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APPENDICES

APPENDIX A.

LIST OF INTERVIEWEES

Name, Position, Organisation

1. Prof. Dr. Prasit Prapinmongkolkarn, Director General, Chulalongkorn University Intellectual Property Institute
2. Associate Prof. Narong Yuthanom, Unisearch Managing Director, Chulalongkorn University
3. Dr. Bunchu Pakotiprapha, Managing Director, The Siam Research and Development (Bangkok) Co., Ltd.
4. Dr. Chatri Stripaipan, Vice President of NSTDA, National Science and Technology Development Agency
5. Associate Prof. Somchob Chaiyavech, Committee of The National Research Council of Thailand and Former President of King Mongkut's Institute of Technology North Bangkok campus
6. Prof. Dr. Surin Sethamanich, Committee of The National Research Council of Thailand and Former Dean of Faculty Engineering at Chulalongkorn University
7. Dr. Somkiat Tangkitvanich, Research Specialist Sectoral Economics Program, Thailand Development Research Institute
8. Dr. Artchaka Brimble, Director of Planning and Development Division, Board of Investment (BOI)
9. Mr. Khemmadaht Sukonthasingha, Vice President of The Federation of Thai Industries, Federation of Thai Industries

APPENDIX B.

INTERVIEWING GUIDELINE

1. From the low R&D expenditure in industry, what is the important factor the industrial sector expense low in R&D?
2. In your opinion, what is the constraint to conducting R&D in industrial sector?
3. Which level of technological capability (transaction, operative, innovative or supportive capability) do you think that Thai industries are?
4. What are the critical factors in choosing a partner to solve the industrial problems?
5. Should the industrial sector be promoted to do their own R&D?
6. What factors would cause the industrial sector to initiate or increase R&D activities in the future? What problems would you anticipate in doing so?
7. Which level of industry-university linkage in Thailand do you think is?
8. Please describe problems and obstacles in industry-university partnership in Thailand.
9. Which level of technological capability (transaction, operative, innovative or supportive capability) do you think that Thai universities are?
10. Are universities ready to research in commercialisation?
11. What are the obstacles in developing industry-university collaboration and should be corrected now?
12. Does Thai government support the linkage between Thai universities and industries?
13. Who do you think should function as the middleman to transfer research results from universities to the industries?
14. What is the critical success factor in industry-university partnership?
15. At present, many universities set up agency involved in R&D in universities. What are the problems that universities cannot link with industrial sector through these agencies? And how to correct them?
16. Besides those agencies, how do you think if the industrial sector relate to universities via membership?
17. Please give your opinion on whether Thai universities ready to set up research-oriented park or not.
18. Please give your opinion on the priority activities industries and universities should give to improve existing collaboration in order to improve their relationship.

19. Your vision in next 5 years on the industry-university partnership in Thailand?
20. What should be the universities', industries', and government's role?
21. Other comments.

APPENDIX C.

INDUSTRIAL DEVELOPMENT IN THAILAND

From interviews and literatures, the lacking industrial development in Thailand

Industrial Development and Promotion

In the early period of industrialisation around the 1930s, the government had involved directly in establishing and expanding various industries by financing new enterprises or using governmental agencies or armed forces to run their operation. Many of these state enterprises, e.g. those producing cement, cigarette, glass and paper, relied not only imported machinery and equipment but also heavily on foreign technical and managerial expertise for their operation. Their operating efficiency, however, was usually very low. By the 1950s, this 'modern' sector of manufacturing industry had passed through nearly two decades of gradual expansion—largely within a framework of state ownership—but was not able to accumulate any significant technological and managerial capability which might have provide a solid foundation for the subsequent phase of industrial development. The main policy motive of the government at that time was to develop modern industry, without any clear strategy for favouring any particular categories of manufacturing nor for absorbing foreign technical know-how.

During the 1950s and early 1960s, Thailand also witnessed the remnants of 'traditional' industries, such as simple household and handicraft production, and some small-scale factories engaging in processing local raw materials and agricultural products, such as bricks, tiles, tuber latex, and processed vegetables, in addition, there were some metal working factories that produced household wares and tools as well as simple machinery and equipment. Unlike the large-scale state-enterprise sector, this sector drew largely on locally produced capital goods—but as a result of pragmatic conditions rather than any policy influence.

In the 1960s, there were new policy measures established to promote new investment and encourage private investment, both domestic and foreign, in industry. The new investment promotion provided companies the rights to repatriate profits and capital, and exempted 'promoted' companies from income taxes for a period of five years. Since imported technology was considered necessary for modern technology, it also exempted promoted companies from import duties and taxes on imported capital equipment, and from import duties on raw materials and other inputs for a five-year period. Tariff protection, especially for consumer goods, was also revised to increase the level of effective protection. All these measures were accompanied by other measures associated with the agricultural sector, which eventually contributed to the low level of wages in Thailand. Consequently, the industry had grown rapidly in this policy context which, in effect, pushed up the domestic prices for manufactured products while keeping down the prices of capital, labour, and some other inputs used to produce those goods.

As a result of this “infant-industry protection” policy regime, Thai industry concentrated mainly in the production of consumer goods and aimed almost exclusively for the domestic market. However, the domestic markets were rather small, and the scale of production of any particular product was correspondingly too low to achieve competitive efficiency. As the same time, some industrial sectors were controlled by few companies and thus they could easily transfer the costs of their inefficiencies to the consumers. This situation was further compounded by another policy aimed to offset this effect in some industries. Realising that the protected market provided opportunities for monopolistic behaviour, the government actively promoted the establishment of several producers within the small domestic markets. Production within some industries was therefore highly fragmented.

The industrial growth in the 1960s did not follow the evolution of the small-scale, traditional sector, which had been more structurally integrated. The nascent capital goods industry in the traditional sector was not drawn into the growth of the modern sector, but nor was a modern capital goods sector established. There was also no strategy to promote ‘leading’ industry, which might provide the ‘core’ of domestic manufacturing and the leading edge of entry into international markets. Thus, the industry did not develop as a coherent structure of production. It became an agglomeration of largely independent ‘islands’ of modern, but internationally uncompetitive, manufacturing companies with no strong linkages between them and to other sectors of production. The sourcing of its inputs, especially machinery and know-how, was predominantly external to the economy.

From the 1970s, the general policy approach shifted from import substitution to export promotion. This change coupled with prudent macroeconomic management resulted in Thailand becoming a favourite spot for foreign investment, which became a major driving force for the economy in the late 1980s. Many multinational companies set up their production in Thailand either to exploit cheap labour or use the country as a base for entry into world markets. This was most evident in the assembly of electronic parts and components. Since 1987, the share of the manufacturing industry in the national gross domestic product has grown by many percentages a year. The private sector, especially foreign investment, is responsible for most of this industrial growth. The growth has brought with it substantial increase in the demands for capital goods and technical know-how. These demands have been met almost entirely by foreign direct investment and technology licensing. This situation has become a major cause of concerns among some policy makers, particularly with respect to technology payments and the extent to which technology import has contributed to indigenous technology development. Nevertheless, such policy concerns have usually been narrowly translated into concerns for more investment in R&D with expectation that this would lead to less technology imports and more technology development.

Past and Current Strategies and Policies in Technology Development and Industrial Promotion

The existing policy approach to science and technology development in Thailand, as in many other developing countries, has three important features:

- 1) The effort to promote science and technology development has almost exclusively focuses on research and development, i.e. a specialized activity undertaken to create new technical knowledge which would become a starting point for the eventual production of new materials, new products or new processes. Lying behind this focus is the conventional wisdom of innovation, which assumes that R&D is the origin and prime mover of a linear and sequential process of innovation.
- 2) There is belief that as most firms in the economy are too reluctant or backward to undertake significant R&D, that activity should be undertaken by the government. Hence, the policy perspective has been even further distorted to emphasize mainly the development of R&D capability in the private sector with an expectation that this would generate outputs useful to the production sector. Resources and efforts directed towards establishing and strengthening R&D institutions and R&D activities outside the structure of industrial production. This practice has drawn significantly on ideas and models from developed countries, despite various contextual differences between them and Thailand.
- 3) There has been little consideration given to utilizing the process of international technology transfer, through which most industrial firms in Thailand were established, to complement local efforts in building up technological dynamism in industry. Local technology development and international technology transfer are often treated isolation from each other. To the minds of many technology development promoters, they are seen almost as alternatives—import goods, services and know-how from abroad of invest in local R&D.

Consequently, the policy concern, which started out as a concern about science and technology development becomes confined to issues about R&D. Thus, the problem on the development of science and technology in Thailand has been viewed as nothing much more than an under-investment in R&D—which is mainly assessed by the amount of resources allocated for R&D in public institutions and universities. Therefore, policies and measures, regardless of their effectiveness, have mainly emphasized developing public sector R&D capability and allocation of resources for public sector R&D. The main policy concern has usually been about how to increase the total level of government funding for public sector R&D.



BIOGRAPHY

Watcharavee Chandraprakaikul was born in 1976 in Bangkok, Thailand. She completed her undergraduate studies at Kasetsart University in Civil Engineering. Then, she studied for Master of Engineering in Engineering Management and Master of Science in Engineering Business Management at The Regional Centre for Manufacturing Systems Engineering, Chulalongkorn University.