

Modern Technology and Development of Thailand

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1. Thailand is ranked one of middle income economies with its per capita's income being U.S.\$800 as of 1985 according to the 1987 World Development Report by the World Bank. Needless to say, income generating capability is closely connected with levels of technology embodied in the society where incomes occur.

2. Although it is generally admitted that promoting science and technology is crucially important, how to do it is not necessarily clear. Various approaches may be possible and/or probable in accordance with varying natural, Social economic, political and cultural conditions. And the world "technology" itself affords many implication and interpretations. Putting aside discussions about defining technology we try to put it in the context of economic development process. Final goal of economic development is to achieve betterment of people's welfare, which in turn is realized through increases in supply of goods service in more efficient ways. This means that less costs

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are required to produce a given amount of output and more output achieved with a given costs, in short, improvement of productivity of inputs required to produce outputs is the expected role of technology and applied sciences. But technology is an entity which must be adopted to various kinds of realities before getting beneficial to people or the society.

3. Socially practical application of technology into production process is often called innovation. More increases in production as a whole is sometimes said economic growth rather than economic development. Development implies structural changes coupled with production increase. In economic history of Thailand we can witness growth without development. In the middle of 19th century, Thai opened the door entering into the world markets as a rice exporting country. Since then production as well as export of Thai rice were tremendously expanded through mainly extension of arable area. Rice planted area increased from 5.8 million rais in about 1850 to 11.5 million rais in 1910 and further to 20.1 million rais in 1930. As a result, rice became an items account for 70 to 80 percent of total exports from Thailand around the end of 19th century. Thai economy then was specialized in rice production. In addition, northern part of Thailand was specialized in teak-wood timber and southern area did in tin. These three items only came to account for 90 percent of total exports from Thailand. This phenomenon is called monoculture economy, which is considered to be fragile against economic fluctuation because such economy can not skillfully cope with structural changes in demand, which are effected due to income and price change.

4. Innovation is, therefore, necessary to avoid growth without development. Innovation on new combination of various factors imply (1) introduction of a new good or a new quality of good, (2) discovery of a new method of production,

(3) opening of a new market, (4) location of a new source of supply, or (5) introduction of a new organizational system. Each of the above probably leads increase productivity and renders a possible expansion path to development. Furthermore to realize innovation requires entrepreneurship or enterprising spirits. Social and spiritual condition which foster entrepreneurship may be provided through education. Education plays a vital role in developing a society. Strenuous pushing up of education does not always bring about a desirable result but, sometime unexpected outcomes one of which is mismatching of labour supply and demand by sectors and by regions. In the field of educational activities deliberate planning is needed. On the one hand, policy measures for giving employment opportunities to the existing labor force should be executed and on the other hand, training and education must be promoted in order make a good matching of available jobs with required labor.

5. In any field, long term policy should be geared with medium and short term measures.

Technological progress in the long run contributes to boost the economy higher than expected from level of inputs used up or costs spent. Mathematically speaking, if a production function which expresses functional relationship between inputs as independent variables and output as dependent variables is homogeneous of degree more than one, output as a function of required inputs would increase to the more extent than degree increase in each input.

6. The choice of techniques to produce some output is also related policy options, For example, electricity generating plant, chemical industry: automobile industry and the like have to be run on the basis of modern advanced technology and in considerably large scale production, while not only a considerable number of consumers goods but also many kinds of producers goods and ser-

vices could be supplied through less capital intensive or labor intensive techniques. The choice of most economical technique to achieve a desired objective must be made upon considering the cheapest combination of inputs to acquire same result. Notwith standing, many developing countries are apt to use a excessive capital intensive technology to lead to a wasteful use of scarce resources. The reasons for it are (1) the policy of import substitution, (2) distortions in factor markets (3) the unavailability of a more labor intensive technology, (4) a desire to use modern production techniques sometime due to rational prestige.

7. More points to be considered in pushing technology to promote development:

- 1) Technical dualism
coexistence of traditional (informal)

- sectors and modern (formal) sectors.
- 2) Adaptation of "appropriate technology"
Appropriate technology is not same as intermediate or obsolete technology.
- 3) Consideration of technical linkage between industries-backward; radio-battery-forward; cement-concrete-bldg.
- 4) Modernization of management
- alleviation of the nepotism, improving promotion, system etc.
- 5) Tax reform
- 6) Fostering ancillary (small-medium) firms
- 7) Improving of educational system and policy more emphasis on secondary school.
- 8) Land use planning-dispersion and relocation.

Table 1 : Share of GDP by Economic Sector (1972 prices)

(per cent)

Sector	1960	1965	1970	1975	1980	1985
Agriculture	40.5	36.3	32.2	30.4	24.9	23.2
Mining	1.2	1.7	1.7	1.2	1.6	1.6
Manufacturing	11.7	14.0	15.5	18.2	20.7	20.7
Construction	4.8	5.8	5.8	4.2	5.7	4.8
Electricity	0.3	0.6	1.1	1.6	1.9	2.4
Transportation	6.7	6.3	6.1	6.1	6.4	6.9
Trading	15.8	16.3	17.7	17.7	16.5	15.8
Banking	1.9	2.6	3.9	4.9	5.9	7.4
Ownership of dwellings	2.9	2.4	2.0	1.7	1.5	1.0
Public administration and defences	4.6	4.3	4.3	4.1	4.2	4.0
Services	9.5	9.7	9.7	9.9	10.6	11.7
Total	100.0	100.0	100.0	100.0	100.0	100.0

Note : estimated.

Source : National Accounts Division, NESDB.

Table 2 : Share of Employment by Major Economic Sector

(Thousand person)
(per cent)

Sector	1977	1980	1985
Agriculture	14,922 (73.85)	15,943 (71.14)	15,092 (62.65)
Mining	50 (0.25)	37 (0.16)	97 (0.40)
Manufacturing	1,329 (6.58)	1,789 (7.98)	2,312 (9.60)
Construction	332 (1.64)	436 (1.95)	737 (3.06)
Public utilities	49 (0.24)	49 (0.22)	49 (0.20)
Trading	1,675 (8.29)	1,916 (8.55)	2,739 (11.37)
Transportation	383 (1.89)	456 (2.03)	600 (2.49)
Services	1,567 (7.76)	1,887 (8.42)	2,558 (10.62)
Other	0.7 (.00)	0.5 (.00)	7.9 (0.03)
Total	20,206.81 (100.00)	22,410.95 (100.00)	24,090.72 (100.00)

Source: National Statistical Office.

Table 3 : Imports by Economic Classification

(Millions of Baht)

Type of Imports	1960	1965	1970	1975	1980	1985	1986
Consumer Goods	3,365 (34.97)	4,163 (26.97)	5,378 (19.91)	8,455 (12.65)	19,286 (10.22)	23,966 (9.54)	24,466 (10.14)
Non-durable	2,558 (26.58)	2,919 (18.91)	3,486 (12.91)	5,148 (7.70)	12,257 (6.50)	12,805 (5.10)	12,982 (5.38)
Durable	807 (8.39)	1,244 (8.06)	1,892 (7.01)	3,307 (4.95)	7,029 (3.73)	11,161 (4.44)	11,484 (4.76)
Intermediate product and raw materials	1,746 (18.15)	3,210 (20.80)	6,725 (24.90)	16,105 (24.10)	45,312 (24.01)	75,772 (30.17)	84,333 (34.94)
Chiefly for consumer goods	1,031 (10.72)	2,128 (13.79)	4,139 (15.32)	10,318 (15.44)	28,182 (14.94)	51,107 (20.35)	61,191 (25.35)
Chiefly for capital goods	716 (7.44)	1,082 (7.01)	2,586 (9.57)	5,787 (8.66)	17,130 (9.08)	24,605 (9.80)	23,142 (9.59)
Capital goods	2,367 (24.60)	4,775 (30.94)	9,371 (34.70)	22,239 (33.27)	46,075 (24.42)	75,404 (30.02)	78,316 (32.45)
Other imports	2,144 (22.28)	3,285 (21.29)	5,535 (20.49)	20,036 (29.98)	78,013 (41.35)	76,027 (30.27)	54,243 (22.47)
Vehicles and parts	755 (7.85)	1,454 (9.42)	2,204 (8.16)	4,542 (6.80)	6,912 (3.66)	9,292 (3.70)	8,939 (3.70)
Fuel and lubricants	1,025 (10.65)	1,353 (8.77)	2,329 (8.62)	14,233 (21.30)	58,733 (31.13)	56,719 (22.58)	32,354 (13.40)
Other	303 (3.15)	342 (2.22)	894 (3.31)	1,261 (1.89)	12,368 (6.55)	9,975 (3.97)	12,790 (5.30)
Total imports	9,622 (100.00)	15,433 (100.00)	27,009 (100.00)	66,835 (100.00)	188,686 (100.00)	251,169 (100.00)	241,358 (100.00)

Source: Bank of Thailand.

Table 4 : History of Industrialization

JAPAN		THAI	
1600	A closed-door policy, centralized power	1600	Scattered, isolated self-sufficient societies
1868	Self-armament and industrialization (A lesson from China) - 1872 "GAKUMON'NOSUSUME" 200,000 copies	1868	Quasi-colonization, Economy by Chinese
1930	Vertical Bureaus for Industrial Policy	1932	Democracy revolution Economy by Thai people
1945	Reconstruction of the economy - 1947 "A White Paper"		- State enterprises x - Industrial promotion x Failure of MOI
1960	Rapid growth economy. Free trade policy - "Income doubling 5 year plan"	1958	World Bank advice
	Very successful	1959	BOI, IFCT, NEDB separately from MOI BOI, IFCT O MOI X not so successful eg. SIFO
1986	MITI's report on the country's future "Japan in the Global Community : Its Role and contribution on the Eve of the 21st Century"	1985	J.P.P.C.C. Sprout of Integration
		1986	Restructuring of MOI 1. Close cooperation with private sectors 2. Integration of BOI, MOC and MOI. 3. Long term vision for each industry

Source: Akira Kuroda, Some Proposals for Industrialization of Thailand, 1986.