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WOMEN AND HUMAN RESOURCE DEVELOPMENT FOR INDUSTRY*

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in co-operation with

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in Industrial Development

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Chapter 1

Female participation in industry: a general perspective

Global and regional trends

The last two decades witnessed a substantial increase in the participation of women in industrial activities. Whereas the male industrial labour force grew by 2.6 per cent per annum, the female industrial labour force exhibited an above-average growth of 3.3 per cent annually between 1960-80.1/

Both developed and developing countries have displayed similar patterns of overall structural changes in their labour force: a marked relative decline in the importance of the agricultural sector and corresponding increases in the relative importance of both services and the industrial sector. However, these structural changes have been much more pronounced with regard to the female segment of the labour force (Table 1). In respect of the developing countries in the 1960-80 period, the male labour force in agriculture went down by 12.6 percentage points while the corresponding decline of the female labour force came to 15.3 percentage points. Concomitantly, the proportion of women employed in the industrial sector almost doubled in the same period to reach 16.3 per cent while for male industrial workers the increase was less rapid.

This structural change has been largely determined by pertinent trends in the Asian region which clearly stands out quantitatively in terms of female industrial employment: Asian countries in 1980 accounted for as much as 87 per cent of the developing country total; even when excluding China and India as exceptionally populous countries, female industrial employment in the remaining Asian countries was higher than in Africa and Latin America taken together.2/ In relative terms, i.e. looking at the industry share in the female work force in 1980, Asia ranked first as well with 17.5 per cent closely followed by Latin America with 17.2 per cent. However, in the latter region the share of industry slightly decreased between 1960-80, a possible explanation being the rapid growth of capital-intensive, traditionally male-dominated industries in middle-income countries such as Brazil and Mexico. In Africa, with industrial development still at a relatively early stage in most countries, only a small portion of the total labour force is employed in industry. The industry share of the female labour force, in spite of having doubled since 1960, stood at only 7.8 per cent in 1980.

1/ Calculated from ILO, Economically active population 1950-2025, Volume V, Third edition 1986.

2/ Cf. UNIDO, The role of women in industrial development, UNIDO/IS.484, 13 September 1984, p.9.

Table 2 shows recent trends in female participation rates, i.e. in the share of women in the total labour force and in the labour force of the three main sectors. The share of women in the total labour force of the world remained practically constant between 1960 and 1980, at slightly above one-third. The share of women in industrial employment has been substantially lower but rising, with few exceptions. In developed countries, the share of women in industrial employment went up from 26.7 per cent in 1960 to 29.2 per cent in 1980. In developing countries, it went up from 21.0 per cent in 1960 to 26.5 per cent in 1980. Thus the inroads into industrial employment made by women in the developing countries appear to have been, on average, slightly faster than those made by women in the developed countries. A gap still exists between developed and developing countries, but it has narrowed sufficiently for the share of women in industrial employment to be of the same order of magnitude: in both developed and developing countries slightly more than a quarter of industrial workers are women.

The figures quoted are broad averages. There are considerable variations, however, between country groupings, particularly in the developing world. Both in 1960 and in 1980 the lowest female industrial participation rates were to be found in the Middle East and in Latin America. Moreover, the rates in these regions have more or less remained at their 1960 level throughout the following two decades.

In Asia, where the share of women in industrial employment was already higher in 1960 than in other developing regions, the two decades brought a further increase which was particularly pronounced in China. It is remarkable that in Asia women's employment share is higher in industry than in services, while the opposite is true in all other country groupings, both developed and developing.

So far the focus has been on presenting the salient features of recent quantitative structural changes in female industrial employment worldwide. In the remainder of this chapter some qualitative issues will be raised to pave the way for the subsequent discussion of required action for human resource development, both in general terms as well as illustrated by specific country cases.

Formal sector

In overall terms, new avenues for female participation in the economies of the developing countries were created by the emergence of the modern manufacturing sector. One major driving force in this process was the redeployment of industries from the developed countries from the 1960's onwards. Relocation first concerned industries with a high labour content and low capital intensity, which are also those traditionally employing a large number of women. Among the first industries to be relocated to developing countries were textiles and clothing. Apart from the attraction of low wages, this was due to a number of additional factors: they utilized locally available raw materials; they required little capital and could employ simple technology, which was either already available, or could easily be shipped; and they could make use of skills in textile and garment-making traditionally present in developing countries. They could take advantage of growing markets in developing countries as well as of larger market shares in the textile markets of developed countries. They could take advantage of growing markets in developing countries as well as of larger market shares in the textile markets of developed countries.

Table 1: Gender composition of labour force by sector and country grouping, 1960/1980

Region or country grouping	Year	Female			Male		
		AGR	IND	SER	AGR	IND	SER
		(Per cent)					
Developed countries	1960	34.2	24.2	41.6	24.6	40.9	34.5
	1980	13.7	29.0	57.3	12.1	47.4	40.5
Developing countries	1960	81.6	8.2	10.2	68.3	15.1	16.6
	1980	66.3	16.3	17.4	55.7	21.6	22.7
- Africa	1960	84.4	4.0	11.6	76.6	9.4	14.0
	1980	73.3	7.8	18.5	66.2	15.0	18.8
- Latin America/ Caribbean	1960	24.0	17.8	58.2	53.6	20.4	26.0
	1980	13.8	17.2	69.0	40.1	27.4	32.5
- Asia[a/]	1960	84.4	8.3	7.3	68.9	15.3	15.8
	1980	69.4	17.5	13.1	56.1	21.9	22.0
- China	1960	87.8	8.0	4.2	66.7	20.0	13.3
	1980	70.5	21.0	8.5	53.8	28.7	17.5
- India	1960	83.7	8.9	7.4	69.6	12.5	17.9
	1980	74.0	14.7	11.3	56.7	18.4	24.9
- Middle East	1960	85.3	8.7	6.0	62.6	16.8	20.6
	1980	67.1	14.0	18.9	45.7	24.5	29.8

Source: Data made available by ILO Bureau of Statistics.

a/ Excluding China, India and Middle East countries.

Note: AGR = agriculture;

IND = industry (including manufacturing, mining and quarrying, public utilities and construction);

SER = services.

Table 2: Share of women in total labour force by sector and region, 1960/1970/1980
(percentage shares)

Region or country grouping	1960				1970				1980			
	T	AGR	IND	SER	T	AGR	IND	SER	T	AGR	IND	SER
World	34.5	38.3	24.3	34.1	35.1	37.4	27.3	37.4	34.8	37.0	27.8	37.8
Developed countries	38.1	46.1	26.7	42.6	39.7	44.4	28.8	47.2	40.2	43.3	29.2	48.7
Developing countries	32.7	36.7	21.0	32.1	32.9	36.5	25.7	25.9	32.4	36.4	26.5	26.9
- Africa	32.9	35.1	17.2	28.9	32.7	34.8	19.7	31.5	32.0	34.4	19.7	31.6
- Latin America/ Caribbean	18.9	9.4	16.9	34.3	21.2	8.1	16.7	38.4	23.0	9.3	15.8	38.8
- Asia[a/]	34.1	38.8	22.0	19.3	34.2	38.7	27.6	21.8	33.6	38.5	28.8	23.2
- China	38.4	45.0	20.0	16.3	37.9	34.8	28.7	20.5	37.6	44.1	30.6	22.7
- India	31.3	35.4	24.6	15.8	32.6	37.9	26.1	16.2	31.7	37.7	27.1	17.4
- Middle East	24.5	30.7	14.4	8.6	22.3	28.1	14.3	13.9	22.9	30.3	14.5	15.8

Source: Data made available by ILO Bureau of Statistics.

a/ Excluding China, India and Middle East countries.

Note: AGR = agriculture;

IND = industry (including manufacturing, mining and quarrying, public utilities and construction);

SER = services.

Further industries to be relocated were certain branches of food-processing, using locally grown fruit and vegetables, or locally available fish and seafood. Also certain types of pharmaceutical production were implanted in developing countries, as well as in particular electronics. In the case of the latter industry, the low wage costs of a dexterous work-force was clearly the main determinant of relocation. Although the branch as a whole is capital-intensive, assembly work could be done cheaper by hand, as rapid technological change did not make it profitable to invest in expensive equipment.

Hence a substantial share of the newly created industrial production capacities in developing countries has been built up as part of the international production and market network. Specially designed export-processing zones were set up to attract foreign investment for exports. In these zones female employment has always been of outstanding importance: The share of female workers in these zones invariably ranges between 75 and 90 per cent (e.g. 77 per cent in Masan and Iri, Republic of Korea; 82 per cent in Katunayake, Sri Lanka; 85 per cent in the Maquiladora industries in Mexico). Thus there can be no doubt that the emergence of export-oriented manufacturing in such zones has significantly contributed to providing non-traditional industrial jobs to women. However, the rationale for and the economic and social benefits from this specific type of employment have been a subject of controversy ever since international industrial redeployment has started on a large scale. The high macro-economic costs of providing these employment opportunities (investments in infrastructure) have been questioned as have been the quality of employment (learning effects; working conditions), the long-term viability of jobs, and the developmental impact (lack of backward linkages and other integration with the domestic economy).[1/] It certainly needs to be emphasised that industrial 'participation' cannot be defined exclusively in quantitative terms; rather it is the quality of industrial employment provided to women which appears essential.[2/] In addition to the past critique of the nature of employment creation via export-processing zones new doubts of their future viability are arising in view of emerging structural changes in the international trade and investment systems.

All in all female participation in the modern industrial sector in developing countries has tended to be characterised by a concentration of female employment in low- wage, low-skill jobs whereas only few women are found at the higher technical and managerial levels. This in part accounts

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1/ Cf. UNIDO, Export processing zones in developing countries, UNIDO/ICIS.176, 18 August 1980 and UNIDO, Women in the redeployment of manufacturing industry to developing countries, UNIDO/ICIS.165, 8 July 1980.

2/ As far as export-processing zones are concerned it would seem that "neither uncritical applause of the 'achievement' of the number of female jobs created in these enclaves (without checking what the alternatives were), nor simple denunciation of these arrangements as 'exploitative' (without offering any alternative employment opportunity), can stand economic scrutiny." UNCTAD/INSTRAW, Women, technology and sexual divisions, UNCTAD/TT/79, 5 March 1985, pp.23-24.

for the much lower income levels of women than men in the manufacturing industry, which in developing countries range between 45-90 per cent of male wages. In many cases, however, women are also paid less for equal work: salaries occasionally are more than 25 per cent lower. This may in part reflect shorter working hours; on the other hand ".... Women are hired precisely because they are willing to accept lower wages."1/

The reasons for the lower-than-average participation of women in the manufacturing sector, and for their being trapped in low-skill, low-pay jobs are predominantly socio-cultural in nature. It is thus in this sphere where changes in attitudes would need to be induced if long run, major improvements in women's participation in productive sectors are to be achieved. Modern industry offers, however, an important vehicle for accelerating this process insofar as in its own development it tends to challenge traditional structures and values in many ways. Properly designed industrial development therefore can both enhance the role of women in society and is in fact dependent upon their participation at all skill levels.

Informal sector

In developing countries, women have traditionally played an essential role in crafts and rural processing. In what is known as the informal sector, women are strongly represented in a variety of manufacturing activities, among which food processing and textile making stand out. Although much of the output of traditional processing and crafts tends to be for domestic use, the manufacturing skills of women also provide essential parts of the family money income. On average 30 per cent of all households are headed by women who are the sole providers for their family. In some regions of Southern Africa and the Caribbean, this percentage increases to almost 50 per cent due to migration of male labour.

The exact extent of female involvement in traditional activities that can be classified as manufacturing production is not known. Apart from the general inadequacies of statistics, the fact that much of this involvement is part-time, unpaid and oriented towards domestic consumption has led to its exclusion from statistical surveys. The size of the female labour force thus tends to be underestimated, and a major contribution to national product remains invisible; hence its development potential also tends to be overlooked.

The growth of the modern manufacturing sector, while offering paid employment to many women, has on the other hand often had negative consequences for informal sector manufacturing. The products of this sector have often not been able to compete successfully with the cheap, uniform-quality products of the formal sector, especially food products and textiles - traditionally an important source of income of women in the informal sector. Although the informal sector will have to continue functioning as a major income source for a large part of the female labour force it thus appears essential that the growth of formal sector activities be accompanied by a corresponding shift of women workers towards modern industrial employment. Hence, while policies should acknowledge the

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1/ Garnsey, E./Paukert, L., Industrial change and women's employment trends in the new international division of labour, (International Institute for Labour Studies, Research Series No.86), Geneva 1987, p.43.

importance of informal industrial activities it would seem to be of special importance to create and strengthen links with the formal sector with a view to establish more complementary relationships.

Chapter 2

Implications of emerging industrial trends

The recent worldwide economic recession and the connected crisis in industry in many developing countries not only meant a break in past trends but also a revelation of the industrial production growth complexity and uncertainty of basic assumptions and parameters which were previously taken as stable and/or predictable.

The ongoing process of industrial transformation in developing countries is accompanied by a corresponding change in skill requirements. Human skills required at any one stage of industrial development in a country for planning, promoting, operating and servicing industries will constantly need to be enhanced and adapted to enable the country's attainment of a higher degree of industrial development. Traditionally manpower planning in the 1960s and 1970s attempted to project requirements in terms of quantities of broad professional categories and could in many cases be based on trend developments and international comparative data. In most developing countries vast skill gaps existed in practically all professional categories relevant to manufacturing and human resource development for industry could thus be designed in an extensive form and on a very broad front pending, of course, availability of financial and institutional resources for training.

Human resources did not always receive the strong attention they deserved as crucial determinant of economic development. Specifically in the sixties and early seventies a widespread fallacy has been to explain economic development basically in terms of capital and technology inputs and to treat the concomitant development of human resources largely as a residual - as such considered more as a social concern than an economic variable. Meanwhile however, it has become widely accepted that it is human beings and the skills they command which are decisive for development and that investment in human capital can in fact yield higher returns than does real capital formation. This relatively recent awareness of the indispensable role of human resource development has been fuelled from a number of different sources, such as the theoretical debate within development economics which in the context of the basic needs debate reestablished the functional relationship between minimum levels of human resource development and enhanced productivity of the labour force. Moreover, the successful experience of a number of developing countries has clearly demonstrated the importance of a well trained and educated work force in accelerating industrial development.

There has also been an increasing awareness that it is human resource development in general and skill formation in particular that are more and more providing the competitive edge in industry.[1/] This point is of

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1/ Cf. UNIDO, New industrial technologies and human resource development in Asia: Some selected issues, UNIDO/IS.611, 19 February 1986.

particular significance for developing countries which are strongly involved in the international division of labour and heavily relying on direct foreign investment flows. Hence, some of the pertinent recent trends in international trade and investment are briefly outlined below as they are found to have contributed to place human resource requirements in the foreground.

One essential point to be made in this context is that comparative cost advantages have increasingly become man-made rather than being determined by the availability of natural resources or by given relative factor endowments. In other words, trade flows are more and more shaped by political intervention, not only in the strict sense that specific lines of technological development are given priority and deliberately promoted but also in the broader sense that, in view of the increasing significance of human reosurces as factor of production, a country's educational system and entire social infrastructure determine its overall competitiveness more strongly than ever before. It is in this sense that the level of human resource development can indeed provide the competitive edge, as mentioned above.

Looking more specifically at recent trends in the international investment system it is clearly discernible that labour costs are rapidly losing in significance as a cost component and thus as an investment determinant. The world economy is characterized by an "uncoupling of manufacturing production from manufacturing employment"1/ emanating from the introduction of revolutionary technological innovations (such as microelectronics-led automation processes). It appears that the first round of global industrial restructuring (largely based on the redeployment of labour-intensive manufactures with a low skill content) to developing countries is increasingly being replaced by international restructuring which involves (i) a partial relocation 'back North' of automated, previously labour-intensive processes and (ii) a new international redeployment of more skill-intensive production processes. Accordingly, in the attraction of foreign investment a premium is put now on the availability of cheap skilled labour and an existing infra-structure allowing the efficient utilization of new production and communication technologies. The industrialization avenue of many developing countries in the sixties and seventies based on low-skill manufacturing for exports may become an increasingly narrow path in the future. More than ever before, the building up of competitive industrial structures and capacities in the developing countries will increasingly require "that the training of technical labour would be done rapidly enough, and on a large scale enough to foster a second stage of 'off-shore' productive decentralization from the North's industrial base."2/

1/ Drucker, P., The changed world economy, in: Foreign Affairs, Spring 1986, p.775.

2/ Castells, M., High technology , world development, and structural transformation: The trends and the debate, in: Alternatives, Vol.11(1986), p.305.

At the same time this implies that unless the prevailing occupational gender stereotypes - largely assigning low skill jobs to women - can be changed the latter stand to lose whatever the outcome may be: either by reduced inflows of foreign investment or by changing skill requirements which currently only a minority of female workers are able to meet.

Thus, increased efforts in the field of general and technical education as well as vocational training for women deserve to be considered a key element and precondition in any attempt to increase and upgrade their future industrial participation.

However, literacy rates for women though growing somewhat faster than the rates for men are still much lower than those for men: in 1980, 67.5 percent of the male population in developing countries was literate as opposed to 51.5 percent for women. Similar proportions may be found for secondary and tertiary level education, although here, again, growth rates for female participation are somewhat higher than for men. With regard to technical and management-related education (at all levels) however, female participation rates appear to be extremely low in most countries.

The educational, social and legal barriers to quantitative and qualitative expansion of female involvement in the manufacturing sector have a negative impact which goes beyond the income of women and their families; policies aiming at expanding the role of women in industry therefore have a significance for development as a whole.

As an earlier UNIDO report formulated the issue:

> "The interdependence between the improvement in women's position in the economy, on the one hand, and the basic objectives of development policy (increased economic growth, improved productivity, fuller employment, more just distribution of income, elimination of poverty, improved balance of payments, reduced birth rates, etc.) on the other hand, is such that providing women with the opportunity to increase and improve their contribution to economic development is an important means of achieving the fulfillment of basic development goals."1/

If the potential of women's contribution to industrial development is to be fully utilized, a better quantitative and qualitative matching of the skills of the female labour force to the (emerging) needs of the manufacturing sector is essential. In many countries, there is widespread unemployment among graduates of tertiary education establishments, while there is a serious shortage of employees with a technical education background. Dynamic, development-oriented human resource planning therefore acquires special significance. Co-operation between Government agencies involved in industrial development and educational authorities can identify areas where special efforts need to be considered to promote a stronger participation of women in technical and managerial training and education.

1/ UNIDO, The role of women in industrial development, UNIDO/IS.484, 13 September 1984, p.67.

Chapter 3

Observations emanating from UNIDO's studies and research

Comparative evidence from country case studies

To illustrate global data on trends, challenges and policies and further substantiate the issues raised, some indicators and analyses at the national level are being presented here. These are based to a large extent on the three initial country case studies on Nepal, Sri Lanka and Zimbabwe referred to in Chapter 1. 1/

The field studies undertaken in the three countries in many ways reflect the overall trends in female involvement in the manufacturing sector in other developing countries. Where women are employed in the formal sector, they tend to be a minority, and only a handful of women is found in senior positions either in the manufacturing sector or in supporting institutions and services. They are overwhelmingly found in low-skill, low-pay jobs. The textile and wearing apparel industry is, as elsewhere, the major employer of women. Food processing follows, other branches showing low levels of female participation. To an extent, the building materials industry plays a role in providing employment to women in Nepal and Sri Lanka. Basically, the employment of women in these industries is related to skills traditionally considered to be their domain. In Sri Lanka, women are increasingly employed in electronics industries, but the number is still rather small; the same is true in the chemicals branch, where the share of female employment has actually declined. In Zimbabwe, which disposes of a more diversified manufacturing sector, women are begining to be employed in significant numbers in the chemicals, paper, printing and publishing and metal products industries.

Whereas the branch pattern of female employment reflects the stage of industrial development in each of these countries, this is not the case with regard to the skill pattern. As noted above, women are overwhelmingly found at the lower end of the job spectrum, and this is virtually independent from

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1/ The three countries represent the range of lower and lower-middle income countries with varying levels of industrial development: in 1985, per capita income and MVA share in GDP were US$150 and 5 percent in Nepal, US$380 and 15 percent in Sri Lanka, and US$680 and 29 percent in Zimbabwe. Nepal is a relatively strongly inward-looking economy, with a relatively low level of human resource development; Zimbabwe is a major factor in the economy of the Southern African region, with a human resource development level that seems fairly typical of middle-income economies and a strong women's movement advocating an enhanced role of women in the economy; Sri Lanka, finally, has witnessed an accelerated integration in the global economy in recent years and exceptional efforts in the field of human resource development initiated by the Government.

the difference in industrial development levels between the individual countries. Some avenues for upward mobility were found to exist both in Sri Lanka and Zimbabwe, but the number of women actually making care rs in the manufacturing sector is very small, and the number of women in senior positions was extremely small in any of the three countries under review.

The fact that female employment growth in higher skill categories does not follow the overall development of the manufacturing sector is partly a consequence of female labour being negatively affected in the wake of technological innovations. Whenever a higher degree of mechanization of the manufacturing process takes place, a number of manual skills becomes superfluous. The consequent reduction in employment may be balanced by new demand for employees (at the samee skill level) through expanded production, but the new employment generated by the need to supervise and maintain the more complex machinery tends to be reserved for men and is hardly ever available to women.

Rising female education levels have so far done little to strengthen the position of women: female literacy rates are growing faster than those of men in Nepal, girls are almost equally well represented as boys at the lower educational level in Zimbabwe, and female participation in education surpasses that of men in some fields in Sri Lanka. Yet, although the participation shares in the industrial labour force differ in the three countries, the status of women in the sector is uniformly low. The low degree of female participation in technical and managerial training in education in all three countries is an important reason for this, but that in turn is to some extent a consequence of the social image and self-image of women as home-makers, not breadwinners in industry.

In the countries under review, however, the need for women to be breadwinners is amply demonstrated by the size of their involvement in a wide range of informal sector manufacturing activities. In contrast to formal sector manufacturing, where a large part of the female workforce consists of young unmarried women, the majority of these involved in the informal sector manufacturing is married with children; informal economic activities are for them generally the only way to combine domestic duties with gainful employment, even if financial gains and working conditions are ususally much less attractive than in the formal sector. Once again, textile-related production was found to dominate, followed by food processing. Women's traditional skills form the actual basis of the manufacturing process in the informal sector, and therefore the branch structure of (self-)employment closely mirrors these skills. Apart from the more modern industries, such as chemicals and electrical/electronic products (which are hardly representated in the informal sector because of their knowledge and capital intensity), women are conspicuously absent in metal working, an important informal sector activity worldwide.

With the renewed emphasis on industrial innovation and entrepreneurship to be observed in many developing countries it appears essential to ensure a stronger participation of women not only in the industrial labour force but also in entrepreneurial activities. So far, there are but few cases of successful female entrepreneurs in formal sector manufacturing. Targeted support services and technical assistance on all aspects of establishing an industrial venture (feasibility studies, finance, production technology, marketing etc.) are much needed. This may require the building up and/or strengthening of corresponding institutions. In this regard, the activities of the Women's Chamber of Industry and Commerce established in Sri Lanka in 1985 deserve special attention.

Female entrepreneurship is much more common in the informal than in the formal sector; in fact, women were found to manage their own businesses in the majority of cases investigated. The evidence moreover suggests that female participation in informal processing/manufacturing activities is not much smaller than male participation; much of it however is not recorded in statistics because the activities are either non-renumerated or regarded as a sideline. In other words, there is a much larger actual contribution of women to manufacturing than is usually assumed. Efforts to fully utilize this support measures, the available evidence on Sri Lanka's Export Production Villages and Nepal's carpet makers suggests, predominantly female informal sector manufacturing can even find a niche in the world market.

A number of weaknesses of the informal sector would have to be overcome. As in the formal sector, technical and management training programmes (and, to a lesser extent general education) are not sufficiently accessible to women. And although programmes combining training and production have been initiated in all of the three countries under review, these concentrate very heavily on traditional female skills in the fields of textiles and food processing. Access to markets and credit, difficult for any informal sector entrepreneur, has proved to be an even greater problem for women. Finally, informal sector products often cannot compete with mass-produced formal sector products; the handloom sector in Sri Lanka provides a drastic example. The co-operation between formal and informal sector seems especially weak where female informal sector enterprises are concerned, although in many cases, they do acquire inputs from the formal sector, and subcontracting within the informal sector was found to be quite common in Zimbabwe. The weak position of female informal sector entrepreneurs and the fact that much of their production is not oriented towards larger markets may be the main reason for the conspicuous weakness of linkages. Intensification of these linkages could however give a considerable boost to industrial development.

The Export Production Villages as operating in Sri Lanka, are a case in point. Under this scheme, activities like the processing of agricultural produce or in some cases also non-traditional manufacturing (umbrella-making; assembly of electronic components) are organized at the village level on a co-operative basis. Through large local firms with access to overseas markets these rural largely female producers are linked with export markets.

All three countries under review have given special attention to strengthening the role of women in the manufacturing industry. Sri Lanka has progressed furthest in the way of laying the foundation for an overall strengthening of the role of women in society, with equal participation rates for men and women in general education. Recent plans and policies in all

countries under review also show an awareness of the fact that women's participation in technical training are to be expanded in order to make better use of this human resource in industry. In co-operation with multi- and bilateral agencies, a great number of training-cum-production projects has been implemented. Women's organizations have supplemented and stimulated these efforts. Governments have also shown an awareness of the dual (domestic/economic) role of women workers by providing special legislation and insisting on special facilities for women.

Technological innovation being one of the essential macro-dimensions of structural change, it appears safe to assume that future developments in the manufacturing sector will lead to an increased complexity of industrial technologies. This tendency is clearly visible in Sri Lanka and Zimbabwe in their attempt to achieve a higher degree of industrial diversification. The following arguments would seem to apply, however, to a large number of developing countries.

While a more diversified industrial structure is certainly desirable from a macro point of view, its impact on female industrial employment industrial employment might be initially rather ambiguous. The immediate effect of a structural shift away from the dominant textiles/clothing industries towards more sophisticated industrial production will obviously be a substantial loss of jobs that have traditionally been 'female'. In consequence, women will only be able to benefit from industrial restructuring to the extent that they will be able and given a due chance to participate in some of the new growth industries. This assigns a decisive role to a vocational training system properly equipped to respond to the emerging challenges.

The overall policy guideline should in fact not be to 'protect' women against technological innovations or structural changes (this could in the long run turn out to be self-defeating) but to ensure their adequate participation in this process. No doubt, in the past there has often been an 'anti-women bias' in technological innovations. However, the blame for this in not to be put on (technological) modernization as such but rather on (socio-cultural) traditions which on the basis of gender-stereotyped employment patterns have relegated women to simple, easily mechanizable tasks. Hence, they have been structurally 'predisposed' to job losses.1/ This has been true not only concerning the introduction of modern technology but often also in the case of small changes in traditional technology, e.g. in the area of processing agricultural produce.

Accordingly, it would seem to be of paramount importance to identify in advance those growth branches and emerging technologies in which women can in the future play a greater role than in most industries in the past and to formulate the respective skill requirements. It appears reasonable to assume that at a time when traditional production processes are transformed by technological change the opportunities to overcome gender-based occupational

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1/ Cf. UNCTAD/INSTRAW, Women, technology and sexual divisions, UNCTAD/TT/79, 5 March 1985, pp.20 ff.

classifications are comparatively great, due to the lower strength of vested interests. Hence, the close monitoring of the introduction of new technologies is of utmost importance in terms of establishing an 'early warning system' capable of identifying both emerging threats and opportunities.

For example, one clearly discernible trend is that the utilization of computer technology is rapidly gaining significance, both in industry itself and in industry-related institutions (Ministries, research institutes, etc.)

While the impact of the rapidly expanding utilisation of computer technology cuts across all branches of manufacturing (and related service activities), there are other technological changes that mainly affect particular industrial branches. For instance, the textiles industry worldwide has in the recent past been experiencing drastic innovations in production technology which will change the future skill requirements of the industry's predominantly female labour force. Whereas their precise impact is not yet clear it appers safe to assume that, on the one hand, new supervisory, data control and programming activities tend to increase related skill requirements while, on the other hand, the generally higher degree of automation would tend to decrease the required skill level in other activities. The clothing industry has so far shown a stronger 'resistance' to technological change but major innovations e.g. in cutting processes are on the horizon. To the extent that these innovations are implemented in developing countries (rather than to lead to a relocation of production back to developed countries) it is crucial for the female labour force to meet the resulting challenge in order not to be replaced by both new equipment and differently qualified male labour.

In the medium run it is important to note that as a result of increasing automation, production systems tend to become more similar across industrial branches than they have been hitherto. Under these conditions, training for industrial activities that make use of the new technologies can clearly yield economies of scale in the sense that a general technical training can easily be adapted for use in specific industrial branches. This implies that sooner or later industry will obtain benefits in strict cost terms through participating in general training courses in the use of new technologies. The financing of such training could, of course, come both from industry associations and the public purse; the benefits for government would be those of supporting industry in its efforts to remain internationally competitive. Moreover, this type of training tends to maximize the mobility of semi-skilled and skilled staff and thus create more opportunities for dynamising the industrial sector as a whole.

All that has been said above points to the need to establish a coherent institutional framework for human resource planning and to make it an integral part of economic policy making. In many countries systematic projections of future manpower requirements and in particular changing skill patterns are not or only insufficiently carried out, at least at the level of manufacturing sub-sectors where - in view of rapid intra-industrial structural changes - they would be most urgently needed. This may often be due to a prevailing market oriented economic policy approach that is felt to be in conflict with the setting of sectoral development priorities and targets from which manpower implications would have to be derived. However, it needs to be pointed out that market mechanisms are insufficient when it comes to dealing with the manpower and skill consequences of industrial restructuring as in this area imperfect knowledge prevails and long gestation periods are needed to generate higher/differently skilled workers.

Selected priority areas for attention

The increased participation of women in industrial development must be seen as one key dimension of the overall development process. Women constitute a segment of the population whose potential contribution so far has not been sufficiently recognized. Growing female entrepreneurship in industry and higher industrial skill levels of women workers will be a stimulating factor in overall growth. On the other hand, only overall growth can create the increased demand for labour from which a greater number of women can also benefit. In order to promote such developments and to counter those forces that tend to reverse the desired trends a number of general measures are called for at the national level.

Education and training

In this, the education system in its dual role of shaping long-term sociocultural gender perceptions and of generating knowledge and skills required by the labour market is of crucial importance. Hence in an overall view, advisory programmes aimed at the elimination of traditional gender roles as well as programmes geared at the eradication of illiteracy desrve strong support. More specifically, it is suggested that national Government give priority to:

- improving technical and managerial skills in the workforce both through formal, educational and on-the-job (re)training schemes;

- special support to training/education in technological fields that are likely to play a key role in future industrial development (e.g. chemicals, electronics, metal working);

- provision of more vocational guidance and career counselling to girls and young women;

- closer co-operation between educational authorities and Government agencies involved in industrial development to ensure a better matching of supply and demand in the labour market.

Human resource planning

Educational and training policies need to be an integral part of a country's social and economic system and in particular will have to respond to its overall economic strategies and policies and the major internal and external trends affecting them. In this context, dynamic human resource planning acquires special significance. In particular, the following areas for policy action may be considered:

- strengthening of the institutional machinery for human resource planning as an integral part of economic and industrial policy-making;

- creation of surveillance schemes ('early warning systems') to monitor emerging technological changes in industry with special emphasis on assessing their impact on women;

- improving information on human resource supply/demand, e.g. through labour exchanges;

- as a precondition for more effective human resource planning, to redefine statistical concepts relating to economic activities of women and improve the coverage, at branch and skill levels, of female particiaption in the manufacturing sector.

Informal sector

In view of the imporant role that women are playing particularly in informal sector industrial activities, policy measures should focus more on tapping its large potential. This would be reached, inter alia, by:

- stimulating forms of co-operation between informal sector entrepreneurs;

- stimulating linkages between formal and informal sectors;

- improving access to credit, material supplies and markets for informal sector enterprises;

- identifying ways to facilitate the adoption of new or improved technologies and new forms of production organization in the informal sector.

Legal measures

In the important sphere of laws and regulations pertaining to the role of women it is recommended to:

- remove legal obstacles to the full participation of women in economic activities where they still exist;

- adopt equality legislation and labour legislation based on ILO standards and regulations that enable women to engage in gainful economic activities while taking account of their domestic jobs (factory day care facilities, etc.);

In implementing the measures outlined above it appears essential to ensure a stronger representation of women in industrial policy-making and technology development and to increase the number of women in key positions in industry, industry-related services and Government agencies involved in industrial development.