International Labour Review, Vol. 133, 1994, No. 2

Global economic changes, skills and international competitiveness

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The object of this article is to review certain recent changes in the world economy and to analyse their implications for skill requirements and the international competitiveness of various groups of countries. Particular attention is paid to these issues in relation to developing countries.

In addition to the ever-growing integration of the international economy over the past two decades and concomitant changes in the nature of competition between nations and firms, many have suggested that the world is undergoing a new, far-reaching technical revolution as a result of the rise and spread of information technology. Freeman (1989) has argued that the "information and communication technology paradigm" presently sweeping the globe is as important in terms of its spillover effects and overall economic impact as any of the three major technological revolutions of the past two centuries. He identifies them as being based: firstly, on a cluster of textile innovations (approximately 1770-1830); secondly, on railways (approximately 1840-90); and thirdly, on electricity, the internal combustion engine and the chemical industry (approximately 1890-1930).

The revolution in information and communications technology involves a constellation of industries, such as computers, electronic components and telecommunications. These are among the fastest-growing industries in most leading industrial countries. The new technology has not only resulted in the introduction of a wide range of new products but, more importantly, has produced a drastic fall in costs and vastly improved technical performance in many other sectors of the economy. Of equal significance, the new technology is bringing about fundamental changes in the organization and structure of firms and industries, and changes in factory lay-out and in the management structure, procedures and attitudes of large firms.

Leaving aside the controversial issue of linking such developments with the Kondratiev long waves (trade cycles of very long duration), the

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important question in this context is how these changes are likely to affect the international competitiveness of developing countries at differing stages of development. In addition to the new technology and associated organizational developments which are being rapidly adopted in advanced countries, other significant changes are also taking place in the production systems of these countries, involving new concepts such as flexible specialization and just-in-time production. How will the new technology and production concepts affect the relative competitive position of developing countries vis-à-vis the industrial countries? The main question at issue here is what implications these global economic and technological developments will have for international competition and for the skill requirements in the developing countries. How should developing countries modify their current educational and training systems to meet the needs of the new technology as well as the far greater integration of the international economy?

These are complex issues and this brief article can offer no more than a few reflections on the most important. In the following two sections significant recent changes in the world economy in the light of post-war and longer-term developments are outlined. Section III then considers the skills gap between the developed and the developing countries and how it has narrowed over the past four decades; it also comments on the relationship between education, skills and economic growth. Issues of international competitiveness and those of North-South competition are analysed in section IV. The policy implications of the analysis of the new technological revolution and international competitiveness are examined in section V in the light of the experience of Japan and the successful Asian newly industrialized countries (NICs). Section VI concludes.

I. Recent developments in OECD economies in a longer-term perspective

In order to appreciate and understand the recent changes in the global economy it is necessary to reflect on the immediately preceding period, namely the quarter century following the end of the Second World War. This was the Golden Age of economic development for industrial and developing economies alike. In the advanced economies, during this Golden Age – 1950 to 1973 – there was an historically unprecedented expansion of production and consumption (at a rate of nearly 5 per cent per annum).[1] Moreover, this was a long, sustained period of more or less full employment in most of these economies. A number of countries not only enjoyed full employment, but in fact had over-full employment: nearly 10 per cent of the employed labour force in countries like France and the then Federal Republic of Germany came from abroad.

In the Golden Age, there was an enormous expansion of world trade, and trade in manufactures grew in volume at a very fast rate of nearly 10 per

[1] Maddison (1982, 1987); Glyn, Hughes, Lipietz and Singh (1990).

cent per annum. Most developing countries also participated in and benefited from this world-wide prosperity, as we shall see in the next section.

However, since 1973 the rate of growth of the OECD countries and of world GDP has nearly halved. Significantly, the recorded rate during the past 15 years is much more in line with the long-term trend rate of growth of industrial countries in the 100 years before the Golden Age (Reynolds, 1983; World Bank, 1987). Consequently, in the 1980s, many industrial countries, particularly those in Western Europe, have been experiencing high rates of unemployment unthinkable in the Golden Age. Similarly, there was a sharp deceleration in the expansion of world trade in manufactures.

Considered purely in statistical terms, in the long history of economic development in industrial countries the Golden Age is certainly a historical aberration. Measured in terms of the rates of growth of output, productivity and capital stock, the period 1950-73 in advanced economies as a whole represents a sharply distinct deviation from the long-term trend values of these variables over the past two centuries (Maddison, 1982).

Turning to economic analysis, Glyn, Hughes, Lipietz and Singh (1990) suggest that the length, steadiness, speed and spread of the Golden Age economic boom was such that these factors could not be accounted for by an accidental combination of favourable economic circumstances. Rather, they argue, this extraordinary economic performance of the industrial countries was brought about and sustained by a unique historical conjuncture which created a specific *economic regime*.[2] This regime was characterized by a social consensus around certain institutional arrangements in respect of setting wages and prices, the distribution between wages and profits, and the state fiscal, credit and welfare policies which guaranteed minimum living standards and maintained aggregate demand. These arrangements in turn permitted a rapid growth of capital stock per worker and productivity whilst maintaining a more or less constant profit rate and roughly equal growth of consumption and production, thus ratifying and maintaining the initial rate of accumulation.

Under the combined impact of (a) a slow down in the rate of growth of productivity in the leading industrial countries which began in the late 1960s, (b) the collapse of the Bretton Woods monetary system which occurred at about the same time, as well as (c) the 1973 and 1979 oil shocks, the Golden Age system disintegrated. The social consensus of the Golden Years, which was crucial to the system as a whole, broke down. In the 1980s and into the early 1990s, the leading OECD governments have been attempting to create a new economic system based much more on free market principles. In pursuit of this objective, there has been a widespread movement towards privatization, deregulation and the erosion of Golden Age arrangements

[2] For reasons of space, this is necessarily a highly schematic and condensed account of the analysis of an extremely complex question: why did the Golden Age occur and why did it come to an end? This summary is based on Glyn, Hughes, Lipietz and Singh (1990) to which the reader is referred for a full discussion of these issues. For some alternative interpretations, see Maddison (1982), Bruno and Sachs (1985), Matthews and Bowen (1987).

with respect, for example, to wage bargaining and to the provisions of the welfare state, with the professed aim of increasing labour market flexibility.

This post-1980 development model does not yet command a broad social consensus in the industrial countries. Nevertheless, at one level, the new model has had some successes – the most conspicuous being the sharp decline in the OECD rate of inflation. The 1980s and the 1990s so far have been characterized by low growth and low inflation, not by the "stagflation" of the 1970s (low growth and high inflation). However, against this, most OECD countries (especially those in Western Europe) are suffering from very high rates of unemployment. On present projections of leading international organizations, the prospects for an appreciable increase in rates of economic growth and for a substantial reduction in unemployment in the OECD economies in the foreseeable future are rather gloomy (IMF, 1993; UNCTAD, 1993).

However, notwithstanding the end of the Golden Age and the consequent slowdown in the growth of world production and trade, it is important to appreciate that the world economy is far more integrated than ever before. Greater economic integration, the Bretton Woods institutions contend, is supposed to lead to more efficient resource utilization and hence faster economic growth; clearly, this has not happened. Be that as it may, close international financial integration has nevertheless been a particularly significant feature of the post-1973 world economy. Such integration has been brought about by the virtual abolition of exchange controls in leading industrial economies and the globalization of the capital markets (Cosh, Hughes and Singh, 1992).

The slowdown in the economic growth of OECD countries in the past two decades has important repercussions for the nature of international competition. The post-war history of the world economy suggests that the competitive game played not only between the North and South but by nation states in general is conducted in a cooperative positive-sum manner only when the world economy is growing fast and when there is full employment in the leading countries. However, when there is widespread unemployment in these economies and the world economy is expanding slowly (as is the case today), instead of international cooperation, the outcome is likely to be conflict and a retreat into negative-sum protectionism. Thus, we find that in the leading industrial countries, workers and trade unionists as well as other groups increasingly blame competition from the developing countries for their job losses. Hence the growing populist demands for protection in one form or another in many advanced countries. Notwithstanding recent progress in concluding the Uruguay Round, the governments of the advanced countries have often responded to these pressures by instituting a wide range of non-tariff barriers against developing country products. From the point of view of the developing countries, a significant and highly controversial example of these barriers is the unilateral United States legislation which imposes minimum labour standards and the so-called

workers' rights provisions against preferential imports of manufactures from poor countries.[3]

We turn now to the question of how these recent economic trends in the OECD economies relate to the question of the new technological revolution in information technology and communications. Here the following observations are pertinent. Firstly, the technological revolution has coincided with a sharp trend fall in the rate of growth of OECD output, rather than with a trend increase. Secondly, there has been a trend fall (again, not a rise) in the rate of growth of productivity as compared with the Golden Age. In the context of the previous paragraph, a very important analytical and policy question arises: namely, to what extent (if any) are the current high rates of unemployment in the OECD countries due to accelerated technical change in the post-1973 period, rather than other factors such as competition from low-wage products from the South?

II. Industrial revolution in the Third World

The period from 1950 to 1980 was also – and in an important sense – the Golden Age of development for the poor countries of the world. During these decades, developing countries made on average historically unprecedented economic and industrial progress. In the propitious circumstances following the end of the Second World War, many of these countries, particularly in Asia and Latin America, began to carry out an industrial revolution – one that they had been prevented from implementing 50 or 100 years earlier on account of the rather different world economic and political conditions which prevailed then. Even developing countries in sub-Saharan Africa, which started with extremely unfavourable conditions when colonial rule ended, managed to increase their share of world manufacturing production during the 1960s and 1970s. More significantly, a group of Asian and Latin American nations – the so-called NICs – were especially successful in the post-war period in establishing technical, scientific and industrial infrastructures, in training their labour forces, in creating managerial and organizational capacities and in developing broadly based industrial structures. By the 1970s these countries were providing formidable competition to the rich industrial economies in a range of consumer and producer goods industries (Singh, 1984, 1989).

Patel (1992) argues that the Third World's economic achievements during these three decades are a story without parallel in world development history. During this period, the South bettered the 80-year record of the North's advance in the nineteenth century (1820-1900). The South did this in half the time, at twice the growth rates, and with five times the North's population in the nineteenth century.

[3] For a fuller discussion of the United States legislation and its implications for industrial development in the North and the South, see Herzenberg and Pérez-López, 1990.

However, a striking feature of the Third World's economy over the past decade has been the interruption (indeed, in many cases the reversal) of the revolution in Latin America and in sub-Saharan Africa, whilst it has proceeded apace in Asia. During a period of slow and fluctuating world economic growth in the 1980s, not just the four little dragons (Hong Kong, Singapore, Taiwan (China), the Republic of Korea), but also a number of other Asian countries have achieved remarkable economic success. China's economic development over the last decade has been extraordinary. Whilst Communism has collapsed in Eastern Europe, China, with a quarter of the world's population, has managed to record a growth rate of nearly 10 per cent per annum in the 1980s – by far the fastest growth rate among the world's major economies. Although the pace of economic expansion in South Asia was slower than in East Asia over this period, it is noteworthy that India was able to achieve an appreciable trend increase in its growth rate during the 1980s, compared with its past records (see table 1).

Table 1. Growth performance of developing countries, 1965-80 and 1980-90 (percentages)

	Average annual growth rate of GDP	
	1965-80	1980-90
Category of economy[1]		
Low-income economies	4.9	6.1
China	6.8	9.5
India	3.6	5.3
Other low-income	4.8	3.9
Middle-income economies	6.3	2.5
Region		
Sub-Saharan Africa	4.2	2.1
East Asia and Pacific	7.3	7.8
South Asia	3.6	5.2
Latin America and Caribbean	6.0	1.6

[1] The World Bank defines "low-income countries" as those with per capita income of U$580 or less in 1989 and middle-income countries as those with per capita income between U$580 and U$6000.
Source: World Bank: *World Development Report, 1992.*

In contrast to the Asian experience, the Latin American and sub-Saharan African countries suffered a sharp trend decline and a collapse of their GDP growth rates in the 1980s, which have been aptly described as the "lost decade" for these regions. During this decade, people in these two continents typically experienced a sizeable fall in income as their per capita GDP fell. When the per capita GDP figures are adjusted appropriately for changes in the terms of trade and net factor payments, the results indicate that average per capita income in 1990 in Latin America was 15 per cent lower and in the African countries as much as 30 per cent lower than in 1980.

On the other hand, in the South and East Asian economies the corresponding average per capita income rose by 53 per cent during the decade (United Nations, 1990).

It is important to note in this context that before 1980 the Latin American and Asian economies had been growing at much the same average long-term rate – about 6 per cent per annum. Detailed analysis shows that on the basis of their growth rates in the 1960s and 1970s, the two groups of economies could not be statistically distinguished by performance (Fishlow, 1991; Hughes and Singh, 1991). The "great continental divide" which characterizes the economic experience of the Asian and the Latin American countries in the 1980s is therefore all the more significant (Singh, 1986).

III. Education, skills and economic growth

At the end of the Second World War there was an enormous skills and educational gap between the developing countries and the industrial countries. However, these deficits were spectacularly narrowed in a relatively short period of time. Consider, for example, the overall literacy rates, which in 1950 in the South were approximately a hundred years behind the North. Hobsbawm (1987) estimates that the North's literacy rates averaged below 25 per cent in 1850 and below 50 per cent in 1900. Patel (1992) suggests that the comparable level of literacy in the South was about 30 per cent in 1950. By the 1980s, it had risen to 50 per cent in Africa, 70 per cent in Asia and 80 per cent in Latin America.

Although there are shortcomings both in the data themselves and in the quality of education imparted in developing countries, the North-South educational distance is unquestionably far smaller now than it was four decades ago. Table 2 indicates that in 1950 the South was behind the North by 60 to 70 years in primary school enrolment and 40 to 50 years in secondary and higher enrolment. By the mid-1980s, on a per capita enrolment basis the South had equalled (or surpassed) the comparable developed-country level in primary education, because of larger relevant age groups. It had reached mid-1950, developed-country levels in secondary education and nearly attained the 1950 enrolment levels of tertiary education in the developed countries (see table 2).

Similarly, in the post-war period, the developing countries in general were very successful in decreasing the gap with the North in relation to industrial and engineering skills. The Latin American and Asian countries in particular were able to establish during this period a whole infrastructure of universities, technical institutions, vocational training centres as well as specialist institutes for a wide range of scientific and engineering disciplines.[4] The developing countries were enormously helped in this task by cooperation and assistance from the West as well as the

[4] For a description of the systems of vocational training adopted in developing countries, see Foster (1987).

Table 2. Educational advances in the South, 1950-85

	South		North		Ratio South/North	
	1950	1985	1950	1985	1950	1985
Enrolment, in millions						
Primary	80	475	110	105	0.7	4.5
Secondary	10	184	31	88	0.3	2.1
Tertiary	1	25	5	31	0.2	0.8
Total	91	684	146	224	0.6	3.1
Enrolment per 1,000 population						
Primary	49.0	125.0	149.0	95	0.3	1.3
Secondary	6.0	48.0	41.0	79	0.1	0.6
Tertiary	0.6	6.6	7.2	23	0.1	0.3

Source: Patel (1992).

East. To take an example, during the Cold War, both the United States and the USSR were at pains to provide on-the-job training in their own countries to thousands of Indian technicians and enabled India greatly to expand its steel industry.

The net result of this huge educational and training effort in the South has been that countries like India have become significant exporters of PhDs around the world. In place of the skills deficit with the North, there has been serious concern with the brain drain from the South to North (Bhagwati, 1988). More importantly, in the leading Asian and Latin American countries, inadequate education and skills can no longer be regarded as constraints on long-term economic growth. This is not to suggest that these countries do not experience deficits in specific areas, but rather that they now possess the educational, scientific and technical infrastructure either to generate the required skills themselves or to import them from abroad on reasonable terms.

It is useful to reflect briefly on the complex relationship between education, skills and economic growth. In general, the relationship between these variables is positive but it is far from being linear. In an important recent World Bank publication, the *World Development Report: The challenge of development*,[5] the authors used the standard mainstream economic paradigm and intercountry cross-section analyses and arrived at the following empirical conclusion with respect to the relationship between education and economic growth:

[5] The World Bank: *World Development Report: The challenge of development* (1991, Washington, DC). This report is a significant document since it synthesizes what the Bank's economists have learned about economic development from their 40 years of experience with the developing countries.

> Research for this Report suggests that increasing the average amount of education of the labour force by one year raises GDP by 9 per cent. This holds for the first three years of education; that is, three years of education as compared with none raises GDP by 27 per cent. The return to an additional year of schooling then diminishes to about 4 per cent a year – or a total of 12 per cent for the next three years. These results are consistent with earlier studies. (World Bank, 1991, p. 43).

Although the report correctly observes that such correlations do not imply causation, it nevertheless goes on to draw the conclusion that: "both better policies and more education contribute to growth. Furthermore, they seem to interact. Thus, the effect on growth of better policy and more education together is greater than that of each separately . . ." (ibid., p. 46).

From these and other similar analyses, World Bank economists arrived at the policy recommendation that, in order to enhance economic growth, the developing countries should promote primary and secondary education. However, such recommendations can be misleading. For example, it is difficult to argue that the Latin American economic performance over the medium term (say the next five to seven years) would be improved by further investment in early education. The economic failure of the Latin American countries during the "lost decade" of the 1980s can scarcely be ascribed to a deficit in education.[6] It is hard to demonstrate that education, let alone primary or secondary education, is a binding constraint on economic growth in these countries.

Even for African countries, where the World Bank report's policy conclusions on this question may be regarded as more applicable, a detailed investigation is required to show that it is the lack of primary or secondary education, rather than other factors (for instance, world economic conditions) that have been more responsible for slow economic growth in these countries over the past decade. The report does not provide such an analysis. Any policy conclusion that expansion of primary education will increase economic growth in the medium term or for that matter during the rest of this decade, even for the African countries, is therefore hazardous. It is not very helpful to attempt to draw policy conclusions on the role of education in economic growth from an implicit model that assumes full employment and perfect competition, and which uses cross-section data.[7] The World Bank report is, of course, right to note that "progress in education is to be sought mainly as an end in itself" (p. 56). However, its general policy conclusion that investment in primary

[6] There is a large and growing literature on the question of why the Latin American countries failed so comprehensively in the 1980s whilst the Asian countries continued to enjoy economic success (see Singh, 1993a for a review of this literature). However, none of it suggests that this phenomenon could be explained in terms either of a skills deficit in the Latin American countries, or of the differential impact of the information and communications revolution on the two continents. Rather these writings emphasize the role of the debt crisis or internal mismanagement in the Latin American countries to explain the differences in performance of the economies on the two continents.

[7] On this issue, see further Fanelli, Frenkel, and Taylor (1993) and Singh (1993b).

and secondary education will promote economic growth is not adequately substantiated.

Important aspects of the relationship between education, skills and economic growth are not usually captured by econometric or statistical analyses. These may be illustrated by the following example from the Punjab (India). Punjab has had an outstanding record in growth of agricultural production as well as productivity per acre over the past two decades. Food grain production in the state increased at a long-term rate of nearly 5 per cent per annum over the period 1967-89, an exceptional performance by comparative international standards (Rao, 1992). The net result is that with less than 2 per cent of the country's arable area as well as of its population, Punjab produces three-quarters of the country's entire food grain surplus.[8]

This transformation of Punjab's agrarian economy over the past 20 years has been made possible by the introduction and widespread adoption by the Punjabi peasantry of the green revolution technology. Yet Punjab's literacy and primary school education levels were by no means as good as those in other parts of the country which were unable to adopt such technology. The Government played a major role in propagating the technology, by providing demonstrations of the success of new seeds, etc., at farms throughout the state. Certainly, the lack of formal education does not seem to have prevented the peasantry from acquiring the skills necessary to understand and implement this technical revolution in agriculture.

Nevertheless, it is important to note that formal education and skills did play a central and critical role at a different level in this process. Punjab's agricultural revolution of the past 20 years was initiated by the state's agricultural university at Ludhiana. Although the green revolution technology came from abroad, it was adapted and developed to meet the local soil and climatic conditions by scientists and agronomists at the agricultural university. The university also played a crucial role providing new seeds and training agricultural extension workers, as well as by running demonstrations of the success of the new technology at experimental farms. Thus, in this significant case, it was not primary or secondary education but rather the availability of higher-level training, education and skills which led to the observed trend increase in the state's agricultural and overall growth rates.[9]

[8] This surplus has been primarily responsible for allaying the international concern (widespread in the mid-1960s in the wake of Indian harvest failures at the time) that the country would remain unable to meet its food needs and would thus be a perpetual burden on the international community. However, the adoption of "green revolution" technology, even in a few states like Punjab covering only a small proportion of the arable land, transformed the food outlook in India. Notwithstanding a rate of population growth of over 2 per cent per annum the country has been comfortably self-sufficient in food over the past two decades.

[9] For a fuller discussion of Punjab's agrarian revolution, see Gill (1979); Singh (1983); Bhalla and Chadha (1983); Bhalla and Tyagi (1989).

IV. North-South industrial competition and international competitiveness

Returning to the theme of global economic changes and their impact on the international competitiveness of the industrializing economies, let us consider the record so far. The broad facts concerning North-South competition in manufactured products may be summarized as follows. Between 1965 and 1985, the South's share of world manufacturing production, though still quite small, increased from about 14 per cent to 18 per cent. More significantly, during this period, the South's share of the world exports of manufactures increased at a much faster rate than its share in world industrial production; the exports share more or less doubled over this period (from about 9 per cent to 18 per cent). Further, the record indicates that, whereas there was a sharp trend decrease in the rate of growth of manufactured exports from the industrial market economies during the period 1973-85 compared with 1965-73, the developing countries registered a trend increase in their growth of manufacturing exports over the corresponding periods. To stress this very important point: during the period 1965-73, the rate of growth of manufacturing exports of the developed countries was much the same as that of the developing countries – about 10 per cent per annum at constant prices. Between 1973 and 1985, the former's exports grew only at 4.4 per cent per annum, whilst the latter's increased at an incredible 12.3 per cent per annum.

The same pattern continued in the 1980-90 decade. UNCTAD (1993) indicates that during this period, the volume of Third World manufactured exports expanded at a rate of 12 per cent per annum; this was two to three times as fast as the corresponding expansion in the rate of growth of manufactured exports of industrial countries. Much the larger part of the Third World's manufactured exports continues to go to the North. Further, there is evidence that the developing countries are exporting not only the traditional, labour-intensive and resource-based products, but are also recording very fast growth in the export of a variety of products of capital goods industries (World Bank, 1987; UNCTAD, 1993).

This period of rapid increase in the South's industrial exports has coincided with the "de-industrialization" occurring in most of the older industrial countries of the North. The latter group of countries have been experiencing falling shares of manufacturing output and employment, as well as high overall rates of unemployment, particularly since the end of the Golden Age. This, as noted earlier, has provoked a protectionist reaction in the North.

However, with respect to a main theme of this article, the important point is that the new technological revolution and the consequent changes in production systems and organization have not so far dented the South's competitiveness. At least in terms of North-South competition, the results up to now appear to be extremely encouraging. The important policy questions are, firstly, whether this situation can be expected to continue as the new

information technology spreads further and deeper in the North; and secondly, what the practical policy implications are for skill requirements and skill development.

V. National systems of technological accumulation and capabilities

The new information technology and associated changes in the organization of firms and industries raise in an acute form the challenges which the late industrializers face in the modern world. As Amsden (1989) has observed, the poor countries cannot compete in the world economy on the basis of low wages alone. It is essential for them to take a long-term view and constantly to raise and upgrade their technological levels in order to be competitive. This requires not just greater "training" or more "education", or some particular importation of technology. Rather, what is needed by the late industrializers is a national technological system, spanning the government, firms, the universities, indeed the society as a whole. Such a national system of technological advancement was first advocated by Friedrich List in the first half of the nineteenth century, to enable Germany to catch up with Great Britain. Although "catching up" was much easier then than it is for developing countries today, many of List's insights remain valid.[10]

More directly relevant for the late industrializers at the end of the twentieth century is the system of national technological advancement adopted by the Japanese after the Second World War. Although Japan began industrializing in the modern sense of the term in the 1870s at the time of the Meiji restoration, even by the mid-1950s Japan was producing only 5 million tons of steel and 50,000 cars per annum – less than countries such as India, Brazil or Mexico do today. Moreover, the domestic costs of producing steel in Japan at the time were twice the world prices and the country was largely an exporter of labour-intensive products. The United States annual steel output in the mid-1950s was about a 100 million tons and the American automobile industry produced around 6 million cars every year. Yet less than two decades later, Japan was producing more steel and by 1980 more cars than the United States. Japanese workers, starting from Asian wage levels in the 1950s, were well on their way to reaching European standards of living 25 years later (Singh, 1989).

In analysing this, arguably the most spectacular case of successful catch-up in the history of mankind, it is important to appreciate that the Japanese Government consciously followed a particular national development strategy: instead of pursuing the comparative advantage in textiles or light manufactured goods Japan had in the early post-war period, the Ministry of International Trade and Industry (MITI) decided to create a

[10] See Freeman (1989).

heavy industrial base for the economy. In the view of MITI, although Japan's existing economic structure may have conformed to the theory of comparative advantage (the country being a labour-surplus economy at the time), it was not viable in the long run (OECD, 1972).

To achieve the desired structural transformation of the economy, the Japanese adopted a long-term, techno-economic strategy. Freeman (1989) identifies the following principle elements in this strategy:

(a) The ability to design and redesign entire production processes, whether in shipbuilding, machine tools or any other industry.

(b) The capacity at national, government level to pursue an integration strategy which brings together the best available resources from universities, government, research institutions and private or public industry to solve the most important design and development problems.

(c) The development of an educational and training system which goes beyond the German level in two respects: firstly, in the absolute numbers of young people acquiring higher levels of education, especially in science and engineering; secondly, in the scale and quality of industrial training carried out at enterprise level.

(d) The policy of mainly rejecting foreign investment as a means of technology transfer. This automatically places on the enterprise the full responsibility for assimilating imported technology. This is far more likely to lead to total system improvements than the "turnkey plant" mode of import or the foreign subsidiary mode.

(e) The emergence of a much more flexible and decentralized management system, permitting both greater horizontal integration of design, development and production and a quicker response to change.

(f) Close cooperation between the central government and Keiretsu (large groupings of Japanese enterprises) in identifying future technological trajectories, and in taking joint initiatives, to adopt this strategy to enhance the country's prospective competitiveness.

It is noteworthy that many Asian countries (including the Republic of Korea, Taiwan (China) and China) have been following the Japanese model in this sense and building their own national technological systems according to their resources and requirements. Freeman finds it particularly striking that several Asian countries now have a higher annual output of graduate engineers per 100,000 of population than Japan. These countries are thus trying to outdo Japan in this respect, just as Japan outstripped the United States.

None of the above comments are intended to underestimate the formidable problems the late industrializers face in keeping in step with the new technological revolution (see, for example, Dore, 1989). Nevertheless the successful examples of Japan, the Republic of Korea and other Asian NICs suggest that their basic approach to the problems of competitiveness and to those of meeting the new technological challenges is worth emulating.

This involves a continuing development of national technological capability through an integrated system in the ways outlined above. It is an incremental, long-term process which requires concerted national effort. Without such an effort, it is unlikely that the newly industrializing countries will be able to hold their share of world manufacturing exports, let alone appreciably increase them, as they have so successfully done over the past two decades or so.

VI. Conclusion

To sum up, in the post-war period, the late industrializing developing countries have demonstrated a remarkable capacity to absorb new technology rapidly, adapting and developing it to their needs and circumstances. At the same time, the more successful among them – the Asian NICs – have also been quick to enter new markets and exploit export opportunities. This helps to explain the South's overall highly creditable export performance in the world economy. Countries like the Republic of Korea, Malaysia and others have understood the need for an integrated national approach to enhance their technological capabilities. With the infrastructure of education, science, technology, and training systems that they now possess, there is no reason to believe that these countries will not be able to meet the challenges of the new information technology and the new production concepts being applied in the advanced economies.

Readers will of course appreciate that the new production concepts in the North are often a response to competition from the South. Even when they owe their origin to other forces, there is no reason why the industrializing countries should not be able to imitate such institutional innovations. Nor does evidence regarding the new information and communication technology lead to the conclusion that one particular system of training or vocational education is universally superior to all others, whether in advanced countries or industrializing economies. There are wide variations in the systems of skill development, education and training in successful advanced countries as well as successful developing countries. These are a product partly of each country's past training systems and partly of its particular skill needs at present. The important point is whether and how far these institutions form a part of a national integrated system of enhancing technological capabilities.

In this context, to focus on early education as the World Bank does may not be the best way of enhancing the international industrial competitiveness of a developing economy. To compete in the world industrial economy, it is essential to have higher educational institutions, scientists, technologists and engineers. Universal primary and secondary education is a worthy goal in its own right, but alone it does not provide the wherewithal to compete in the international market. It is undoubtedly far more expensive on a per capita basis to provide higher education than to provide primary or secondary

schooling. The former is also necessarily elitist, but this is a price that may have to be paid for international competitiveness.[11]

The greatest threat to the prospective international competitiveness of developing countries is posed by recent institutional changes in the global economy other than the information and communication technology revolution. Today, developing countries are hampered not just by the non-tariff barriers to their exports which, despite the profession of greater liberalization from the North, continue to plague them. For the main point is that in the past decade the general international economic environment has changed unfavourably for these countries compared with most of the post-war period. Prior to the Second World War, for example, the developing countries were able to protect their own markets whilst having free access to advanced countries' markets. Under the global arrangements prevailing today, the industrial countries no longer feel compelled by the imperatives of the Cold War to continue such one-sided arrangements. Consequently, these nations are seeking and enforcing greater "reciprocity". Thus, the industrializing economies are now increasingly obliged to allow greater access to advanced countries' products, to multinationals, and to foreign financial institutions. The situation is particularly acute in this respect in the Latin American and African economies. Because of balance of payments difficulties associated with the debt crisis, these countries have been subject to structural adjustment programmes agreed with the international financial institutions for most of the 1980s and into the 1990s. Consequently, in addition to opening their markets to foreign competition, they have been required to deregulate, to privatize their public enterprises, and to carry out other measures which enhance the role of the market and reduce that of state industrial policies. Katz reports that for the Latin American countries the net result is that:

> A massive industrial restructuring has occurred in which industries which are relatively intensive in domestic value added, such as the metal-working sector or the production of capital goods, have contracted, while industries that process raw materials ... and that are much less intensive in domestic engineering content and value added, have expanded. ... In most cases firms have increased the import content of their production activities and have moved "backward" toward final assembly of imported components. This indicates that in the new industrial organization scenario, based on the need to be competitive at a global level, firms have opted for less in-house technological effort, minimal product design engineering, and so on. (Katz, 1992, p. 310).

Although the Asian countries' stronger external position has meant that during the 1980s they were far less under the tutelage of Bretton Woods institutions than the Latin American countries were, they were not untouched by the above developments in the international economy.

[11] This is not to suggest that all expenditure on higher education in the developing countries is either efficient or useful. In many countries a good case can be made on efficiency grounds for diverting resources away from liberal arts university education towards agricultural universities or science and engineering institutions.

However, their greater economic strength has allowed countries such the Republic of Korea and Taiwan (China) to take the time to liberalize their trading systems and financial regimes. By contrast, Latin American liberalization in the 1980s was precipitate and explosive (Fishlow, 1992). Nevertheless, as Katz (1992) notes, these developments make it much more difficult to operate the national systems of technological accumulation which Asian countries successfully implemented hitherto and which, as emphasized above, are so crucial to technological catch-up and to their international competitiveness. However, this does not mean an abandonment of such systems and a return to laissez-faire. Rather, it means changing the systems in the light of the new economic realities, much as the Japanese, when faced with similar liberalization pressures from the United States and other OECD countries, have been doing since the mid-1970s.

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