CHAPTER V

CONCLUSIONS
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The emerging picture of prospects for rapid industrialization on the basis of heavy industry in small overpopulated countries is bleak. The concatenation of market and resource constraints restricts such countries to a strategy of trade-based industrialisation. This strategy is based on the export of labour-intensive manufactures where scale economies are insignificant and factor prices, mainly labour costs, determined locational advantage. A simplistic interpretation of such trade flows could be viewed in terms of capital flows to cheap labour. Expansion of the domestic market occurs as income shifts from rents to wages (a la Stolper-Samuelson), with increasing absorption of labour.

The possibility of industrialisation in such a strategy is however, slim. The possession of cheap surplus labour is a weak base insufficient to transform the structure of an economy despite capital mobility. In the totality of world exports labour-intensive manufactures constitute only a small percentage. In fact, in our study we were able to delineate only five products. Reliance on these exports would allow only a marginal participation by the country in world trade.

The dynamic group of manufacture exports are those characterised by high-level technology. A study by Grueber and Vernon on 24 industries showed that 8 industries which were technology-intensive constituted 30 per cent of world exports. "Further, areas which are prominent exporters of technology-intensive products are also the most prominent
exporters of other manufacturing products. Their findings have been corroborated by Hufbauer, Keeling, Tyler, Hong etc. This raises two important issues with regard to an Export-Promotion (E-P) strategy: i) the changing nature of world trade in favour of technology-intensive manufactures; ii) the related changing importance of factor endowments. These two points need further elaboration to understand the limitations of a traditional E-P strategy based on cheap surplus labour.

**Skills and International Trade**

Explanations of trading patterns apart from the traditional factor endowments of a country viz. physical capital and labour (natural resources included) have been the scope of the above studies. The impetus to a broader analysis of national attributes and product characteristics was an outcome of the Leontief Paradox. Explanations were sought in human-capital - skill; Research and Development (R & D); and economies-of-scale. Despite the multicollinearity between the variables a high correlation between trade and technology intensive commodities


c) W. Hong, "Industrialisation and Trade in Manufactures: The East Asian Experience", in Lawrence and Kenen, 2(b), pp. 213-39.

d) W.G. Tyler, "Trade in Manufactures and Labour Skill Content", Economia Internazionale (Genoa), vol. XXV, 1972, pp. 314-32.
was found. The proxy variable for technology being the proportion of skilled labour involved compared to low skilled labour; an extension of the 'Labour-Efficiency' resolution of the Leontief Paradox and the Product-Cycle - Technology-Gap models. Therefore, it would not be a broad generalisation to include the entire gamut of explanatory variables under skill formation and human capital.

Skill formation has normally been associated with investment in education and training facilities relating to higher per capita income of the developed countries. For example, the commonly used Harbison-Myers Index of human resource development. The explanation is straightforward in the case of U.S.A., U.K. and other advanced countries, but not in explaining the deviant behaviour of Japan, Korea and Canada.

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These models have been discussed in Chapter III.


5 Grueber and Vernon, n. 1. "While there is of course an intimate relation between the per capita income and the human resource development index of any area, the correlation of the absolute differences in these measures for pairs of areas is weak (+ .046). This reflects the aberrant behaviour of several areas including Canada, Japan and the 'Rest of EFTA'. Canada is on the low side as measured by the human resource development index, in view of its per capita income, while Japan and 'Rest of EFTA' project the opposite view," , p. 257.
These exceptions show that skill-formation and capital accumulation need not presage the export of skill-intensive manufactures. And that in certain products human-resource development might suggest a reverse flow of goods from less developed countries (LDCs) to developed countries. By a calculated development of human capital it is possible to divorce it from domestic capital accumulation and the unilateral causation.

This is not to minimise the cultural and social background which combined with a high level of economic growth has been responsible for the high proportion of skilled manpower in the advanced countries. But within certain limits it is possible through training facilities and opportunities for learning-by-doing to upgrade the skill-levels. The initiative to invest in education and training facilities is government sponsored hastening an otherwise slow process. For a country with a low natural resource base growth would represent heavy investment in skill formation. Capital being relatively mobile the constraint to expand manufacture production would be skilled labour.

The role of labour-intensive manufactures exports is therefore reduced to that of an initial stimulant to overcome the narrow domestic market. Both for further exports and a diversified domestic industrial base the consideration should be a shift towards more sophisticated products involving a large proportion of skilled labour.
In a related study by Chenery on resource endowment and economic development it was posited that countries with large natural resources at lower levels of income tended to export more primary products, while resource-poor countries export more manufactures. This is not only because of the obvious resource limitation but also because of a greater substitution of capital and skilled labour in the production of manufactures. The most obvious success story of low resource with high population density has been that of Japan.

The Japanese Case

Japan is a country which has substituted capital and skilled labour for its limited natural resource base. Since capital is not the main constraint we shall briefly review the process of skill formation in Japan. It must be admitted that only a broad sweep (post-Meiji era to present) will be attempted.

The post-Restoration (Meiji era) of Japan had inherited a relatively high-level of general education from the Tokugawa period. The Samurai class was well versed in both Confucian classics and Dutch studies (armaments and medicine), while the general public sent both their sons and daughters to Temple schools for instruction in the three R's. Estimates place 50 per cent of all the males and 15 per cent of all females

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as receiving some formal education. As Dore has remarked, "Japan we are frequently told in these days of growing punditry on the course and causes of economic development is 'different'. And there is by now a growing awareness that one of the ways it differs from most other late-developing countries is in starting its career of forced-pace modernisation with a wide-spread and well developed tradition of formal institutional education."

The distinctive feature of Japan being a high esteem for education than for birth privileges among its citizens.

By 1872 education was obligatory for all children between 6-13 years of age. The cost of education was borne by the parents themselves. This was not surprising in view of the premium placed on education by society. The enrollment of students in schools went up from 26.1 per cent in 1868 to 96 per cent in 1896.

But to understand the development of technical skills and training facilities it is necessary to know the industries which were encouraged. Training imparted by the Dutch studies was inadequate for a forced-pace of modernisation. Broadly there were two groups of industries often termed as the 'dualistic

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b) E.H. Norman, Japan's Emergence as a Modern State (New York, 1940).


8 Dore, quoted in Hirschmeier, n. 7(a).

9 Hirschmeier, n. 7(a).
structure of Japan's industry. The first group was strategic industries in response to defense needs. They were heavily subsidised by the government. The second group was the traditional industries which formed part of the labour-intensive exports of Japan. This pattern of dualism was maintained throughout the period of Japan's economic growth.

The defence group of industries was iron-steel, ship-building, mining and railways. These industries had a two-fold effect: i) the development of a diversified industrial base with their strong linkage effects; and ii) the scope for setting up labour training facilities and learning-by-doing, which these industries offered. Being capital intensive they were based on the current advanced Western technology. For training of labour foreign instructors were engaged and Engineering and Technical schools were set up. Some students were sent abroad for further training. In this way these industries reached Western technical levels quickly.

The traditional sector helped in absorbing the labour-surplus and earning the necessary foreign exchange for the massive inflow of imports. This sector was the base of the export strategy of Japan. Exports grew from 1.4 billion yen in 1930 to 2.6 billion yen in 1936, helped considerably by the war boom. The exports consisted mainly of cotton goods, pottery, toys and other cheap manufactures. Imports were made up of raw materials, machinery and components.

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10 Ibid., p. 150.
with this background it is possible to understand the labour-training programmes in Japan. A detailed account has been given by Hirschmeier which we summarise below.

**Labour-Training Programmes:**

1) Apprenticeship schemes in iron-steel works and shipyards. These schemes took youngsters between the ages of 13-17 and gave them several years of training employing them within the firm after graduation. The training programmes included both theoretical and practical aspects requiring a background of high-school education.

2) Short-term training courses -- on the job -- were introduced lasting from several months to a year. Again, the trainees were assured of permanent employment with the firm.

3) Facilities to send workers to outside schools and institutions for further training.

The above simplified analysis has left out the indoctrination of labour through education and the sentiment of nationalism which education strengthened. Mention should be made here of the interesting manner in which Japanese firms were able to solve the problem of retention of skilled labour. In a combination of paternalistic family system and modern industrial structure Japanese firms evolved a system of 'lifetime commitment' and 'promotion according to seniority'. The former assured employment even after retirement by obtaining

11 Ibid., pp. 195-7.

positions in related concerns for the retired employees. The latter, by assuring promotion on the basis of seniority mini-
mised the risk of employees leaving the firm for fear of losing out on seniority. Thus, the incentive to stay by employees and the incentive to train by firms was perfected. Surprisingly the phenomena of brain-drain was only marginal.

Certain conclusions can be drawn from the Japanese case which are of relevance to our study. In the first instance, it must be accepted that Japan had a head start in already having a high level of literacy in 1868. But nevertheless, the sustained training of labour was not possible without institutional facilities. The crux of the matter is the linkage between certain industries and development of skills e.g. shipbuilding and training facilities.

Industries and Skill Formation

Keeping in mind the Japanese experience, the most dynamic group of industries is the Engineering industry. There are four considerations which influence the choice, viz: i) engineering industries are intimately related to the process of learning and the growth of an indigenous technology; ii) Natural resources are less of a constraint than in most other industries -- the key factors being human effort, skill and organisational ability; iii) engineering production grows faster than consumption with rising per capita income than in other industries; and iv) engineering industries have high inter-industry linkages.

Engineering industry is a broad classification for a large number of products which range from nuts-bolts and wire meshes to electrical machinery, electrical appliances, transport equipment and electronics. This wide spectrum offers a large potential for the spontaneous upgrading of skills through 'on-the-job' training and 'learning-by-doing' facilities. The training potentiality itself shifting with new products incorporating higher skills. The rapid growth of skills and technology is complemented through formal educational and training programmes.

what is important is the selection of engineering products for investment, which is in conjunction with the existing availability of skills and market size. The latter assuming relevance to the economies-of-scale which are significant in engineering industries. The peculiarity of this group is the linkage between products and processes which in a sense can bypass the issue of economies-of-scale. The argument is perverse. The linkage arises because; i) engineering products usually require the joint utilization of several processes; ii) processing facilities are highly versatile; iii) engineering products are extensively as inputs in the production of other engineering products. This linkage can be simplified through sub-assemblies step-fashion, in the operation of certain components. These components can be

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14 In the earlier chapters we had briefly reviewed the electronics' industry whose characteristics are typical of the other engineering industries.

15 UNIDO, n. 13, p. 28.
standardised to suit a whole range of potential users serving to reduce costs. Such standardisation is however feasible only with regard to simple products. Therefore, selection of projects has commonly been delineated into stages. The central theme of the stages approach being that of learning-by-doing.

Stage I involves activities confined to simple products mainly fabrication from metal sheets. It also includes repair and tinkering services for machinery. Skill requirements at this stage are low. The importance of this stage is the development and diffusion of skills in repair shops for automobiles, radios etc. Such services are initially furnished by the original companies supplying the machinery.

Stage II is the start of the production of simple products ranging from springs, nails, bicycles to agricultural implements and small electric motors. The need for formal training starts in this stage complimenting the growing 'on-the-job' training. The most important transformation occurring during this stage is the strengthening of domestically based technology and the appearance of small multipurpose machine shops capable of turning out replacement parts for much of the equipment and machinery existing in the country.

The higher stages follow with domestic expansion of the market and greater availability of skilled labour. The engineering industry grows to innovate under its own steam. The argument so presented has also been the justification for protection and import-substitution (I-S) strategy. The

16 Ibid., p. 39.
linkage between products and processes interpreted as the need for 'Balanced growth' industrialisation. The biggest loophole in the I-S strategy is the undue weightage given to establishment of engineering projects of the higher stages viz., a fascination for capital intensive industries. The logic being the urgency of contracting the gulf between the developed countries and the LDCs, rather than the 'learning-by-doing' of stages of growth. By being transport intensive it is hoped that utilisation of cheaper domestic raw materials would enable the country to withstand competition from cheaper imports. But such contraction by neglecting the relevance of market size results only in underutilization and the setting up of small inefficient units. Thus, reducing the scope for both skill-building and industrialisation. One of the factors for the success of Japan in heavy industrialisation may have been due to the numerous wars it fought. A similar strategy of market widening is not economically justifiable in the present LDCs. Our study of I-S strategy for Bangladesh has shown that for at least this country it is not a viable proposition.

**Interlinkage Between Exports and Skill Formation**

The resolution then, between market size and skill formation is possible in a dualistic strategy; the strategy being two-pronged. The first stage is the export of labour-intensive manufactures. In our study of Bangladesh there are three product lines viz., marine products, light manufactures and electronics which are conducive to 'learning-by-doing'. The initial training facilities therefore, arise in the repair
shops of these exports.

The scope for the development of skills through market forces is a slow process with every possibility of slipping back to stagnation. An insurance against this is the hastening of skill-accumulation through simultaneous initiation of Stage II industries by the government. This stage is the manufacture of simple engineering products and is conducive to the setting up of training facilities. A double subsidisation is involved here, subsidisation of industry and subsidisation of training facilities. Thus, over time both exports and factor-endowments change to suit international demand patterns. Without Stage II an E-P strategy reaches limits to its expansion quickly.

The study, therefore, seeks to establish the possibility of industrialisation for a small country which possesses no resource or locational advantage, burdened with population density. Thus, in such a situation where capital is mobile and demand is for sophisticated products industrialisation for such LDCs would specifically relate to the development of skills. All this in the framework of Bangladesh leaves no choice besides a high rate of investment in skills.