999, 12 human resource managers and executives from 8 international electronics companies are interviewed to validate constructs and content of this study. The selection of 8 firms depends on the accessibility of the firms. Through expert interview, questionnaire is designed on the basis of practices in the electronics industry. Fourth, pretest is conducted to check flaw in questionnaire (Sudman, 1976; McDaniel and Rogers, 1999). The questionnaire is pretested to determine any problem of ambiguity of questions. Sudman (1976) notes that the size of sample to do pretest is between 20-50. McDaniel and Rogers (1999) suggest that sample size should be more than 5 percent of the size of the total population. Thus, in November, 1999, thirty international electronics firms from the total population of 390 international electronics companies in Thailand were selected to do pretest by mail survey. The criteria to select the pretested companies was based on random technique (Davis and Cosenza, 1993). Ten questionnaires were returned for a 33.33% response rate. In addition, in November, 1999, thirty executives who were attending an Ex-MBA class at the University of the Thai Chamber of Commerce were asked to answer the questionnaires. Eight questionnaires were returned for a 26.67% response rate. The reason of the low response rate of the Ex-MBA class is that the pretest was conducted at the time close to examination period at the University. Comments from executives attending the Ex-MBA class at the University of the Thai Chamber of Commerce suggest that the study of this topic should be conducted in one industry because such questions to measure international strategy, human resource management practices, and competitive advantage are suitable for a particular industry.

The adoption scale approaches of international strategy and human resource management practices are developed through several steps: 1) developing and modifying scales

from previous research in the areas of strategic management and human resource management; 2) asking experts to judge the proposed scales; 3) and pretesting the proposed scales to the pretest (McDaniel and Rogers, 1999).

International strategy

This study develops and modifies measurement of international strategy in the predisposition framework based on previous research of Heenan and Perlmutter (1979). The adoption scale approach suggested by Heenan and Perlmutter (1979) is used to indicate the location to conduct the company activity. Scale to measure types of international strategy is categorized into 3 group scale: 1 = at headquarters outside Thailand; 2 = at Thailand location; and 3 = cooperation among the company in Thailand and headquarters and other subsidiaries. The company activities in the questionnaire are based on 1) activities suggested by Heenan and Perlmutter (1979); 2) activities that are not subject to local practices enforced by local laws and regulations; 3) alternative activities that are freely selected by each multinational corporation; and 4) activities that can reflect management decision to control local subsidiary (Heenan and Perlmutter, 1979; Chakravarthy and Perlmutter, 1992; Pucik, 1993). After a review of the literature, expert interviews, and pretests, the relevant activities employed to measure type of international strategy are summarized in Table 3.2.

Table 3.2: Summary of Relevant Activities Used in This Study to Measure Type of International Strategy

Relevant activities	Modified and derive from
1.Job description of management level	Heenan and Perlmutter (1979)
2. Human resource planning at management level	Heenan and Perlmutter (1979)
3. The assignment of high level managers	Heenan and Perlmutter (1979)
4. Personnel promotion for management level	Heenan and Perlmutter (1979)
5. Training programs for top level management	Heenan and Perlmutter (1979)
6. Incentive policy	Heenan and Perlmutter (1979)
7 . Inventory control	Heenan and Perlmutter (1979)
8. Internal auditing	Heenan and Perlmutter (1979)
9. Price setting policy	Expert interview
10. Marketing promotion plan	Expert interview
11. Marketing channel plan	Expert interview
12. Financial control	Expert interview
13. Production planning	Expert interview
14. Procurement for important raw material	Expert interview

Human resource management practices

Seven human resource management practices which include *1) employee participation, 2) clarity of work direction, 3) employee contribution, 4) reward system at management level, 5) employment security, 6) selection by job competence, and 7) control* are investigated in this study. This study develops and modifies measurement of 7 human resource management practices based on previous studies related to corporate practices in the area of human resource management (Cameron and Quinn, 1999; Hofstede et al, 1990; Pucik, 1993; Raelin, 1985; Newman and Nollen, 1996; Laurent, 1993; Mabey and Salaman, 1995, Hickman and Silva, 1984; Reynolds, 1986; Rosenzweig and Nohria, 1993). Measurement of 7 human resource management practices is measured by 5-point itemized rating scale which reflects degree of frequency of practices ranged from: 0 = never; 1 = less frequent ..... 4 = more frequent. 5-point itemized rating scale is employed in this study because it is employed by the past research in the area of human resource management by Cameron and Quinn (1999) and Rosenzweig and Nohria (1993) and because the unit of analysis of this study is at firm level. The scale is suitable to be asked in frequency of practices. Moreover, more numerous response categories exceed the respondents' ability to discriminate, producing noise rather than more precise data (Geringer, 1991). After the expert interview with human resource managers, this study finds that the 5-point itemized rating scale appears to be appropriate to indicate degree of frequency of human resource management practices. In addition, the 5-point itemized rating scale is easy to construct, administer, and produce more reliable rating (McDaniel and Rogers, 1999; Churchill, 1995; Westbrook, 1980; Peter and Churchill, 1986).

Measures of 7 human resource management practices are modified and adapted from relevant literature in human resource management and from expert interviews as well as pretests. After a review of the literature, expert interviews, and pretests, the measurements employed to measure 7 human resource management practices are modified and summarized in Table 3.3.

Table 3.3: Summary of Measures of Human Resource Management Practices Employed in This Study

Employee participation	Modified and derived from
1. In your company, decision-making is encouraged to be made by all levels of managers.	Hofstede et al. (1990)
2. In your company, employees are allowed to express opinion.	Expert interview
3. Your company offers programs to encourage employees to participate in company's activities.i	Expert interview
4. Your company is open to receive employees' idea.	Newman and Nollen (1996)
5. Your company encourages open discussion with employees.	Mabey and Salaman (1995).
6. Your company allows employees to use better ways to achieve work performance.	Hickman and Silva (1984).
7. Your employees are encouraged to share responsibility.	Hickman and Silva (1984).
8. Your company focuses on teamwork such as small group activity	Cameron and Quinn (1999).
9. Company allows employees to be involved with human resource development.	Cameron and Quinn (1999).
10. Your company allows employees to use new ways to achieve work performance.	Cameron and Quinn (1999).
Clarity of work direction	**Modified and derived from**
1. Your company takes actions to assure employees understand the policy such as salary policy, promotion policy.	Newman and Nollen (1996)
2. Your company uses the clear direction in doing business.	Newman and Nollen (1996)
3. Your company uses job training program to provide job direction.	Laurent (1993); Mabey and Salaman (1995)
4. Your company focuses on work instruction or standard procedure.	Newman and Nollen (1996)
5. Your company uses orientation to help new employees familiar with work and place.	Hofstede et al. (1990)
6. Your company provides practices to clarify company's purpose.	Hickman and Silva (1984)
7. Your company uses programs to take action on employees who do not clearly understand company's purpose.	Hickman and Silva (1984)
8. Your company take actions to assure employees understand the practices such as promotion practices	Newman and Nollen (1996)
Employee contribution	**Modified and derived from**
1. In your company, employees' creativity is recognized as contribution to attain employees' achievement.	Newman and Nollen (1996)
2. Your company has program to encourage employees' creativity.	Expert interview
3. In your company, employees are told when good job is done.	Hofstede et al. (1990)
4. Your company offers programs to encourage employees to achieve work goals such as target sales or target production quality.	Hofstede et al. (1990)
5. In your company, employees' productivity is recognized.	Newman and Nollen (1996)
6. Employees are willing to take actions to achieve goal.	Cameron and Quinn (1999)
7. Your company encourages employees to achieve.	Cameron and Quinn (1999)
8. Company encourages to generate new idea to achieve work goal.	Hofstede et al. (1990)
9. Company focuses on acquiring new challenge for attaining work goal.	Hofstede et al. (1990)

Table 3.3: Summary of Measures of Human Resource Management Practices Employed in This Study (continue)

Reward system at management level	Modified and derived from
1. Job promotion for managers is evaluated by better work performance.	Mabey and Salaman (1995); Newman and Nollen (1996); Pucik (1992)
2. In your company, higher salary of managers is based on higher performance.	Mabey and Salaman (1995); Newman and Nollen (1996); Pucik (1992)
3. In your company, better job opportunity of managers for advancement is based on better performance.	Mabey and Salaman (1995); Newman and Nollen (1996); Pucik (1992)
4. Job promotion of managers is evaluated by work performance rather than seniority.	Hofstede et al. (1990)
5. Performance of managers is reviewed by job competence.	Hofstede et al. (1990)
6. Personal growth of managers is evaluated by level of performance.	Cameron and Quinn (1999)
7. Better performance of managers is the criteria for job promotion.	Cameron and Quinn (1999)
8. Company opens opportunity for personal growth for management level.	Cameron and Quinn (1999)
9. Company opens opportunity for human development for management level.	Cameron and Quinn (1999)
Employment security	**Modified and derived from**
1. Your company uses long term perspective to maintain employment.	Raelin (1985)
2. Your company makes effort to keep people employed even under crisis condition for company's business.	Raelin (1985)
3. Your company keeps the right kind of employees in the long term period.	Raelin (1985)
4. Your company focuses on life time employment.	Raelin (1985)
5. Your company focuses on secure employment.	Cameron and Quinn (1999)
6. Company maintains full-time employees even though it has business problems.	Expert interview
7. Company uses practices to assure that employees feel secure in their job.	Cameron and Quinn(1999)
Selection by job competence	**Modified and derived from**
1. In your company, employees appear to be professional type; for example, they think at least three year ahead in their career.	Hofstede et al. (1990)
2. Company uses job competence rather than social or family background as criteria in hiring employees.	Hofstede et al. (1990)
3. Company uses job competence to rotate employees to the new positions.	
4. Job skill is the only criterion in hiring people.	Hofstede et al. (1990)
5. Your company screens employees for employment to ensure a match with job competence.	Hickman and Silva (1984)
6. Employees are selected to fill position by their job skill.	Hickman and Silva (1984)
7. Employees at management level are achievement-oriented.	Cameron and Quinn (1999)
8. Job rotation is based on experiences and skills of selected managers.	Cameron and Quinn (1999)

Table 3.3: Summary of Measures of Human Resource Management Practices Employed in This Study (continue)

Control	Modified and derived from
1. In your company, meeting is kept punctually.	Hofstede et al. (1990)
2. In your company, work performance is reported.	Expert interview
3. Company focuses on budget follow-up program.	Hofstede et al. (1990)
4. In your company, management focus on report system.	Raelin (1985)
5. Your company uses strict quality control procedures.	Mabey and Salaman (1995)
6. Company focuses of formal procedures to govern what employees do.	Expert interview
7. Company assures report assessment occur in operating unit.	Cameron and Quinn (1999)
8. Company focuses on formal system to manage employees.	Cameron and Quinn (1999)
9. Company focuses on monitoring system to keep close track of process.	Cameron and Quinn (1999)

Competitive advantage

Competitive advantage can be measured subjectively and objectively (Gopalakrishnan, 1995; Porter, 1990). Gopalakrishnan (1995) notes that measurement of competitive advantage can be subjectively measured by expert's opinion. However, competitive advantage in this study is objectively measured by innovation and productivity. This study investigates measures of innovation and productivity by employing knowledge in the area of managerial accounting. Several studies in managerial accounting field suggest measures of innovation and productivity (Kaplan and Atkinson, 1998; Kaplan and Norton, 1992; Peter, 1990; Johnson, 1990; Armitage and Atkinson, 1990; Kaplan, 1990). In this study, managerial accounting ratios are selected wisely to measure innovation and productivity. In addition, selected ratios are usable measures. Selection of managerial accounting ratios to measure innovation and productivity is based on whether such managerial accounting ratios are generally employed across the electronics industry in Thailand. Questions to measure managerial accounting ratios in this study provide some ranges of answer for respondents in order to avoid refusal of response (Churchill, 1995; McDaniel and Rogers, 1999). The ranges of answer of each managerial accounting ratio are based on the nature and scope of such ratio in the electronics industry, expert interviews, and pretests (Kaplan, 1990).

Innovation

Gopalakrishnan (1995) categorizes measures of innovation into product innovation and process innovation. Based on literature review in Chapter 2, Selection criteria of managerial accounting ratios are from expert interviews and pretests. Product innovation in tnis study is measured by Questions 1,2, and 3; moreover, process innovation is measured by Questions 4 and 5. Questions 4 and 5 measure quality of products - the proxy of customer satisfaction which is measure of process innovation.

1. Number of new products sold in the past 5 years
[ ] none [ ] 1-3 [ ] 4-6
[ ] more than 6

2. Number of new models sold in the past 5 years
[ ] none [ ] 1-5 [ ] 6-10
[ ] 11-15 [ ] more than 15

3. Time response to market opportunity in months
[ ] no response [ ] 0-3 months [ ] 4-6 months
[ ] 7-9 months [ ]11-12 months [ ] more than 12

4. Percentage of returned products on total products sold
[ ] 0.5% or below [ ] 0.51-1.0% [ ] 1.01-1.5%
[ ] 1.51-2.0% [ ] 2.1-2.5% [ ] more than 2.5%

5. Number of customer complaints in one month
[ ] none [ ] 1-5 [ ] 6-10
[ ]11-15 [ ] 16-20 [ ] more than 20

Productivity

Productivity is designed to measure key success factors of the firm (Armitage and Atkinson, 1990). Based on literature review in Chapter 2, selection criteria of managerial accounting ratios are from expert interviews, and pretests. Measurement of productivity in this study is shown in Questions 6, 7, and 8.

6. Percentage of defective products at final production

[ ] 0.5% or below	[ ] 0.51-1.0%	[ ] 1.01-1.5%
[ ] 1.51-2.0%	[ ] 2.1-2.5%	[ ] more than 2.5%

7. On time shipment to customers on average basis

[ ] on time according to schedule
[ ] delay for 1-7 days from schedule
[ ] delay for more than 7 days from schedule

8. Return on investment

[ ] lower than 0%	[ ] 0-5%	[ ] 5.1-10%
[ ] 10.1-15%	[ ] 15.1-20%	[ ] more than 20%

Although measures of innovation and productivity are asked by multichotomous questions, scale of such questions is parametric. The reason why scale is still parametric is that unit of the answers such as percentage and number of products or model are originally treated as ratio. Churchill (1995) remarks that the researcher can treat it as parametric scale for the purpose of broader analysis and more implication of data, even though the ratio is ordinal by the nature of questions.

3. Data Collection

Unit of analysis of this study is at the firm level. The questionnaire is focused *on* executive or human resource managers who know best about firm's international strategy, human resource management, and competitive advantage.

Based on expert interviews and questionnaire pretests, some modifications are made to the questionnaire such as re-wording and changing some questions. Then, the questionnaire is finalized and ready for use. (See Appendix A).

Mail survey is used to gather the data because it can cover widely dispersed population (Jobber and Saunders, 1988). Only the electronics industry is selected in this study because the nature of the electronics industry is different from any other industry. It has the rapid changes in technology and the short product life cycle which strongly influence measure of

innovation, namely, speed in responding to the market opportunity. A careful and comprehensive follow-up plan is used in this study to ensure the larger response rate. The follow-up plan includes 1) some telephone calls before sending survey in order to personally introduce this study, to solicit the contact person; 2) follow-up telephone calls of both local and long distance calls after the first week of sending survey; and 3) follow-up telephone calls of both local and long distance calls after the second week of sending survey. Due to limited budget, only follow-up telephone calls of both local and long distance calls are employed in this research project.

Questionnaire is in both English and Thai. Questionnaire is translated back from English to Thai. The back-translation technique has been widely used with good result (Davis and Cozensa, 1993; Zikmund, 1996). Questionnaire is sent to the entire selected population of international electronics companies in Thailand (total = 390). One set of questionnaire is sent to one company. The mailing package consists of a cover letter, a questionnaire, and a postage-paid envelope with returned address to Faculty of Accountancy and Commerce at Chulalongkorn University. Because the population companies are asked sensitive topics about international strategy and human resource management practices of the companies, the cover letter signed by the advisor is included in the set of questionnaire in order to explain the research project, to encourage participation, and to offer the result of the study. Respondents are assured of confidentiality of their responses. A period of two-month (January-February, 2000) is used for data collection.