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**INDUSTRIALIZATION UNDER NEW WTO LAW**



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# **High-level Round Table on Trade and Development: Directions for the Twenty-first Century**

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## **INDUSTRIALIZATION UNDER NEW WTO LAW\***

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\* The views expressed in this paper are those of the author and do not necessarily reflect the views of the UNCTAD secretariat.



## Executive Summary

This paper addresses the issue of whether late industrializing countries, including those with modest manufacturing experience as well as those which have successfully promoted manufacturing over the last 50 years, can continue to build their manufacturing sectors under new World Trade Organization (WTO) rules. The answer to the question is as follows.

First, new WTO rules give ample opportunity for countries to promote their manufacturing sectors. Whatever else WTO laws are designed to do, they may be construed as being in favour of advancing science and technology (S&T). The most technologically advanced countries continue to promote their industrial competitiveness by subsidizing research and development (R&D), regional development and environmental protection. In addition, their up-and-coming firms benefit from special incentives offered for locating residence in “science parks” and industrial estates. Moreover, WTO law is not inflexible with respect to tariffs. It contains safeguards and other measures that allow countries to protect specific industries threatened by a surge in imports (for up to eight years) and to protect against *all* imports if they are at a level which jeopardizes their balance of payments (for an indeterminate time period). This is not to belittle some concerns that developing countries have articulated about the WTO. Such concerns relate to trade in agriculture and services, including financial services, intellectual property rights; labour standards; and the environment. There is, however, no shortage of methods that can be used by less industrialized countries to promote their industries even under new WTO laws.

Second, countries that make use of WTO rules to promote their industries should be aware of the “reciprocal control mechanisms” that successful late industrializers utilized in order to ensure that subsidies and other supports to business were used productively. Nothing was given away for free. Subsidies of all sorts were tied to monitorable performance standards. Countries that begin promoting their industries under WTO rules should be certain that machinery is put in place to ensure that the principle of “reciprocity” obtains and that all promotional measures are tied to results-oriented performance standards. After examining the principle of reciprocity in action (we focus on Thailand), we argue that new WTO laws are compatible with a continuation of this principle, although Governments are more constrained in setting export targets as a condition for subsidies.

Third, possibly the greatest inhibition to manufacturing growth in those countries whose industrial diversification has either stalled or is still in its infancy is the absence of a “vision”. The paper ends with a discussion of a new vision grounded in science and technology.



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# INDUSTRIALIZATION UNDER NEW WTO LAW

*Alice H. Amsden*

## INTRODUCTION

For nearly half a century after World War II, many countries, which were outside the main orbit of world manufacturing, nonetheless experienced rapid industrial expansion under old GATT law (see table 1).<sup>1</sup> These, and other latecomers, are now confronted with the challenge of continuing to build their manufacturing sectors under a new trade regime. This new regime is allegedly more liberal than the previous one, which operated from the time of the Bretton Woods Agreement in 1944 to the formation of the WTO in 1994.

The challenge is indeed great because, historically, relatively high tariffs have accompanied major waves of industrialization: the first industrial revolution in the United Kingdom from about 1770–1830; the second industrial revolution in the North Atlantic from about 1873–1914; and “late” industrialization from about 1950–1995. In broad terms, tariffs fluctuated in a downward direction from 1830 to 1873, and then went up again between 1873 and 1914, and still further up during the inter-war years (O’Brien, 1997). After World War II, tariffs were again high and then gradually diminished, first in the North Atlantic and then, in an even more desultory fashion, in latecomer countries.

This raises the question of how less industrialized countries, with only modest manufacturing experience, are to continue to move into mid-technology industries if the WTO forbids infant industry protection and subsidization. This paper provides an answer to this question.

## I. THE FLEXIBILITY OF WTO LAW

The WTO, like the GATT, enables members to protect themselves from two types of foreign import competition: competition from aggregate imports that destabilizes their balance of payments (Article XVIII); and competition that threatens their individual industries, due either

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<sup>1</sup> To avoid the bias introduced by different levels of manufacturing activity among countries in 1950, it would have been preferable to examine manufacturing output per worker. However, the requisite data are not available to make this calculation for a sufficient number of countries. Table 1 is meant to suggest the wide variety of countries, if only in terms of geography, whose manufacturing sectors have grown rapidly over the past 50 or so years.

**Table 1**  
**Real annual average growth rates of GDP**  
**in manufacturing latecomer countries, 1960–1995**  
(Percentage)

| <i>Country</i>                            | <i>1960–1970</i> | <i>1970–1980</i> | <i>1980–1990</i> | <i>1990–1995</i> | <i>1960–1995</i> |
|-------------------------------------------|------------------|------------------|------------------|------------------|------------------|
| Argentina                                 | 5.4              | 0.9              | -1.4             | 11.6             | 2.1              |
| Brazil                                    | 8.0              | 9.0              | 0.15             | 25.2             | 8.5              |
| Chile                                     | 9.4              | 1.8              | 2.9              | 10.4             | 5.5              |
| China                                     | n.a.             | 8.4              | 9.6              | 13.5             | 9.9              |
| India                                     | 3.1              | 4.0              | 7.4              | 2.3              | 4.5              |
| Indonesia                                 | 6.4              | 14.2             | 7.4              | 15.1             | 10.1             |
| Korea, Republic of                        | 17.7             | 16.0             | 12.0             | 10.9             | 14.6             |
| Malaysia                                  | 10.9             | 11.8             | 9.5              | 19.8             | 12.0             |
| Mexico                                    | 9.7              | 7.2              | 2.2              | 8.4              | 6.6              |
| Taiwan Province of China                  | 15.0             | 12.6             | 7.2              | 4.8              | 10.6             |
| Thailand                                  | 9.1              | 10.1             | 9.6              | 13.2             | 10.1             |
| Turkey                                    | 8.1              | 5.1              | 7.1              | 4.7              | 6.5              |
| <b>Prime 12: Mean</b>                     | <b>9.7</b>       | <b>9.1</b>       | <b>6.8</b>       | <b>11.7</b>      | <b>9.0</b>       |
| Egypt                                     | 4.8              | 9.7              | n.a.             | 8.3              | 7.9              |
| Tunisia                                   | 7.8              | 11.9             | 6.8              | 5.6              | 7.6              |
| Pakistan                                  | 9.4              | 8.4              | 2.2              | 6.4              | 6.7              |
| Philippines                               | 6.7              | 7.0              | 1.1              | 9.5              | 6.6              |
| Nigeria                                   | 9.1              | 14.8             | (-) 8.8          | 14.8             | 6.4              |
| Venezuela                                 | 6.4              | 5.2              | 1.1              | 7.1              | 5.8              |
| Colombia                                  | 5.7              | 5.7              | 3.0              | 9.1              | 5.7              |
| Ecuador                                   | 4.9              | 9.6              | 0.5              | 11.7             | 5.7              |
| Kenya                                     | 6.5              | 5.7              | 4.8              | 2.4              | 5.2              |
| Honduras                                  | 4.5              | 5.7              | 3.0              | 3.4              | 4.9              |
| <b>Secondary Top 10<sup>a</sup>: Mean</b> | <b>6.6</b>       | <b>8.4</b>       | <b>1.4</b>       | <b>7.8</b>       | <b>6.2</b>       |

**Source:** 1990–1995 data adapted from (UNIDO, 1997) and earlier years. All other data adapted from (World Bank, various). Cited in Amsden (forthcoming).

**Note:** Statistics for each column represent averages of real annual growth rates for all available years. An entry was labelled unavailable if growth rates were not available for seven out of 10 possible years. Growth rates are calculated using inflation-adjusted current market prices. Comparability is not ensured because sometimes manufacturing includes some combination of mining, construction and/or utilities. The definition of manufacturing may also vary across countries depending on the coverage of firms below a minimum employment level.

**a** The average is for the period 1960–1995.

to an import surge (Article XIX on temporary safeguards) or to an unfair trade practice (Article VI on anti-dumping and countervailing duties). GATT placed no formal limits on the duration of safeguards, whereas the WTO limits their duration to eight years and improves their transparency.

Under GATT, voluntary export restraints (VERs) were the premier safeguard. While they had been used most extensively by the North Atlantic economies of Europe, Canada and the United States, they had also been relied upon by “the rest” to protect strategic industries.<sup>2</sup> The Republic of Korea, for example, used a form of VER to ban imports of automobiles and electronics from Japan, its most serious competitor. This “agreement” (to which Japan was not even a consenting party) began to function in the 1980s and remained in effect until 1999 – long enough to allow these industries to build up their knowledge-based assets (Taiwan Province of China and mainland China were neither GATT members nor are they signatories to the WTO, and thus may protect these and other industries more openly; the electronics industry in Taiwan Province of China is a case in point). The new WTO bans VERs because they are discriminatory, that is, their effect varies by country. The advantage of eliminating VERs was that they were non-transparent. The disadvantage was that they served a useful purpose, and “unless a superior means of serving that purpose is provided, then countries will find ways of their own to do it, and those ways are likely to be even worse” (Deardorff, 1994: 57).

As predicted, countries in “the rest” have raised tariffs in lieu of using VERs or other cumbersome safeguards. Despite the fact that the level of tariffs fell after the Uruguay Round of trade negotiations, developing countries have bound many of their tariffs at fairly high levels (or have left them altogether unbound) as the starting point for their entry into the WTO (see table 2). In the event of an import threat, they can raise their tariffs to these high levels and keep them there for at least eight years:

“While developing countries have committed to a significant increase in their tariff bindings in the Uruguay Round (albeit at levels generally well above currently applied rates), they are still unlikely to invoke Article XIX (on safeguards) because they have both the unfettered right to raise tariffs to their bound levels and virtual *carte blanche* authority to impose new tariffs or quotas for balance of payments reasons...” (Schott, 1994: 113).

Raising tariffs in an emergency has become the recourse even of countries whose policy regime has been liberalized; for example, when a new “free-trade” Mexico confronted stiff foreign competition in 1995, tariffs were increased from the prevailing rates of 20 per cent, or less, to 35 per cent on clothing, footwear and manufactured leather products on imports from non-preferential sources. *These sectors were already protected to a certain degree through anti-dumping duties and a relatively restrictive use of marking and origin requirements* (OECD, 1996a: 106).

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<sup>2</sup> “The rest”, or prime latecomers (as listed in table 1), includes 12 economies, most of which have well-developed control mechanisms (the major exception being Argentina): Argentina, Brazil, Chile, China, India, Indonesia, Malaysia, Mexico, Republic of Korea, Taiwan Province of China, and Turkey.

**Table 2**  
**Tariffs before and after liberalization**  
*(Pre- and post-Uruguay Round)*

|                    | Trade-weighted tariff averages |                    |
|--------------------|--------------------------------|--------------------|
|                    | Pre-Uruguay Round              | Post-Uruguay Round |
| Argentina          | 38.2                           | 30.9               |
| Brazil             | 40.7                           | 27.0               |
| Chile              | 34.9                           | 24.9               |
| India              | 71.4                           | 32.4               |
| Indonesia          | 20.4                           | 36.9               |
| Korea, Republic of | 18.0                           | 8.3                |
| Malaysia           | 10.0                           | 10.1               |
| Mexico             | 46.1                           | 33.7               |
| Thailand           | 37.3                           | 28.0               |
| Turkey             | 25.1                           | 22.3               |
| European Union     | 5.7                            | 3.6                |
| Japan              | 3.9                            | 1.7                |
| United States      | 5.4                            | 3.5                |

**Source:** GATT secretariat (1994), appendix tables 5 and 6, as cited in Hoda (1994).

**Note:** The pre-Uruguay Round duties refer to 1994 bound duties or, for unbound tariff lines, to duties applicable as of September 1986. The post-Uruguay Round duties refer to the concessions listed in the schedules annexed to the Uruguay Round Protocol to the GATT (1994). As import statistics refer in general to 1988, trade-weighted duties using post-Uruguay Round import data may be slightly different. The data are preliminary and may be revised to reflect the final schedules annexed to the Final Act of the Uruguay Round, although as of April 1999, no changes were registered, except for Thailand. The changes for Thailand appear above.

Marking and origin requirements are forms of non-tariff measures (NTMs) that restrict trade. In the Uruguay Round of negotiations, however, “achievements in the area of NTMs had been less than had been expected” (Raby, 1994). Mexico’s affiliation to the North American Free Trade Agreement (NAFTA) is in itself a form of managed trade that violates orthodox free market principles. Members of free trade agreements can protect themselves against all other countries except one another, and, unlike members of customs unions, they need not have common external tariffs. Of 100 or so regional trade agreements notified to the WTO since its inception, only one was approved by the end of 1999 (that between the Czech Republic and Slovakia). Others, such as NAFTA, were not forbidden; WTO members simply agreed not to take action on them.

Anti-dumping duties have emerged as another way to protect trade in an emergency, supposedly when competitors engage in “dumping”, or selling below costs. In the late 1980s, the

United States, the European Union, Australia and Canada accounted for about four fifths of all anti-dumping cases. However, by 1998 they accounted for barely one third of the 225 cases opened in that year. Instead, the developing countries became leaders in anti-dumping initiatives, especially India (which also maintains almost permanent import surcharges to protect its balance of payments), Brazil and Mexico. As other types of trade barriers decreased, anti-dumping suits rose in importance (data are from Row and Maw Ltd., London). Thus Argentina's steel industry, a showcase of restructuring, cut tariffs unilaterally to within a range of 0 per cent to a "mere" 24 per cent. But when Brazilian steel started to flood the Argentine market in 1992, a tax on imports was "temporarily" increased by almost fourfold (Toulan and Guillen, 1996).<sup>3</sup>

In response to United States pressure, the Uruguay Round of negotiations was extended to trade in services, which included foreign investment. The results of the Uruguay Round on trade-related investment measures (TRIMs), however, were "relatively modest" (Startup, 1994: 189).<sup>4</sup> As a consequence of limited agreement in the area of TRIMs, developing countries are able to maintain or even strengthen local content requirements. They can also retain trade balancing stipulations and the 100 per cent export requirement of export processing zones, both of which are forms of export promotion. In 1995, for example, Brazil hammered out an agreement with the countries representing its major automobile assemblers, whereby all of them consented to export cars whose value equalled the imports of parts that components assemblers were bringing into Brazil. Countries that had notified the WTO of their local content and/or trade balancing programmes under a new 1998 TRIMs Agreement include Argentina (automotive industry), Chile (automotive industry), India (pharmaceuticals and, in the case of "dividend balancing", 22 consumer goods industries)<sup>5</sup>, Indonesia (selected products), Mexico (automotive industry), Malaysia (automotive industry) and Thailand (selected products) (UNCTAD, 1998).

Thus, safeguards of various sorts enable countries to buttress their balance of payments and sustain an industry under siege. Safeguards can also be used to protect an infant industry with eight years of protectionism virtually guaranteed. The major risk is that of triggering unilateral trade sanctions under Section 301 of the US Omnibus Trade Act, but not until a United States industry is actually threatened by foreign competition are sanctions likely to be invoked (Low, 1993).

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<sup>3</sup> The steel industry accounted for roughly 40 per cent of all anti-dumping cases in 1998 (data are from Row and Maw Ltd., London, 1999).

<sup>4</sup> Trade-related aspects of intellectual property rights (TRIPs) were a whole other new area of regulation, designed to protect rather than liberalize, access to proprietary know-how. The United States placed TRIPs on the WTO agenda: "Just before the Uruguay Round an American *enquête* among industries cited intellectual property rights as the biggest problem when investing in other countries" (Knutrud, 1994: 193). The effect of TRIPs by the year 2000 is still unknown, but much feared by developing countries, especially those with large pharmaceutical industries, which circumvented patents to produce and deliver drugs locally at below-world prices (see Mourshed, 1999). There was also a movement afoot among North Atlantic members of WTO to regulate international business practices (Malaguti, 1998).

<sup>5</sup> Dividend balancing stipulates that during a period of seven years after the start of commercial production the amount of dividend that a firm can repatriate must be covered by the firm's export earnings (UNCTAD, 1998: 58).

Subsidies also receive relatively permissive treatment under WTO law. They fall into three categories. Some are prohibited (for exports and for domestic, rather than imported, inputs); others are “actionable” (they can be punished subject to proof of injury); and three are permissible (all heavily utilized in the North Atlantic). Permissible subsidies include those to promote (i) R&D, (ii) regional development and (iii) environmentalism. Any high-tech industry, therefore, can receive unbounded subsidies for the purpose of strengthening S&T. Export subsidies are also permissible for countries with per capita incomes equal to, or less than, \$1000. As noted earlier, exports can be promoted indirectly through the establishment of science parks or export processing zones.

All in all, the liberal bark of the WTO appears to be worse than its bite, and “neo-developmental States” in “the rest” have taken advantage of this, where necessary.

## II. PERFORMANCE STANDARDS

Here we may distinguish among latecomer countries, between those with pre-war manufacturing experience that were generally successful in introducing reciprocal control mechanisms (“the rest”) and those with negligible pre-war manufacturing experience whose reciprocal control mechanisms, if any, were weak or malfunctioning (“the remainder”).<sup>6</sup>

Given their absence of rich knowledge-based assets, countries in “the remainder” may need to use subsidies in order to make mid-technology industries sufficiently profitable to attract enough resources to undertake a “three-pronged” investment: in managerial and technological capabilities; in plants of minimum efficient scale; and in distribution networks (Chandler Jr. 1990). Nevertheless, whereas subsidies continue to be sanctioned under WTO law, and may be a necessary condition for industrial expansion, they are not a sufficient condition. Countries must also allocate subsidies in a disciplined manner, under what may be called a “reciprocal control mechanism”.

A control mechanism is a set of institutions that disciplines economic behaviour based on a feedback of information that has been sensed and assessed.<sup>7</sup> The control mechanism of the North Atlantic countries revolved around the principle of *market competition*, which disciplined economic actors and allocated resources efficiently. The “invisible hand” thus transformed the

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<sup>6</sup> Economies comprising “the rest” are explained in footnote 2; “the remainder” includes secondary, tertiary and still later industrializers, few of which had substantial pre-war manufacturing experience (Amsden, forthcoming).

<sup>7</sup> The concept of a control mechanism was first applied to the animal and the machine, and adapted to cybernetics by a physicist (Wiener, 1948). It also became an integral part of modern corporate management techniques (Merchant, 1985). All control mechanisms share at least four elements: a *detector* or *sensor*, or a measuring device to identify what is happening in the process to be controlled; an *assessor*, or a device to determine the significance of what is happening (where significance is typically evaluated by comparing information on what *is* happening with a specified standard of what *should* happen); an *effector*, or a feedback device to alter behaviour, if necessary; and a *communications network*, or a device to transmit information between the detector and assessor and between the assessor and effector (Anthony and Govindarajan, 1995).

chaos and selfishness of free market forces into general well-being (Mandeville, 1714; repr. 1924). The control mechanism of “the rest” revolved around the principle of *reciprocity*, which disciplined subsidy recipients and thereby minimized government failures. Subsidies were allocated to make manufacturing profitable – to convert money-lenders into financiers and importers into industrialists – but did not become giveaways. Recipients of subsidies were subjected to monitorable performance standards that were redistributive in nature and result-oriented. The reciprocal control mechanism of “the rest” thus transformed the inefficiency and venality associated with government intervention into collective good.

In the cotton textile industry, for example, the privilege of selling in the protected domestic market was made conditional on the fulfilment of export targets. Later, other industries had to match imports with an equivalent value of exports (or comply with some sort of “trade-balancing” arrangement). In automobile assembly and consumer electronics, the right to sell locally under tariff protection was tied to the “localization” of parts and components manufacture. A condition for receiving the soft loans of development banks was the employment of non-familial professionals in responsible positions, such as chief financial officer and quality control engineer. Development bank credit for heavy industries committed borrowers to contributing their own capital (under debt-equity ratio requirements) and constructing plants of minimum efficient scale. In India, price controls in the pharmaceutical industry encouraged cost-saving innovation and exporting in exchange for loosely enforced foreign patent laws. In the Republic of Korea, a lucrative license to establish a general trading company depended on exports meeting criteria related to value, geographical diversity and product complexity. As industries in “the rest” were upscaled, performance standards increasingly pertained to research and development, as noted below. Chinese “science and technology enterprises” were granted a special legal status in exchange for performance standards with respect to technically trained employment and new products in total sales. The best small firms in Taiwan Province of China were specially picked to locate in science parks which obliged them to spend a certain percentage of their sales on R&D and to employ advanced production techniques.

“The rest” rose, therefore, in conjunction with getting the control mechanism right. No matter what prices existed – whether as a consequence of market forces, technocratic choice or political intervention – they were taken as given by policy makers concerned with industrial expansion. Around existing prices a set of rules and institutions was constructed to attract resources into manufacturing and to make those resources conform with performance standards that were result-oriented.

### **III. DEVELOPMENT INSTITUTIONS: THE CASE OF THAILAND**

We briefly review here the developmental institutions created by Thailand, a case of relative minimalism as far as government intervention is concerned (World Bank, 1993). A

country overview, based on information from high-ranking government officials, gives some sense of the depth and breadth of controls in Thailand.<sup>8</sup>

*Selection by academic merit:* Thailand's control mechanism was managed by civil servants selected by academic merit, as a result of a 1932 political movement which had led to civil service reforms. The Thai civil service thus became very well-educated in a society where social status came to depend on higher education. In 1963, as much as one third of Thai students studying abroad were government officials on leave of absence (Evers and Silcock, 1967). Thailand's Board of Investment (BOI), the overseer of industrial promotion, claimed that until the 1990s it had never faced a shortage of well-trained engineers, despite low school enrolments. In the early phase of industrialization, as most Thai manufacturing firms were first-generation family-owned enterprises, government officials tended to be better educated than private entrepreneurs.<sup>9</sup> Whatever the balance, the BOI attracted the brightest talents after World War II, as did elite bureaucracies in Meiji Japan and other countries in "the rest" (Daito, 1986).

A permanent opposition to the developmental policies of the Thai civil service arose in the form of American-trained economists.<sup>10</sup> Officials in the BOI complained of constant criticism from the "pure economists" in the Prime Minister's Office who "misunderstood the real world". Pure economists counter-charged that private enterprise would have grown strong without BOI support, that power-bred corruption, and that the BOI's methods of "picking winners" were arbitrary. The BOI responded by appointing its critics as advisers.

*Coverage:* A very large number of investment projects in Thailand grew up under the BOI's wing. A survey of Thailand's big businesses in the 1990s estimated that around 70 per cent of the manufacturing firms belonging to the largest industrial groups had received benefits and had fulfilled performance standards under contract with the BOI (Suehiro, 1993). According to the BOI's own estimates, it was involved in about 90 per cent of Thailand's major manufacturing projects covering both the private and public sectors and foreign and local firms, with investments totalling around \$14 billion by 1990. Given Thailand's thin industrial base and BOI's relatively small staff, any official with the BOI for 23 years (1968–1991) would know every major investor personally. In 1990, 70 per cent of the BOI's professional staff were engineers, and only 100 engineers were employed in total.

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<sup>8</sup> Information on Thailand is from interviews with Board of Investment officials, Bangkok: Deputy Secretary General Vanee Lertudumrikam, July 1991 and August 1993; Deputy Secretary General Khun Chakchai, July 1991 and April 1996; and Deputy Secretary General Chakramon Phasukavanich, April 1996. Shorter quotes in the text from Board of Investment officials are from one or another of these people.

<sup>9</sup> This contrasted with a more even incidence of university education in the public and private sectors in India, Brazil and Mexico, whose industries were more advanced than Thailand's in the late 1950, and hence more managerial. For the private sector, see CEPAL (1963) for Latin America, and Agarwala (1986) for India. For the bureaucracies responsible for economic policy in Brazil, see Willis (1990). For country examples, see Ross Schneider (1998).

<sup>10</sup> For a comparable situation in the Republic of Korea, see Amsden (1994).

As it became clearer that manufacturing activity under the BOI's direction could generate profits, the Government became more committed to industrialization. As such commitment from top political leaders strengthened, industrial promotion expanded and development flourished despite militarism and corruption. As one senior government official commented, "Everyone was nervous that rapid growth would end", and success itself helped keep corruption in check, at least through the early fast-growth years.

Thailand's real annual average growth rate of manufacturing output jumped from 5.6 per cent in the pre-plan period before 1960 to 9.1 per cent in the period 1960–1970, and 10.1 per cent in the period 1970–1980. The share of manufacturing in GDP rose from 12.5 per cent in 1960 to 18.3 per cent in 1975. The BOI's pervasive influence thus went hand in hand with sustained manufacturing expansion (Amsden, forthcoming).

*New rules:* The BOI gave mainly tax breaks, protection (in consultation with the Ministry of Finance), subsidized credit (reserved for national firms by a development bank, the Industrial Finance Corporation of Thailand), entry restrictions (in consultation with the Ministry of Industry) and special benefits for foreign firms (permission to own land and to import labour). These benefits were exchanged for performance standards related to export targets, local content requirements, debt-equity ratio ceilings, national ownership floors, operating scale minima, investment timetable obligations, regional location criteria and, eventually, product quality specifications and environmental rules. The Government specifically promoted technology transfers from multinational firms by making the support of such firms contingent on their hiring local managers. The Foreigners' Occupation Control Law restricted the number of working visas issued to foreign personnel, thereby initiating the replacement of foreign managers and engineers with Thais.

In the 1960s, Thailand's corporate income tax was as high as 30 per cent and its import duties on inputs for finished manufactures were pervasive. Import duties had been a major source of government revenue since before the eighteenth century. Despite Thailand's reputation for "openness", import duties around the time of the Third National Economic and Social Development Plan (1972–1976) averaged 30–40 per cent, and 60 per cent on luxuries. In 1983 the average nominal tariff was 31 per cent in "open" Thailand, compared with 24 per cent in "fortress" Republic of Korea (James, 1987). Therefore, the right to a reduction or exemption of import duties was a rich reward. To protect local industry, however, duty exemptions were only given for machinery and other inputs *not* made in Thailand (variants of this "law" of similars existed throughout "the rest", the first instance possibly dating back to the 1930s in Brazil). BOI staff argued that "tax benefits under the Investment Promotion Law were the beginning of business prosperity in this country".

All BOI projects followed the same procedure no matter who initiated them (missions abroad to court potential investors were usually BOI-initiated). Proposals were first subject to Project Analysis by engineers, who checked technical feasibility and capacity fit with related industries, and economists, who checked conformance with policy criteria specified in five-year plans. Viable proposals were then sent to a Decision Committee, whose members were from the

BOI and private industry. Proposals approved by this committee then went to a Privileges Committee, which reviewed the benefits package involved. As a way to reduce corruption, Decision Committee meetings on major projects were open to all concerned ministries, and approved projects, no matter what their size, had to have a detailed Return Statement indicating the rationale for their acceptance. After approval, inspectors monitored performance (for instance, they checked to see if specified technologies had been bought and machinery installed). On average, the BOI annually withdrew benefits from 7 per cent of its clients for non-compliance with agreed terms.

Performance standards attached to tax breaks were designed to create new capacity in “targeted” industries based on modern, as opposed to second-hand, equipment. Firms that expanded their own capacity through acquisition of an existing firm or extension of an existing plant facility did not qualify (although new plants of existing firms did qualify). Additional performance standards were negotiated when projects were being screened. In the case of pre-screened projects, performance criteria were laid down by the BOI. Cotton textile manufacturers, for example, had to export 50 per cent of their output after the first energy crisis in 1973 to qualify for new or continued support. This applied equally to foreign and national firms. Given this 50 per cent floor (which was determined after “detailed study”), a textile firm would be selected for promotion depending on how competitive its proposal was in terms of the additional performance standards it promised.

In the case of guided projects, the BOI divided all industries into three classifications with varying benefits lasting for a finite duration. As economist criticized this procedure, the BOI resorted to a case-by-case decision rule. However, as this was unworkable, in 1977 the BOI went back to a three-way classification, but used new criteria to select the industries for the largest privileges, such as export-intensity and regional location, rather than capital- or labour-intensity. On average, only 15 per cent of applications were rejected, but only companies that fitted BOI criteria tended to apply.

In the case of big projects, the BOI and potential clients engaged in intense bargaining. Major sticking points were the number of entrants to an industry that the BOI would promote (and the Ministry of Industry would license) and the amount of “own-capital” the firms would supply (which influenced a firm’s debt/equity ratio). In the case of coloured television picture tubes, for example, considerations of scale economy led the BOI to offer privileges to only one player. Players in big projects were selected in a transparent process involving all ministers with economic portfolios.

*Response to economic disequilibria:* At critical turning points before the 1990s (defined by exogenous shocks, big new projects, or more foreign competition), the BOI responded by altering the scope and nature of support. Tariffs were the business of the Ministry of Finance, but a key section of a general tariff law gave the BOI power to impose surcharges on existing tariffs. When Thai industry faltered after the second energy crisis of 1979, 20 product groups were subjected to import surcharges ranging from 10 to 40 per cent on top of existing duties (Narongchai and Ajanant, 1983). Likewise, extraordinary measures were taken in order to build

major industries. In the case of automobiles, one of the most problematic industries in the BOI's portfolio, from 1978 to 1990 the BOI banned imports of small cars (below 2,400 cylinders) and limited the number of brands and models of automobiles that could be assembled or produced locally. A diesel engine project related to motor vehicles, which received competitive bids from three Thai-Japanese joint ventures, typified the BOI's non-bureaucratic side. On the issue of number of entrants to produce diesel engines in Thailand, the BOI's technical staff "fought hard" (in the words of a senior official) for a limit of one, at most two, but was overruled by the BOI's governing board, which wanted more competition and licensed "no more than three firms". On the issue of using Thailand's casting capacity to make engine blocks, the BOI supported local Thai casters against the Japanese claims of poor quality. In exchange, the BOI forced Thai casters to subcontract work to smaller Thai suppliers. Finally, with regards to exports, the BOI secured an export commitment from Japanese contenders (who had initially demanded export *restrictions*) by causing cutthroat bidding among them (Doner, 1991).

All the BOI's daring-cum-bureaucratism may have reflected "culture" at work, but not necessarily Thai culture. Developmental bureaucracies throughout "the rest" exhibited similar behaviour under conditions of economic disequilibria. The culture among all latecomers in the 1960s was "getting the job done".

The problem by the year 2000 for latecomers trailing behind Thailand in manufacturing growth and industrial diversification is precisely the lack of a culture or vision to "get the job done". The constraint does not lie in the liberal machinery of the new "global" world order, as exemplified by the WTO. This machinery sanctions the use of reciprocal performance standards in exchange for (legal) subsidies and trade protection, as examined in section I.

Three major types of performance standards may be distinguished for purposes of assessing their legality. First, techno-standards, which tie subsidies (typically, subsidized credit offered by development banks) to the professionalization of managerial practices. Second, policy standards, which tie subsidies to the promotion of major national strategic priorities, such as maintaining price stability, increasing local content, raising the level of exports and not worsening income distribution. Third, both types of performance standards, as they operate in the area of science and technology, which are designed to increase national skill formation and the generation of firm-specific knowledge-based assets. Possibly, the only performance standard restricted by WTO law concerns exporting, insofar as direct export subsidies can no longer be offered by WTO members. Indirect requirements to export, however, are possible in the form of trade-balancing requirements, for example, as noted earlier.

Given this permissiveness, we turn now to the issue of vision.

#### **IV. PROMOTING SCIENCE AND TECHNOLOGY**

The principle of reciprocity has not died in "the rest" with the liberalization of markets, the privatization of state enterprises and the deregulation of business. Instead, it has survived in

the realm of science and technology, in the sub-set of countries in “the rest” that have invested heavily in national skill formation and proprietary knowledge-based assets – let us call these countries “the independents” (Amsden, forthcoming). Industrial development, through means that also strengthen science and technology, based on a reciprocal principle, presents a possible vision or culture to energize industrialization in secondary or tertiary latecomers in “the remainder” countries (for the 10 countries in “the remainder” whose manufacturing sectors grew the fastest after World War II, see table 1).

The principle of reciprocity slowly pervaded the policies of “the independents” with respect to science and technology. Firm-level targeting in high-technology industries was typically transacted through public research institutes or science parks. Even when admission into such parks depended on a competitive process, picking winners was inherent in this process. Otherwise, given the benefits of locating in such parks, all firms would have wanted to operate in such a setting. To qualify for the benefits of a science park, a firm had to meet pre-screening criteria.<sup>11</sup> In Taiwan Province of China, for example, admission into Hsinchu Science Park depended on the evaluation of a committee that consisted of representatives from Government, industry and academia. The major criterion for admission was the nature of the technology a firm was developing. Tainan Science Industrial Park (TSIP), approved by the legislature in 1995, was designed to attract firms in the microelectronics, precision machinery, semi-conductor, agricultural and biotechnology industries. Benefits for TSIP companies included grants of up to 50 per cent of necessary funds from government programmes, tax exemptions, low interest loans, as well as special educational facilities. In exchange, companies seeking admission into TSIP had to meet criteria related to operating objectives, product technology, marketing strategy, pollution prevention and management (Tainan Science-Based Industrial Park, 1996).

In comparison with Europe, what appeared distinct about the science parks in Taiwan Province of China was their scope (measured in terms of sales and park employees) and the extent to which the neo-developmental State made park benefits conditional on innovative behaviour. According to the Hsinchu Park Administration, “An existing company would be asked to leave if it changed to labour-intensive operations and no longer met the evaluation criteria (which the Park Administration specified)” (Xue, 1997: 750–51).

Taiwan Province of China promoted S&T through science parks and related government research institutes, as well as spin-offs from such institutes in the form of “model factories” (such as United Microelectronics Corporation, which manufactures integrated circuits). The Republic of Korea promoted S&T by means of large national research projects. These expanded in the 1990s with a plan for Highly Advanced National Projects (HAN), or “G7 projects” as Koreans called them, in recognition of their aim to propel their country into the ranks of the world’s top

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<sup>11</sup> “Because of the attractive investment policies in Hsinchu Science Industrial Park, HSIP could easily be filled with companies from various kinds of industries. ... Should that happen, however, HSIP would simply become another industrial park or Export Processing Zone. It would not be able to achieve its main objective of developing high-tech industry. To prevent this from happening, the Park Administration (under the auspices of the National Science Council) has played an active role as the ‘gatekeeper’ to make sure that only firms which fit the target industry list are considered” (Xue, 1997: 750).

group of seven countries (G7).<sup>12</sup> Both approaches involved targeting. The science park administrations of Taiwan Province of China and the Republic of Korea's G7 Planning Committee selected projects according to the criterion of how well they advanced "strategic industries", which were themselves selected at the highest political level of decision-making. By involving large-scale projects, however, the Korean approach also tended to involve participation by big firms.

By the 1990s, China had also moved away from the defence-oriented national innovation systems of the United States and the former Soviet Union towards a firm-focused system that emphasized industrial competitiveness.<sup>13</sup> The transition had come in 1985, when the Central Committee of the Chinese Communist Party and the national State Council had decreed that "economic construction should rely on science and technology", which was far richer in China than in equally poor developing countries, and "science and technology research should serve the needs of economic development" (Lu, 1997: 17). To modernize S&T, China combined science parks and national R&D projects, tax breaks and subsidized credit, playing a large role in both. The Beijing city government, for example, established a leading-edge R&D testing zone dubbed "Beijing's Silicon Valley", with exports in 1998 of \$267 million (expected to reach \$1 billion by 2000). "In the enterprise zone, the Government adopted institutional devices nested in the taxation process and investment process that redistributed resources to strategic sectors". Targeted industries were given tax breaks, special loans from state banks with below-market interest rates, and permission to exceed normal debt-equity ratio ceilings (Lu, 1997: 234). On the other hand, the Chinese Government also emphasized national R&D projects and the formation of "science and technology enterprises" that were neither State-owned nor private. The State Planning Commission announced a policy to build approximately 100 national key laboratories (analogous to corporate central R&D laboratories) in selected fields of basic science in which Chinese capabilities already excelled. "S&T enterprises" were spun-off by city, provincial or national Governments to commercialize the knowledge of public labs (see, for example, the annual report of Stone Electronic Technology Ltd., one of China's most successful S&T enterprises). Although these enterprises were nominally independent, "in granting S&T enterprises a special legal status, the government obliged them to meet certain requirements (analogous to performance standards under a reciprocal control mechanism). These requirements included the percentage of technology personnel, the percentage of sales contributed by new products, the percentage of products exported, the allocation of retained earnings, etc." (Lu, 1997: 235). Thus, to a greater or less degree, the neo-developmental State retained its conditionality-based form of subsidy allocation in the high-tech phase of industrial transformation.

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<sup>12</sup> Four HAN projects fell into the product technology category: new agrochemicals; broad-band integrated service digital networks; high definition television; and next-generation vehicle technology. Seven projects fell into the fundamental technology category: next-generation semiconductors; advanced materials for information, electronics and energy; advanced manufacturing systems; new functional bio-materials; environmental technology; new energy technology; and next-generation nuclear reactors. In addition to these projects, S&T in the Republic of Korea in the 1990s involved more centralized coordination (to avoid duplication by competing ministries), a 1997 law ("Special Law for the Promotion of S&T Innovation") to expedite R&D within a five-year period, and the internationalization of R&D activity (see Cho and Amsden, 1999; Cho and Kim, 1997; Kim and Yi, 1997; Lim, 1999); and OECD, 1996b).

<sup>13</sup> For the old system, see Wang (1993) and Saich (1989), who also discuss reforms in the 1980s.

## V. CONCLUSION

Late industrializers may expect both discontinuity and continuity between GATT and WTO rules. The major difference between the two trade regimes from the viewpoint of late industrializers is the prohibition by the WTO of subsidies to exports. This prohibition terminates a very powerful developmental tool insofar as latecomers that made the transition from low-technology into mid-technology industries after World War II made exporting, with subsidies, a condition for operating in protected domestic markets. Exporting was a performance standard that contributed to efficiency and growth. Continuity characterizes the two trade regimes insofar as most preferential measures to protect infant industries and to diversify manufacturing industry are still permissible, as is the reciprocal control mechanism that the most successful latecomers used to insure that subsidies to business were not given away for free.

WTO provisions related to science and technology enable developing countries to promote their mid-technology (and especially high-technology) industries through the medium of science parks, R&D national projects, as well as temporary and transparent barriers to imports. The major lesson from successful industrializers after World War II is that whatever the instrument of promotion, to be successful it must be tied to a monitorable performance standard, and operate within a reciprocal control mechanism that disciplines all parties involved in industrial expansion. Given whatever prices exist as a consequence of market forces, technocratic decision making or political intervention, it is important to get the control mechanism right. Getting the control mechanism right, in conjunction with promoting science and technology, are twin pillars of a new industrial development strategy that may serve to energize still later industrializers.

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