

# CHAPTER 1

## INTRODUCTION



### 1.1 Introduction

The global economy is experiencing unprecedented change, competition and integration. With the increasing emphasis on global competitions and worldwide competitiveness, the exploring all accessible sources of pertinent research and development information relating to products or services are the critical importance for Thai industry. No longer can many industrial concerns afford the luxury of staffing and equipping an internal operation capable of performing all required research in-house. As a consequence, more modest company-conducted efforts are becoming the norm, appropriately supplemented by directed research performed outside the firm.

Using university research capabilities is a way to accomplish the firm's applied research work. In the last decade, university and industry linkages (UILs) can play a key role in solving technical problems and enhancing global efficiency through information sharing and other ways and means of cooperation

The exchange of knowledge and ideas through growing networks of universities and productive sector agents offers channels and mechanisms for economic cooperation that are less politically sensitive than other forms of economic cooperation, such as trade or investment cooperation. It also offers an unprecedented opportunity for universities to play a critical role in promoting and supporting national as well as regional economic dynamism and quality of life.

At the same time, the industry, realising the mentioned abilities of the university and the urgent needs to keep up with the global competitive market where the latest technology is essential, turn to the universities who are considered to be responsible for the basic research and technology development. They are the developers, organising knowledge and identifying needs of the ultimate users or adopters.

Cooperation with universities not only gives industry financial benefits but also an insight into the today's international technology market. However, the type of transfer and other artefacts accompanying the process differ with different countries' economical, social and political climates.

In developed countries, there are strong linkages between university and industry to facilitate the exchanges of technology between the two sectors. Moreover, their governments take active hand in building the bridge between the academic and industry. However, in developing countries like Thailand, the collaboration between the two sectors is not significant. This gives the universities just vague idea of what kind of technology they should develop that could be implemented successfully in the business

sector. In order to speed up the industrialisation, universities need to go beyond tradition and intensify levels of collaboration with the productive sector. This will not only enhance the provision of knowledge to society, but the application of knowledge more relevant to the needs and quality of industry and eventually people, as end-users, or the society.

## **1.2 Rationale of the Study**

This study will be very important, because there is not much research published about Industry-University Partnerships in Asia developing countries before. Most publications tell about either developing countries or newly industrialising countries. The other reason is practical problems. The model used by developed countries may not be appropriate for the situation in developing countries. The differentiation between background of developed countries and developing countries, also characteristics of each university or industry require different partnerships approaches. Through this study, I will try to assess the most suitable approach to improve the research & consulting conditions.

Secondly, for the current status in Thailand, we still face the economic shrinkage, which causes from many conditions such as lack of investor confidences, uncertainty of currency exchange rate and high rising of oil price. Therefore, to enhance scientific and technological capability in this period, the increasing the efficiency of linkages in industry-academia-government collaboration on R&D is one way because this collaboration can make benefits to industry, academia and government as mentioned in introduction section.

## **1.3 Current Status of R&D of Technology in Thailand**

In this section, the current status of R&D of technology in Thailand will be concerned. According to Chansa-ngavej, et al. (2000), gross expenditure on R&D as a percentage of GDP in 1996/1997 of Thailand and other counties can be summarised in Table 1.1.

**Table 1.1: Gross Expenditure on R&D as a Percentage of GDP 1996/1997;  
Source: National Research Council of Thailand (1999)**

Country	Business (%)	Academia (%)	Government (%)	Total (%)
Japan	2.01	0.27	0.42	2.83
Korea	2.04	0.45	0.26	2.79
Switzerland	1.94	0.07	0.67	2.75
America	1.92	0.23	0.39	2.62
France	1.43	0.47	0.39	2.32
Germany	1.51	0.36	0.41	2.28
United Kingdom	1.26	0.28	0.38	1.94
Australia	0.80	0.40	0.45	1.68
Singapore (1998)	n.a.	n.a.	n.a.	1.65
China (1995)	n.a.	n.a.	n.a.	0.50
Malaysia (1996)	0.16	0.02	0.05	0.22
Philippine (1992)	0.048	0.032	0.13	0.22
Indonesia (1994)	n.a.	n.a.	n.a.	0.16
<b>Thailand (1997)</b>	<b>0.009</b>	<b>0.034</b>	<b>0.057</b>	<b>0.10</b>

Table 1.1 shows gross expenditure on R&D of Thailand is low when compared with others. Moreover, gross expenditure R&D of Thai business is the lowest when compared both of developed countries and same region countries such as Malaysia, Singapore and Philippine. In addition, relative ranking on scientific and technological capability together with success of basic and applied research for Thailand in the World Competitiveness Yearbook has dropped from the 32<sup>nd</sup> in 1998 to the 46<sup>th</sup> in 1999, reflecting the prevailing conditions on R&D activities and R&D human resources. These show that the development of Thailand's technological capability is weak. Additionally, when we consider the gross expenditure on R&D of Thailand from Table 1.1, we can see the expenditure on R&D of business is the lowest among that of academia and government.

In sum, Thailand R&D characteristics may be described as follows:

1. Low level of R&D expenditure.
2. Relatively low proportion of engineering and applied science research.
3. Very small role of private sector on R&D.
4. Very low number of research scientists and engineering.
5. Lack of efficient linkages among industry-academia-government collaboration.

After understanding Thailand R&D characteristics, then we will focus on the current status of R&D of technology in Thai industry.

### 1.3.1 Current Status of R&D Technology in Thai Industry

According to Far Eastern Economic Review (2000), from 1985 to 1995 when Thailand was one of the world's fastest growing economies, small and medium entrepreneurs were the driving force behind the country's manufacturing led growth. Protected from global market forces, Thai companies profited substantially from plentiful capital and cheap labour. But those days have gone as lower cost competitors such as like India and China open up and as foreign investors demand more managerial control before committing funds.

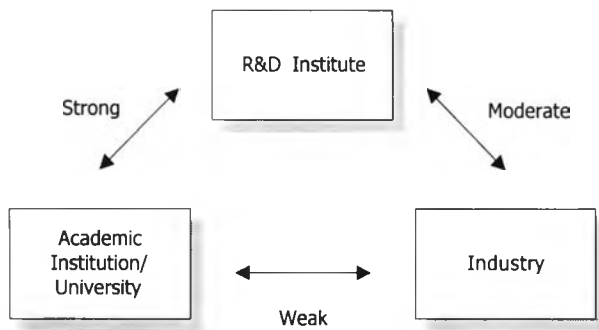
Now Thai industry is suffering from the second stage of Thailand's economic crisis. Most small and medium sized enterprises that account for 90% of the country's manufacturing and employ 50% of the industrial workforce don't have the funds to upgrade their technical skills and technology in order to keep pace with changing market demands. With economic recovery, many now risk missing the new round of business opportunities they should be best placed to capitalise on.

That's particularly true of the car industry, which is a regional export platform for Honda, Toyota, Ford, General Motors, BMW and Daimler Chrysler and is by all estimates set to boom in coming years. With local content requirements lifted, all the multinationals plan to buy far less from domestic suppliers. That is a good opportunity for Thai car parts makers. However, from report by the German Technical Cooperation Agency shows that of about 500 car parts makers in Thailand, nearly all 300 risk going under standard. In addition, Thai suppliers generally lack engineering skills, technological know-how and investment in design and development. From that reasons may cause Thai manufacturers miss out Thailand's car production boom through 2006.

In sum, to compete in a globalise world, a country requires better engineering skills, higher technological capability and skills, research and development and funds to investment in development. This is indeed essential for Thai manufacturers that have to improve their technical knowledge. Only by joining hands in research and development with universities or government can they survive in this global competition. Linkages with university and government will help industries to solve technical problems and improve global efficiency through information sharing. Moreover, it can save investment costs from their own research.

## 1.4 Statement of Problem

The lack of collaboration between university and industry is common in many developing countries. The components of the innovation triangle shown in Figure 1.1 are not balanced. In most developing countries, the relationships between academic institution (university) and industries are very weak.



**Figure 1.1 Innovation Triangle in Developing Countries**

Figure 1.1 shows the weakness in the relationship between university and industry. From this figure, the question arises for this thesis is how to improve existing and building new viable industry-university partnerships to developing countries such as Thailand. The study in this thesis will address this question.

### 1.5 Objectives of The Study

In accordance with the statement problem, the study aims to achieve two main objectives the objectives, which are:

- 1) To identify an appropriate partnership model suitable for universities in Thailand as a developing country.
- 2) To determine strategies for a university to set up a particular partnership model to aid in the development of industry.

### 1.6 Scope of The Study

This study is a pilot study for recommending an appropriate partnership model to Thai universities and strategies for building university industry partnership, but not including implementing the model.

### 1.7 Methodology

The study is carried out in the following steps:

- 1) Study related literature, journals, Internet and research studies in industry-university partnerships.
- 2) Collect data and study industry-university partnerships in various countries.
- 3) Analyse information and list the factors that have possible effects on the suitability of the various types of partnership models.

- 4) Collect data from face-to-face interviews with selected managers of industrial firms in Thailand, executives of related institution such as Federation of Thai Industry, and the other sources to gather information on factors influencing the choice of partnership models.
- 5) Analyse the requirements of industry (demand) and identify an appropriate partnership model for industry-university collaboration by using a multiple-criteria decision-making tool.
- 6) Recommend strategies for building industry-university partnership.
- 7) Summarise and recommend further studies.
- 8) Thesis write up and submission.

**Table 1.2: Research Schedule**

No	ACTIVITIES	September	October	November	December
1	Study related literatures				
2	Study industry-university partnership in various countries				
3	Analyse information and list the factors				
4	Collect information from interview with industry and other sources				
5	Analyse requirements and identify model by using AHP as a tool in making decision				
6	Recommend strategies for building industry-university partnerships				
7	Summarise and recommend further studies				
8	Thesis write up and submission				

## 1.8 Expected Results

There are two expected outputs, which are related to each other. They are shown as follows:

- An appropriate partnership model suitable for Thai universities.
- Strategies for designing the partnership approach.

## 1.9 Plan of the Thesis

Chapter 2 reviews the literatures related to university-industry partnerships including the objective of the partnership, benefits from industry-university interactions, motivation of industry and university regarding technology transfer, demand pull or technology push for building partnerships, types of industry-university interactions, structure of industry demand side and university supply side, evolution of technology transfer, obstacles of relationships, and critical success factor in building the relationships.

Chapter 3 proposes an analytical framework that will be used as a frame of reference and an analytical tool to examine the suitable partnership model for Thailand.

Chapter 4 presents the partnership models in various countries and analyse the similarities and distinct differences of all characteristics, across the different models.

Chapter 5 presents an analysis of the characteristics of the industries and universities of Thailand and suggests a partnership model that is most compatible with certain market conditions.

Chapter 6 recommends the strategic plan for designing the chosen partnership approach.

Chapter 7 presents a summary on research findings and recommendations for further studies.