UNU-WIDER “Country Role Models for Development Success” Project

“The Japan Model of Economic Development:
Relevant and Non-relevant Elements for Today’s Developing Economies”

May 2008

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1. The first non-Western country for successful industrialization

In the domination of the Western nations in the era of imperialism in the 19th century and the first half of the 20th century, Japan had a peculiar history. Barely escaping from the colonization by the Western power, it went through the Meiji Restoration in 1868 and started building a modern nation state under the strategy of *fukoku kyohei* (enrich the country, strengthen the military) and *shokusan kogyo* (promotion of industries). The revision of unequal treaties with the Western nations, which were unequal in terms of extraterritoriality and fixed low import-export duties subject to international control, was a prime diplomatic target, but the complete removal of unequal articles took long time until 1911. Japan fought WWI on the side of the Allied Powers and gained a seat of the permanent member of the League Council together with the United Kingdom, France, and Italy. Japan, however, inclined to bold militarism in the 1930s, started a prolonged war with China in 1937, and ended up with an unconditioned surrender in WWII in 1945.

The war provided total devastation, and Japan had to re-start from ruins. It took almost 10 years to regain the prewar level of production. After the reconstruction, however, Japan accomplished notable economic growth in 1955-1973, which pushed up the Japanese economy to the full scale of industrialization and the second largest position in the Western world.

Since Japan was the first case of successful industrialization as a non-Western nation, there used to be a dominant view of emphasizing peculiar characteristics of the Japanese economy. The view on so-called “industrial policy” was such an example generating a lot of unwarranted “myth.” From the viewpoint of today’s development thought, however, the Japanese economic history is nothing qualitatively different from a usual country’s economic development. There were a lot of elements common to today’s less developed countries (LDCs) such as the importance of macroeconomic stability, human capital development, and economic infrastructure. However, we must note differences in external economic conditions from today’s LDCs. The period of the 1950s and 1960s was way
before the current globalization era. Foreign borrowing was then much more difficult, and the perception on hosting foreign direct investment (FDI) was largely negative. We were under the thought of development strategies seeking indigenous development with minimal dependency on foreign economic forces.

The paper plan is as follows: the next section sets up the starting point of Japanese economic development after WWII, and the third section discusses economic elements, including macroeconomic stability, human capital development, and economic infrastructure, mostly common to today’s LDCs. The fourth section examines industrial policy, which was heavily influenced by external economic conditions and development thought different from the current world. The last section summarizes our findings relevant and irrelevant in drawing lessons for today’s LDCs.

2. Where was the starting point?

At what stage of development did Japan reside just after WWII? The modern economic growth in the sense of Simon Kuznets started at the end of the 19th century, and Japan went through the total war in the Japanese-Sino war and WWII. The forced development of machinery industries in the military regime was substantial after the latter half of the 1930s. However, the industrial structure before and during the war was not still fully developed, and the destruction of physical and soft infrastructure was so severe. The stage of development in the mid 1950s was at most equivalent to newly industrializing economies though such an expression did not exist at that time (Kohama (2007, p. 1)).

Figure 1 presents the gross national expenditure (GNE) of Japan at constant prices in 1930-1976. We vividly observe devastating effects of WWII in a drastic drop of the GNE. It took about 10 years to get back to the pre-war level. In other words, just a recovery, rather than pushing a new frontier of development, made a substantial economic growth in the first ten years after the war.

==Figure 1==
Figure 2 depicts shares of value added of agriculture and manufacturing sectors in the net domestic products (NDP) in 1930-1976. The share of manufacturing sector reached the above-20% level at the beginning of the 1930s and was boosted even higher after the mid-1930s due to the total militarization of the economy. However, the share of agriculture was still as high as 20% before WWII. After WWII, the share of agriculture jumped up because of the devastation of other sectors and gradually came down during the next ten years. The substantial shifting from agriculture to manufacturing sector as well as services started from the mid-1950s.

3. How to resolve bottlenecks?

Just like today’s LDCs, Japan confronted with a number of bottlenecks for development after WWII. We review three elements for economic development in this section: macroeconomic stability, human resource development, and economic infrastructure.

(1) Macroeconomic stability

Macroeconomic stability is no doubt essential to steady economic development. Japan after WWII paid a lot of attention to taking care of macroeconomic management, sometimes with a substantial cost due to external conditions.

The macro economy in the latter half of the 1940s was extremely chaotic. Drastic decreases in the supply of goods due to decreased capital stock, demilitarization of industries, and shortages in raw materials and equipment were serious. Together with losing control on monetary discipline, typical post-war hyperinflation occurred: consumer prices increased 80-fold, and wholesale prices increased in 61-fold in the period between the end of war and April 1949 (Kohama (2007, p. 176)). In such a situation, policy-induced contraction with recessionary fiscal and monetary
policies is inevitable. Japan, then occupied by the Allied Forces, started the Economic Stabilization Plan in FY1949, which was called the Dodge Line, named after Joseph M. Dodge, economic advisor as well as the chairman of Detroit Bank. This plan imposed balanced government budget discipline as well as a single foreign exchange rates regime (1 dollar = 360 yen) that was claimed to be over-valued (Komiya and Itoh (1988, p. 176)).

Due to a serious shortage of foreign currency, very tight management on international trade continued under the Foreign Exchange Control Law (December 1949) and the Foreign Capital Law (May 1950). International trade was then prohibited in principle though some exceptions were allowed.

After regaining the independence in 1951, Japan regained the freedom of setting its own tariffs and set up a new tariff system. In addition, based on the Import Control Law, the AFA (automatic fund allocation) System and the FA (fund allocation) System were introduced. Most of the finished products, intermediate products, and materials were under the FA System, which was virtually an import quota system. Under the FA System, importers must get a foreign currency quota from the Minister of International Trade and Industry in order to ask foreign exchange banks to approve the usage of foreign currencies.

Japan acceded to GATT provisionally in 1953 and was admitted as a contracting party in 1955. However, a large number of countries, except the US, Canada, West Germany, Italy, and the Scandinavian countries, refused to apply GATT obligation to Japan by using Article 35. This discriminatory treatment is a bitter memory for Japanese. Even the US, which was a strong supporter of the GATT regime, occasionally requested Japan to impose voluntary export restraints (VERs) in the 1950s.

The system of normal international trade was finally established after the Guideline of Trade and Exchange Liberalization was announced in 1960. Until the 1950s, most of the trade was conducted in the regime of heavy nontariff barriers. The motivation of having such trade barriers was the management of foreign currencies and the balance of payments, rather than protecting domestic industries.
External environment for Japan was finally normalized at the beginning of the 1960s. Macroeconomic management, however, was not yet easy. Japan gradually established ample domestic saving rates that enabled investment rates high. Due to limited opportunities for foreign borrowing, domestic saving and domestic investment had to balance with each other. The management of foreign currency reserve and the balance of payments was still difficult. Until the mid-1960s, Japan was always at the risk of foreign currency shortages under the fixed exchange rate regime. Once the economy picked up a boom, trade deficit occurred; the government then had to cool down the economy by imposing recessionary policies.

Figure 3 presents the ratio of current account surplus to NDP in 1930-1976. Obviously, the ratio was tightly managed until the mid-1960s, with foreign currency reserve equivalent to the import amount in two to three months. Difficulty in foreign borrowing together with the fear of incoming FDI forced Japan to keep such a tight discipline. Today’s LDCs may enjoy much more flexibility in managing foreign currency reserve and the balance of payments, due to active international capital transactions.

---Figure 3---

(2) Human resource development

Did Japan have high educational background from the beginning? Historians claim high literacy ratios even in the Tokugawa Era, and the introduction of education system since the Meiji era is usually praised. However, some statistical figures indicate that Japan was facing strong demand for human resource development even in the post-war era.

Figure 4 presents changes in the proportion of (i) the enrollment in compulsory education (primary and lower secondary schools), (ii) the advancement to upper secondary schools, and (iii) the advancement to universities and junior colleges. In the late 1940s and the early 1950s, Japan had a solid background in basic education but did not yet fully establish the upper secondary and tertiary education. It took 20 to 25 years,
until the mid-1970s, to reach a respectable level of education. Of course, what education meant in the 1940s and 1950s was perhaps different from the current world due to changes in the industrial structure and cultural background. However, at least we can claim that quantitative expansion of educational system was an important task for Japan in the process of industrialization until the mid-1970s.

==Figure 4==

Figure 5 presents an increase in the number of researchers in private companies, research institutes, and universities after WWII. It also indicates that human capital accumulation, particularly at the higher level, was an essential element to successful industrialization and the preparation for a new stage of competitiveness after the 1970s.

==Figure 5==

(3) Economic infrastructure

Economic infrastructure was also a serious bottleneck for post-war Japan, just like today’s LDCs. The external condition, however, was different: opportunities for borrowing from abroad were limited. In addition, the technique of public private partnership (PPP) was not yet developed, and investment for economic infrastructure was taken for granted as a government’s role.

To finance investment in economic infrastructure, the government extensively utilized the fiscal investment and loan program (FILP). The FILP was a budgetary system prepared in addition to the central government’s general budget, which was financed mainly by postal savings until FY2000. Figure 6 presents the proportion of FILP by usage in 1955-1984. Spending for social infrastructure was kept low at around only 30% while the substantial amount was headed to economic infrastructure.
Japan had the World Bank loans in 1953-1966 and invested mainly in power plants, steel plants, freeway construction, and bullet train. However, the total amount during the period was US$862.9 million (Kohama (2007, p. 3, Table 1.1)), which occupied only a few percent in total amount of investment in Japan.

The Japan Development Bank (JDB) was established in April 1951 to provide long-term loans for development. Table 1 presents the composition of JDB loans by usage. The substantial portion of loans was allocated for energy and sea transport sectors in the 1950s and 1960s. This also indicates the emphasis on economic infrastructure development.

The speed of infrastructure development was impressive from the mid-1950s to the mid-1970s. An example is roads. Figure 7 presents the length of national general national highways and national expressways in 1936-1985. In the early 1950s, the road condition in Japan, including the proportion of paved roads, was very poor. However, the substantial improvement was observed in the 1950s, 1960s, and afterward. The construction of national expressways was mostly financed by toll collection, which necessarily made the construction slow though it did not hurt government budget.

Figure 8 shows another example: electric power generation by hydro, thermal, and atomic in 1926-1984. We again observe a spectacular growth in the period between the mid-1950s and the mid-1970s. Generation modes shifted from hydro to thermal so as to enhance the capacity, depending on imported petroleum.
4. Did industrial policy work?

Japan was in the transition of industrial structure from labor-intensive industries to capital- or human capital-intensive industries from the mid-1950s to the mid-1970s, just as today’s newly industrializing economies are trying. However, the policy package that Japan applied was somewhat different from current LDCs. Japanese “industrial policy” used to be praised without much criticism, but what worked well and what did not have recently been analyzed in a much more critical manner. This section summarizes a “modern” view of industrial policy in Japan.

(1) Evolving trade patterns

Before going into policy discussion, let us briefly review the transition of trade pattern in Japan.

Figure 9 shows changes in import commodity composition on the standard international trade commodity classification (SITC) one-digit basis in 1951-1985. SITC0 (food) and SITC2 (crude materials) initially occupied large shares in Japanese imports, but their shares decreased over time. Instead, SITC3 (mineral fuels) gained importance from the latter half of the 1950s due to switching from domestic coal to imported petroleum and had the largest share after the burst of the first oil crisis in 1973. Imports of manufactured goods were relatively small though imports of SITC7 (machinery) were essential up to the first half of the 1970s for introducing technology-embodied industrial machines. Vertical intra-industry trade with East Asian countries did not begin until the 1990s.

Figure 10 is on the export side. Major exported commodities shifted from SITC6 (textiles, iron and steel, and others) to SITC7 (machinery); as a whole, we observe changes in comparative advantage from
labor-intensive manufactured goods to capital-intensive or human-capital-intensive manufactured goods.

Figure 10

To check the trade balance in each commodity classification, net export ratios are calculated. Net export ratios are defined as

\[ \text{NER}_i = \frac{(X_i - M_i)}{(X_i + M_i)} \]

where \( i = \text{SITC}0, \text{SITC}1, \ldots, \text{SITC}9 \).

Figure 11 presents net export ratios. SITC0 to SITC4 were negative all the way; Japan was a net importer of primary products. SITC6 was strongly positive though gradually coming down from the mid-1950s to the 1970s. SITC7 climbed up in the 1960s to mid-1970s, gaining international competitiveness.

Figure 11

(2) Background of industrial policy

There are various views and assessment on industrial policy in Japan.\(^1\) It is at least true that bureaucrats sincerely tried to promote industrialization by using industrial policy in most of the cases. However, the background logic was not necessarily consistent with the standard economics. Rather than focusing on solving static and dynamic market failure, the flavor of mercantilism sometimes came in. Competition was often regarded as too harsh, and inefficient measures for limiting competition were occasionally introduced. Therefore, industrial policy sometimes worked well while sometimes rather worsening the situation.

According to Komiya (1988, p. 3), industrial policy is defined as follows: (1) policies that affect the allocation of resources to industry, including (a) items that affect the infrastructure of industry in general, such

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as the provision of industrial sites, roads and ports, industrial water supplies, and electric power, and (b) items that affect inter-industry resource allocation; or (2) policies that affect industrial organization, including (a) items aimed at regulating the internal organization of particular industries, such as industrial restructuring, consolidation of firms, output restrictions, and the adjustment of output and investment, and (b) items affecting cross-industry organization, such as small and medium enterprise measures. (1b) is regarded as industrial policy in a narrow sense. At the same time, industrial policy is usually equivalent to policies conducted by the Ministry of International Trade and Industry (MITI), and “industry” mainly refers to manufacturing.

There were at least several reasons why industry policy worked to some extent in post-war Japan. First, Japanese firms were accustomed to government direct control and market intervention from the war period so that they presented some degree of obedience. Second, tight foreign currency management provided a strong leverage for MITI’s initiative at least in the 1940s and 1950s. Third, people were still obsessed with the strong fear of hosting FDI so that fostering indigenous firms and entrepreneurs was taken for granted. Japan was actually more open to multinational enterprises in the 1910s and 1920s than in the post-war period. These are conditions widely different from those for today’s LDCs. We therefore should be careful in drawing direct lessons from the Japanese experience.

(3) Direct financial support and taxation

One of the important measures in Japan’s industrial policy was direct financial support and taxation by the government. As for the allocation of financial resources for prioritized sectors, the large amount of FILP as well as long-term loans by JDB was directed to economic infrastructure such as energy and transport sectors. Direct government support for manufacturing industries was modest. However, even if the amount was small, the government commitment often encouraged additional funding by private banks. Together with export facilitation by the
Export-Import Bank of Japan (established in December 1950 as Japan Export Bank), financial support by the government seemed to effectively control the total funding along the strategic prioritization to some extent. The establishment of inclined taxation system in 1951, strengthened by the Firm Rationalization Promotion Law in 1952, also presented a substantial impact. This system promoted the introduction of foreign technologies and investment on machineries and equipments by firms. Japanese firms for long experienced no access to new technologies developed in foreign countries due to the war, and thus it was extremely important to enable them to obtain chances for technology transfers in order to fill the gap. In this regard, the system worked well.

(4) Attempts to control industrial structure by MITI

There is no doubt that MITI officials in the high period of industrial policy had great enthusiasm in promoting industries. However, they could not always obtain intended outcome. The reasons were at least threefold. First, they often committed a wrong choice of policies. Second, the power of enforcement was sometimes too weak for private firms to follow the government’s intention, particularly in the 1960s. Third, the government ex ante often underestimated private dynamism. Indeed, successful industrialization was realized when industrial policy was along the market mechanism or when private dynamism overruled industrial policy.

One example is automotive industry. Downstream industries were typically dominated by market mechanism, and thus government intervention was weak in general. However, automotive industry drew attention as a strategic industry, and MITI continuously tried to promote it. In 1952, MITI decided to provide protection on automotive industry. In May 1955, MITI announced a draft guideline for promoting national cars, claiming that national cars should be small-size, inexpensive cars partially for exports and be produced by only one company. The draft guideline was not approved by the government as a whole because it was regarded as too difficult to implement subject to the technological constraints at that time.

In the latter half of the 1950s and the 1960s, the private sector
extended vigorous competition among multiple companies and started producing a large profile of different kinds of cars. What MITI intended to do was actually the opposite. In June 1961, MITI proposed the plan of concentrating automotive production that would try to limit new entries and enhance economies of scale by a small number of producers. The plan did not work well though. Private dynamism actually surpassed MITI's intention, and market competition provided competitiveness of multiple companies. MITI was losing an enforcement power after the end of the 1950s so that private companies did not necessarily follow MITI's policy.

In cases of upstream industries such as petrochemicals, iron and steel, oil refineries, and cotton weaving, MITI had stronger grips because of its control on imported materials. Government intervention took the form of individual industry laws or administrative guidance. However, the trial of limiting competition, coordinating investment, and attaining collusive oligopoly was not realized as MITI intended. Backed up by vigorous market expansion, new entries in the private sector overturned the MITI's plan of limiting competition.

We can conclude that the MITI's industrial policy did not necessarily work as intended, particularly in the aspect of limiting competition, because of the unexpected level of market dynamism.

(5) Temporary trade protection

The trade regime of Japan started from severe restriction due to the necessary transition from the war period and foreign exchange constraints. Until the early 1950s, virtually all the trade was under direct control of the government. Throughout the 1950s, a larger portion of trade was still under various non-tariff barriers (NTBs) with the government’s discretion. In June 1960, the Cabinet announced the Trade and Capital Liberalization Program and set up the commodity-wise procedure and schedule of the tariffication of NTBs and trade liberalization. The removal of import quotas started in 1961 and was mostly completed for manufactured goods by 1963. Japan switched its status in the International Monetary Fund (IMF) from a country under Article 14, which allowed a country to regulate foreign
exchange due to the balance-of-payments concern, to a country under Article 8, which did not allow a country to do so.

The trade liberalization was motivated by strong pressure from the US and the international community, rather than internal policy consideration. In this sense, the liberalization was a passive one. But it worked as a credible policy commitment for trade liberalization. The private sector had a clear time framework for strengthening competitiveness in open market. International trade continued to be liberalized under the Kennedy Round negotiations (1964-1967), which also worked as a credible threat to be prepared.

Figure 12 presents the ratio of annual amount of custom duties to the value of imports in 1927-1984. A big trough in the latter half of the 1940s and the 1950s was actually the indication of other types of trade barriers, and the upward trend until the mid-1960s was due to tariffication of NTBs. Particularly from the beginning of the 1960s, import substitution in specific industries was clearly intended with the setting of tariff escalation. Low tariff rates were set for primary commodities, raw materials, well-established export industries, and products that did not have much hope to gain international competitiveness. On the other hand, high tariffs were imposed on products of newly established industries, hoping to gain international competitiveness. It is important that trade protection was provided only temporarily. By 1974, the ratio dropped to 2%, which indicates that major trade barriers were removed, particularly for manufactured goods.

==Figure 12==

Liberalization for inward FDI also worked as a credible threat for the indigenous private sector and encouraged efforts for strengthening competitiveness. Japan participated in the OECD in April 1964 and needed to obey the obligation of capital flow liberalization along the Code of Liberalization of Capital Movements. The first and second waves of capital movements liberalization were conducted in July 1967 and April 1973, which
completed most of the liberalization. Although incoming FDI did not increase much, the liberalization process worked as a clock setter.

(6) The development of small and medium enterprises (SMEs)

After WWII, Japan already had a large pool of SMEs, which is different from most of today’s LDCs. However, the gap between large firms and SMEs was substantially large in terms of technology and managerial ability. The access to financial resources as well as advanced foreign technology by SMEs was also limited. The labor market was dualistic between large firms and SMEs in terms of human capital, wages, and employment conditions; the famous lifetime employment system was not literally applied by SMEs.

The government continuously conducted a series of SME promotion policies. The policies had multiple channels helping financial arrangements, managerial practice and technology, cooperative organizations, modernization scheme through advice, and tax concessions. The financial support to compensate liquidity constraints was particularly important.

The Japanese subcontracting system (shitauke) developed between upstream SMEs and downstream large firms as a sort of intermediate form between complete vertical integration by a single firm and spot market bidding among unrelated firms. Such inter-firm relationship worked when technological and managerial gaps between large firms and SMEs were neither too large nor too small and contributed to the upgrading of SMEs in terms of technological improvement and access to foreign markets in the 1950s and 1960s. The government implemented various policies to protect SMEs from the viewpoint of social policy as well as competition policy.

As SMEs gained their competitiveness, SME related policies gradually evolved from a sort of social policy helping the weak and poor to

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2 As for the subcontracting system in Japan, see Kimura (2002).
3 “Unfair” trade practices of large parent companies (clients) were strongly criticized by media, and in response, the government enacted a specific law to prevent from undue delays of payments of subcontracting fees and other improper trade practices in 1956 (Shitauke Daikin Hou).
economic policy cancelling out market distortions. SMEs eventually became a source of international competitiveness of the Japanese industries in the 1970s and took an important role in extending production networks in East Asia in the 1990s and after.

(7) Tentative conclusions

Although the debate on Japanese industrial policy has not completely been settled yet, some broad consensus has been formed by now.

First, while infant industry protection or import-substitution strategies may not theoretically be impossible, it is in most of the cases very difficult to properly plan and implement.

Second, industrial policy itself was not always logically consistent, and some flavor of mercantilism was occasionally mixed. Avoiding “excessive competition” by limiting the number of firms and encouraging collusion was neither logically consistent nor effectively working. Such policies rather generate an obstacle in gaining international competitiveness. In successful cases of industrialization, private dynamism dominated the government’s intention.

Third, we are not sure whether trade protection was an essential element for fostering indigenous firms but at least can conclude that time limits for private firms to prepare for harsh worldwide competition effectively worked as a credible threat.

Lastly, Japan did not utilize incoming FDI in the post-war development period. However, introducing foreign technologies through technology purchases and importing advanced production machines was crucial in the process of gaining international competitiveness.

5. Relevant and irrelevant elements for today’s developing countries

When discussing the development experience of Japan, we used to emphasize peculiar elements of Japan probably too far. It is of course understandable that Japan was the first non-Western nation that accomplished the full scale of industrialization and researchers naturally found various aspects different from the Western world. However, we have
by now accumulated our observation on a number of countries going up the ladder of economic development and have learned a wide range of common elements across countries. We can now demystify the Japanese model of economic development and draw lessons applicable to today’s LDCs. We however have to take into account peculiar conditions that Japan faced. Namely, the experience of total war and its devastating effects were peculiar features in the latter half of the 1940s and the first half of the 1950s. Japan also developed itself way before the current globalization era in which vigorous cross-border corporate activities are utilized for economic development.

What we can learn from the Japanese experience is threefold. First, macroeconomic stability is essential for economic development. In the case of Japan, the management of foreign currencies and the balance of payments was a focal point, and very tight control had to be implemented. Today’s LDCs have much more ample opportunities than Japan for introducing borrowing from abroad as well as the support from the international community, which allows considerably larger deficits in trade and current account. On the other hand, they sometimes face a risk of fast-moving capital, speculative attacks, and the lack of coordination between internal and external financial markets, which generates novel difficulties.

Second, solving bottlenecks for economic development is important. Just like today’s LDCs, Japan had to face serious shortage of human capital, economic infrastructure, and other poor economic and social conditions for economic development. Japan was not a completely unprepared country. Some development experiences were accumulated even before WWII. However, the level of preparation was far from enough for jumping from a newly industrializing economy to the full scale of industrialization. Compared with the devastation of the war and strong hostility of foreign countries Japan faced, most of today’s LDCs are in a much better external environment and are easier to obtain support from the international community. The current outset of international higher education is also completely different from the past. Furthermore, financing infrastructure
development may now be conducted in much more efficient way due to the recent innovation of financial instruments including the public-private partnership.

Third, effectively utilizing globalizing forces is important. In the case of Japan, introducing foreign technologies through technology purchases and importing advanced industrial machines were crucial to successful industrialization. Opening up to free trade in a short period worked as a credible threat for private sector to enhance competitiveness. Passions for industrial development held by bureaucrats and politicians were probably conscientious, but industrial policy, particularly the type of limiting the number of firms and encouraging collusion, did not work. In successful cases, private dynamism always dominated the government's original intention.

Today’s LDCs are in much more globalized environment, and utilizing incoming FDI is the key for economic development. The East Asia model of economic development has fully utilized fragmentation and agglomeration forces (Kimura (2006)), and much faster introduction of advanced technology and managerial knowhow has been realized. The key is to introduce competition among multinational enterprises (MNEs). How to connect MNEs’ operation with local firms/entrepreneurs is a new issue to be dealt with. The importance of the exposure to foreign advanced technology is a common element to the case of Japan while strategies of how to do it should be different.

References


Figure 1  Gross national expenditure at constant prices in Japan (1930-1976)

Until 1951: 1934–1936 calendar year base, in millions of yen
After 1952: 1970 calendar year base, in billions of yen
Figure 2. Shares of agriculture and manufacturing value added to net national product (1930–1976)

Figure 3  Ratios of current account surplus to gross national expenditure in Japan (1930–1976)

Until 1951: 1904-1936 calendar year base, in millions of yen
After 1952: 1970 calendar year base, in billions of yen
Figure 4 Growth of enrollment rates and advancement rates (FY1948-FY1986)

Figure 5  The number of researchers by research organizations (1953–1985)


Figure 6. The composition of the fiscal investment and loan program (FILP) (1955–1994)

Table I Composition of loans by the Japan Development Bank

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<td>Promotion of technology</td>
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<td>Total JDB loans (100 million yen)</td>
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Original source: Nihon Keizai Shimbun (The Japan Development Bank).
Source: Ogura and Yoshida (1988, Table III, p. 195)
Figure 7  The length of roads and paved roads (1936–1985)
(In kilometers)

Figure 8 Electric power generation (1926–1984)
(In millions of kilowatt-hours)

Figure 9  The composition of imports by SITC (1951-1985)
(In millions of yen)

SITC
0  Primary products
1  Beverages and tobacco
2  Inedible raw materials (excl. mineral fuel)
3  Mineral fuels, lubricating oil, etc.
4  Animal and vegetable oils and fats
5  Chemicals
6  Manufactured goods by materials
7  Machinery, transportation equipment
8  Miscellaneous
9  Special goods

Figure 10  The composition of exports by SITC (1951-1985)
(In millions of yen)

Source: same as Figure 9.
Figure 11 Net export ratios by SITC (1951-1985)

Source: same as Figure 9.
Figure 17: The ratio of customs duties to imports (1907-1984)

Source: MCA-NS (1988), Volume 3, pp. 15, 10-17, 90, 773