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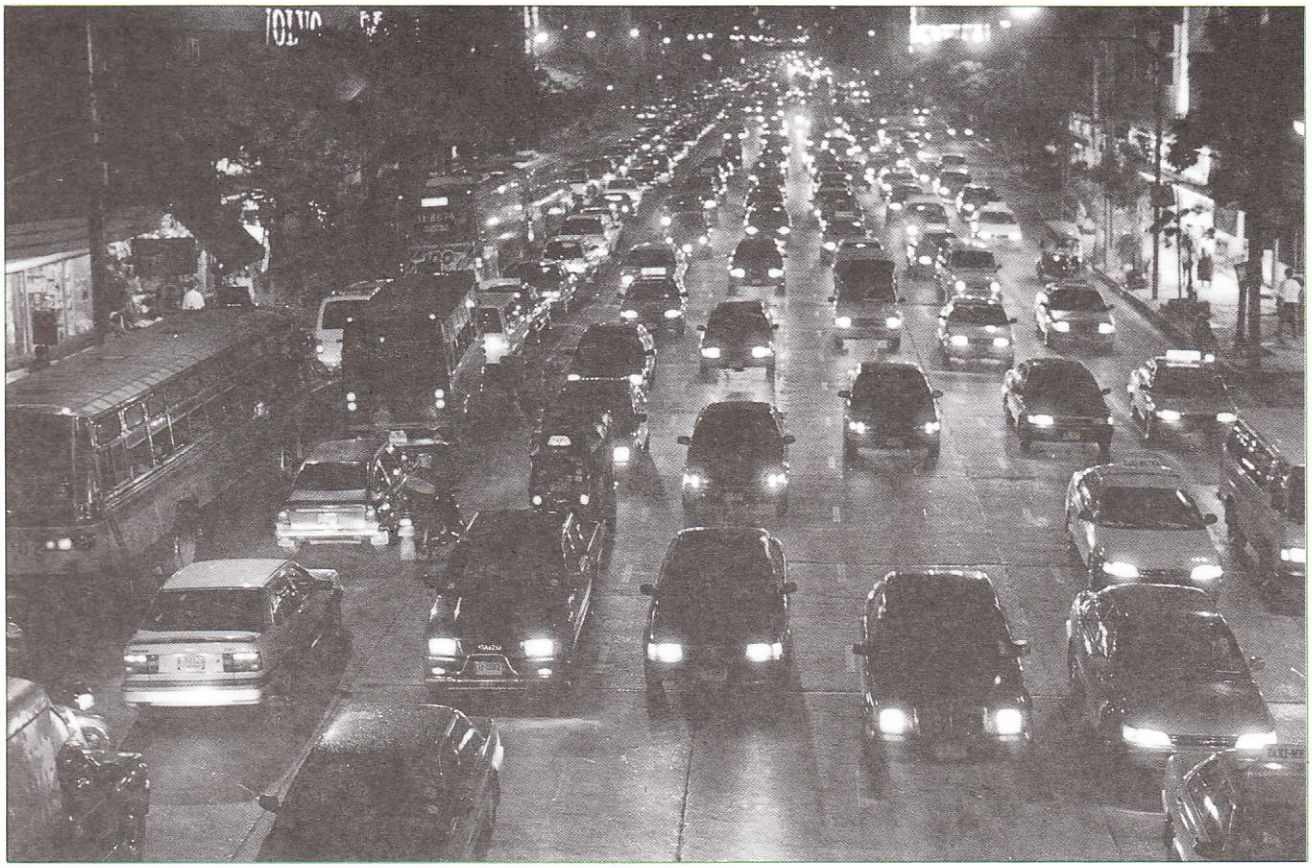

Seven lanes of bumper to bumper traffic stretch for as far as the eye can see on Bangkok's Sukhumvit Road. Is there a solution to this desperate situation? (see related article on page 20)

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The Thailand Development Research Institute Foundation was established in 1984 to conduct policy research and disseminate results to the public and private sectors. TDRI was conceived, created and registered as a non-profit, non-governmental foundation, and is recognized as such by the Royal Thai Government. The Institute does technical and policy analyses to support the formulation of policies with long-term implications for sustaining social and economic development. TDRI has six research programs: Human Resources and Social Development, International Economic Relations, Macroeconomic Policy, Natural Resources and Environment, Science and Technology Development, and Sectoral Economics; and two special research projects: "Thailand in the Year 2010" and "Thailand and Economic Cooperation in the Asia-Pacific Region."

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Deputy Prime Minister Supachai Panitchpakdi Opens TDRI Conference on AFTA

H.E. Deputy Prime Minister Dr. Supachai Panitchpakdi delivered the inaugural address at a TDRI conference on "AFTA and Beyond: An ASEAN Perspective," held April 27 to 28, 1994 at the United Nations Conference Center in Bangkok. Nineteen speakers from Asia, North America, Australia and the Economic Union presented papers and held discussion sessions on the role of the ASEAN Free Trade Area (AFTA) in uniting ASEAN countries and helping them become more integrated into the world economy. Over 180 people attended the conference. It was organized by TDRI in collaboration with Queen's University, Kingston, Canada, with the assistance of the Economic and Social Commission for Asia and the Pacific (ESCAP). Primary funding sources were the Canadian International Development Agency (CIDA), the United Nations Development Program and General Finance and Securities Company, Ltd. (GF). Below we reprint Dr. Supachai's speech, entitled "AFTA and Beyond: Visions and Issues."

Canadian Ambassador to Thailand,
Deputy Executive Secretary of ESCAP,
President of TDRI,
Distinguished Professors and Guests,
Ladies and Gentlemen,

It is an honor and a privilege for me to be invited to address this prestigious international conference before distinguished academics and an audience from many parts of the world. The topic of the conference is close to my home – "AFTA and Beyond: An ASEAN Perspective." As I read through the program, I was glad to learn that the progress and the future of AFTA have been pressing concerns of many leading professors from more than 10 countries who will be speakers or commentators during the next two days.

My assignment is to provide "visions" or future scenarios for AFTA and to spell out the issues that AFTA members should carefully consider to ensure that AFTA will be an effective forum in a rapidly changing world economic environment.

I should like to start my talk by first focusing on what I believe to be new developments in international trade, especially after the signing of the final draft of the Uruguay Round (UR) of Multilateral Trade Negotiations at Marrakesh, Morocco. The ASEAN country officials who formed AFTA strictly abide by the GATT principles of non-discrimination. Therefore the progress of GATT, the conclusion of UR and the formation of the World Trade Organization (WTO) will very much influence the current and future directions of AFTA. After laying out the general background and describing recent changes in the world trade system, I will discuss AFTA's current status and its future development.

Distinguished Guests,

The conclusion of the UR calls for a note of optimism. It represents a ray of hope that in the future the world trade system will be based on general rules and regulations that will be applied to and upheld by all member countries, big or small. In addition, the WTO will basically be the core institute where trade disputes can be resolved with fairness, based on the principles of GATT, to which most countries have long adhered.

The content of the UR final draft is, however, far from perfect, even though its realization took seven years of arduous talks and negotiations. In general, the final draft shows a compromise solution where every party is bound to find advantages and disadvantages. But, to be more precise, more advanced countries are likely to gain more from the draft proposal than less developed countries. For example, the Intellectual Property Rights Protection Act will solely benefit the developed countries, especially in the short term, as the ownership of most pattern and property rights belongs to companies in developed countries. Similarly, the opening up of the service sectors also gives clear advantages to the developed countries, as they have more experience and scale advantages in providing such services. On the other hand, benefits to the less developed countries are unfortunately rather limited. The issue of agricultural market liberalization has been very much watered down. If there had been no pressure from the group of agro-based

Organizers and speakers of the AFTA Conference (from left to right): Mr. Kazi Rahman, ESCAP; Mr. David Stifel, TDRI and GF; Mr. Bijoy Raychaudhuri, ESCAP; Mr. Ravi Sawhney, ESCAP; Dr. Shigeyuki Abe, Kobe University, Japan; Ms. Maureen Grewe, TDRI; Dr. Deepak Nayyar, Jawaharlal Nehru University, India; Dr. Chia Siao Yue, National University of Singapore; Dr. Mohamed Ariff, University of Malaya, Malaysia; Dr. Mari Pangestu, Center for Strategic and International Studies, Indonesia; Dr. Frank Flatters, Queen's University, Canada; Dr. Wisarn Pupphavesa, TDRI; Dr. Michael Plummer, Brandeis University, U.S.; Dr. Richard Harris, Simon Fraser University, Canada; Dr. Ludo Cuyvers, University of Antwerp, Belgium; Dr. Zhang Jun, Fudan University, China; Dr. Florian Alburo, University of the Philippines; Dr. Hal Hill, Australian National University (Not in photo: Dr. TB Lin, Chinese University of Hong Kong).

countries at the final stage, in particular the Cairns Group, the conclusion on liberalizing agricultural markets might have been much less meaningful.

The situation is the same in the case of textiles. Less developed countries will have to wait another 10 years before the sector can be fully liberalized. This "unbalanced gain," inherited from the UR, will undoubtedly influence the direction of the regional groupings of the less developed countries. On the one hand, they may have to assist each other more in future trade negotiations. On the other, regionalism might still remain popular in spite of the victory of multilateralism, purely because of the need to strengthen their negotiation position through the group's solidarity.

With regard to the WTO, which is expected to be ratified by all GATT members by the end of this year, the gesture shown by the super economic powers – the European Union and the United States – does not bode well for the future of the organization. France remains persistent in continuing to use non-tariff barriers, most recently in halting imports of fishery products from some ASEAN countries. The U.S. insists on keeping the set of section 301 laws of unilateral action and proposes to link the "labor and environmental clause" with the trade issue. In this case, Thailand, as well as ASEAN, believe that the workers' rights and labor standards are not issues in which GATT should be involved. The labor rights issue, for example, can be more properly addressed by other relevant organizations, such as the International Labor Organization (ILO). Indeed, more trade restrictions on those countries which have low labor standards could in effect end up harshly penalizing the workers themselves. In contrast, if the United States focuses on opening up more markets for agriculture and labor-intensive manufacturing products, this could directly benefit farm and factory workers, as their working conditions and income will surely be improved.

Ladies and Gentlemen,

Besides the work that GATT and WTO must accomplish to help make the multilateral negotiations the core of the world trade system, they would at the same time have to make regional groupings more supportive of the non-discrimination principle, hoping that in the long term all markets would be combined into one. Regarding regional groupings, the minimal measures for GATT's new framework are as follows:

First, GATT should consistently require regional blocs to be more outward-looking – to really open itself up to new members, while membership requirements should be clearly spelt out. At least the rules and regulations for being an associate member must be publicly stated.

Second, GATT as well as members of the regional blocs should eliminate or minimize the "exceptions to rules." The AFTA exclusion list, for example, should be reconsidered from time to time and the normal tract and exclusion time frame should be shortened whenever possible.

Third, GATT should assist in the establishment of linkages between regional groups.

Fourth, GATT should provide some form of financial assistance to facilitate the transition process and to help increase production efficiency.

Finally, there should be a standard range of commodities in forming a regional grouping. GATT should urge every group to cover as wide a range of commodities as possible in forming the free trade area.

Distinguished Guests,
Ladies and Gentlemen,

The recent changes in the world economic environment indicate two important trends. First, multilateral trade negotiations are now regaining momentum. Some modifications are needed to make WTO more effective in carrying out the GATT principles of non-discrimination and reciprocity; however, we have hope that major trade disputes between countries and between blocs which might jeopardize the future trade system could be resolved within the framework of WTO with mutual understanding and under common rules and regulations.

Second, the WTO will gain full support from the less developed countries (LDCs) and small economies and countries outside NAFTA and EU. ASEAN has long preferred multilateral to bilateral negotiations and will do its best to enhance the role of WTO. By doing so, it is ASEAN's task to prepare AFTA for a new environment and to take this opportunity to adjust AFTA, in principle and in practice, in line with UR's framework. ASEAN should also be mindful to prod WTO to work in a way which benefits ASEAN the most.

Every ASEAN member agrees that AFTA must be modified to speed up its progress on trade liberalization; it should, for example, cover more commodities in the original inclusion list for tariff reduction. The following are the immediate tasks which I believe ASEAN should consider if member countries want to keep AFTA at the forefront with other regional cooperation schemes.

First, AFTA's time frame needs to be shortened. The 15-year trade liberalization period is already too long when compared to GATT and NAFTA, which have both set a maximum trade liberalization period of 10 years. Moreover, WHO will impose stricter discipline and require strong justification for regional groupings which require more than a 10-year time frame. If AFTA can agree on measures to facilitate the adjustment process, such as the "AFTA adjustment fund," the faster pace of liberalization would probably only give us more benefits in terms of enhancing ASEAN's economic competitiveness and accelerating local and foreign investment within the region. Regarding the time frame, the five year reduction for the normal tract (from 15 to 10 years) and the three year reduction in the exclusion period (from eight to five years) could be acceptable and considered to be appropriate.

Second, considering the comprehensive coverage of UR commodities, the list of AFTA commodities should be expanded. At present, non-processed agricultural products are excluded from the list. This may no longer be appropriate in view of their inclusion in GATT. Moreover, in NAFTA, most of the agricultural exports between the U.S. and Mexico will be subject to zero tariff within five years. If exclusion from the agricultural sector is maintained, it will not only render the AFTA initiative less liberalizing than those of GATT and NAFTA, but it may also jeopardize ASEAN attempts to become a leader in agricultural negotiations in the next round of multilateral negotiations under the WTO.

ASEAN should also continue to reduce products on the exclusion list, keeping the list minimized as much as possible. At present, there is a positive tendency by some countries to reduce the number of commodities on their exclusion list, while other members have 600 or more listed items. The industries in which ASEAN should be able to competently compete in the world market, for example, the petrochemical industry, should be reviewed and serious discussions should be held to remove them from the list.

Third, the tariff scheme and the local content requirement comprise other important considerations. When AFTA was launched in January 1992 at the ASEAN summit in Singapore, prospects were grim for the conclusion of the UR, and we had incomplete information about the future of other free trade areas. No doubt the tariff reduction and local contents requirement, which were ambitiously agreed upon at that time, would not have been well suited for the situation in 1994. The situation has evolved faster than we had anticipated

and it is now time to reconsider and readjust such details. On the minimum tariff rate, the current 0 to 5 percent tariff reduction is high relative to the rate of other free trade areas. In this case, we might aim for a zero tariff rate. On the local content rules, in order to be consistent with the text in the agreed Trade-Related Investment Measures (TRIMs), we may need to review the cumulative local content rules, as well as the substantial transformation principle in the textile and apparel sectors.

Finally, it has become increasingly evident that subregional cooperation is an effective instrument to strengthen economic cooperation within the context of free trade areas, and to help redistribute income to the regional areas. In the future AFTA should play a greater role in initiating and facilitating the formation of intraregional economic cooperation schemes, such as the Indonesia-Malaysia-Thailand Growth Triangle Project.

Ladies and Gentlemen,

I have outlined what I believe to be AFTA's immediate task – to catch up with the new world economic environment. However, I believe that merely passively adjusting to a changing environment is not enough to bring AFTA to its maximum potential. After all, AFTA is one of the leading country groupings that will help shape the future of the new world economic order. It must be strong enough to bargain on an equal footing with other advanced countries. We must always form a "forward looking strategy" to increase AFTA's strength.

I always urge ASEAN members, as well as people with whom I come into contact, like the distinguished audience today, to think of AFTA in dynamic rather than static terms. International trade is by nature dynamic; this is the case for AFTA too. If we recall the prime objectives of AFTA – to expand our market size, to unleash our market forces, and to enhance our competitiveness in the world market – there is no reason why we cannot link AFTA with other free trade areas or regional economic groupings. Moreover, to expand AFTA is to confirm to the world that the ASEAN philosophy on international trade is truly based on an "open concept," and not disguised protectionism. We must also remember that the AFTA we helped create is consistent with the GATT principles of non-discrimination. This implies that we must do our best to link AFTA to the world market.

I would like to stress again that ASEAN members should not be afraid of competition. New participants can expand the market, help increase investment and raise our competitiveness. This in turn will create the conditions for AFTA to grow.

Distinguished Participants,

I believe this a good time to consider the "open concept," to study the possibility of AFTA's future expansion and to discuss opportunities to establish links with other regional groupings. I would like to inform you that at the Marrakesh meeting, where the UR was concluded, ASEAN was approached by Sir Leon Brittan to discuss the possibility of a closer relationship between EU and AFTA. The United States, as a representative of NAFTA, followed suit. This is not to mention the Prime Minister of Australia's expressed interest in enhancing economic cooperation with ASEAN.

This "open concept" is one important step in helping prepare AFTA to become a strong supporter of the WTO. By expanding linkages, especially with countries in the same geographical area as AFTA members (for example, Australia and New Zealand), there will be a chance to shape the WTO agenda. In fact, we must not only appreciate countries which express an interest in moving closer to us, but we must also look for countries which share common principles with us. This can increase AFTA's negotiation strength and enable it to identify suitable alliances.

We should also bear in mind that without AFTA each country's individual economy is small, in fact too small to shape productive expertise, not to mention negotiation power, which is becoming increasingly important in today's global trade scenario. By combining our economies to create an organization such as AFTA we gain sizeable economic momentum in trade and investment relocation and in bargaining power. Therefore, there are no grounds to the argument that open regionalism could weaken AFTA's strength. On the contrary, I believe that if we are careful enough in expanding AFTA step-by-step, it could become in the near future one of the most powerful and highly respected economic cooperation schemes in the world.

Ladies and Gentlemen,

In conclusion, may I take this opportunity to wish the organizers – TDRI, Queen's University and ESCAP – every success in this conference. Reviewing the list of speakers, I trust that all participants will gain enormously from the new ideas and valuable information to be passed on to them today. This will help all of us to determine future trends and directions for the continuing fruitful development of AFTA – and its realization of greater accomplishments in the years to come.

Thank you.

Enhancing Thailand's Trade Policy Through AFTA

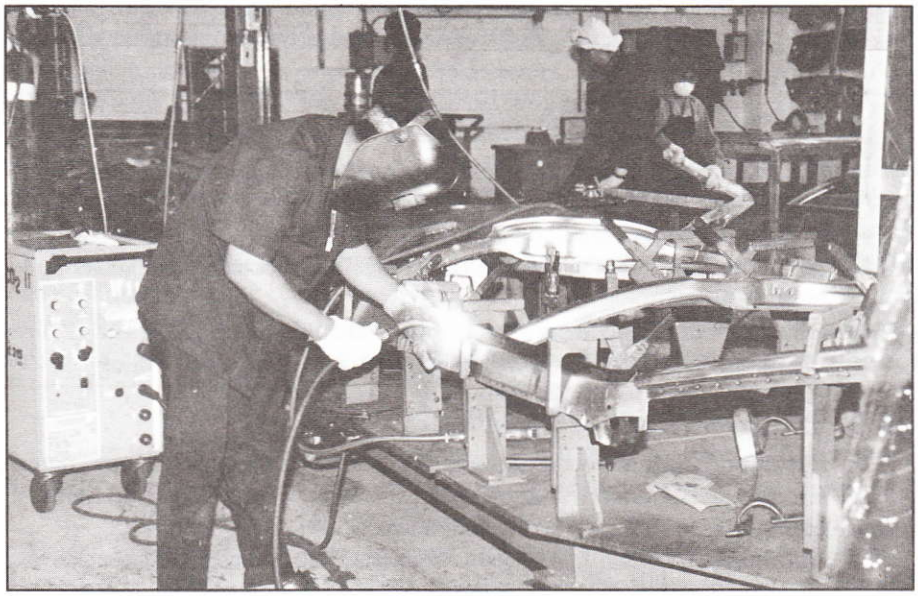
Wisarn Pupphavesa*
Maureen Grewe**

The following is a paper presented at a conference on "Pacific Trade and Investment: Options for the 90's," held in Toronto, Canada from June 6 to 8, 1994. The conference was organized by the John Deutsch Institute at Queen's University, the Centre for International Business at the University of Toronto, and the Thailand Development Research Institute.

The implementation of the ASEAN Free Trade Agreement (AFTA) will provide an opportunity for Thailand to review and rethink its approach to trade policy. This should be in terms of intra-ASEAN trade and competition, attracting foreign direct investment and enhancing the competitiveness of Thai industries to face global markets. While AFTA will eventually bring tariff levels down to 5 percent or less for intra-ASEAN trade in manufactured goods after 15 years, the ASEAN countries will be reducing their own tariffs with differing timetables. At the same time, multilateral tariffs will be falling, due to the recently completed Uruguay Round of GATT. Thailand needs to consider how its AFTA tariff reduction schedule will affect its competitiveness vis-a-vis the other ASEAN countries and the world. It must also structure its trade policy to provide appropriate incentives to its producers.

THAILAND'S TRADE POLICY PRE-AFTA

Over the past two decades, Thailand has achieved an impressive record of economic growth, averaging 9.5 percent from 1986 to 1991. This growth has largely been attributed to an export-oriented industrialization strategy, combined with a stable macroeconomic environment. Thailand's competitiveness has been and continues to be based on cheap sources of inputs, both labor and material.



The automobile industry has been targeted by ASEAN as a prime source of foreign direct investment.

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** *Ms. Grewe is a visiting Research Associate from the Woodrow Wilson School, Princeton University, now working with TDRI's International Economic Relations Program.*

During the 1980s, Thailand's tariff structure was characterized by low tariff protection for raw materials. Tariff rates increased with additional processing and were quite high for finished products. Tariffs had an anti-export bias, with rates for import substitution industries fixed at much higher levels than those for export-oriented industries. To combat this, the government introduced incentives to encourage the growth of export-oriented manufacturing and agriculture, resulting in the favorable treatment of imported inputs over local intermediate goods[1] (see Table 1). Rather than revamp the overall policy, these incentives were layered over the existing import substitution supporting framework. This inconsistent policy has led to conflicting interests among those who want to liberalize (exporters) and those who want to maintain protection (producers for the domestic market). It has also created distortions which give artificial advantages to particular industries. Thailand's dramatic export growth has occurred in spite of these factors, but future growth may depend on the rationalization of distortions and inefficiencies.

A large portion of Thailand's imports are intermediate and capital inputs from non-ASEAN sources. Table 2 shows Thailand's principal imports in 1991 and their sources. While lowering tariff barriers to other ASEAN countries will be an initial step in improving competitiveness and reducing costs to Thai producers, lowering tariff barriers to the world through unilateral liberalization would be more appropriate. This would facilitate imports necessary for export-oriented industries and maintain Thailand's competitive advantage. Artificial and transaction costs, including the tax burden on these imported inputs, must be eliminated.

Moving in this direction, the Seventh National Economic and Social Development Plan identified six industries as particularly important for Thailand's economic development. These are agro-industry, electronics, iron and steel, metal working, petrochemicals and textiles and garments. The Plan calls, for example, for a reduction in import duties for upstream and intermediate textiles to promote investment in weaving and spinning. This will benefit the Thai textile and apparel industries by lowering input costs. The plan also endorses a similar cost reduction for the plastics industry by reducing the protection of upstream and intermediate petrochemicals. These are positive steps toward rationalizing import duties and promoting lower costs for downstream Thai producers. As mentioned above, however, the plan targeted only six industries, rather than promoting a broad liberalization for Thai industry as a whole.

Table 1: Investment Incentives under the Investment Promotion Act of 1977

Tax Incentives

- Exemption, or 50% reduction, from import duties and business taxes on imported machinery
- Reduction of import duties and business taxes of up to 90% on imported raw materials and components
- Exemption from corporate income taxes for 3 to 8 years, with permission to carry forward losses and deduct them as expenses for up to 5 years
- Exemption for up to 5 years from withholding tax on goodwill, royalties or fees remitted abroad
- Exclusion from taxable income of dividends derived from promoted enterprises during the income tax holiday

Additional Incentives for Enterprises in Special Investment Promotion Zones

- Maximum reduction of 90% on business tax on the sales of products for a period of up to 5 years
- Reduction of 50% on corporate income tax for 5 years after the termination of a normal income tax holiday or from the date of income earning
- Allowance to double the cost of transportation, electricity and water supply for deduction from taxable corporate income
- Allowance to deduct from taxable corporate income up to 25% of the investment costs of installing infrastructure facilities for 10 years from the date of income earning

Additional Incentives for Export Enterprises

- Exemption from import duties and business taxes on imported raw materials and components
- Exemption from import duties and business taxes on re-exported items
- Exemption from export duties and business taxes
- Allowance to deduct from taxable corporate income the amount equivalent to 5% of an increase in income derived from exports over the previous year, excluding costs of insurance and transportation

Source: Board of Investment.

Table 2: Thai Imports of Selected Intermediate Imports and Capital Goods By Volume and Source

Category	1991 Imports (millions of baht)	% of 1991 Total Imports	Major Suppliers and % of Total	
Non-electrical machinery and parts for industrial use	181,653.0	18.93%	Japan Germany U.S.A.	43.5% 12.5% 10.5%
Electrical machinery and parts	118,147.3	12.31%	Japan U.S.A. Singapore	38.5% 21.3% 9.9%
Iron and Steel	71,454.0	7.45%	Japan China South Korea	44.8% 9.1% 7.2%
Chemicals	66,987.6	6.98%	Japan U.S.A. Germany	28.1% 14.5% 7.2%
Jewelry, including silver bars	51,973.1	5.40%	India Hong Kong Belgium	35.7% 15.8% 13.7%
Crude Oil	40,297.0	4.20%	Malaysia Saudi Arabia UAE	30.3% 16.7% 16.3%
Parts and access, including chassis and bodies	28,492.9	2.97%	Japan Germany South Korea	86.1% 6.4% 1.0%

Source: Department of Business Economics, Trade Statistics and Economic Indicators of Thailand 1991.

Conflicts of interest among industry groups and subsequent political pressures have precluded general liberalization of import barriers. The result is a high wall of protection undermined by import duty exemptions and exceptions for specific industries or investors. These exceptions become increasingly costly to monitor and administer as they multiply in number. They also foster conditions which benefit only a minority of firms. A more equitable and efficient approach would be to lower import barriers for the economy as a whole. This would address another goal of Thailand's overall economic policy—to reduce income distribution width. The interests of large, influential producers are more likely to be heard in policy circles than those of consumers. A trade barrier liberalization, however, will lower consumer costs, thereby producing a welfare gain which is likely to be more equitably distributed than welfare gains accruing to individual producers.

THE ROLE OF FOREIGN DIRECT INVESTMENT

By the second half of the 1980s, foreign direct investment (FDI) into Thailand had rapidly accelerated from 9,000 million baht in 1987 to a peak of 65,000 million baht in 1990. It declined slightly in the early 1990s.[2] Major investors in Thailand are the United States, Japan, the newly-industrialized economies (NIEs, i.e., Hong Kong, Taiwan, South Korea) and Singapore. The recent period of high FDI inflow has resulted in a diversification of exports from primarily natural resource-based products into growing shares of technology-intensive and skilled-labor-intensive goods.[3]

Due to the gap between savings and investment, Thailand needs to maintain FDI inflow for continued growth. According to a recent study,[4] cost reduction and investment for export to the home market were primary reasons for FDI into Thailand. The study also found that tariffs on intermediate products and capital equipment were hindering FDI. Infrastructure availability was noted as another important factor contributing to FDI. Thus, to further attract foreign investors, Thailand should strengthen and broaden policies to facilitate cost effectiveness; this would include reducing tariffs on imported inputs. Existing plans to improve telecommunications and transportation infrastructure will also be important in maintaining foreign inflows.

Many economists feel that AFTA will contribute to further foreign direct investment in the region. The

ASEAN region's increased appeal will stem from the expanded ASEAN market's economies of scale, as well as the free movement of goods between the ASEAN economies. These factors will facilitate the formation of ASEAN's international production networks. These networks will be composed of production units based in different locations created by lowered transportation costs and improved infrastructure. As new technologies are introduced to lower costs and boost competitiveness, the ASEAN economies' diverse production base should attract investors by eliminating barriers to intra-firm trade and imports of intermediate inputs.[5]

Within the region, however, Thailand will be competing against other ASEAN nations for a limited pool of foreign investment funds. For this reason, Thailand cannot simply wait for AFTA to bring investors to the region. It must ensure that it maximizes its areas of comparative advantage relative to the other ASEAN economies.

One example where Thailand may be missing out under AFTA is in the case of automobiles. Of Thailand's exclusion items, 57 of 117 are automobile-related. Similarly, automobile items make up 181 of Indonesia's 1,708 exclusions, 160 of Malaysia's 648 excluded items and 55 of the Philippines' 1,179 excluded items. The automobile industry has been targeted by ASEAN as a prime source of FDI through the ASEAN Industrial Complementation (AIC) and Brand to Brand Complementation (BBC) Schemes,[6] relying primarily on import duty exemptions to ease the flow of intermediate inputs. The goals of these schemes seem to be thwarted by the placement of automobiles and parts on most AFTA exclusion lists.

In recent years, the Thai automobile industry has slowly been moving toward lower levels of protection. The industry started exporting cars and trucks for the first time in 1987. Import duties on completely built-up units (CBU) and completely knocked-down units (CKD) were slashed in 1991. A recent article states that "Thai auto policy is more effective than that of Indonesia, Malaysia and the Philippines" with respect to local content, rationalization and exports.[7] It maintains that Thailand "should have given some priority to using the ASEAN Free Trade Area to enlarge the country's local parts and components markets, particularly as Thailand has a competitive edge in some subsidiary auto items."[8] The exclusion list will be amended from time to time. Serious consideration should be given to the Thai auto industry's possible expansion by removing the excluded auto items from the AFTA exclusion list.

INTEGRATING AFTA INTO THAILAND'S TRADE POLICY

The ASEAN countries have introduced AFTA to lower their trade barriers and promote competition among themselves before being faced with future multilateral liberalizations. Protected industries will be able to adjust to a more competitive environment on a limited basis, before being exposed to global markets. Thailand should make the most of this opportunity to strengthen weak industries and further solidify strong industries' market position. An appropriate tariff reduction schedule, coupled with adjustment assistance programs for previously protected industries, will help Thailand take advantage of the opportunities offered by AFTA, and prepare it to face global competition.

To date, Thailand has a mixed record on achieving these goals. There has been a conflict between government claims that tariff rates will be reduced within AFTA targets and actions which delay tariff reductions for several years. Normal track goods, for example, with rates presently above 30 percent will not be subject to reductions until 1998.[9] Similarly, Thailand has proposed to reduce trade barriers on a much slower schedule than the other ASEAN countries for many normal track items. This may drag out the adjustment period for Thai industries.

In response to industry pressures, petrochemicals have recently been moved from the fast track to the normal track. Thus, despite the importance placed on liberalizing this sector in the Seventh Plan, influential upstream producers and large producers receiving Board of Investment (BOI) or Customs Department privileges have succeeded in delaying the phase-out of their protected position, to the detriment of small producers.[10]

Delays in tariff reductions will also hinder Thailand's intra-ASEAN exports, because under Article 4.2 of the AFTA Agreement, Thailand will not be eligible to take advantage of the other ASEAN countries' concessions until it reaches the 20 percent level itself. Hence, Thai exporters will have to pay import duties for intra-ASEAN exports while other ASEAN exporters will not. Comparisons between major export items with a delayed tariff reduction schedule and the rest of ASEAN and their existing tariff rates are listed in Tables 3 and 4. They include such products as cereals, sound recording equipment, transistors, switchgear, plastic articles, textiles and apparel, some iron and steel products, optical instruments, watch cases and some imitation jewelry.

The reduction of tariffs for previously protected industries will inevitably cause adjustment pains. Thusfar, the Thai government has not addressed the need to assist affected industries in their adjustment process. While those protected are often viewed as inefficient and privileged, in fact most have simply responded to the incentives and signals set forth by the government. The goal is to help these industries to respond to market signals and become more competitive, not to punish them for taking advantage of prior opportunities.

A recent article[11] sets forth criteria for industrial restructuring assistance. These criteria include directly

Table 3 Tariff Reduction Schedule of Selected Thai Export Items with Late Reduction versus Other ASEAN Countries

			20> Tariff rate >5						5> Tariff rate >0					
	SITC2	SITC Description	Brun	Indo	Malay	Phil	Sing	Thai	Brun	Indo	Malay	Phil	Sing	Thai
1	04701	Cereal flour (non-wheat)	0			1993	0	2000		1993	1993	2003		2008
2	05649	Flours of other veg., fruits	0	1993	0	1993	0	2000		1996-9		2003		2008
3	0612	Refined sugar, etc			0	E	0	2000		0				2008
4	5311	Synthetic organic dyestuffs	0	1993			0	2000		1993-200	1993	1993		2008
5	5530	Perfumery, cosmetics, etc	1998	E	1993	1993-96	0	2000	2004		1993-2002	2002-8		2008
6	58343	Polyvinyl chlor. plates etc.	0	E	1993	E	0	2000			2002			2008
7	5839	Other polymrztion etc products	0	1995-E	1996	1993	0	2000		2003	2002	1999-200		2008
8	59211	Starches, inulin	0			1993-20	0	2000		1993	1993	2002-8		2008
9	65315	Cont syn textile fabric nes	1993	1993	1993	1993-20	0	1997	1995	2000	2000	2004-8		2003
10	6532	Disc syn textile fabric nes	1993	1993		1993-20	0	1997	1995	2000		2008		2003
11	6536	Desc regn textile fabric nes	1993	1993		1993	0	1997	1995	2000		2008		2003
12	66492	Lamp etc envelopes, glass		1997	1993	1993	0	1997		1993-200	1999	1993-200		2003
13	69979	Iron, steel manufactures nes	0	1998	1993	1994	0	2000		2008	2002	2008		2008
14	71621	AC motors, inc universal motor	1993-E	1998		1993	0	2000	2000	2008		2002-6		2008
15	7492	Cocks, valves etc nes	0	1993		1993	0	2000		1996-200	1993	2002-3		2008
16	7599	Acctg etc adding machine parts	1993	1993	0		0	1997	2000	2000-1		1993		2003
17	76388	Dictating machines etc	1993	1993	1993-6	1994	0	2000	2000	2003	1999-2002	2008		2008
18	7642	Microph, loudsp, amplifiers	1993-E	1995	1993	1993	0	2000	2000	1993-200	1999	2002-8		2008
19	76491	Pts nes of appar. of Hdg. 7641		1993	0	1993	0	1996		2000		2008		2002
20	76493	Telecomm equip pts nes	1993	1993	1995	1993	0	1998	2001	2000	2002	2002		2004
21	76499	Pts etc of sound equipment	1993	1993	1995	1993-4	0	2000	2000	1993-200	2002	1998		2008
22	77129	Electric power machinery pts	1993	E			0	2000	2000			1993		2008
23	7721	Switchgear etc	1993	1993-8	1993-8	1993	0	2000	2001	1993-200	1998-2002	1996-200		2008
24	7731	Insulated wire, cable	0	1998		1993	0	2000		2008	1993	2008		2008
25	77884	Electrical condensers	1993-E	1993	0	0	0	1995	2001	1995				1998
26	89831	Prepd sound recording media	1993	1993-8	1993	1993	0	2000	2000	2001-8	2002	1996		2008

Source: ASEAN Secretariat.

Table 4 Tariff Rate Reduction Schedule of Selected Thai Export Items with Late Reduction versus Other ASEAN Countries

			Existing Tariff Rates					
	SITC2	SITC Description	Brun	Indo	Malay	Phil	Sing	Thai
1	04701	Cereal flour (non-wheat)	0	5	5	19.5-30	0	
2	05649	Flours of other veg., fruits	0	15-20	0	19.5	0	
3	0612	Refined sugar, etc			0	30E	0	65
4	5311	Synthetic organic dyestuffs	0	5	0	5	0	7.5
5	5530	Perfumery, cosmetics, etc	0-30E	30E	0-16.5	10-50E	0	45-60
6	58343	Polyvinyl chlor. plates etc.	0	40E	15-21	20-30E	0	15-60
7	5839	Other polymrztion etc products	0	5-40E	1-30	11-20	0	7.5-60
8	59211	Starches, inulin	0	5	5	13-30	0	
9	65315	Cont syn textile fabric nes	10	25-30	11.1-20	10-40	0	15-45
10	6532	Disc syn textile fabric nes	10	30		26-30	0	15-60
11	6536	Desc regn textile fabric nes	10	30		26	0	15-60
12	66492	Lamp etc envelopes, glass	0	5-15	0	7.5-16.5	0	22.5-30
13	69979	Iron, steel manufactures nes	0	30	0-16.5	10-26	0	0-35
14	71621	AC motors, inc universal motors	20E	0-30		7.5-20	0	17.5-35
15	7492	Cocks, valves etc nes	0	5-30	0-2	10-20	0	5-22.5
16	7599	Acctg etc adding machine parts, acc	0-20	5-20	0	5.5	0	30
17	76388	Dictating machines etc	20	20-40	0-27.5	10-27	0	7.5-50
18	7642	Microph, loudsp, amplifiers	20	5-30	12.5-17.5	12-20	0	30-40E
19	76491	Pts nes of appar. of Hdg. 7641		5-20	0	7.5-20	0	3.75-30
20	76493	Telecomm equip pts nes	20	0-20	1.4-25	6-12	0	3.75-45
21	76499	Pts etc of sound equipment	20	0-20	1.4-25	6-12	0	3.75-45
22	77129	Electric power machinery pts nes	20	5E		5.5	0	3.75
23	7721	Switchgear etc	20	0-40E	2.5-45	6-20	0	2.5-35
24	7731	Insulated wire, cable	0	5-30	5	20	0	30-40
25	77884	Electrical condensers	20E	0-10	0	6-7.5	0	5-35
26	89831	Prepd sound recording media	20	5-30	0-20	6-26	0	7.5-60

Source: ASEAN Secretariat.

targeting adversely affected groups, being neutral and equally accessible to eligible firms of all sizes, providing assistance in an amount tied to the extent of required restructuring, and being economical and administratively simple. The mechanism proposed to meet these tough criteria is an accelerated depreciation allowance for capital equipment and machinery, equivalent to a corporate income tax deduction. This measure would be administratively simple, transparent and automatic. Fresh capital freed by the allowance would have uses determined by the firms themselves, for example, to upgrade technology or to diversify into more competitive industries.

POLICY RECOMMENDATIONS

Trade policy must continually be reviewed in the face of changing global circumstances and evolving comparative advantages. AFTA's implementation provides a chance for Thai policymakers to review existing policies for inconsistencies and inefficiencies. The following measures are recommended to integrate Thailand's AFTA commitments into a more coherent and forward-looking trade policy:

- Respond to calls for a shorter 10-year AFTA timeframe by adjusting and restructuring tariffs quicker than the existing AFTA schedule requires. This is particularly important for those items where Thailand lags behind in reducing to the 20 percent concession level.

- Unilaterally reduce import duties on raw materials and intermediate inputs in deeper and more immediate ways, to encourage foreign investors and provide cheaper inputs sourced outside the ASEAN region.

- Take advantage of AFTA's phase-in period by providing an adjustment scheme to promote restructuring of uncompetitive industries.

These measures will not only increase AFTA's benefits to Thailand, but will help to rationalize Thailand's overall trade policy. The unilateral measures will balance the gains for consumers and users of lower priced imports with the potential losses of existing protected producers. By strengthening uncompetitive industries within AFTA, multilateral liberalization can be pursued more quickly. This will give Thai exports better access to world markets and help to continue Thailand's export-led success.

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ENDNOTES

1 Pupphavesa, Poapongsakorn and Stifel, p. 5.

2 Pupphavesa and Pussarungsri.

3 Wiboonchutikula, p. 13.

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6 Pupphavesa, Poapongsakorn and Stifel, p. 11.

7 Kaosa-Ard, p. 16.

8 Ibid.

9 Pupphavesa, Poapongsakorn and Stifel, p.2.

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Muddling Toward A Miracle: Thailand and East Asian Growth[1]

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THAILAND AND THE EAST ASIAN GROWTH DEBATE

The factors which have enabled many East Asian countries to achieve high growth rates per capita are the subject of vigorous and vitriolic debate. Recently, a consensus has emerged regarding the basic economic ingredients contributing to the region's rapid and sustained growth (World Bank, 1993).

One important factor has been sound macroeconomic management, marked by low inflation rates and realistic currency valuations. Stable prices and currency values favorable to exports have encouraged high rates of investment to GDP and rapid growth in export earnings. Another ingredient has been increasing factor productivity, marked by high accumulation of physical and human capital. Many East Asian economies have successfully allocated capital and human resources to highly productive investments, while acquiring or developing technologies to deepen the industrial base. These strategies dynamically altered static comparative advantages in natural and human resources.

Debate continues, though, over precisely *how* these economic feats were realized, the focal point being the role of the state and economic policy. Much of this debate is concerned with the extent and consequences of state intervention in the economy.

Advocates of a neoclassical view argue in favor of a minimal state role and reliance upon price signals and low barriers to trade and investment. In this view, growth is achieved because the state has confined itself to the maintenance of macroeconomic stability, the provision of basic infrastructure, and the enforcement of law and order, including property rights. The state has an important role, but one confined to establishing the conditions for the efficient operation of markets.

Advocates of an activist state, on the other hand, suggest that rapid growth in Asia has been achieved because governments have intervened extensively in the economy. By intervening in foreign exchange and credit markets, and through industrial policy, governments have gotten prices deliberately "wrong" in order to channel resources into targetted sectors, industries, and firms. The state has also imposed performance criteria on targetted industries to ensure compliance with development policy objectives.

Unlike other newly-industrialized countries in Asia, where governments helped repair market failures, Thailand has relied on the market to overcome government failures. This formula will no longer suffice, given the technological, environmental and human resource challenges at hand.

Thailand's Passively Interventionist State

Thailand's experience has much to contribute to this debate on the state's role in economic growth. The country has achieved impressive growth rates and growth per capita has remained positive for several decades. But in Thailand neither the minimalist nor the activist account accurately describes what the state has

1 *A version of this paper was presented to the Development Research Center of the State Council, People's Republic of China, at a workshop on Chinese regional development strategies in Kunming, Yunnan Province, on March 27, 1994. The research builds on a country study conducted by the authors during 1992-1993 for the East Asian Miracle Project of the World Bank. The authors acknowledge the Bank's support.*

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done. Moreover, neither a laissez faire nor a "picking winners" ideology has guided the state in the allocation of resources. The state has intervened, but in a passive, often ad hoc fashion.

Government policies have been most effective in maintaining a macroeconomic equilibrium conducive to trade, investment, and the growth of firms. Yet, although the state has intervened at the sectoral level, it has been least effective in identifying or implementing any sectoral objectives. Most resource allocations which have boosted factor productivity have been determined by the market and private sector institutions, not state economic policies.

Should Thailand adopt an activist state approach? Upon reviewing the evidence, we argue that an activist state requires certain institutional capacities that have eluded Thai economic policy, notably with regard to the sectoral bureaucracy. The stable macroeconomic environment, combined with the resources and entrepreneurship of private firms, have helped overcome an acute lack of coordination and purpose in sectoral policy. But these factors will not completely substitute for effective, coherent, and competent sectoral management.

Unlike other newly-industrialized countries (NICs) in Asia, where governments helped repair market failures, Thailand has relied on the market to overcome government failures. While we do not advocate increased state intervention in the economy, we do call for more effective government action in those sectoral policy areas where the private sector will increasingly rely upon government to act. These policy areas include education, worker training, public health, social welfare, monitoring and enforcing environmental and safety regulations, and supporting and perhaps coordinating scientific research.

MACROECONOMIC POLICIES: STABILITY HAS PAID OFF

The World Bank's *East Asian Miracle* report concludes that stable macroeconomic policies are necessary for strong growth. Thailand serves as confirmation of this conclusion. Thai technocrats in the Central Bank, Ministry of Finance, and Prime Minister's Office have provided macroeconomic policies conducive to export, domestic and foreign investment, and the growth of a strong private sector which has emphasized productive investment over pure rent-seeking. The stable macroeconomic environment, marked by low inflation and a stable exchange rate, has encouraged the diversification of agricultural exports away from rice and rubber. Stable prices have also encouraged foreign direct investment and a shift away from exporting light manufactures to higher value-added wares, notably electronics.

Exchange Rates

The Bank of Thailand has displayed a sustained commitment to a stable exchange rate regime. From 1959 to 1984, the Thai baht was tied to the U.S. dollar. This gave the baht stability for most of this period, but also caused trouble for Thailand when the U.S. dollar appreciated vis-a-vis other major currencies. The Central Bank has also proven its ability to carry out needed devaluations. The Bank devalued the baht by 9 percent in 1981, and 14 percent in 1984, which boosted export competitiveness and offset the current account deficit of the early 1980s. Since 1984, the baht has been valued according to a "managed float," whereby the Bank of Thailand specifies daily exchange rates in accordance with fluctuations in a basket of major currencies. The purpose has been to maintain the baht/dollar parity within a somewhat wider band.

Low Inflation and Price Stability

The stable exchange rate has helped the Thai economy maintain a very stable price level. Inflation remained low throughout the post-World War II period, approximately 4 to 6 percent annually. Price stability, however, has not been fully immune to external shocks. A few periods of higher inflation have been generated by external factors, such as the oil shocks and peaks in global interest rates. The Bank of Thailand has consistently acted against inflationary pressures through interest rate interventions. But the key factor ensuring stable prices and low inflation in Thailand has been exchange rate stability. *Relatively* stable fiscal policies have also played a role. Fiscal deficits were not allowed to grow out of control.

Minimal Intervention in Foreign Exchange and Credit Markets

The Central Bank does not control markets for credit or foreign exchange. Thailand is unusual in this respect. Most developing country governments have intervened in these markets to guide investments into desired sectors, industries, commodities, and firms, or to boost employment. As the Thai state does not practice this kind of intervention, it has been impossible to have the brand of industrial "targetting" found in some of Asia's other NICs. Moreover, it has been necessary, in the absence of state direction, for the commercial banks to perform many of the investment coordination functions through financial intermediation that have been attributed to the state in many NICs.

The Central Bank has provided credits at discounted rates and in modest quantities for only two "target" activities – export financing and lending for agriculture and farmers. Export financing, provided in

Worker training is one of the many sectoral policy areas where effective government action is needed.

the form of discounted promissory notes, is given to the commercial banks for allocation to bank clients on a discretionary basis. Agricultural credits are provided to the state-run Bank for Agriculture and Agricultural Cooperatives in the form of low-interest loans from the Central Bank. Neither of these interventions has distorted prices to the extent of creating severe misallocations of resources.

"Insulation" of Macroeconomic Policies

The Bank of Thailand's governor is appointed by the Minister of Finance, and the Bank is technically under the jurisdiction of the Ministry of Finance. In practice, however, the Central Bank formulates policy quite independently of the Ministry and the Cabinet. The Central Bank also retains a tradition of financial conservatism handed down by the British advisors of the early 20th century. The Bank's autonomy from the political process allows it to sustain a tradition of adherence to macroeconomic stability. Successive prime ministers have allowed their finance ministers very little authority over the Central Bank.

Fiscal policy is also somewhat insulated from political decision-making. The Bureau of the Budget is located in the Office of the Prime Minister. Budget appropriations are conducted by the sectoral ministries, not Parliament. The Budget Bureau then approves these appropriations and submits a budget to the Cabinet to present to Parliament. Parliamentarians have no authority over appropriations, and they have only limited authority to reshuffle funds on the allocation side, within a specified ceiling laid down by the Ministry of Finance.

Because fiscal and monetary policy management is effectively out of the hands of parliamentarians, the politicians are virtually unable to use macroeconomic policies to promote social or political objectives. Recently, however, the Central Bank, in response to requests by the ruling Democrat Party, has made efforts to increase low-interest loans for the agricultural sector. Their stated objective is to make more institutional credit available to poor farmers. Thus equity considerations have been introduced into macroeconomic policy, but the Central Bank has so far pursued these goals within the broader objective of price stability.

AGRICULTURE

It is often forgotten that until recently the foundation of Thai economic growth was not industry, but agriculture. Agriculture absorbed a large proportion of the rapidly expanding labor force. During the mid-1970s, agriculture provided the entire labor force increment with employment during the wet season, so that the share of labor in agriculture actually increased (Siamwalla, 1990). This was possible because of a land surplus – until 1980, cultivated land per farmer increased.

Agriculture is not amenable to state "planning." Productivity is highest when farmers make decisions based on their own understanding of their resources and technical constraints. But agricultural growth does require timely and competent state intervention in the provision of infrastructure. The state must also ensure a favorable marketing framework for production, trade, and transmission of price signals. Until the mid-1980s, policymakers performed reasonably well in this regard. Since then, however, their innovations in the farming sector have run out of steam, owing to the rising costs of infrastructure and services and pervasive bureaucratic inertia.

Nevertheless, stable macroeconomic policies and surplus resources have encouraged a vast diversification of Thai agriculture away from rice and staple food crops.

This has been an important ingredient in diversifying farm incomes, creating new employment options for farmers, and reducing the incidence of poverty in the rural areas.

Rural Infrastructure

The state heavily invested in the national road network, especially during the 1960s and 1970s. These investments were driven by military rather than economic considerations. The transport network made it possible for the state to increase its presence in the countryside in efforts to combat the communist insurgency. A spin-off benefit of the extensive road network was the far-reaching positive impact it had on agricultural growth. Moreover, much of the capital invested in the road network was provided by multilateral lending agencies, notably the U.S. Agency for International Development and the World Bank.

Multilateral lending agencies also assisted in irrigation development. The key investments were in the Chao Phraya River basin, where Thailand's richest rice-growing areas are located. Only about one-seventh of the country's total cultivated area is irrigated. Moreover, most of the present irrigation infrastructure consists of very basic facilities – primary and secondary canals. Tertiary and quaternary canals, which are necessary to achieve on-farm water level control and greater efficiency, make up less than 20 percent of the system. This has been a subject of negotiation between the irrigation authorities and lending agencies. Officials admit that the level of operations and maintenance capacities in the irrigation bureaucracy are inadequate for revamping the infrastructure.

Pricing and Marketing

Distortions in the macroeconomy which created prices unfavorable to producers were evident in the form of export taxes on rice and rubber. Because Thailand was a food surplus country, there was no need to promote staple food production to achieve self-sufficiency, and thus the government taxed rather than subsidized farm output. During the commodity boom of the 1970s, the state raised the premium, at times as high as 45 percent of the world rice price. Although these taxes lowered farmgate prices, they also stabilized them. In the meantime, the land surplus allowed for extensification of production, while stable monetary policies encouraged growth in farm exports.

Thailand is something of a rarity among developing countries in that the government has left most commodity trading to private business. It is one of only two countries in the world that allows private traders to trade rice freely on international markets (the other being the United States). This contrasts markedly with many African countries which assigned procurement and trading to government marketing boards. In many cases, the marketing boards procured farm commodities at low prices to provide urban consumers with cheap food. The result was often to discourage farm productivity, foster corruption, and encourage parallel markets.

Thailand has avoided these inefficiencies. Internal trading is conducted by a competitive marketing system of small, independent traders, while the export of most farm commodities has been managed by a dozen or so private traders with strong affiliations to the largest commercial banks. Bangkok Bank, for instance, played an important role from the 1950s to the late 1980s in bearing foreign exchange risks for the rice exporters. It was the first Thai bank to provide a letter of credit to foreign rice buyers, and its massive foreign exchange dealings helped to coordinate a market for risk and enabled traders to arrange forward contracts.

Growing Pains: The Structural Shift

In the 1980s, the land surplus disappeared, followed almost immediately by a long decline in agricultural prices from the peak of the 1970s. Both these developments imposed heavy pressure on farmers' incomes. Rural poverty increased between 1981 and 1986. As agriculture solved its income problems by shedding its younger (mostly female) labor force, manufacturing was given a boost. Throughout these developments, the state was a mere spectator. To date, there has been no *effective* action taken by the government, either to hurry the structural shift along, or to provide a safety net for farming families subject to the adverse turn of events.

PHYSICAL AND HUMAN INFRASTRUCTURE

Until the economic growth surge of the latter 1980s, the Thai government had chalked up a fairly good record in its provision of roads, railroads, electricity, and ports. Today's transport bottlenecks are primarily the result of the slowdown in infrastructural investments during the economic austerity program of the mid-1980s, which coincided with an anticipated surge in investment and economic growth. Government capital expenditures, which are directed primarily at infrastructure, declined from 5.4 percent of GDP in the 1970s to 4.0 percent in 1980, falling further to 2.7 percent in 1990.

Transport bottlenecks are also caused by an ad hoc and largely unsuccessful bid to privatize major infrastructure projects. In many areas, the overseeing state enterprises have monopoly powers under the law; therefore the only way to have private firms participate has been to grant them concessions, often on a build-

operate-transfer (BOT) basis. These concessions have become a battleground for politicians, state enterprises, and technocrats. One key constraint has been the lack of a legal framework which could inspire investors' confidence. Another has been leadership turnover, as successive groups of ministers have subjected existing contracts to new rounds of negotiations.

Education

Thailand's primary school enrollment rates have been historically high, and they correlate with growth in both agriculture and labor-intensive manufacturing. In 1960, primary school enrollment was about 83 percent. Thailand's secondary school enrollment rates, however, rank among the lowest in Asia. The share of the workforce with a primary education or less was 83 percent in 1990, the highest among the rapidly industrializing Asian countries. The secondary school enrollment rate in 1988 was 29 percent, while tertiary enrollment stood at only 10 percent. The government has yet to introduce mandatory education through the ninth grade level.

INDUSTRIAL POLICIES

Industrial policies have not been marked by industrial sector planning or by any industrial targetting strategy. As noted above, the Thai state does not control the markets for credit and foreign exchange, thus depriving policymakers of perhaps the key tools for conducting industrial targetting. Furthermore, there has been little coordination or coherence in the use of existing industrial policy instruments – tariffs, investment promotions, capacity controls, and local content regulations.

Nevertheless, an overall bias can be discerned when reviewing the consequences of various industrial policies. Thailand followed a broad import-substitution strategy from WWII until the mid-1970s. This favored capital-intensive industries, such as automobiles, chemicals, and electronics, but Thailand then shifted to an export-oriented strategy involving the promotion of manufactures exports. This strategy is not guided by any vision of what Thai industry should become. Indeed, the composition of the manufacturing sector is largely determined by the investment and trade strategies of the multinationals, upon whom Thailand has become increasingly reliant for markets and technology.

No Effective "Planning"

Thailand's brief experiment with state-led industrialization during the 1940s and 1950s saw the creation of nearly 100 state enterprises and the allocation of government revenues and loans to a number of disastrous industrial ventures. This strategy was aborted between 1958 and 1960 during a series of economic policy reforms which effectively pulled the ministries out of direct production and curbed the activities of the state enterprises, with the exception of those involved with public infrastructure. A planning board – the National Economic and Social Development Board (NESDB) – was created in 1959 to draft five-year "development plans." Production was turned over to the private sector, which was to become the "engine" of growth.

To call the NESDB a planning board is a misnomer. The agency does not plan production, nor does it command markets. Its real function is to outline a public investment program for five-year periods, in line with the agency's assessment of market trends. Its earlier duties concentrated on infrastructure planning. Lately it has broadened its plans to include a broader range of public investment and policy activities. During the 1980s, the agency even devised an industrial development plan for the Eastern Seaboard region. But with no implementation powers, the agency could do little more than advise other state agencies which pursued projects suggested in the NESDB "plan." Though the plan was set down 13 years ago, the Eastern Seaboard project is only partially completed.

Ad Hoc Sectoral Strategy

Policies for the industrial sector have not been guided by any coherent ideology or developmental purpose, with the partial exception of the investment promotion policies implemented by the Board of Investment. Tariffs, for instance, were not a tool for industrial protection, but were used predominantly as a source of government revenue by the Ministry of Finance.

The Ministry of Industry's factory capacity controls have been loosely applied and have not been effective in achieving stated policy objectives. Controls applied to the textile industry between 1971 and 1987, for example, did not prevent surplus capacity in the industry, as large firms successfully bypassed the controls and small firms illegally imported machines. Indeed several of the larger firms boosted their capacity in anticipation that more controls would be put into place (Kaosa-ard, 1992). Often the controls simply acted as an official lever to extract rents through corrupt means.

One lesson is that regulatory controls that are incoherently or ineffectively applied create opportunities for rent-seeking. In this case, the lack of adequate information about the market, and the industry at hand, and the lack of effective monitoring and enforcement of performance criteria rendered the capacity control instruments ineffective.

Local content policies have had more success. They have played a more important role, for example, in

supporting the growth of the automobile parts industry. Tariff protection for automotive assemblers also provided support to that industry. One cost has been the channelling of resources into a capital-intensive activity, requiring sustained tariff protection to survive. This has had adverse effects on consumers.

Board of Investment and Growth in Exports: Don't Be Quick to Correlate Them

The Board of Investment (BOI) was established in 1960. As one of the chief instruments of industrial policy, its major portfolio was to grant tax holidays, to grant exemptions from import duties on machinery, components, and raw materials, and to impose bans and surcharges on competing imports. BOI began by promoting mostly import-competing and capital-intensive industries, though the record shows that privileges had been allocated to most industries. The agency never espoused a coherent import-substitution policy per se, and it never developed or enforced performance criteria to ensure that promoted firms had complied with BOI terms.

During the 1980s, BOI shifted more decidedly toward an export-promotion strategy. Promoted firms were required to export a certain percentage of their output to qualify for promotions. These incentives attracted a wave of investment from Japan, and later from Hong Kong, Singapore, and Taiwan. Total FDI averaged about US$270 million annually from 1980 to 1985; by 1990 it had risen to US$2.4 billion. The level of FDI in 1992 stood at about US$2 billion.

The FDI influx coincides with a boost in exports of both traditional light manufactures, including garments and footwear, and new manufactures, including electronics and consumer goods. Recently there has been a surge in consumer electronics exports, notably televisions, air conditioners, video machines, and refrigerators, in addition to other electronic goods, such as printed circuit boards and integrated circuits. Total exports have risen from U.S.$7.8 billion in 1985 to U.S.$36.8 billion in 1993.

It would be difficult, though, to attribute these trends to BOI incentives. The real driving force behind FDI and trade flows has been the currency realignments occurring since 1985. BOI's main contribution has been in making investment in Thailand *at least as attractive* as investing in other Southeast Asian countries.

DYNAMIC BUSINESS GROUPS AND CAPITAL MARKETS

Thailand's industrial structure is not characterized by a few huge, major conglomerates similar to those of Japan or South Korea. Its structure is more akin to that of Taiwan's, where a large number of firms dominates a broad range of industrial activities.

A coordinating mechanism exists in the form of business "groups" and commercial banks. These institutions have reduced transaction costs, resolved information dilemmas, and facilitated industrial investments. While there are disparities in wealth and opportunity between larger and smaller firms, strong banks and groups have also created a dynamic and flexible private sector that offers attractive partnerships to foreign investors, and that can move adeptly into new production processes and export markets.

Financial Intermediation

At the core of the economy are a dozen or so leading commercial banks. These banks have been responsible for financing Thailand's transition from an agricultural export economy to an industrial- and services-based economy. The allocation of credit and the coordination of investments have fallen almost entirely upon the commercial banks. Through a strong network of family ties and ethnic affiliations with traders and other entrepreneurs, the banks have somewhat successfully managed the allocation of capital earned from agricultural exports into manufacturing investments.

The usual risks associated with credit allocation, combined with problems of imperfect information, have caused the private banks to favor large borrowers over medium and small-scale businesses. As the banking system has become more complex, the Central Bank has pressured banks to bring down their rates for small borrowers, especially those in the provinces.

Business "Groups" as Coordinating Institutions

The banks are also at the core of business "groups" built up primarily by Sino-Thai families since the 1950s (Leff, 1979). Such business groups have emerged in almost all Thai industries. The supply of capital from the commercial banks, allocated through dominant business families, and the creation of vast business empires spanning multiple stages of production, have helped to create economies of scale and build entrepreneurship in the manufacturing sector (Christensen, 1993).

Capital Markets Are Diversifying

Firms are now able to raise capital, not only through commercial loans and foreign investors, but also through equities and bond instruments. Equities and bonds have diversified the sources of capital available and put pressure on the commercial banks to lower their interest rate margins and improve their services. The issuance of

bonds, however, has been constrained by the absence of a secondary bond market. There is a demand for state intervention to help coordinate a market in bonds. The Central Bank has begun this task by encouraging state enterprises to issue their own paper and set up mechanisms for bond trading.

CONCLUSIONS

A simple description of Thai economic policy-making might convey the impression that the state has been active in promoting economic growth. But much of the action, while full of sound and fury, has signified very little. The Thai state has been particularly lax at the sectoral level, where any attempt to delineate a systematic policy has been defeated either by corruption or by frequent personnel shifts. Also lacking has been any powerful tool to discipline firms and sectors to "deliver."

In macroeconomic management – an area essential to solid economic growth – the state has performed extremely well. A calm monetary environment has made it possible for the private sector to grow and for the banks to assume investment coordination functions.

The key to even better performance in sectoral policy is not a more activist state, i.e., one that conducts extensive interventions at the industry and firm levels. The Thai state has intervened in the past, but its interventions have not been very effective, well-coordinated, or conducted with a clear purpose in mind. Some might argue that *better* sectoral interventions could assist the economy to grow more rapidly. But this requires a type of state apparatus that Thailand – and many other developing countries – simply do not have.

In this respect, the Thai state's information base at the sectoral level has been quite inadequate. Intelligent intervention requires some vision of the changing industrial structure. Moreover, there needs to be some investment coordination not only among private firms, but also between the private and public sectors. Thailand's experience here has been variable. Finally, Thailand could have used more sectoral vision concerning infrastructure. Privatization of urban projects has now yielded a whole new set of problems, but there is a big opportunity for policymakers to better coordinate infrastructure development in the provinces.

Overall, the state is struggling to keep up with the demands of a rapidly changing economy. Even though Thailand has enjoyed some success, it is not well prepared for the next stage of industrialization. Its investments in secondary education and its output of technicians and engineers fall seriously short of the country's needs. Moreover, the state is institutionally ill-equipped to assume the monitoring, enforcement, and social welfare functions for regulating an advanced industrial economy. At present, Thailand hardly needs an activist state. Instead it needs a more effective minimalist state able to anticipate the complex problems that will inevitably arise down the road.

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Bangkok Traffic Congestion: Is There a Solution?

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Mingsarn Santikarn Kaosa-ard**
Piyanuch Pienchob***

Though few would believe it, Bangkok was the first city in Southeast Asia to draw up plans for a system to reduce traffic congestion. Thailand was, ironically, the third Asian country, after Japan and Hong Kong, to plan such a system.

More than two decades ago, the World Bank hired German experts to evaluate Bangkok's traffic problems. The resultant "Bangkok Transportation Study" in 1971 stressed that Bangkok, even then, badly needed a mass transit system, as well as a city study plan. Neither were ever drawn up and today Bangkok is one of the world's most heavily congested cities, with arguably, its worst traffic.

Bangkok's traffic situation is desperate. And yet the problem has never been properly analyzed. The current chaos is an inescapable result of an endless hodgepodge of half-measures, wrong measures, and no measures. Expanding existing roads, for example, merely causes further congestion due to messy, obstacle-course construction that hurts at least as much as it helps. It also encourages people to put more cars on the roads.

Proposals on how to improve Bangkok's traffic problems continue to abound: a subway system, a sky train, and a waterway system. Viable alternatives to cars and motorbikes must be provided; experts are needed, as are more traffic data, funds and a coordinated inter-governmental master plan.

Bangkok's average traffic speed rates are much lower than those of other cities. As traffic gets worse, the rates drop even more. The plethora of business centers along the Ratchadapisek Road, for example, has slowed traffic there to a maddening crawl, just 8 to 9 kms. an hour in normal traffic situations, and a barely moving 2 to 3 kms. an hour in rush hours. In crowded residential areas, traffic flow is now only 10 to 15 kms. an hour. The city center, without a single restricted zone, of course has

A cloud of pollution hangs over the permanently choked streets near Bangkok's Victory Monument.

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Table 1 Number of Buses and Private Vehicles in Bangkok

	1984	1992	Rate of Change (%)
Number of buses in service (per day)*			
Non air-conditioned buses	3,775.12	3,575.86	- 5.28
Air-conditioned buses	412.38	470.11	14.00
Total	**4,187.50**	**4,045.97**	**- 3.38**
Number of tickets (per million)*			
Non air-conditioned buses	1,517.382	1,398.222	- 7.85
Air-conditioned buses	65.208	92.819	42.34
Total	**1,582.59**	**1,491.041**	**- 5.78**
Population**	6,293,197	7,617,237	21.04
Number of private cars**	544,096	1,045,896	92.23
Number of motorcycles**	462,302	1,094,494	136.75

Sources: *Statistical Report, 1992,* the Expressway and Rapid Transit Authority.

* Calculated from the yearly figure (only Bangkok Mass Transit Authority buses).

** Only the Bangkok Metropolitan Region, which includes Bangkok, Nonthaburi, Samut Prakan, and Pathum Thani.

the most severe traffic. People do not drive there anymore unless they must.

Public transportation, especially public buses, has lagged far behind the city's population and business growth. This lack of alternative transport options causes more and more people to buy cars and motorbikes, thus generating an endless cycle of traffic defeat.

In 1990, Bangkok vehicle registrations increased by 935 per day, or 341,275 vehicles in a single year. These included private cars, public vehicles, motorcycles, trucks of all sizes, and buses. Private cars alone increased by 524 per day. By 1992, the number dropped somewhat to the still staggering figure of 846 vehicles per day – 232 being private cars.

EXPRESSWAYS VERSUS MASS TRANSIT SYSTEMS

The Expressway and Rapid Transit Authority (ERTA) was established in 1972 to reduce Bangkok traffic congestion by building expressways and mass transit systems. Until now, ERTA has opted to build expressways rather than mass transit systems. This decision was based on the difficulties and problems which ERTA felt it might encounter in establishing a mass transit system. These considerations include:

- Managing a mass transit system is a complex task and ERTA does not have the necessary expertise.
- Mass transit systems require high technology which must be standardized to ensure efficiency and cross services.

The government requires mass transit systems to be financially self-supporting. It does *not* want them to rely on government funding. The government has no support policy, except in the provision of land. With expressways, toll charges can be collected to recuperate the capital invested. But mass transit systems usually do not set fares at prices high enough to offset building and operating expenses. If they did, the public would protest. ERTA, however, still hopes to eventually acquire the funds and expertise to build a mass transit system.

The first stage of the city's expressway system consisted of the Bangna-Klongtoey Port Road and Daokanong-Klongtoey Port Road. Completed in 1987, their major purpose was to allow cargo trucks to easily come in and out of Bangkok. There was also a plan to build a route joining the Klongtoey Port and major cities in the north, east and south. No plans were set for these routes to cater to private drivers wanting to use the expressway to get to business roads in the city, because it was expected that people living in the outskirts of Bangkok would use the envisioned soon-to-be-constructed mass transit system.

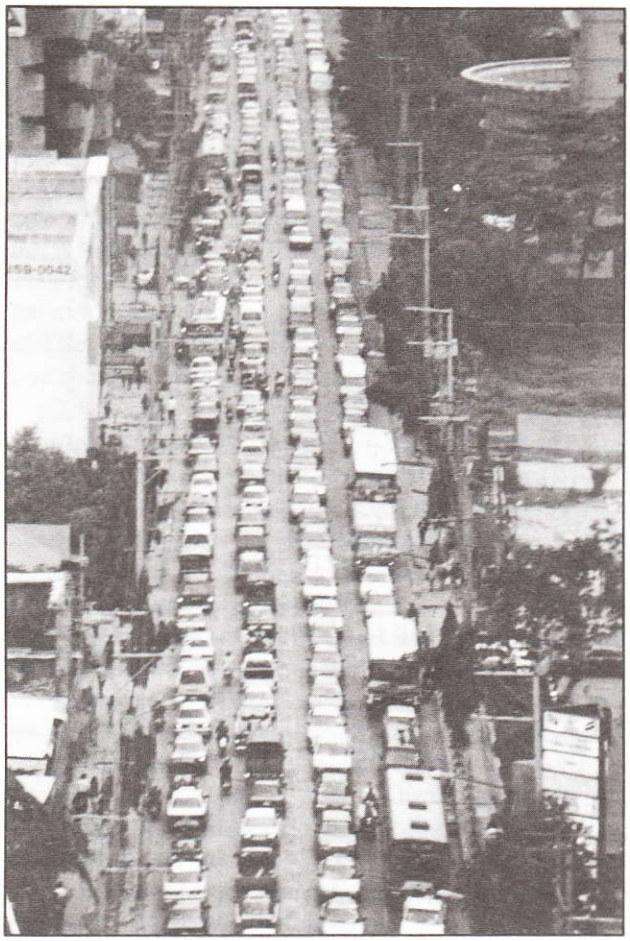
Stage One of the expressway system quickly proved to be unrealistic. The city lacked zoning regulations that would separate housing, business and industrial areas and give each access to the other. Housing had spread to Bangkok's outskirts and this necessitated people's travelling to the city center for work.

A second stage expressway was then built to enable motorists living in the suburbs to get to town. A major portion of this road has been in operation since 1993, with other portions still under construction. There are also plans to build third and fourth stage expressways. The Arjnarong-Ramindra Road and Donmuang Tollway projects are still under construction.

The three electric mass transit systems – to be built through the Thanayong, Hopewell and Mahanakhon Projects – have all been delayed. The Lavalin Project was proposed in 1972, approved in 1990, but finally cancelled, principally due to lack of funding. The routes for the Lavalin Project have been changed to suit the Mahanakhon Project.

The mass transit system that is furthest along is the Hopewell Elevated Railway Project. Its concrete pillars have just been installed. The project is, however, already two years behind schedule.

The Mahanakhon Project has been heavily criticized because it will be built over main roads. Current plans include building underground routes in some of the city's heavily-trafficked areas, such as under Rama IV Road. These are expensive and thus the total budget has now increased to over 6 billion baht. After lengthy discussions on which system should be used for the Lumphini area, the government has only now decided to use an underground system. Project delays and technical alterations have made it difficult to acquire funds from financial institutions.



Asoke Road at rush hour.

All these projects are progressing, albeit very slowly – the contracts have been signed for three to four years. The projects, however, continue to come under critical fire.

SHORT-TERM SOLUTIONS

Despite the overwhelming difficulties of Bangkok's traffic crisis, some actions can and should be taken now. The following measures could conceivably improve Bangkok's traffic capacity by up to 15 percent:

- Install correct and coordinated timing for street lights.
- Improve existing public transportation. This can be done by setting up new systems for bus lanes on such major roads as Petchburi and Sukhumvit, by increasing bus routes on expressways, and by opening main bus routes that cut through and circle the city.
- Re-arrange the one-way road system to facilitate a better traffic flow. The best one-way system for countries with left-hand driving is a clockwise system. This means reversing the north-south route of Phayathai Road, Rajdamri-Rajprarop, Chidlom Road, Wireless Road at the section between Ploenchit and Petchburi Roads and North Nana Road to follow the clockwise system. The present two-way Asoke Road and Phayathai Road should follow the one-way system (see illustration 2). Nine usually congested areas – Victory Monument, Phayathai, Rajthawee, Urupong, Yodsee, Pratumwan, Rajprasong, Asokepetch and Pratunam – and five intersections – Rajthawee, Urupong, Pratumwan, Asokepetch and Pratunam – could be reduced to four intersections (Urupong, Rajprasong, Asokepetch and Pratunam) with a considerable drop in traffic if a proper one-way system is introduced.

Illustration 1 Traffic Flow

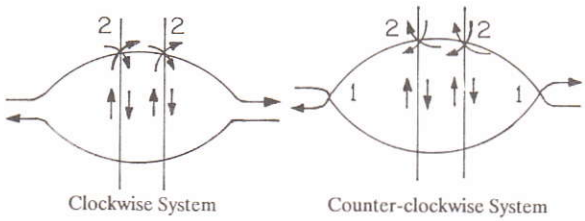


Illustration 2 Changes Required in Street Direction

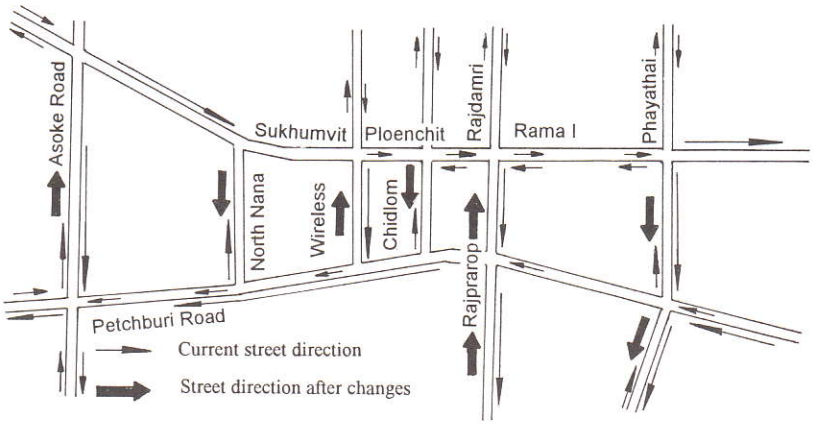
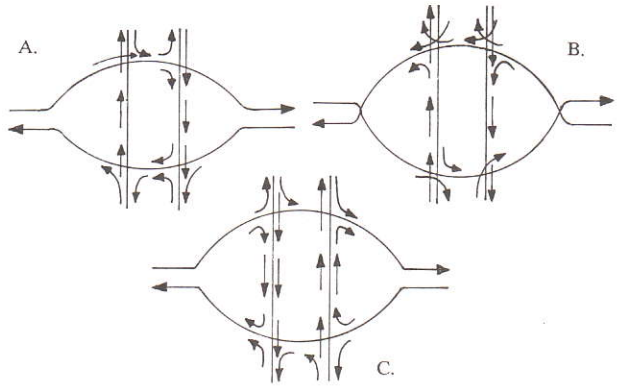


Illustration 3 Changes Required in Street Direction



A. One-way clockwise system
B. and C. Mixed one-way clockwise and counter-clockwise systems

CONTROLLING TRAVEL WITH PRICE MECHANISMS

There may also be a need to restrict private vehicle travel through a pricing system. But this option would affect the daily public routines and its consequences will have to be carefully considered. Using price mechanisms can change the travel formats, routes, destinations and travel times of commuters.

Singapore has instituted numerous price controls to regulate traffic. These include higher fuel prices, higher tollway fees, collecting passing fees from private vehicles using restricted zones, and restricting the movement of single passenger cars. These measures should also be considered for Bangkok.

ADAPTING SOLUTIONS TO THE THAI SITUATION

Most data on Bangkok's traffic problem is compiled based on the personal preferences of those involved. This is grossly inadequate for solving a problem of this magnitude and complexity. Systematic and coordinated planning is needed. We still need to refer to other countries' experiences, data and solutions. All these, of course, must be adapted to the realities of the Thai situation. Using foreign expertise may not be beneficial in all cases, for example, in the case of the Thai one-way counter-clockwise traffic system.

SUMMARY

Bangkok's traffic situation is now critical. Support from many groups is urgently needed to tackle the problem.

In the past, the government tried to solve the problem by building more roads, especially expressways. This only resulted in more private cars and worsening traffic.

In the long term, there is an urgent need for a major mass transit system capable of carrying up to 50,000 people an hour. It should be faster and at least as comfortable as traveling by private vehicle.

A mass transit system will be a long time in the making. In the interim, improvements in the existing public transport systems within the available road network must be made.

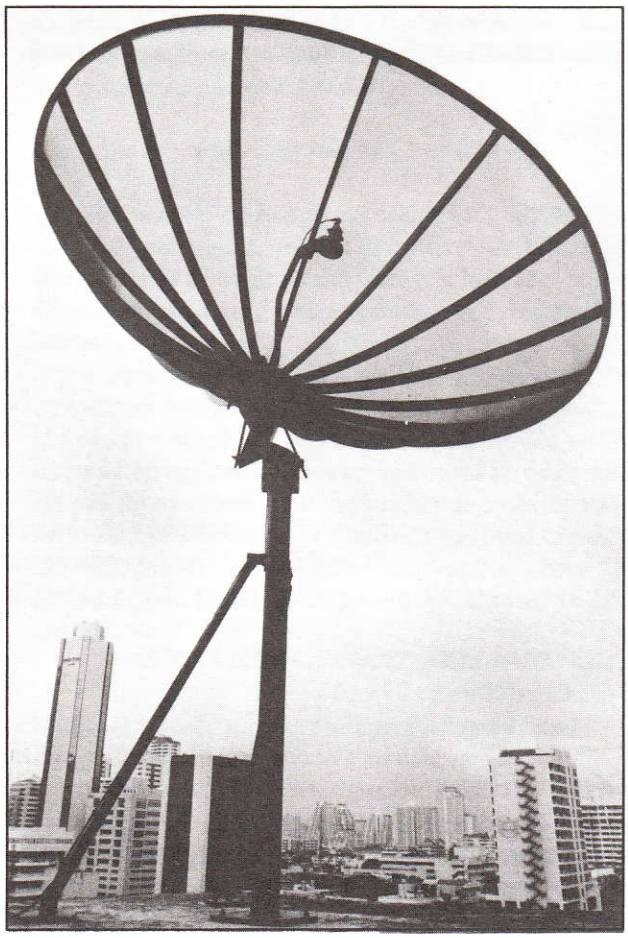
Science and Technology Development for Industrial Competitiveness in Thailand: Problems and Lessons

Nit Chantramonklasri*

Thailand's economic growth since the late 1980s has been impressive. The country is also in a state of transition from a traditionally agro-based economy to a more industrially oriented one. Despite this economic success, however, there are still questions about the country's long term ability to sustain economic growth while improving international competitiveness. This is particularly true for the country's industrial sector.

Throughout Thailand's industrial development, there has been a strong reliance on imported technology. Despite this, few firms have managed to raise their performance levels to international standards and to carry out significant improvements to their products and production systems. A large number of firms remain technologically static even though they have been operating for many years (Chantramonklasri, 1986). In many large Thai and joint-venture firms, the innovative capabilities are still very weak (TDRI, 1992a). At the same time, the industrial sector as a whole has not developed into a coherent production structure, but has become an agglomeration of largely independent "islands" of manufacturing companies with no strong linkages between them or to other sectors of production. Except for some exports produced by foreign or joint-venture firms, most of the country's industrial products are not technologically sophisticated.

This situation clearly suggests that, unless the country manages to upgrade and strengthen its industry, its chances of becoming internationally competitive are limited. Further compounded by the fact that at present there are new market economies with much lower wages and more abundant natural resources, Thailand's traditional comparative advantages in terms of labor and resources may be rapidly eroded. As developed countries move toward more modern and automated production and make significant advances in new materials, certain exports from Thailand will become less competitive, and hence the survival of some industries may be at risk. It is thus highly possible that without substantial efforts to develop indigenous capability in science and technology to support industrial development, Thailand may even face a major economic and social crisis in the near future.



Indigenous science and technology development is needed if Thailand is to remain competitive in the regional and international markets.

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EXPERIENCE IN SCIENCE AND TECHNOLOGY DEVELOPMENT IN THAILAND

Development of Scientific and Technological Institutions

The call for investment in science and technology development is not new in Thailand. For more than 30 years, there has been a growing awareness of the need to develop science and technology. In 1956, the government established the National Research Council of Thailand (NRCT) to fund research activities in wide-ranging areas, from basic science to social science in the public sector, including universities. The Thailand Institute of Scientific and Technological Research (TISTR) was set up in 1963, originally as the Applied Scientific Research Corporation of Thailand. It was established as the main publicly-funded institute to carry out a specialized scientific and technological activity, i.e., research and development (R&D) to serve almost all production sectors of the economy. Fifteen years ago, the Ministry of Science, Technology and Energy was established. This clearly indicated the recognition of the role of science and technology in national development. There have also been some research activities in the country's universities, but on a limited scale. Much more research has been carried out in governmental agencies.

Since the establishment of the Science and Technology Development Board (STDB) in 1985, which was then a U.S.$50 million United States-Thai cooperative project, research in universities has been strengthened. The STDB aimed to raise the level of Thailand's technological capability through R&D grant support to public-sector researchers, R&D grant and loan support to companies, as well as information and consultancy services. STDB's main emphasis, however, in terms of both efforts and resources, was on strengthening R&D capability in universities and government agencies and on mobilizing this existing public-sector capability toward a higher level of applicability.

STDB's establishment reflected dissatisfaction in the under-investment in R&D and, perhaps more importantly, under-utilization of public-sector capability for economic development. By the 1980s, it had become evident that not only the existing institutes (especially NRCT and TISTR) had spread their limited resources too thin, but also that the interaction between different scientific and technological components in the country was very weak. In particular, the so-called technology suppliers in public research institutes and universities and the technology users in industry failed to interact with each other; and the latter in many cases was not even aware of the existence of the former.

About the same time that the STDB project was launched, three national centers were established under MOSTE to provide funds to state universities, state enterprises and government agencies for R&D. These specialized in the areas of biotechnology, materials technology, and electronics and computer technology. These four initiatives, i.e., STDB and the three centers, were the predecessors of the National Science and Technology Development Agency (NSTDA), established by a special law, the Science and Technology Development Act, in December 1991. NSTDA supports both public and private sector organizations, and has plans to develop its own research laboratories in the three technological fields. Since NSTDA is still new, it is difficult to assess its current impact on industry. An assessment of its predecessors, however, suggests that few of the public-sector R&D projects supported by them have resulted in commercial application (TDRI, 1992b-g).

Governmental support to directly stimulate the development of technological capability in industry has been nearly non-existent, apart from small private-sector R&D support of STDB, now under NSTDA, and a similar MOSTE funding program. A more recent development has been the establishment of the Thai Research Fund (TRF) in 1992; but its mandate is close to that of NRCT rather than aimed specifically at encouraging industrial technological development. The Industrial Finance Corporation of Thailand (IFCT) used to have a soft-loan program for private-sector R&D, but this no longer exists. In an attempt to stimulate investment in R&D within the industrial sector, the Board of Investment (BOI) – the key organization responsible for granting privileges to promote investment projects – has offered since 1989 various tax incentives associated with setting up R&D laboratories and the related imports of machinery and equipment for use in R&D activities. So far, these mechanisms have not been well received by the private sector.

Problems and Lessons

The limited utilization of public-sector R&D capability has been caused principally by the tendency of researchers to carry out scientific and technological activities in a manner which is isolated and disconnected from the real world. Despite attempts to launch commercially viable R&D programs, various "centers of research excellence" have often been unable to have an impact on the industry. A well-known argument often used to explain this ineffectiveness is that industrial firms have a tendency to utilize proven technologies from foreign sources, thus limiting the demand for local scientific and technological capabilities. This argument remains highly questionable because it presumes that those "centers of excellence" have available the kinds of products which are relevant to the needs of their potential clients. As noted by an empirical study, "industrial firms tend to doubt the ability and effectiveness of universities and public technical institutes to solve practical industrial problems" (TDRI, 1992a, p. 85).

Underlying this situation is the fact that despite the policy awareness of the importance of science and technology for development, the prevailing policy practice is problematic. When concrete policies and actions on science and technology development are made and implemented, there is usually a bias towards a specific area.

The policy approach taken in Thailand (as in many other developing countries) has three important features :

- The effort to promote science and technology development has almost exclusively focused on R&D, 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. Behind this is the conventional wisdom which assumes that R&D is the prime-mover of a linear and sequential process of innovation – i.e., a process starting from "basic and applied research" to "development and engineering" and eventually "production and application."
- There is a belief that as most firms in the economy are too small or backward to undertake significant R&D, such activities should be undertaken by the government. Hence, the policy perspective has been even further distorted to emphasize the development of R&D capability in the public sector with an expectation that this would generate useful outputs. Resources and efforts are directed toward 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 less developed countries.
- There has been little consideration given to utilizing 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 as isolated from each other. In the minds of many technology development promoters, they are seen almost as alternatives – either import goods, services and know-how from abroad or invest in local R&D.

Eventually, policy concern which begins with science and technology development becomes confined to R&D issues. Technology acquisition, consultancy and technical services are not totally excluded, but they are often dealt with vaguely and much less seriously. Thus, the development of science and technology in Thailand has been viewed as nothing much more than an under-investment in R&D. Policies and measures have mainly emphasized developing public sector R&D capability; policy concern has usually been about how to increase the total level of government funding for public sector R&D.

With the growing realization that there is a serious problem in the application of public-sector R&D, there have been some efforts to improve public institutes. But these have emphasized almost exclusively internal management improvement – especially giving more autonomy and flexibility. There is little analysis of the underlying principle that governs the establishment and operation of these institutes and on the structural problems of the existing pattern of industrialization. There has not yet been a systematic examination of the supply and demand of science and technology in the context of industrial development. Consequently, when no significant improvement and change in the existing institutes could be made, new institutes for generating or strengthening endogenous technological capabilities were established with a hope that they, under efficient management, would fulfil the expectation of effectively utilizing science and technology to promote industrial competitiveness. Various linkage measures, such as R&D grants and tax incentives for the private sector, have also been employed more recently to augment the mainstream efforts. Yet, it is highly questionable whether all these efforts – most of which are not concerned with the demand side of science and technology – are on the right track.

The argument that local R&D efforts have not contributed much to technological development in industry is by no means a suggestion that R&D is unimportant. R&D is a key capability needed to generate technical changes and improvements in industry. But R&D is never sufficient by itself for generating new products, processes and services as well as various kinds of improvements needed by industry. A wide range of other technological and managerial resources and capabilities is needed. Perhaps more important than the R&D capability in the public sector is the development of technological and managerial capabilities, including R&D strength, *within* the industrial sector itself.

As suggested by numerous studies in recent years, there are two major differences between advanced countries and less advanced countries in their R&D investment. First, advanced countries have a higher level of national investment in R&D, both in absolute and relative terms. This is evident in Table 1, which shows that while Japan spent about 3 percent of its GNP and newly-industrialized countries like Korea, Taiwan and Singapore spent about 1 to 2 percent of their GNP in R&D, the R&D investment in Thailand in recent years was less than 0.2 percent of GNP. The second and more important difference concerns the national share of

private-sector R&D. In Thailand, this has been very small, i.e., only about 5 to 8 percent, as shown in Table 1. This strongly contrasts with the situation in the more advanced countries, where their private sectors accounted for half or most of the R&D investment.

There is reason to believe that unless industrial firms have built up significant in-house capabilities they cannot effectively draw on public sector R&D results. This limits the effectiveness of public-sector R&D. In other words, unless the technology users are sufficiently sophisticated to conceptualize and translate their needs into a requirement for products and services, they cannot exert an effective "pull" on the formal R&D system.

As mentioned earlier, the government has recently offered various incentives and financial support for R&D activities in industrial enterprises, but these have not been effective. A major problem is that these incentives are mostly aimed at small and medium-sized local firms – which usually do not possess sufficient in-house capabilities to engage in R&D activities. Moreover, firms can normally draw on sources of technology other than in-house and public-sector R&D. What is needed by most firms may not be new technical knowledge but re-creation and assimilation of knowledge from elsewhere, especially from foreign sources. This fact coupled with the general belief that technology can be readily acquired from foreign sources may lead firms to feel that there is little or no need to invest in R&D. Once firms obtain appropriate and efficient technical systems, they assume that everything will be all right. They then take a rather passive approach, until it is time to choose another new production system. Thus, they can simply undertake very limited technological learning, i.e., only at the minimum level needed to operate the systems. Indeed, there is a lack of awareness among many industrial firms of the importance of in-house technology development, not only R&D.

Economic policy for industrial development in Thailand has actually generated disincentives for companies to invest in developing in-house technological capabilities and has encouraged them to acquire only "ready-made" technology. The policy framework was designed with the following concepts in mind:

- To stimulate the growth of new industries, especially those producing for local markets, various protective measures, such as the import ban and high tariff, are needed to help these infant industries achieve competitive efficiency.
- Technology is almost equivalent to machinery and equipment; hence a major problem of industrial development is to promote investment in that "capital-embodied" technology by providing incentives to subsidize that investment and facilitate the transfer of that technology from abroad.

Consequently, policy measures have not been designed to generate *demands* by firms to pursue an aggressive investment strategy to ensure acquisition of in-depth knowledge along with their usual purchase of production facilities from abroad. Actually, no policy attention has been given to the issue concerning efforts by firms to acquire knowledge and expertise that would be required to build up significant technological capability within industry in the long term. On the contrary, some features of industrial policy have had a negative influence on investment in *knowledge* capital by industry. The most important is the "import-substitution" policy, accompanied by "infant-industry protection." Although there is now a slight change in policy toward more export-oriented and less protective regimes, that practice persisted for a long period and thus has effectively reduced or removed competitive

Table 1 R&D Expenditures of Thailand and Some Selected Countries

Country	R&D Expenditures (US$ million)	R&D as % of GNP	Share of Private sector
Japan (1988)	68,008	2.85	82.0
Korea (1990)	4,536	1.91	89
Taiwan (1991)	3,175	1.70	48
Singapore (1991)	464	1.10	59.0
Thailand (1989)	113	0.17	5.5
Thailand (1991)	154	0.20	approx. 8

Sources: R&D and Science and Engineering Indicators, National Science Board, Japan;
Ministry of Science and Technology, Korea;
Indicators of Science and Technology, National Science Council, Republic of China;
National Survey of R&D Expenditure and Manpower, National Science and Technology Board, Singapore;
Research Policy and Planning Division, the National Research Council of Thailand.

pressure on firms. Without a competitive market, where firms perceive technical improvement and innovation as imperative to their survival and growth, there is little or no demand for investment and accumulation of technological resources and capabilities.

Experience in Industrialization and Technology Development of More Industrialized Countries

Given that certain countries, such as Japan, Korea, Taiwan and Singapore, have attained high degrees of technological dynamism in industry, it is useful to examine their experience in industrialization and technology development. Although much of their experience may not be completely applicable to the context of Thailand, a brief overview of their common patterns of development may offer useful insights.

As is reflected in Table 1, the most important aspect of their experience is the accumulation and utilization of technological capability *within* industry. Centralized research institutions have played a role in supporting the development and application of science and technology as a complement to, not a substitute for, the efforts of the production sector itself. Moreover, the linkage between these institutions and industry has usually been of an *interactive* nature, rather than simply a one-way flow of output from the former to the latter. In other words, industry in these countries has played an important role in influencing the activities undertaken by centralized institutions. In some cases, the industry has even influenced the creation and evolution of the institutions. Furthermore, the experience in institutional development of these countries has demonstrated a process of institutional *innovation*, i.e., the design and development of different types of institutions to meet differing and changing needs. This path of institutional development was similar to that of some advanced countries in their early phases of industrialization, as pointed out by R. M. Bell (1985) :

> *The evolution of the institutional structures for harnessing science and technology to economic development was not based simply on copying the models available in more industrialized countries. As with technology itself, selective and adaptive imitation of institutions was combined with a continuing succession of "home-grown" institutional innovations. These were developed out of the experience of the societies themselves (p. 11).*

As also suggested by Linsu Kim and Carl Dahlman (1992) with respect to the case of Korea, the more successful public R&D institutes were not confined to the narrow function of R&D – contrary to the orientation of similar institutes in Thailand.

Therefore, it seems that the pattern in Thailand of 1) imitative rather than innovative institutional development, and 2) development of innovative capability outside rather than within industry, was not really the dominant trend in industrialized and newly-industrialized countries.

Another equally striking feature of their experience was the utilization of international technology transfer to augment local technological efforts in industrial firms, and behind that, the supportive role of the public sector. Japan's experience in its early days of industrialization is a good example, as described by R. M. Bell (1985):

> *Japanese firms made considerable efforts not just to import technology in the form of machinery and operating know-how, but also to acquire it in the form of underlying knowledge and principles that would add to their own capacity to generate technical change. .....By the twentieth century, the complexity of industrial technology often required firms to make different kinds of effort to ensure that, in importing technology, they also built up a technological capacity to generate their own subsequent path of technical change....by investing in "deeper" technological training, in the development of engineering expertise, and in their own research and development. (In the 1950s and 1960s) such complementary efforts linked to the importation of technology were commonplace among Japanese firms; and, at least in key industries, government policy (implemented through MITI) explicitly ensured that firms actually made those efforts (p. 10).*

Various kinds of mechanisms have been employed by the governments of these countries to systematically encourage and reward such efforts by firms. The Korea Technology Banking Corporation (KTB), for example, provided funds, soft loans and technical assistance to such activities as foreign technology acquisition, technology upgrading, and technical training as well as R&D. The Economic Development Board (EDB) of Singapore has not only played a key role in directing investment into strategic industries, but also orchestrated various governmental and private efforts to upgrade the technological levels of local and foreign firms through the provision of incentives, including generous loans and grants, and a wide range of technical and business advisory services. Other schemes were launched to assist local firms in upgrading their operations by acquiring foreign expertise, sometimes with the help of multinational companies – not to mention the establishment of venture funds and many specialized training institutes. Similarly, the Taiwanese government has not only provided its local industrial firms with fiscal and financial supports, but also employed substantial resources and efforts to facilitate international technology transfer, including forging strategic alliances

between foreign and Taiwanese firms. The situation in Thailand contrasts sharply with those of the countries cited above.

The governments of these countries have also been highly interventionistic in creating the *demand* for technological development. Among various measures employed, government policies that enhanced market competition seemed to play the most important role. This is highlighted in the case of Korea, as noted by Linsu Kim and Carl Dahlman (1992) :

> *Korea's outward-looking policy appears to have been another important mechanism..... While the Korean government highly protected the local market to foster infant industry growth, it promoted exports as something of a "life or death struggle" in order to bring about economic growth goals within a small domestic market. Thus, the government pushed and pulled firms with threats and promises. Export promotion continually places pressure on firms to acquire foreign technology and to use it effectively in order to be able to compete in foreign markets. (p. 442) ....As producers entered the international market, the keen international competition forced them to invest more in technological efforts. In addition, informal technical assistance offered by foreign OEM (original equipment manufacturer) buyers to ensure that Korean-made products met their technical specifications provided invaluable help to Korean firms in acquiring the necessary technological capability (p. 451).*

Similarly, the gradual liberalization of the Korean domestic market in more recent years made it "imperative for Korean firms to enhance competitiveness by elevating their technological capabilities through foreign technology transfer as well as through intensifying their own R&D efforts" (Linsu Kim and Carl Dahlman, 1992, p. 447).

Finally, a large part of the economic success of these countries is due to their aggressive strategies in human resources development. Again, this can be summed up by the case of Korea. "It was Korea's heavy investments in human resource development that made it possible to acquire technological capability rapidly and, in turn, to achieve rapid industrialization" (Linsu Kim and Carl Dahlman, 1992, p. 451).

Current Problems and Challenges Ahead

Various domestic conditions and Thailand's current international economic environment are quite different from those faced by the more advanced countries when they embarked on industrialization. Apart from the frequently cited differences in politics and socio-cultural settings, there are several important factors which are likely to create additional problems, obstacles and challenges for Thailand's sustained industrial development.

First, Thailand has faced and will continue to face a severe shortage of technical manpower, especially engineers, scientists and technicians. Moreover, most technical human resources in industry are used for routine production and maintenance rather than innovative activities. Taking into account the potential demands for manpower for broader and deeper technological development, the shortage will become even higher. Almost all universities are now facing problems in retaining their limited staff and hence are unlikely to be able to produce the needed manpower at a level that can fulfill industrial demands in the future. In addition, given that the momentum of technological changes will become increasingly rapid, formal education by itself may not be adequate in the long term to meet the changing and more specialized requirements of the production sector.

Furthermore, the issue is not simply about generating knowledge elites in high-level educational institutions. To sustain future economic growth and increase international competitiveness, Thailand will require, among other things, a substantial upgrading of its industries, including adopting increased automation. Consequently, the days when companies would hire cheap and unskilled workers and keep them employed for years will soon end. But, the country may not have enough educated and skilled people to serve higher knowledge-based work.

There is strong evidence to suggest that the industrialized world is now in the process of a technological revolution of enormous scale. This will entail significant changes in many production activities and will pervasively affect almost all aspects of social and economic development. Micro-electronics/information technology and biotechnology are playing a prime role in this process. Given that in the industrialized world billions of dollars are being invested to develop these new technologies and that they can generate significant productivity and quality gains, their rapid diffusion across a number of production activities can be expected. Such changes in the industrialized world can eventually undermine the competitive advantages Thailand has in certain exports. There is also growing evidence that the access to advanced know-how is increasingly constrained by both the complexity and size of the technology itself as well as by the fact that its appropriation is increasingly under the control of industrialized-country firms and organizations. Local firms in many industries may eventually have to enter into a new era of technological dependence on foreign sources of machinery and expertise. It is imperative that a wide range of efforts and measures be systematically deployed to enable Thailand to benefit from the new

technological changes while keeping their threats or negative effects to the minimum.

The world economic environment since the 1980s has changed significantly. In the wake of recession and international trade problems and growing unemployment in some advanced countries, protectionistic policies have been employed in several world markets. Conversely, more liberal trade regimes in some economic regions, such as the North American Free Trade Agreement (NAFTA) and the coming ASEAN Free Trade Agreement (AFTA), imply intense international competition. Thai industries may have to compete against foreign or multinational companies in both domestic and international markets. These changes, coupled with the changes in the area of intellectual property rights, will have significant implications for the future development prospects of Thailand.

The increasingly intensive competition at the inter-firm and international levels will lead to major changes in corporate strategy. Indeed, the recent surge in inter-firm cooperation among the developed country companies and transnational companies signals a new mechanism for addressing a wide range of corporate objectives. In the domain of technological innovation, many firms are forming strategic alliances to gain access to complementary technologies. Thai industry, however, has had a very limited historical accumulation of the skills, knowledge, organizations and relationships that constitute the basis for international competitiveness. The chance that Thai firms can enter into cooperative agreements as a means to achieve internationalization is limited. Therefore, there may be a need for supports, or pressures, to stimulate and facilitate the internationalization of Thai industry. This is not just a matter for trade policy. A range of national programs and policy measures is needed to foster greater development of technological and managerial capabilities in industry. They must be highly focused on specific industries and also take into account the rapidly changing international environment.

In the light of the analysis in this article, perhaps the most important challenge for Thailand is the ability to recognize the limitations of its past pattern of science and technology development. Without that recognition, it is unlikely to be possible to formulate and implement a new approach to policy and institutional development that is qualitatively different from the dominant efforts in the past and has an international and dynamic perspective.

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NEWSBRIEF

Dr. Nguyen Huu Ninh Speaks on Environmental Management in Vietnam

Dr. Nguyen Huu Ninh, Director of the Center for Environment Research Education and Development, Hanoi, gave a lecture at TDRI on May 13, 1994 on "Environmental and Natural Resource Management in Vietnam."

Dr. Ninh cited deforestation as the most pressing environmental problem facing Vietnam today. A decrease in land resources (caused by a high population growth rate and intense land use), over-exploitation and pollution of coastal zone areas and marine resources, irrational use of mineral and water resources, loss of genetic diversity, and air, water and soil pollution were cited as other urgent environmental issues.

Standing on the threshold of a seemingly massive national industrialization effort, Vietnam can learn from the mistakes made by other developed and developing countries, Dr. Ninh said. Recognizing early on the need to integrate environmental protection in the development process, the Vietnamese government passed an Environmental Protection Law in December of last year. Dr. Ninh said that rules, regulations, laws and standards for environmental protection are in the process of being drawn up, as are the establishment of environmental authorities at the central, regional and provincial levels. He added that the Vietnamese government hopes to have a cohesive national environmental strategy in place by the year 2000.

Dr. Nguyen Huu Ninh, Director of the Center for Environment Research Education and Development, Hanoi.

International Economic Relations Program Holds AFTA Conference

TDRI's International Economic Relations Program, in collaboration with Queen's University, Kingston, Canada, and with the assistance of the Economic and Social Commission for Asia and the Pacific (ESCAP), held on April 27 and 28 a conference entitled "AFTA and Beyond: An ASEAN Perspective" at the United Nations Conference Center in Bangkok. This unique conference provided an opportunity for ASEAN Free Trade Area (AFTA) member countries to examine vital issues surrounding AFTA's future growth and development. AFTA member countries are Thailand, Indonesia, Malaysia, the Philippines and Singapore. Its major trade partners include Japan, the United States, the European Union, Canada, Hong Kong, India and China.

The inaugural speaker was H.E. Deputy Prime Minister Dr. Supachai Panitchpakdi, who spoke on "AFTA and Beyond: Visions and Issues." The keynote address, "Global, APEC and ASEAN Economic Cooperation Scenarios for the Year 2010," was given by Dr. Narongchai Akrasanee, Chairman of General Finance and Securities Co., Ltd. and a member of the Eminent Persons Group of the Asia Pacific Economic Cooperation (APEC) grouping.

Dr. Ammar Siamwalla, TDRI President, chaired the first session, in which speakers from the United States, Canada, Japan and the EU discussed the international economic setting for AFTA and ASEAN's place in the international trading system.

According to Dr. Shigeyuki Abe, Professor at Kobe University of Japan, "AFTA's main role is probably not to enhance trade within ASEAN but to enhance the region's international network and to attract more investment from Japan."

Dr. Michael Plummer, of Brandeis University in the United States, recommended "more rapid and extensive liberalization within AFTA to open new markets, increase regional economic interchange" and offer an attractive investment destination to foreign investors. He said that this would assist AFTA in competing with the North American Free Trade Area (NAFTA).

Dr. Ludo Cuyvers, of the University of Antwerp in Belgium, stated that "ASEAN's major exports to the European Union are likely to benefit from the completion of the European Single Market."

Speakers from each of the ASEAN countries explored the progress and the problems they encountered in implementing AFTA in each of their countries. AFTA's important regional trading partners – Hong Kong, India and China – commented.

Dr. Wisarn Pupphavesa, Director of TDRI's International Economic Relations Program, noted that "whole-hearted commitment to trade liberalization, accompanied by greater consistency in industrial policy, are needed for Thailand to carry out its commitments to AFTA, while making the most out of AFTA."

Approximately 180 participants attended the conference. These included representatives from international organizations and the Thai government, several ambassadors and diplomats, academics and business people.

NEW RESEARCH PROJECTS

Macroeconomic Policy Program (MEP)

The Macroeconomic Policy Program (MEP) has been contracted by the International Institute for Environment and Development (IIED) to carry out a project on "Macroeconomic Linkages Between Environment and Development: A Case Study of Thailand." The project's broad objective is to devise a macroeconomic strategy or a set of policy options that integrate environmental considerations, economic development objectives and demographic factors at the national level. This will be achieved by using a computable general equilibrium framework to project economic growth and to conduct selected policy simulations. The study's specific research objective is to examine environmental feedback, i.e., the impact of environmental degradation on economic growth in the medium-term. Selective interlinkages between environmental and economic outcomes with potential for quantitative modelling will be identified and studied. The research output will be an economic-demographic-environmental macromodel for Thailand. The project began in May 1994 and will last for two years.

TDRI's Sectoral Economics Program (SEP) has been contracted to carry out the following research projects:

- *Evaluation of the Taxpayers Survey*

The Department of Internal Revenue has been conducting a taxpayers survey for the past 10 years. The purpose is to bring potential taxpayers, especially small businesses, into the tax system. In recent years, the benefits of this on-going survey have decreased and the costs, including the marginal cost of public funding, have increased. Because of this, SEP has been commissioned to evaluate the survey. Through an institutional linkage with the Canadian International Development Agency (CIDA) and Queen's University, Dr. Bev Dahlby, Professor at the University of Alberta, will assist the research team.

- *Industrial Development in Northeast Thailand and Neighboring Countries*

In recent years, Thailand has been losing its comparative advantage in the world market because of rising wages and rapid exhaustion of raw materials. Economic cooperation with its neighboring countries, especially Laos and Vietnam, will not only expand the market for Thai manufactured goods, but it will also allow Thai industries to have access to cheaper raw material sources.

The objective of this study is to explore the industrial development potential of Laos and North Vietnam along the Nakorn Panom-Tha Kog-Vingh route. Basic information on natural resources, major economic activities and infrastructure will be compiled. The project is financed by the Office of Industrial Economics.

- *Rural Electrification*

Today, less than three to five percent of rural villages in Thailand do not have electricity. In many electrified villages, however, villagers who live far from the village center still do not have electricity. The government, in an attempt to diversify economic growth in the rural areas, has now set a policy to provide electricity to all rural households. The financial rate of return from such an investment, however, is negative. The Provincial Electricity Authority has therefore commissioned SEP/TDRI to evaluate the economic rate of return for the rural electrification investment project.

TDRI TV Series Airs Program on Financial Liberalization

On May 1, 1994 TDRI's Macroeconomic Policy Program (MEP) presented a paper on financial liberalization on the "TDRI White Paper Series" television program. The paper addressed the objectives, measures and possible outcomes of the country's domestic financial liberalization scheme. Interviews were conducted with the Governor of the Central Bank and the Deputy Secretary of the Security Exchange Commission. The paper will also be published in the *TDRI White Paper Series.*

Working Papers

The following publications are now available at the TDRI Publications Office :

- Institutional Problems in Thai Water Management by Scott R. Christensen and Areeya Boon-Long
- Development of the Thai Manufacturing Industries: An Industrial Organization Approach

  - Rubber-based Industries
  - Starch-based Industries
  - Electronics Industry

IN-HOUSE SEMINARS

Natural Resources and Environment Program (NRE)

A seminar on "Water Use Conflict Management in the Northeast: Case Studies of Nam Siaw and Nam Pong" was held on May 23, 1994 at Khon Kaen University. Another seminar on "Water Allocation Problems in the North" was held in Chiang Mai on April 1, 1994. The seminars were part of NRE's project on "The Governance of Water Allocation Problems in Thailand," which analyzes the political economy of water allocation conflicts and suggests institutional reforms for improving water management in Thailand. The project leader was Scott R. Christensen. Researchers were Amnaj Wongbandit (Northeast) and Tanet Charoenmuang (North).

Science and Technology Development Program (STD)

TDRI's Science and Technology Development Program (STD) and the National Electronics and Computer Technology Center (NECTEC) hosted a seminar on "The Development of Information Technology Personnel in Thailand" on April 28, 1994 at the Siam City Hotel. More than 50 people, including public policymakers, academics, information technology developers as well as private sector professionals, attended the seminar.

Participants at the Information Technology Seminar (left to right): Dr. Nit Chantramonklasri, Director of the STD Program; Dr. Anupap Tiralap, Project Researcher; Dr. Chatri Sripaipan, Project Researcher; Dr. Pichet Durongkaveroj, Project Leader; Ms. Chodchoi Eiumpong, Deputy Permanent Secretary, Office of the Permanent Secretary, Ministry of Science, Technology and Environment; Dr. Sumeth Vongpanitlerd, Project Researcher; Dr. Yongyuth Yuthavong, Director of the National Science and Technology Development Agency; Dr. Pairash Thajchayapong, Director of NECTEC; and Mr. Vigrom Chaisinthop, Managing Director, T.N. Communication Systems Ltd.

Sectoral Economics Program (SEP)

TDRI's Sectoral Economics Program (SEP) held the following in-house seminars during the second quarter of 1994:

- "The Future of the Cane and Sugar Industry" (Final Report) was held on March 2, 1994 at the Landmark Hotel, Bangkok. The seminar was opened by the Permanent Secretary of the Ministry of Industry, Mr. Sivavong Changkasiri.

- "The Development of Thai Manufacturing Industries: An Industrial Organization Approach" (Final Report). Three seminars were organized in order to disseminate research results. The first seminar was "Industrial Development in Songkhla Province," held on March 5, 1994 at the B.P. Grand Tower, Songkhla. The second seminar, "Industrial Development in Nakorn Ratchasima, Saraburi and Chiang Mai," was held on March 14, 1994 at the Kaew-Un Hotel, Saraburi. The third seminar, held on March 15, 1994 at the Office of Industrial Economics, the Ministry of Industry, presented the final draft reports of five industries, namely, rubber-based industries, starch-based industries, the electronics industry, the textile industry and the petrochemical and plastics product industries. The research team discussed each industry's industrial structure and performance and made policy recommendations to the Office of Industrial Economics as to how to promote the five industries. Approximately 100 participants from both the public and private sectors attended.

- "Export Opportunities and Their Impact on the Thai Economy Under AFTA" (Final Report) was held from May 20 to 21, 1994 at the Royal Cliff Beach Resort, Pattaya. TDRI's Sectoral Economics Program and its International Economic Relations Program, in cooperation with the Federation of Thai Industries, organized a two-day seminar on AFTA's impact on international trade, foreign direct investment and the competitiveness of 15 Thai industries. The seminar was opened by Dr. Trirong Suwankiri, Deputy Minister of Finance, who also actively participated. The seminar was open to the public and had working group meetings with representatives from each industry. Comments from both public and private sector participants, about 90 in number, will be incorporated into the final report.

COMPLETED RESEARCH PROJECTS

Natural Resources and Environment Program (NRE)

In May, 1994, the Natural Resources and Environment Program (NRE) completed a regional project on "Institutional Linkages for Natural Resource Management in Mainland Southeast Asia," with the support of the Asia Foundation. The project involved field trips by NRE researchers to Cambodia, Laos, Vietnam, and Yunnan Province to interview researchers in the natural resources and environment fields and assess capacities for independent policy research in each country. The project leader was Dr. Mingsarn Santikarn Kaosa-ard. Researchers were Scott R. Christensen, Kundhinee Aksonrwong and Sunil Pednekar.

NRE recently completed a research project on "The Assessment of Sustainable Highland Agricultural Systems." This project, financed by the Department of Public Welfare, examines a number of reputedly sustainable highland agricultural systems to assess conditions essential for their current successes, including support cost, and to determine factors that could undermine sustainability and/or limit expansion of similar systems into other highland areas.

Sectoral Economics Program (SEP)

TDRI's Sectoral Economics Program (SEP) has completed the following research projects in the second quarter of 1994:

- *The Future of the Cane and Sugar Industry*

This project studied changes and trends in the Thai cane and sugar industry since the implementation of the revenue-sharing system in 1982-1983. The study found that rising wages, scarcity of cane-cutting labor and the inability of cane growers to expand planting areas in the central and west-central regions of Thailand have caused many sugar factories to relocate from two disadvantaged regions in the northeast to the lower-northern and the central regions of Thailand. Such locational shifting, and its accompanying capacity expansion, has caused the rapid growth of cane planting areas and cane and sugar production during the past decade. This study forecasts that cane and sugar production will increase in the coming years. It also predicts that more cane-cutting and cane-loading machines will be used to replace human labor. Domestic sugar consumption, both household (70%) and industrial (30%), and sugar exportation are predicted to increase.

The study recommends that the government continue the revenue-sharing system into the next decade and promote the development and improved efficiency of the cane and sugar industry. Moreover, the government should encourage the use of sugar as industrial raw material and promote the improvement of sugar quality. Finally, the government should promote the exportation of white and refined sugar instead of raw sugar.

- *Export Opportunities and Their Impact on The Thai Economy under AFTA*

This study found that most of the 15 Thai industries under the fast track CEPT scheme will be able to compete with those in other ASEAN countries. The competitive position of most Thai industries can be maintained or even improved if the government reduces the duty on imported raw materials and components. But Thai industries will not be able to enjoy the concession benefits from AFTA if the tariff rates still exceed 20 percent. Among the ASEAN members, Thailand not only has the highest average tariff rate, but its tariff reduction schedule is very slow. The tariff rates on a large number of products will not be below 20 percent before the year 2000. Therefore, the study recommends that the Thai government should propose a new tariff reduction schedule. Moreover, it should consider removing the electronics, automobile and auto parts industries from the exclusion list because a number of their products are competitive in the world market.

Science and Technology Development Program (STD)

TDRI's Science and Technology Development Program (STD) recently completed a research project entitled "The Development of Information Technology Personnel in Thailand." The project was contracted to TDRI by the National Electronics and Computer Technology Center (NECTEC) of the National Science and Technology Development Agency (NSTDA).

The study found that there were severe shortages in Information Technology (IT) manpower in Thailand, and that in some instances those already working in the field were not properly trained or qualified.

Many innovative measures were proposed to tackle problems in the field. These included how to bypass bureaucracy and how to resolve problems caused by the lack of incentives in human resource development.

Results of this study will be presented to the National IT Committee, chaired by the Deputy Prime Minister, Dr. Amnuay Veerawan.

TDRI White Paper Series

TDRI's Publications Office last year launched a new *White Paper Series*—research reports which address some of the most important, and in some cases, critical issues facing Thailand today.

Conducted under the auspices of the President's Office, the Series papers are published in the Thai language, but particularly relevant or crucial ones are translated and printed in English in the *TDRI Quarterly Review*. There are currently seven papers published in the series, each selling for 25 baht.

Mae Moh Disaster

The first *White Paper Series* edition presents the hard facts behind the Mae Moh electricity generation plant disaster. Air pollution resulting from this industrial accident affected the health of more than 1,000 people and caused crop failures and the deaths of thousands of domestic animals. Safe and environmentally sound electricity generation is one of the many vital issues discussed.

Thailand's Tourism Industry

The second edition examines Thailand's tourism industry. It discusses what the country gains and loses from the industry, current trends and problems in the industry, and what direction tourism in Thailand should take in the future.

The Drug Trade

The third edition traces the drug trade from the Golden Triangle in Thailand and examines how this affects the incidence of drug addiction in the country. Some case studies of drug addicts are analyzed, as are the effects of current anti-drug policies.

Bangkok's Motorcycle Taxis

The fourth edition explores a unique phenomenon of Bangkok streets—the emergence and rapid growth of the private motorcycle taxi business. The paper answers such questions as: Who owns and operates private motorcycle taxis and how? In what ways do motorcycle taxis respond to the needs of Bangkok commuters? How do motorcycle taxis affect the city's traffic situation? And, finally, what are the future trends of this booming business?

Bangkok Traffic

The fifth edition examines Bangkok's critical traffic situation. The paper describes in detail the severity of the problem and traces governmental responses to it. Short- and long-term solutions are proposed.

Toxic Waste

The sixth edition addresses another of Thailand's burning environmental issues—toxic waste. The sources of toxic waste and control of its disposal are two major focuses of the paper.

Rice Market

The seventh edition concerns government's intervention in the rice market during the 1992 to 1993 season. The paper presents government policy on price control intervention, examines whether or not it is beneficial in the rice market, and attempts to forecast the longevity of its implementation.

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