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**HUMAN RESOURCES AND INDUSTRIAL
DEVELOPMENT IN AFRICA**

V.91-31510

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Preface

As part of its work on regional issues, the Regional and Country Studies Branch of UNIDO carries out studies and provides advice on key industrial policy issues in developing countries. The present study, covering Africa, is part of the work program on human resources for industry.

The paper addresses the past neglect of the human capital dimension in industrial development strategies that has been a critical factor in the shortcomings of industrial efforts in Africa. Factors affecting human resources supply and demand are examined, highlighting relevant gender differences. The study culminates in policy implications for national and international endeavors directed towards enabling human resources to play their full role in the process of industrialization.

It is difficult to be definite on such a vast and diverse subject as human resource development for industry. UNIDO therefore welcomes comments and suggestions on the the present study that it then can take into account in later revisions and, above all, in its operational activities. Such observations can be addressed to: Head, Regional and Country Studies Branch, UNIDO, P.O. Box 300, A-1400 Vienna, Austria.

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ABBREVIATIONS

CAPA	Commonwealth Association of Polytechnics in Africa
FDI	Foreign direct investment
GDP	Gross domestic product
GNP	Gross national product
HRA	Human resources assessment
HRD	Human resources development
KTTI	Kenya Textile Training Institute
ILO	International Labour Organization
MVA	Manufacturing value added
ODA	Official development aid
R & D	Research and development
REG	Regional and Country Studies Branch, UNIDO
SIDA	Swedish Industrial Development Authority
TA	Technical assistance
TNCs	Transnational Corporations
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNI	United Nations Industrial Development Organization

Key Assumptions

1

Improvement in African industry will concentrate on rehabilitation of existing productive capacities, on improving efficiency and profitability.

2

Where genuine development takes place, it will be from simple processing of raw materials to the assembly and fabrication of producer and consumer goods; information and knowledge-based technologies take over from those characterizing mass production.

3

Small and medium scale enterprises, whether within or outside the formal sector, will account for most of the income and employment generation in African economies.

4

Capacities in African countries to absorb foreign know-how and skills are low; the building-up of an indigenous skill base and technological tradition becomes absolutely essential.

5

Human resources development in the broadest sense and skill development in the narrower sense will provide the competitive edge in industry.

1. Background

Most African countries received their independence some 30 years ago. This meant great expectations among the continent's peoples. In the industrialized world optimism with respect to Africa's development was high as well. Since then, however, the expectations have been shattered: populations have grown while economic development has not kept pace, living standards have declined, the infrastructure has decayed, once self-sufficient people are starving and dependent on donor aid.

Large amounts of official development aid (ODA) has been devoted to Africa. In 1988 alone, the official development assistance to African countries exceeded \$1.5 billion.¹ It is not correct to conclude that all this aid has been in vain. But, a justified question is: has the development aid, by and large, been directed towards the correct type of investment? Clearly, scepticism among donors regarding previous aid is now reflected in two facts: they are shifting ODA flows towards those African countries that have committed to undertake fundamental restructuring of their economies, and there is a growing preference for cofinancing arrangements. Capital from private sources is also drying up as international flows of foreign direct investment is increasingly drawn to countries that have the prerequisite technological capability. In the end, however, this could have a positive outcome. What Carl Eicher observed already some 15 years ago with respect to education in Africa may hold just as well for its industrial structure:

"African education is intimately linked with the international aid and education industry, and ...the donor/client dependency relationship has inhibited the development of African institutions and the capacity of Africans to develop educational policies which are socially relevant and financially feasible, for the last quarter of a century."²

The initial spurt of African economic development in the 1960ies was based on the notion that industrialization was the engine that would pull behind it raising standards of living and general welfare for the continent's population. The slow-down of the industrial growth in the 1970ies, stagnation and eventually even de-industrialization in the 1980ies has given rise to

¹ World Bank, World Development Report 1990, Washington, D.C

² Quote repeated in Kenneth King, "Education and Training in Africa: The Search to Control the Agenda for its Development", paper presented to the Conference of the Royal African Society on 'Suo-Saharan Africa: the Record and the Outlook', St John's College, Cambridge, 14-16 April 1991

international debates and reports that question the validity of the concept of industry-led growth and related strategies adopted in Africa.³ As a rule, these strategies stressed one or another economic sector or issue at the expense of an integrated, holistic approach to development. Success was seen as dependent on natural resources and low cost labor. Today, the key elements are technology, capital, telecommunications, skilled labor, and management. The trinity between company, customer and competition against the macro background of political and currency stability are the main determinants of economic progress. In the economic infrastructure, management is regarded as the principal function that ties together the three components: human resources, technology, and capital.⁴

Against the above background, a general consensus has now formed about the need for a new strategy. Stressing only one sector in a national economy is now recognized as too simplistic a solution. Industry is still seen as very important for the overall economic development. But the restructuring and integration of all economic activities—industry, agriculture and services—together with such support functions as financing, external aid, and human resource development (HRD) is now viewed as absolutely essential for sustainable and equitable growth. Creating an "enabling environment", restructuring, rehabilitation, development of human resources and technology transfer are being put forward as means to bring Africa, especially Sub-Saharan Africa, back onto the path of economic growth. Major components of the new "human centred development strategy" are more outward looking, export oriented industrial policies with emphasis on international competitiveness, private enterprise, direct foreign investment and joint ventures, and regional/international cooperation.

Competitiveness and open trade are at the center of the proposed new strategy. Competition on the markets takes place on the basis of price, design, quality, marketing, reliability, timeliness, and after-sale service. The degree to which the African producers can master these tasks will determine their position on domestic markets and international markets. It will also impact the respective countries' ability to develop their industrial sector as part of the international systems of production, trade, and consumption. Quality control as part of full production management systems⁵ and

³ See, e.g. Haarlem Brundtland Commission: *Our Common Future*; or World Bank: *Sub-Saharan Africa From Crisis to Sustainable Growth*, 1989; or *The Report of the South Commission*; UNIDO: *Global Report 1990/91*; or UNDP: *Human Development Report 1990*.

⁴ Dr P. Hara, President of Seiko, Inc. in speech given at UNIDO on May 8, 1991

⁵ Production management systems can be defined as the totality of production planning

industrial/engineering design are the very fundamental issues. They in turn are entirely dependent on the basic mastery of technology, knowledge, and skills—on HRD for industry. Simultaneously, the choice of appropriate technology has to be a judicious one, carefully balancing the need to be competitive with domestic policy goals such as employment generation and with constraints such as availability of capital and foreign exchange.

Current tendencies in agriculture, industry, trade and social investment policies embodied in economic restructuring in Africa can lead to further marginalization of women. Incentives promoting efficiency, export, foreign investment affect sectoral and inter-sectoral priorities, technology, labor relations, social services, geographic distribution, wages and terms of employment. A conscious effort is required to balance these incentives with legal, social and economic measures directed to fulfilling the objectives of human resource development of which women are a recognized and integral part.

Recognizing that human resources have been a "neglected dimension of development strategy"⁶ the question arises: how does the human potential match the new industrial development expectations or desired patterns? In this paper industrial strategies put forward for Africa in terms of their implications for industrial skill requirements are interpreted. The paper identifies issues which have to be addressed in the implementation of the new industrial strategy based on human resource potentials. Important factors influencing the build up of technological skills are highlighted stressing the need for close integration of human resource issues into industrial development policies. The focus is on human resource development in terms of industrial skill formation aiming at deriving generally applicable policy recommendations and technical assistance guidelines with respect to HRD for industry in Africa.

The paper builds on a survey of in-house available literature and statistics on most of the 52 countries in Africa and on select comparisons with other developing countries. Counting the island states but excluding South Africa, there are 52 independent countries in Africa. Out of these, one nation (Egypt) produces well over one half of all engineering graduates on the continent; four of them produce nearly 80 per cent of the total. Out of 33 African

and control, inventory control, and quality control. See P.C.L. Goonatilake, "Production Management—The Forgotten factor in the Industrialization Policy in Developing Countries", *World Development*, Vol II, No 9, 1983, pp. 845,....,850

⁶ The UN Committee for Development Planning, "Human Resources Development: A Neglected Dimension of Development Strategy", New York, 1988

countries for which 1987 manufacturing value added (MVA) figures are available, fully 30 countries together produced no more than one half of the total MVA. Clearly, there is a great diversity between the individual African countries. Nonetheless, there are certain common features among the countries that make it possible to arrive at useful generalizations.

In the following sections, the relevant facts are reviewed starting with the most basic issue on the supply side: population itself. Next the characteristics of education and training in Africa are analyzed in statistical terms as far as possible. The employment situation and the growing importance of the informal sector is investigated. A short review of the situation of the manufacturing branch on the continent leads into the discussion of the demand side. The focus is on the characteristics of the present labor force and the available evidence of market demands for various skills.

Next the employment generation of the manufacturing industry overall is reviewed along with available evidence on the supply of and demand for specific industrial skills. The analyses in the preceding sections and other piecemeal evidence is then brought together as far as possible in order to gauge emerging skill gaps that are likely to be of importance to what is now beginning to be termed technological capability. The final section concludes with suggestions for areas and issues where international assistance and cooperation could be most useful and effective. It draws out policy implications for national and international endeavor directed towards enhancing HRD in the process of industrialization, and concludes with suggestions for UNIDO's future activities on HRD for industry.

2 Supply of Human Resources for Industry

2.1 Population

In 1970, Africa had the total population of 363 million. This was equivalent to 9.9 per cent of the total world population. Since then the population in Africa has grown at 3.0 per cent per annum whereas the growth in the rest of the world gradually slowed to 1.7 per cent. By 1989, the population of Africa had risen to 611 million and its share in the world total had climbed to 12.0 per cent. At the current growth rate the population in several Africa countries will double every 20 years, the continental total reaching 1 billion in 2010.

It is only recently that active population policies have been sanctioned by the majority of African governments.⁷ So far only three African countries, Mauritius, Botswana and Zimbabwe, have achieved a sizable decline in fertility rates. For the continent as a whole, progress in this regard is not expected before the end of this century. The World Bank's scenario for sustainable growth in Sub-Saharan Africa projects that the total fertility rate will have to fall by 50 per cent in the next generation, from 6.7 in 1990 to 3.4 by 2020 in order to bring the population growth rate from the present 3.3 per cent to an average of 2.75 per cent a year for 1990-2020.⁸

Almost half of the African population now is in the economically active age group. Moreover, this segment is growing faster than the total population. This presents a serious problem for employment creation in the future. On the other hand, a growing population especially in this age group, if matched with income earning opportunities, also represents growing markets for consumer goods and subsequent multiplier effects on employment and interindustry linkages.

According to ILO projections based on past trends of women's economic participation, one quarter of the total female population of Africa (28 per cent in Sub-Saharan Africa and 9 per cent in northern Africa), or 100 million females (91 million in the age group 15 to 64), will be economically active at the end of the 20th century. But, high fertility rates affect women's chances to complete secondary and higher education, structure, form and terms of employment, and change the traditional perceptions about women's role.

⁷ At the Conference of African health ministers in Niger in January 1989 almost all countries endorsed an active population policy whereas 15 years earlier at the World Population Conference in Bucharest most of them had been opposed.

⁸ World Bank, *Sub-Saharan Africa: From Crisis to Sustainable Growth*, Washington D.C. 1989, p. 6.

Furthermore, the majority of the female economic active population is in rural areas where the social and economic infrastructure does not provide for favorable conditions for women's entry into the formal sector.

Not only women but most of the population still lives in the rural areas although the rate of urbanization is increasing. Ten to forty per cent of the African population live in urban areas where concentration of educational and training services is highest. Only in three or four countries is the urban population larger than the rural one. Thus, only relatively few Africans have ready access to educational facilities, especially secondary and higher education.

As this high growth in population has largely not been accompanied by a corresponding increase in economic activity it has significantly handicapped governments' endeavors to improve per capita income, literacy rates and economic and social well-being in general. According to World Bank estimates, per capita income in Sub-Saharan Africa declined 2.8 per cent per year between 1980 and 1987.⁹

2.2 Education and Training

Since independence, many governments in Africa set a high priority on the eradication of illiteracy.¹⁰ A significant proportion of government budgets was allocated to general education. As a result, the illiterate portion of the population has declined fairly rapidly in many African countries. In the 1970ies, available UNESCO data indicate that 15 out of 23 countries had illiteracy rates over 60 per cent, including 6 countries where the rates exceeded 80 per cent. In 1990, however, out of 38 countries 16 still had illiteracy rates over 60 per cent and only one country came in with a rate over 80 per cent. If only male illiterates are considered, 6 countries remain to have an illiteracy rate over 60 per cent with no country having one over 80 per cent. Thus, female illiteracy is higher than that of Africa's male population. Cultural factors, marital status and fertility rates continue to strongly affect women's opportunity to gain education and training.

The eradication of illiteracy has been brought about by the governments' attempt to universalize primary school education. Indeed, several countries

⁹ *ibid.*, Table 1.

¹⁰ For a discussion of the importance of basic education for technology transfer, see Elias H. Tuma, "Technology Transfer and Economic Development: Lessons of History", *Journal of Developing Areas*, Vol 21, July 1987, pp. 403,....,428.

Table 1 Percentage of Age Group Enrolled in Education, 1987

Country	Primary		Secondary		Tertiary	
	Total	Female	Total	Female	Total	Female
Algeria	96	81	55	46	9	
Angola	..	..	..
Benin	63	43	16	9	3	
Botswana	114	117	32	33	3	
Burkina Faso	32	24	6	4	1	
Burundi	67	50	4	3	1	
Cameroon	109	100	26	20	3	
Central African Rep.	66	51	12	6	1	
Chad	51	29	6	2	0	
Congo	..	..		..	..
Côte d'Ivoire	70	58	19	12	..	
Egypt	90	79	69	58	20	
Ethiopia	37	28	15	12	1	
Gabon	..	..			5	
Ghana	71	63	40	32	2	
Kenya	96	93	23	1		
Lesotho	113	..125	..	..	..
Liberia	35	23	5	..	3	
Libya	..	..			10	
Madagascar	..		21	19	4	
Malawi	66	59	4	3	1	
Mali	23	17	6	4	1	
Mauritania	52	42	16	9	3	
Mauritius	106	107	51	50	1	
Morocco	71	56	37	30	10	
Mozambique	68	59	3	4	0	
Niger	29	20	6	3	1	
Nigeria	77	..	..	..	..
Rwanda	67	66	6	5	0	
Senegal	60	49	15	10	3	
Sierra Leone	..	..	..	..	..
Somalia	15	10	9	6	3	
Sudan	49	41	20	17	2	
Tanzania	66	66	4	3	0	
Togo	101	78	24	12	3	
Tunisia	115	107	40	34	6	
Uganda	70	63	13	9	1	
Zaire	76	64	22	13	2	
Zambia	97	92	17	13	1	
Zimbabwe	136	132	45	36	4	
Average	72	63	21	17	3	
Standard deviation	29	32	17	15	4	
Number of countries	34	33	33	32	34	

Source: IBRD, World Development Report 1990

Note: Enrollment may exceed 100 per cent because some pupils are younger or older than the country's standard school age for the grade in question.

in Africa have accomplished or nearly accomplished the goal of universality of primary school education for their nationals (see Table 1 above). Equally, several countries are still far from this objective and correspondingly more than a generation away from complete or nearly complete literacy among their populations. Taking into consideration the time it takes for the learning process to take effect puts these countries in a difficult situation in terms of skill formation. In the case of Mozambique, for example, a large part of the manufacturing work force is still illiterate forcing some industries to include literacy classes in their on-the-job training programs.

Primary school education is essential, but not sufficient to support high stages of industrial development. However, almost all the countries in Africa have not been able to raise the enrollment ratios of secondary and higher levels of education despite allocating sizeable shares of their education expenditures to the secondary level as well as to the primary level. Only three countries—Algeria, Egypt, and Mauritius—have reached secondary school enrollment ratios above 50 per cent. Women's enrollment is lower than that of men across the board (see Table 1 above).

The tertiary level enrollment ratios are extremely low in most of the African countries except for the Arab states in North Africa. Thus, many of the countries still depend to a large extent on foreign countries for their tertiary education, especially when it comes to specialized and advanced studies. Many students also choose to go abroad to obtain a high quality education. In 1988, some 170 000 African students were studying abroad.¹¹

The low enrollment of women across the education system is of concern. In 1983 girls in Sub-Saharan African countries accounted for only 44 per cent of all students in primary schools, 34 per cent of enrollment in secondary schools, and 21 per cent of those enrolled in higher education. Illiteracy is also much higher among females. The gender gap in education comes at a high cost in view of evidence showing high interrelationships between female education, health and nutrition levels, agricultural production, fertility rates and chances of employment in the formal sector.¹²

Drop-out (attrition) rates for girls are much higher than for male students; 20 to 30 per cent in primary school, 40 to 60 per cent in secondary school.

There is sex discrimination in the secondary school curriculum that offers different courses for girls and boys, e.g. girls are offered domestic science and commerce at the expense of science and technical subjects. This limits

¹¹ UNESCO Statistical Yearbook 1990, Table 3.15.

¹² World Bank, Sub-Saharan Africa... (1989), *op.cit.*, p. 79.

Table 2 Enrollment in Vocational Training, 1987

Country	Enrolled		All	Popul. millions	Enrol.(All) per 1000 Popul.
	Males	Females			
Algeria	38126	39957	128083	23.8	5.382
Benin (1986)	3674	2441	6115	4.2	1.456
Botswana	1770	491	2261	1.2	1.884
Burkina Faso	2428	2158	4586	8.5	0.540
Burundi (1986)	4024	1527	5551	4.8	1.156
Cameroon	54706	38945	93651	11.2	8.362
Central African Rep.	1077	886	1963	2.9	0.677
Chad	1927	719	2646	5.4	0.490
Congo	11887	15108	26995	2.1	12.855
Côte d'Ivoire (1986)	15561	9767	25328	10.7	2.367
Egypt	538882	362389	901271	50.2	17.954
Ethiopia	5300		5300	47.4	0.112
Gabon	6712	3255	9967	1.1	9.061
Ghana	26534	8755	35289	14	2.521
Guinea (1988)	3736	1376	5112	5.4	0.947
Kenya	4524	1077	5601	22.4	0.250
Lesotho	760	843	1603	1.7	0.943
Liberia 1980)	1695	627	2322	1.9	1.222
Libya (1985)	27000		27000	3.8	7.105
Madagascar	9287	5231	14518	10.9	1.332
Malawi	852	92	944	8	0.118
Mali	5577	2059	7636	8	0.955
Mauritania 1986)	1641	361	2002	1.8	1.112
Mauritius	552	311	863	1.1	0.785
Morocco	11808	5434	17242	24	0.718
Mozambique	7656	1662	9318	14.9	0.625
Niger	730	63	793	7.3	0.109
Nigeria (1982)	79274	7722	86996	90.6	0.960
Rwanda	18626	14837	33463	6.7	4.994
Senegal	3353	1431	4784	7	0.683
Sierra Leone (1984)	838	558	1396	3.6	0.388
Somalia (1985)	4572	1361	5933	5.4	1.099
Sudan (1985)	19506	6104	25610	21.9	1.169
Tanzania	0	0	0	24.7	...
Togo	4841	1992	6833	3.4	2.010
Tunisia	59567	31159	90726	7.8	11.632
Uganda (1986)	5760	732	6492	15.2	0.427
Zaire (1986)	155945	71062	227007	31.7	7.161
Zambia (1986)	3229	1338	4567	6.9	0.662
Zimbabwe (1986)	224	32	256	8.7	0.029
All	1194161	643862	1838023	532.3	3.453
Average					2.806
Standard Deviation					4.092
Number of countries					40

Source: UNESCO 1990 Statistical Yearbook, Table 3.7

girls' access to higher education and subject specialization. Thus, e.g., three quarters of all female university students in Zambia are in arts, social science and education. At the post graduate level, 6 out of 7 women studied art and social science at the Univ. of Dar es Salaam, 16 out of 21 in Zambia.

In order to cope with complex, fast advancing technologies a greater emphasis on science and engineering must be paid in secondary and tertiary levels of education. Particularly, vocational training schools, technical training schools and polytechnics serve an important role to produce the skills required. Greater emphasis must be placed on the teaching and development of production management systems as a whole instead of treating components such as production planning and control, inventory control, and quality control as somehow separate subjects.¹³ Furthermore, female enrollment in technical subjects both in secondary schools and polytechnics is unnecessarily low as shown by regional surveys for Western, Eastern, and Southern/Central Africa conducted by ILO and the Commonwealth Association of Polytechnics in Africa (CAPA) on Women in Technical Education, Training and Jobs.

Figures on vocational training enrollments are not consistently reported. But, the average for 40 African countries for which relevant data are available compares poorly with that for Asian developing countries (see Statistical Analysis 1 below and Table 2 above¹⁴). Moreover, the variation among the African countries is much larger than in Asian countries.

Statistical Analysis 1 Enrollment in Vocational Training per 1000 Population

	<u>African Countries</u>	<u>Asian Countries</u>
Average	2.81	6.87
Standard Deviation	4.09	5.14
n	40	15
δ		4.49
t		2.99

UNIDO based on UNESCO and World Bank data

¹³ Production management courses accounted for only 3 per cent of all courses offered in 31 developing country universities whereas it was as high as 44 per cent in four studied developed countries. See Goonatilake, *op.cit.*, p. 848.

¹⁴ The averages and the standard deviations are not based on random samples so, strictly speaking, the statistical inference is not fully justified. Nonetheless, the differences between the two groups of countries—statistically expressed by the joint standard deviation δ and the t-statistic for the difference between two sample means—is clear enough to allow a qualitative conclusion. The same observation applies to the other statistical comparisons in this paper.

Proportional to population, enrollment in engineering, whether at Level 5 (*Programmes leading to an award not equivalent to a first university degree (UNESCO)*) or at all levels, is significantly less in Africa than in Asian developing countries (see Statistical Analyses 2 and 3 below).

Statistical Analysis 2 Enrollment in Level 5 Engineering per 1 000 Population

	<u>African Countries</u>	<u>Asian Countries</u>
Average	0.0293	1.0698
Standard Deviation	0.0618	1.4833
n	41	12
∂		0.72
t		4.39

UNIDO based on UNESCO and World Bank data

Statistical Analysis 3 Enrollment in Engineering (All Levels) per 1 000 Population

	<u>African Countries</u>	<u>Asian Countries</u>
Average	0.117	2.318
Standard Deviation	0.195	2.221
n	41	13
∂		1.12
t		6.15

UNIDO based on UNESCO and World Bank data

Although there are differences between the relative proportions of engineering and vocational students between African and Asian developing countries (see Statistical Analysis 3 above), there is no significant disparity in the proportions of those enrolled who actually graduate (see Statistical Analysis 4 below).

Statistical Analysis 4 Graduates per Enrolled in Engineering (All Levels)

	<u>African Countries</u>	<u>Asian Countries</u>
Average	0.154	0.165
Standard Deviation	0.194	.054
n	33	10
∂		0.18
t		0.17

UNIDO based on UNESCO and World Bank data

Enrollment of female students in technical and vocational training schools ranges between 20 to 40 per cent of the total enrollment, but the majority of all female students are concentrated in a few subjects such as domestic science, secretarial and business studies, clerical work, and teachers training. In education by correspondence, women make up only 13 and 9 per cent of the total enrollment in Tanzania and Zambia respectively, mainly in teachers' training.

It appears reasonable that young persons, when considering what type of education to get and what career to pursue, would attempt to gauge future job markets. To test this hypothesis as far as industrial jobs are concerned, the enrollment in different types of technical and vocational training is compared to the past growth in manufacturing (see Fig 1 below). Clearly, the empirical data do not confirm the hypothesis for African countries. But neither is it born out for Asian countries, at least not as far as vocational training is concerned (see Fig. 2 below). The implication of this finding is that either the labor markets do not send adequate signals to prospective new employees, or students are misinformed or have other but occupational motives for enrolling in vocational training, or enrollment is determined by the supply of training.¹⁵ The consequence for industry and students alike is that there is a poor match between supply of and demand for vocational skills.

It is difficult to obtain a comprehensive picture of how well African education and training corresponds to enrollment demand and how well the graduates do on the job market. The evidence is mainly anecdotal and narrated in occasional studies and reports but it tends to point towards the same conclusions. Therefore, chances are, but it is by no means sure, that the following summary (see box on page 20) of the educational situation as far as industry and manufacturing is concerned in Djibouti is typical for many regions, countries, and areas in Africa.¹⁶

¹⁵ Since the hypothesis was not supported by the data for vocational training for which we had assumed that the relationship would be clearest, we did not test the hypothesis for other types of education. We note, however, that vocational and other types of technical training might be more responsive to changes in gross output than to changes in MVA. We did not test for this hypothesis. A further possibility is that there are considerable lags between skills demand and supply. In Japan, lags from one to two decades have been observed.

¹⁶ The summary stems from UNIDO, Djibouti, Economic diversification through industrialization. Industrial Development Review Series, UNIDO, PPD.111, Mar 1989.

Fig. 1 Enrollment in Vocational Training vs. Change in Manufacturing Value Added, African Countries, 1987

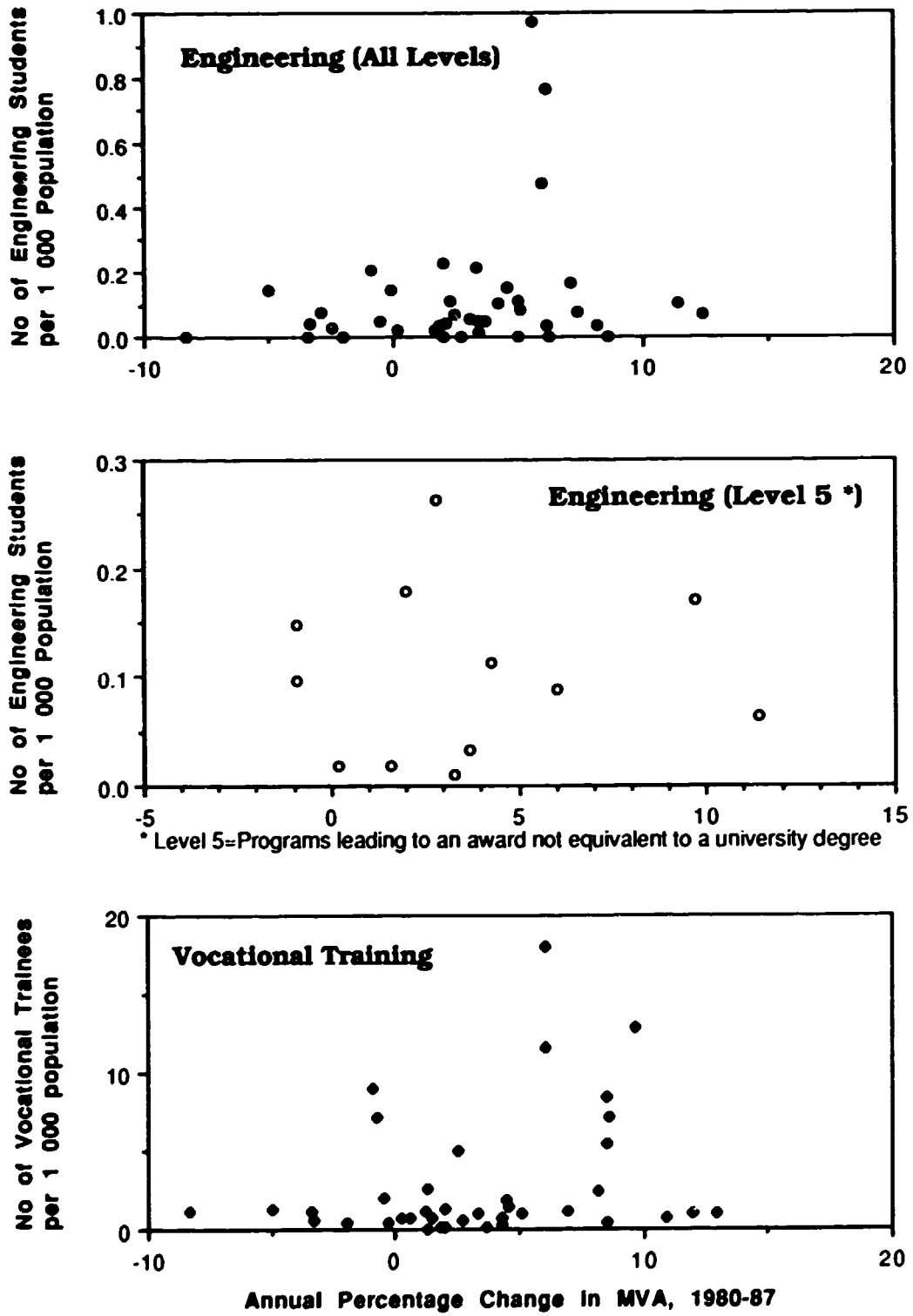
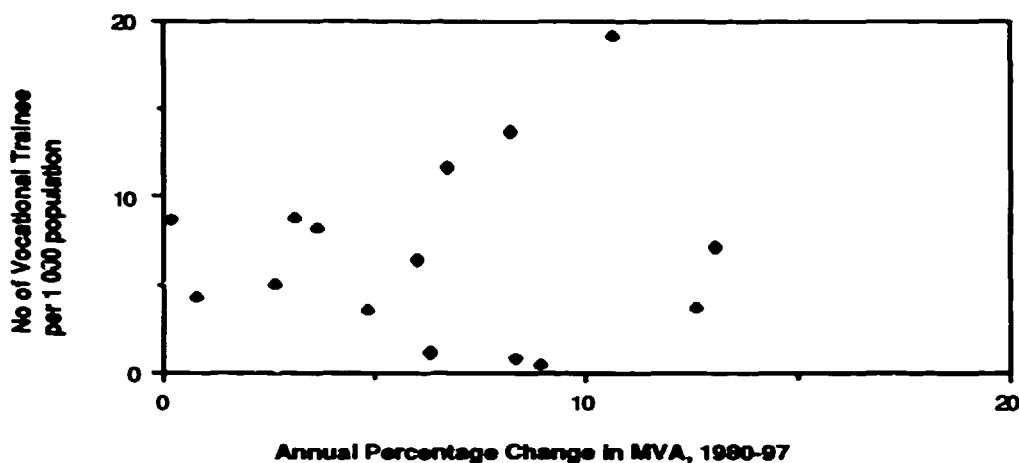


Fig. 2 Enrollment in Vocational Training vs. Change in Manufacturing Value Added, Asian Countries, 1987



Evidence from ILO country studies on Women's Employment Patterns Discrimination and Promotion of Equality in Africa suggest that women have to have a better education to be considered for a job and often job requirements are exaggerated in order to discriminate against women. A case study in Zambia showed that in formal employment 58.6 per cent of the men had only a primary education compared to 27.9 per cent for the women.¹⁷

For Congo, large numerical discrepancies between demand and supply of manufacturing manpower are reported at all levels of education except the very highest.¹⁸ The Djibouti and Congo examples illustrates tendencies also observed in other African countries, namely:

- (a) that there are many more students applying than there are available places in technical training institutions;
- (b) the Ministry asserts that still more graduates are required;
- (c) yet, a sizeable portion of the graduates do not find jobs;

¹⁷ This is caused by men being in production related jobs with lower education requirements whereas women are seldom found in such jobs.

¹⁸ B. Millot, *Le syndrome du diplôme et le chômage des diplômés: le cas de la République Populaire du Congo*, BIT/PECTA, April 1984.

The principal weaknesses of the present system of technical training are:

- (1) Applications for places at the LEP and CFPA [two major technical training institutions in the country] far exceed the number available. In 1987 only 236 of 2 512 applicants were admitted. Yet, the number of students receiving a technical education is insufficient to meet the demand. The Ministry of Education estimates that the private sector requires 600 technical and managerial staff per year, the public sector 106 and the para-public sector 193 if the present dependency on expatriates is to be reduced. On the basis of these estimates, several new learning institutions have been proposed.
- (2) Technical training facilities are concentrated to Djibouti City [the capital] depriving those in other areas of educational opportunities. The Government aims at making technical education at the lowest level more widely available.
- (3) The existing educational system does not produce graduates of suitable caliber for the needs of industry and commerce. Most enterprises prefer to hire expatriate technical staff—despite costs that are as much as twenty times that of hiring local staff¹⁹ relegating Djiboutians to subordinate roles. Thus, students from the LEP and CFPA have difficulties in finding employment despite the shortage of skilled staff. Private sector employers prefer to train technicians themselves for specific tasks. From 1983 to 1985, of the 546 students leaving the LEP, 249 of whom had received a diploma, only 48 per cent had found employment by 1986. For those leaving the CFPA with technical qualifications, the proportion is slightly higher at 60 per cent. Those who have had some practical training as part of their education experience far less difficulties in finding a job than those who have only taken the required courses. The employers complain about the low level of basic and scientific education and the consequent inflexibility of technical staff. They need more than just technicians. Engineers with broad training are required to supervise technicians, and to develop and install new technology. At present, there are few Djiboutians who can fulfill this role. In 1987/88, there were only 29 students enrolled in technical science courses.
- (4) There are few facilities for informal and formal management training. Poor management and inadequate preparation now account for most of the business failures. Few entrepreneurs know how to, or understand why they should, carry out market studies or cash flow analyses. The Chamber of Commerce provides occasional courses for the business community but these are poorly attended.

¹⁹ Which only goes to show that entrepreneurs are not out to minimize cost but to maximize profits. Thus, their hiring preferences may very well be economically rational.

- (d) and local employers prefer employees with overseas training even though they have to pay substantially more for such personnel;
- (e) employers complain about low levels of basic and scientific education among the local labor force, even among those who have a technical diploma; and
- (f) the effective demand for continuing education (such as that arranged by local Chambers of Commerce) is low.

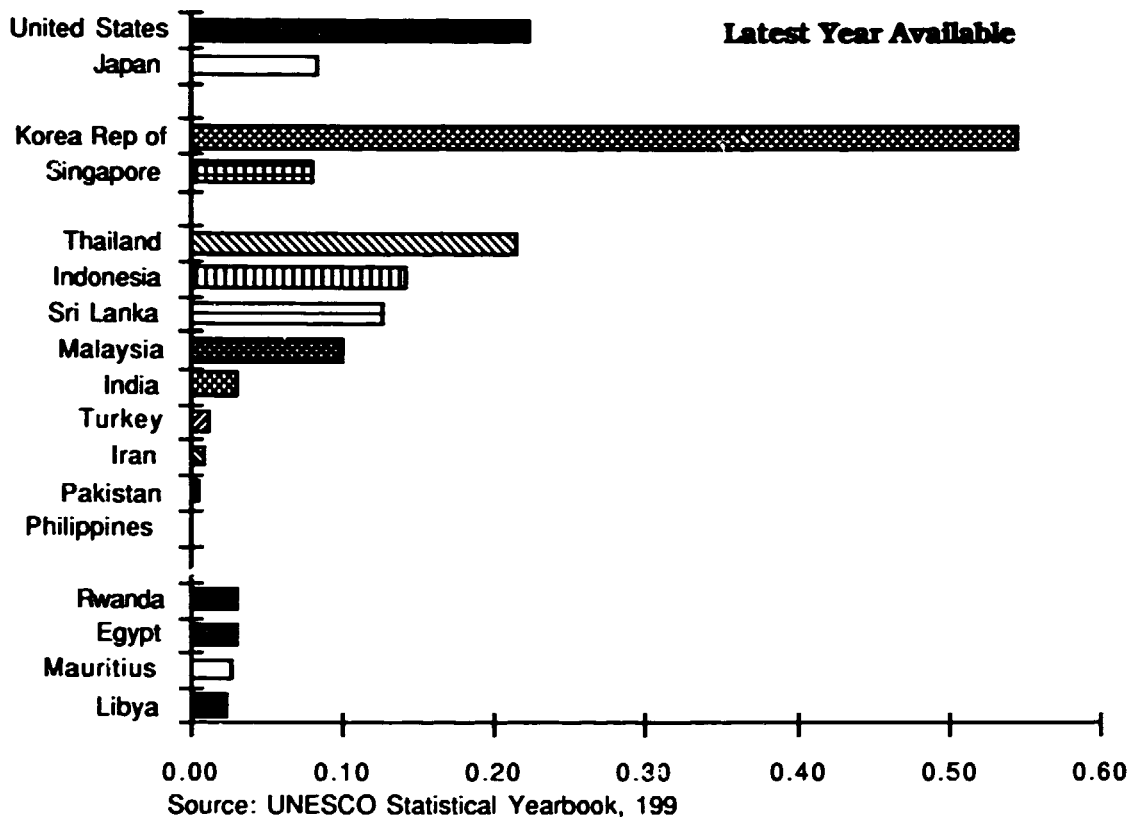
The fact that the premiums received by higher education graduates have lately declined, referred to above, may have been caused by supply increasing faster than demand. But, since it is primarily the governments that in Africa employ people with higher education, the decrease in salaries could also be the result of government wage policies.²⁰

The importance of all primary education for industry is obvious because general literary fosters later, on-the-job training. But, from the point of view of industrial development it would be of importance to know how many and what proportions of the students especially in secondary and higher education receive training in subjects that are in demand by the manufacturing industry. Unfortunately there are no comprehensive statistics on the distribution of students in or graduates from secondary schools and vocational training institutions. Therefore, it can only be assumed that all those with a secondary education or vocational training constitute part of the potential industrial labor force supply.

UNESCO statistics on those with higher, university level education in engineering and science exist only for a handful of African countries. Nonetheless, together with piecemeal and occasional evidence from a variety of sources and observers, it can be concluded that African countries not only graduate relatively few people in science and engineering but, in addition, proportionally far fewer of these actually work in research and development (R&D) than in the successful Asian developing countries (see Fig. 3 below).

UNESCO data (not shown here) indicate a steady progression in the number of R&D personnel relative to the total population in some of the industrially most dynamic countries whereas the African countries—at least those for which sufficient data are available—have essentially gone nowhere in this respect and hence remain on inferior levels. At least relatively speaking this must imply that African countries are losing out to their potential competitors when it comes to products and services that require not only own innovation but plain mastery of high and/or complex technologies.

²⁰ Hinchcliffe, Keith: Issues Related to Higher Education in Sub-Saharan Africa, World Bank Staff Working Paper No 780, 1985, p. 39

Fig. 3 Scientists and Engineers in R&D: Actually Engaged per Stock²¹

With respect to technician level personnel in R&D, the African countries are doing relatively far better than their rivals in Asia, with the exception of the Republic of Korea and Singapore. Correspondingly, the number of technicians per scientists and engineers engaged in R&D is also higher in African than in Asian developing countries (see Statistical Analysis 5 below). But, the fact that the African ratio is, and has been over the past two decades, also higher than that in Japan may indicate that it indeed is disproportionally high. In other words, African countries may produce too many technicians in comparison to higher educated personnel in the service of manufacturing. Admittedly, the evidence is tenuous but it may be an indication of a skewness in the African educational output in relation to industrial requirements: too many technicians in relation to too few highly trained engineers and scientists. Other, anecdotal testimony corroborates this observation.

²¹ "Stock" refers to the totality of those with a science or engineering degree in a country, whether or not they work in a corresponding job.

Statistical Analysis 5 Technicians per Scientists and Engineers Engaged in R&D, 1970ies and 1980ies

	<u>Developing Countries</u>			
	<u>Africa</u>	<u>Asia</u>		<u>Japan</u>
Average	1.377	0.655		0.216
Standard Deviation	1.201	0.338		0.0537
n	32	36		5
∂		0.873		0.325
t		3.41		2.83

UNIDO based on UNESCO and World Bank data

2.3 Cost of Education

The expansion of the physical infrastructure for education in Africa to cope with the increase in enrollments may have come at the cost of quality. Along with rapidly growing school-age populations, the share of education expenditures in state budgets have become very large, more so in Africa than elsewhere in the developing world²² (see Table 3 below). Furthermore, in Africa it is in the Francophone countries that spending on education is relatively the highest. Despite their lower relative spending on education, the Anglophone countries in Africa exhibit both higher enrollment ratios in primary and secondary education and literacy levels than their Francophone counterparts.²³ Relative to the total population, higher education enrollment in Africa is less than one quarter of that in Asian countries. Yet, the expenditures on higher education in both Africa and Asia averages a little less than one fifth of total educational current expenditure²⁴ which in turn accounts for about 20 per cent²⁵ of all central government expenditures.²⁶

²² This could change as many African countries recently have embarked on macroeconomic adjustment programs that typically have a dampening impact on social spending, including central government expenditures on education.

²³ Mingat, Alain and Psacharopoulos, George: "Financing education in sub-Saharan Africa", *Finance & Development*, March 1985, Table 1, p. 35.

²⁴ Actually 18.9 per cent for 38 African countries for which UNESCO reported data in 1989; for 23 developing Asian countries the corresponding figure was about the same, 18.1 per cent.

²⁵ Actually 14.8 per cent in 1988 for 15 African countries for which the World Bank reported data in 1990; for 16 developing Asian countries the corresponding figure was 12.6 per cent.

²⁶ Keith Hinchcliffe, *op.cit.*

Table 3 Percentage of Central Government Expenditure Going to Education, Average for Reporting Countries by Type of Economy

<u>Type of Economy</u>	<u>1972</u>	<u>1986</u>
Low-income economies	20.2	9.8
Lower middle-income economies	17.7	14.5
Upper middle-income economies	9.6	10.2
All developing economies	12.5	10.3
Industrial market economies	5.4	4.5

Source: World Bank, World Development Report 1988, Table 23

A closer examination of the available data suggests that it is the relatively greater emphasis on higher education in Francophone Africa that is behind the elevated costs and the lower overall enrollment and literacy rates. Moreover, it appears that the most significant cost components are salaries (both teachers' and administrators') and student allowances (subsidies). Relative teachers' salaries are two to three times higher in Africa than in either Asia or Latin America, and wages in Francophone Africa are nearly double the level of those in the Anglophone countries.²⁷ A large part of this can be explained by an imitation of pay scales in France and the fixed ratio of the Francophone African currency unit, the FCFA, to the French franc. But it could also be an indication that the emphasis in education in Francophone Africa is on the arts rather than on engineering and science where the equipment component of necessity has to occupy a relatively large share of the total budget.

On the average, a year of secondary schooling is four times as expensive as a year of primary schooling. Higher education is forty times as expensive. The average cost per student in higher education (in 1979/80, \$3 655) as a percentage of GNP per capita was seven to eight times higher in Africa than in Asian developing countries and nine to ten times higher than in Latin American countries around 1980.²⁸ Of course, since the regional per capita GNP figures also differ, these variations in the ratios do not reflect only differences in absolute education expenditures. But, the regional differences in what higher education costs in comparison with primary and secondary education are fully comparable and also striking (see Table 4 below).

²⁷ Mingat, Alain and Psacharopoulos, George, *op.cit.*, p. 37.

²⁸ World Bank, Sub-Saharan Africa...(1989), *op.cit.*, p. 81.

Table 4 Unit Costs in Public Education as Percentage of GNP per Capita

<u>Country Grouping</u>	<u>Primary</u>	<u>Secondary</u>	<u>Higher</u>
Sub-Saharan Africa			
Francophone	29	143	804
Anglophone	18	50	920
Asia			
South East Asia & Pacific	11	20	118
South Asia	8	18	119
Latin America	9	26	88
All Developing Countries	14	41	370

Source: World Bank²⁹

It has been estimated that in the developed countries (excluding Eastern Europe and the USSR) the annual educational operating expenditures are on the average \$2 055 per student. In the developing countries it is only a tenth of that (\$210); in Africa, the corresponding figure is a mere \$88. In the developed countries, about \$270 per student per year is spent on educational materials and supplies. The respective figure for all developing countries is \$15, and for Africa only \$8.³⁰ While more is not always better, so much less clearly does represent a serious handicap for Africa.

"Cost benefit studies during the past decade in 16 African countries suggest that the social rates on return on investment³¹ in education are 26 per cent for primary, 17 per cent for secondary, and 13 per cent for higher education."³² Private returns are superior especially for higher education but may have gone down since these studies were conducted as salary and other premiums received by higher education graduates now have been reduced. Given equity considerations as well as education's dampening impact on fertility rates, it could be that for women, the social return on investment in education is proportionately higher than for men.

²⁹ Keith Hinchcliffe, *op.cit.*, Table 5, p. 12.

³⁰ Using UNESCO, World Bank, and IMF data, Dr. Kurt D. Moses, Director of Service Systems of the International Division of the Academy for Educational Development; as reported in IEES Communique, Issue No. 41, November 1988, Learning Systems Institute, 204 Dodd Hall, Florida State University, Tallahassee, FL 32306.

³¹ World Bank, Sub-Saharan Africa...(1989), *op.cit.*, p. 77. The Bank does not indicate here how the social rates of returns were calculated. Normally, however, social rates of return are derived with reference to a social welfare function or social goals such as equity and full employment. Private returns reflect straight market prices.

³² This is in contrast to the experience in the Asian NICs but not in other SE Asian countries. See K. Gannicott, "The Economics of Education in Asian-Pacific Developing Countries", *Asian-Pacific Economic Literature*, Vol 4, No 1, March 1990, pp. 41,....,64.

2.4 On-the-job training

The importance of educational and training in formal training institutions to acquire basic knowledge and skills cannot be overstated. But, the major part of skill training and development for a given job comes on-the-job regardless of skill level. For this process of transferring technology and skills on-the-job to be effective and efficient, it is paramount that the trainers be well-qualified and have sufficient knowledge and experiences in training their trainees. However, it has been observed that often the trainers (foremen, technicians and engineers) do not have the best qualifications in this regard. Typically, they themselves have acquired their knowledge and skills on the job from their trainers with little formal technical education. Therefore, the transfer of technology to trainees often is neither efficient nor is it the best or the most appropriate technology required to maintain or develop quality products. Thus, in practice on-the-job training can take place with little concern for efficiency and accuracy and often even false skills are taught. This problem is prevalent not only in informal small-scale enterprises, but also in medium- and large-scale public manufacturing industries in Africa.

Apprenticeship is the simplest and cheapest way of transferring technology with little necessity of formal education and technical knowledge beforehand. But, when technology or skills to be transferred become more complex, trainees need formal education given in technical schools, vocational training schools, polytechnics or universities depending on the level of technology complexity and diversity. Nonetheless in practice, the actual skills and technology to manage an enterprise, to produce and develop a specific product, to maintain engineering equipment or to conduct quality control are acquired and developed through experiences and performance on the job.

The transfer of technology to a local work force often is believed to be best achieved by expatriates of a multinational corporation or through technical cooperation. Expatriates are supposed to have the internationally accredited skills and technology to produce a specific product. However, transfer of such skills to local people ("localization") does not always work out in the African manufacturing industries. The following Tanzanian case study illustrates a typical problem in the transfer of technology from expatriates to local personnel through on-the-job training.³³

³³ S.M. Wangwe, *Building Indigenous Technological Capacity: A Study of Selected Industries in Tanzania*. Paper presented at the workshop on *Alternative Development Strategies in Africa*, held at the International Development Centre of the The University of Oxford, 1989-12-11, ..., 13.

"...in 1981 all management at TPCC [a local company] was localized. Two years later, it was reported that as the local personnel took over the general and technical management functions of the company, one kiln blew up in 1983 allegedly due to insufficient attention given to maintenance by management. The action which followed was drastic involving the demotion or transfer of top management in the company. This decision inhibited further learning-by-doing on the part of the affected local personnel. In addition, such a drastic action contributed to the problem of high turnover of local staff in this case initiated by management in the form of transfers or demotions. Some interviewees expressed the opinion that in this case the relevant authorities should have appreciated the fact that good experience and skills are partly a product of mistakes. Such mistakes could therefore be regarded as part of the cost of acquiring experience. In fact, the local management was later replaced by a foreign management team. It appears that the option of strengthening the local management (by selectively searching locally or by selectively employing individual expatriates for specific tasks for which local qualified personnel was not available) was proposed by the Board of Directors of TPCC but the higher level Board of TSC (the holding parastatal) decided to remove the whole top management. Since this local management was the most experienced in cement production in the country the only alternative was to engage foreign management. It was decided that the local management be replaced by an expatriate management team. In 1984 Cementa International AB of Sweden contacted to manage the plant for a period of five years with financial support from SIDA. Top management in the cement industry was at this point delocalized, essentially the earlier progress towards localization was reversed because of one major accident." ³⁴

Foreign direct investment (FDI) often entails management and technical agreements for the purposes of effecting technological learning and "localization". However, the effectiveness of such arrangements has been limited. One reason is the tendency on part of the foreign personnel towards a preoccupation with maximization of output and profitability rather than long term objectives such as training.³⁵ Another contributing factor is the limited capability of the trainees to absorb (learn and adapt) the new technologies because of limited basic education and technical competence.

On-the-job training can be fruitfully supplemented with course work in formal technical institutions. In this way theory and practice proceed hand in hand and strengthen each other. For example, the Kenya Textile Training Institute (KTTI) is a technical facility established especially to cater for the domestic textile industry's training requirements. Textile firms from all over the country send their employees there for training. The courses follow the so-called sandwich system whereby half a year of theoretical studies and practice at the KTTI is followed by half a year of work back in the sponsoring

³⁴ *ibid.*, p. 25, ..., 26.

³⁵ *ibid.*, p. 27.

plant, thereafter the trainees return to the KTTI for further studies. The system aims at maximizing the immediate practical utility of formal course work.³⁶

Women's access to on-the-job training in the industrial sector is limited by their minimal presence in the relevant occupations, little technical experience perpetuated by cultural and educational practices, and generally little overall experience in formal sector employment. Often, passing skills from mothers to daughters or from relatives is the only type of apprenticeship available to females. The high proportion of unpaid female family workers reflect these tendencies.

On-the-job training may increase labor mobility and therefore, some employers are reluctant to invest heavily in upgrading skills among their workers. There are, however, many schemes and incentives that can be used to counter any tendency among newly trained employees to leave.

2.5 Employment

The employment situation has deteriorated to an unprecedented stage in most of African countries since the beginning of the 1980ies. The ILO indicates the following causes: (1) the growing impact of the demographic tide on labor supply; (2) a phenomenal expansion of educational enrollment which has led to a substantial mismatch between supply and demand for skills on the labor markets; (3) lack of transformation of the economy; and (4) sluggish economic growth.³⁷

As one of the results of the rapid labor force expansion and the severe economic stagnation in Africa, real wages have fallen at a substantial rate. Available data (Table 5) indicate that only two countries out of 18 showed modest increases in real wages whereas the other countries registered significant declines since 1980. On the average real wages in Sub-Saharan Africa declined by about a quarter in the period of 1980-85. This appears to confirm the ILO's assessment above that the quantitative supply exceeds demand, and that wages therefore have to decline in order to bring about an equilibrium. But, since in most of the countries concerned, the public sector

³⁶ UNIDO, *The Regeneration of Kenyan Manufacturing Industry with Emphasis on Selected Key Industries*, PPD/R.41, Sep 1990, p. 86.

³⁷ World Labour Report 1989.

Table 5 Real Wage Trends in Sub-Saharan Africa, 1980-87 (1980=100)

Country	Coverage	Year	Index 1980=100	Annual Change (in percentages)
Botswana	Public sector	1984	105.5	.9
Burundi	Non-agriculture	1987	85.3	-3.9
Cape verde	Public sector	1984	71.7	-8.0
Ethiopia	Civil service	1984	84.1	-4.2
Gambia	Modern sector	1984	80.5	-5.3
Kenya	Non-agriculture	1987	77.4	-3.6
Madagascar	Public sector	1984	54.8	-14.0
Malawi	Non-agriculture	1986	67.1	-6.4
Mauritania	Civil service	1984	76.4	-6.5
Mauritius	Non-agriculture	1986	93.6	-1.1
Senegal	Civil service	1985	70.0	-6.9
Seychelles	Non-agriculture	1985	110.6	2.0
Sierra Leone	Non-agriculture	1987	25.5	-20.6
Somalia	Civil service	1986	28.4	-18.9
Sudan	Civil service	1985	52.2	-12.2
Tanzania	Non-agriculture	1987	26.1	-17.5
Zambia	Non-agriculture	1984	63.7	-10.7
Zimbabwe	Non-agriculture	1984	88.9	-2.9
Average		1985	70.1	-6.7

Source: Compiled from ILO: Yearbook of labour statistics, government statistical abstracts, and JASPA and World Bank country studies.

is the largest wage employer, these trends do not tell us much of what is happening in the industrial sector.

Since independence, African authorities have focused mainly on promoting large-scale industrial enterprises granting them preferential access to credit, foreign exchange concessions, and protection from competition through subsidies, tariffs, quotas, and exclusive licenses. Both initial and expanding capacity often were installed with little regard to cost or profitability. These public enterprises as well as government services have employed relatively highly educated engineers and managerial staff, many of whom were expatriates. Especially from the 1970ies until the early 1980ies, government services expanded so much that public sector employment grew far more than that in the private sector further enlarging the existing disparity between the two sectors in Africa. In many countries, the public sector employment reached more than half of total wage employment.

Since the early 1980ies, however, the public sector employment has changed drastically as a result of tight fiscal positions. Modern sector wage employment as a whole declined significantly despite a sharp drop in wages. This has been attributed to restricted or retrenched recruitment in the public

sector which therefore could no longer sustain previously high rates of labor force absorption. Even in the 1970ies, when the public sector was largely expanding its working force, the labor force grew faster than wage employment in most African countries. With the reduced public sector employment and no corresponding increase in private hiring, the gap between the potential labor force and wage employment—at least in the modern or formal sector—has been phenomenally widening.

Most women with wage employment work in the public sector, specially in community and social services (in Kenya between 1972 and 1983, almost 79 per cent of the new female entrants into employment were in these sectors.). Therefore, the impacts of a contraction in this sector are proportionately more severe for women than men.

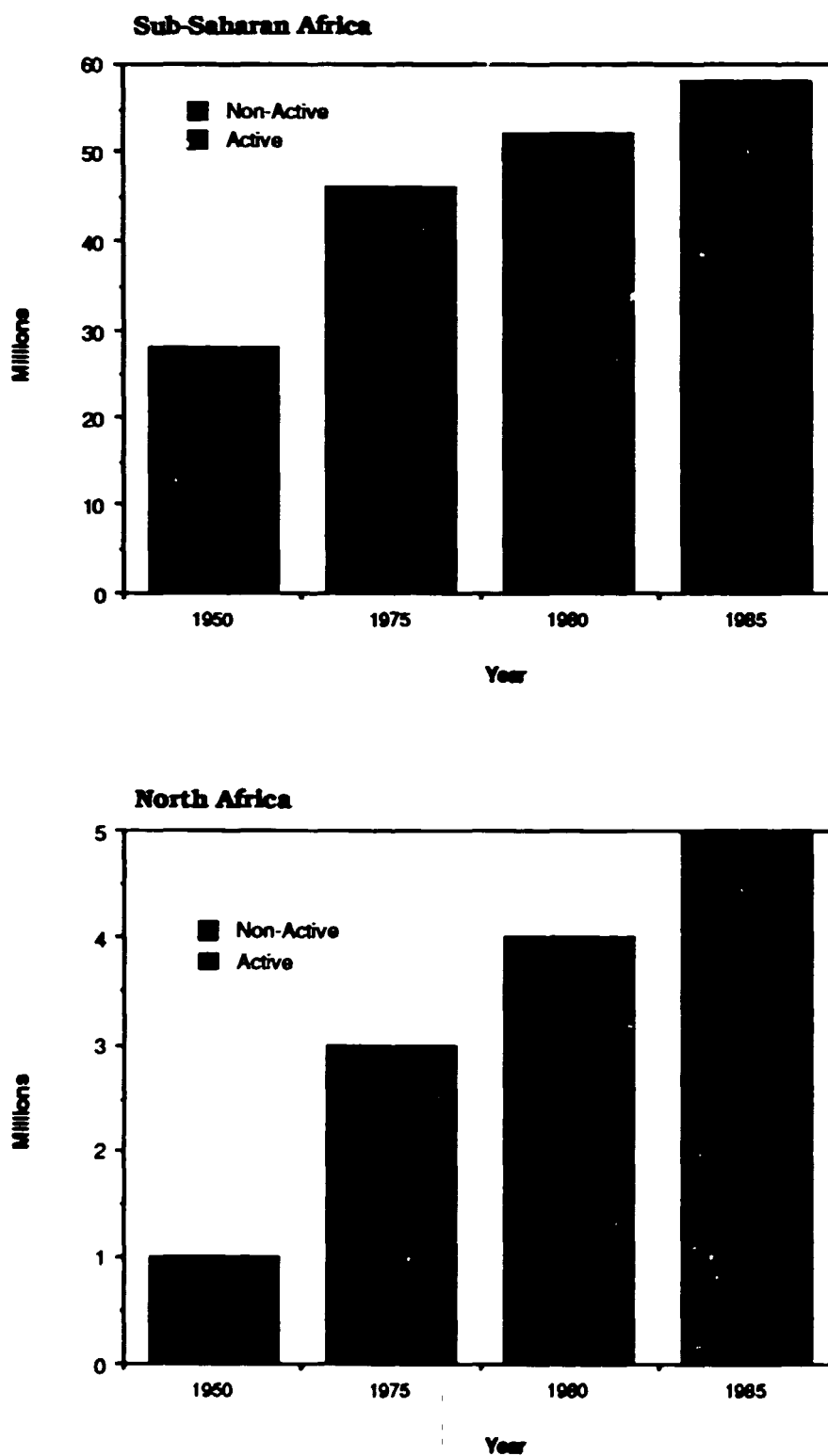
The widening gap between actual jobs and the potential labor force and an accelerated pace of migration from rural to urban areas have led to such large unemployment in urban areas that it has become a serious social problem in Africa. Among the unemployed, youth and women constitute the majority; youth represent between two-thirds and three-quarters of the unemployed population and women appear to run at least twice the risk of being unemployed compared to men. In addition, it should be noted that the unemployment rate for the educated labor force tends to be higher than for the work force without any formal education. Even university graduates, who used to be assured by most governments a position in the public sector, are no longer guaranteed a job, whether in the public or private sector.³⁸ Unhappily, rather than trying to steer young people towards employable skills, some African countries have tried to deal with their graduate unemployment by reducing the intake of institutions of higher learning.

In some countries, the governments have tried to alleviate the effects of the shrinking of the public sector by certain compensatory measures for the retrenched workers. These include the provision of credit and technical assistance to would-be entrepreneurs. The scheme has suffered, however, from the fact that few of the eligible candidates posses the technical or managerial skills necessary to set up and run new enterprises.

For women, the employment opportunities have diminished even more than for men. Thus, in Sub-Saharan Africa the proportion of economically active women has actually declined (see Fig. 4). At the same time the total number of women in the relevant age group increased from 28 million in 1950, to 46 million in 1975 and 58 million in 1985. In northern Africa, however, the trend

³⁸ *ibid.*, p. 36.

Fig. 4 Number of Economically Active Women in Relation to Total Number of Women in Age Group 15 to 64, 1950 to 1985



Source: Shirley Nuss, *Women in the World of Work*, ILO, 1989

is the reverse showing an increasing share of economically active women.

The two regions also differ with respect to changes in the female shares in the economically active population. In Sub-Saharan Africa, the proportion has been declining from 42 per cent in 1950 to 41 per cent in 1975 and further to 39 per cent in 1985. In northern Africa, it has been increasing from 9 per cent in 1950 to 12 per cent in 1975 and to 14 per cent in 1985. The downward trend in Sub-Saharan Africa reflects a declining share in the benefits from the growth in economic activity accruing to women. In North Africa, women secured an increasing share of the new economic opportunities.

The proportion of the Sub-Saharan population that is actively engaged in agriculture is declining but is still very large. Although since 1950, the share of women in agriculture declined along with that of men, since 1980 it has hardly changed. In the non-agricultural sector, women showed a marked concentration in services and only 4 per cent were in industry compared to 17 per cent of the males in services and 12 per cent in industry in 1980. If present trends continue, about three quarters of all working women will be in agriculture compared to 61 per cent of all males at the end this century. The distribution of the economically active women among agriculture, services and industry has not changed from 1950 to 1980.

The trends in northern Africa show more similarities between men and women than in Sub-Saharan Africa. In 1950, 65 per cent of all female and 73 per cent of all male activities were in agriculture, approximately one tenth of both males and females were engaged in the industrial sector, and 25 per cent of all females and 18 per cent of the males were in services. By 1980, 45 per cent of all females and 48 per cent of all males were in agriculture, 20 per cent of the women and 21 per cent of the men were in industry, and 20 and 21 per cent, respectively, were in services. Although the participation of women in all three sectors increased between 1950 and 1980, it remained far below that of the males.

2.6 The Informal Sector

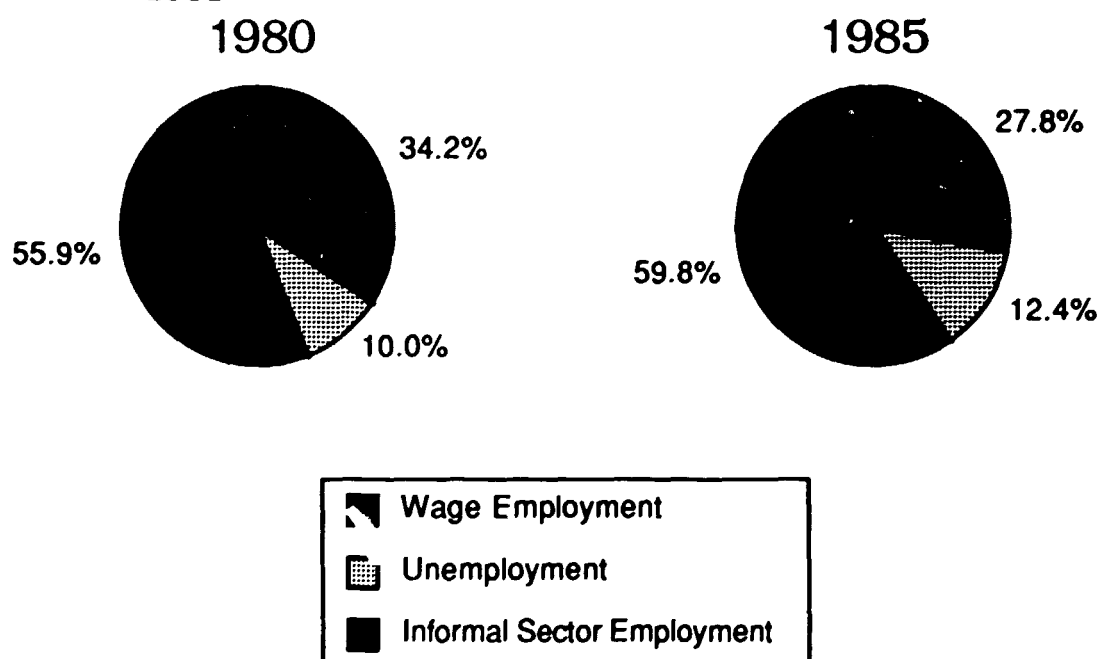
Today the most dynamic part of the African labor market is in the informal sector of the national economies. While the public sector was expanding, the informal sector received scant attention from domestic authorities and international development agencies.. In some countries such as Ethiopia, the informal sector was strictly regulated and even actively discouraged. In Ghana and Tanzania, massive resources were directed to public enterprises, while local entrepreneurs who attempted to circumvent price controls saw

their premises destroyed and their property confiscated. Under such policies and practices, the government services and the public industrial sector remained to employ the majority of wage employees. Consequently, entrepreneurial initiative hardly developed and small-scale enterprises could not raise capital, develop technical and managerial skills, or gain access to efficient infrastructure services. The legacy of this history is now very obvious in Africa, and the sacrifice in terms of a lacking tradition of entrepreneurship outside the informal sector is now due.

Most entrepreneurs in the informal sector acquire their skills on-the-job without formal education. Often this is arranged through an apprenticeship with already established entrepreneurs. As with all on-the-job training, the skills acquired are not necessarily of high standard but are in demand and practical for starting an own business after the apprenticeship period is over. Whether they become successful entrepreneurs or not depends largely on their own efforts and the quality of skills they receive from their trainers.

It is rather difficult to make an accurate assessment of the development of the informal sector since available data are limited. But, little doubt is being expressed that a considerable and growing proportion of the labor force in urban areas is absorbed by the informal sector. Fig. 5 below, based on ILO estimates, reveals that the informal sector is developing to play a major role

Fig. 5 Estimated Urban Employment in Sub-Saharan Africa, 1980 and 1985



Source: African employment report 1988, Addis Ababa, JASPA, 1989

providing job opportunities for the urban labor force. Between 1980 and 1985 in Sub-Saharan Africa, the informal sector created an estimated 6 million new jobs while the modern sector added only half a million new places of employment in urban markets.³⁹ Moreover, an ILO survey of 17 African countries found that the informal sector contributes, on the average, 20 per cent of GDP to the economies studied. The prevailing trend has forced governments to change their attitude to a strong support and promotion for the sector.

Statistics on employment in the informal sector anywhere in Africa are shaky but it is safe to assume that virtually all males without full time employment are engaged in some form of informal activity. The following findings from an ILO survey in 1982 in Djibouti may serve as an example of what can be found. This survey identified 427 informal sector enterprises employing 2 543 persons; 41 per cent worked in services whereas 38 per cent were engaged in manufacturing firms. The survey ignored some 1 100 transport enterprises (taxis and minibuses) employing 7 700 persons, 1 700 small shops employing 8 500 persons and a potentially larger number of ambulant salesmen. Altogether, at least 24 000 persons were employed in the informal sector compared to 21 902 in registered employment. Since 1982, these numbers are likely only to have increased.

Thus, those who fail to find a job in the formal or modern sector disappear from the official statistics into the obscurity of the informal economy. There they frequently find various types of service jobs or either start or join a great variety of microenterprises that produce simple, everyday consumer goods. The growing informal sector by itself does not represent a dismal trend, especially when considering that lately many of these people have come from the bloated, unproductive public sector. But, it is legitimate to ask whether letting the informal sector take over much of the economic activities in a country constitutes the optimal use of its human resources. For example, labor productivity in a microenterprise tends to be much lower than in a corresponding undertaking on an organized, industrial scale. Moreover, raising necessary government revenues and export earnings through the informal sector is difficult.

Another aspect of African employment that gets poorly recorded by official statistics or even occasional surveys is women's true contribution to a nation's economic welfare. This is usually far greater than what is reflected in the statistics, be they figures on production or participation in the labor force. An increasing proportion of women are now classified as self-

³⁹ ILO, World Labour Report 1989, p. 37.

employed or unpaid family workers in agriculture, wholesale/retail trade, restaurants and hotels. In Kenya, the percentage and these categories increased from 17.7 per cent in 1970 to 32.1 per cent in 1982. In the urban areas of Tanzania, 80 per cent of the total female labor force is self-employed and 53 per cent of all informal sector workers are female. In Ghana, three quarters of all female workers are self-employed and 15 per cent are unpaid family workers.

Less than 10 per cent of the urban, female, economically active population is in the formal manufacturing sector where they represent 5 to 15 per cent of the manufacturing labor force. (In SE Asian countries, women can constitute up to one half of the total manufacturing labor force.) Most of working women are in the informal sector, categorized as self-employed. Irrespective of sector, women's activities are mostly in "traditionally feminine" industries: food processing, beverages, textiles and clothing. As the importance of the informal sector increases as a major absorber of the labor force, the problem for women "is not simply one of how to encourage women to enter a wider range of fields, which may be important, but how to enable them to hold their own in the informal sector."⁴⁰

The number of women headed households is high and increasing. For this group, wage employment is a financial necessity, at least in urban areas. However, women's capacity to work is often badly constrained and their productivity correspondingly reduced by culture and tradition, both of which are often codified into law, policy, and common practice. This is particularly pronounced when it comes to access to technology, information, labor markets, education and training, to credit and markets.

Female employment is more in terms of casual work than a regular job. Women receive lower wages or salaries in every occupational category, without exceptions. The gap actually increases the higher women move up in the job hierarchy and even more so in "feminised" occupations.

Legislations protecting women can have a negative effect on their employment opportunities in the private sector if not balanced by incentives. In Zambia, for example, it has been estimated that the potential increase in female employment in 1980 could be as high as 70 per cent if legislations prohibiting women's entry into certain occupations and industrial branches were to be removed.

⁴⁰ Eileen Kane, Caught between two stools: Women in vocational education and training in Ghana, Vocational Training Discussion Paper No 29, ILO, Oct 1990.

2.7 The Manufacturing Sector

Without trying to present a comprehensive analysis of manufacturing in Africa, certain facts of importance for the current analysis are noted below.

The share of manufacturing value added in GDP in Africa is still low. In the majority of the 52 countries it is below 10 per cent on the average. In 19 African countries did the MVA share exceed 10 per cent. Only Cameroon (22.2), Mauritius (24.0), Zambia (21.1) and Zimbabwe (36.0) posted a higher than 20 per cent MVA share in 1987.

The manufacturing industry is dominated by agro-based products in many African countries. Only a few have a strong engineering production base and even among them, the major products are consumer oriented rudimentary metal products produced by cottage and small-scale industries.

For some time now many observers have talked and written about a missing link between small-scale industry and medium or large-scale industry in many African countries. Although there are a number of large-scale, modern industrial plants producing automobiles and electric appliances, they tend to be nothing but assembly plants. Parts and components are almost entirely imported from abroad. The small-scale industries in Africa have not gone beyond the level of informal manufacturing producing consumer goods such as food stuff, beverages, and textiles for the local market. They are not yet capable of establishing subcontracting business with large-scale enterprises. The implication of the missing link is that there is a missing sequence in Africa's industrial development: the process from informal manufacturing industry to small-scale modern industry has been bypassed.

During the 1960ies, the annual MVA growth in Sub-Saharan Africa averaged 6.5 per cent, falling to 5.7 per cent in the 1970ies and is estimated to average as low as 0.5 per cent in the 1980ies.⁴¹ The low annual growth rates in MVA during the 1980ies are well below the 3.1 per cent average annual population growth of the region and thus imply a negative growth per capita.

In the past few years, industrial picture over large parts of Africa has not been rosy—at least statistically—as the output from medium- and large-scale public industries (whose output gets recorded) has declined. The informal sector may or may not have picked up some of the slack as far as the products for the domestic markets are concerned. Exports of manufactured goods, however, certainly have suffered.

⁴¹ UNIDO, Industry and Development, Global Report 1990/91, Vienna 1990.

The manufacturers in the informal sector, in contrast with the large-scale public industries, characteristically use domestic labor and raw materials intensively, and produce consumer goods exclusively with simple technology and little capital investment. Most of the employees have not received formal technical education; they are trained mainly on-the-job.

The light-consumer type of industries predominant in Africa have been set up behind protection barriers that induced import of technology in a packaged form (turn-key) and also made it more attractive to import intermediate and capital goods. Thus a considerable proportion of GDP was spent on capital formation, the capital to labor ratio was high, and the physical capital stock made available to each manufacturing worker was high in relation to the manufacturing value added per worker. Although these tendencies are to be expected at the early stage of industrialization, there are no signs of change in Africa. The mode and extent of technology transfer together with imported technical skills have not served as a vehicle for development of domestic technical skills. There has not been a consistent and deliberate policy, neither on the exporter nor the importer side, to link technology transfer to the learning and capacity building process of the domestic labor force.

Development and technological change both displace and provide additional employment for women. In Sub-Saharan Africa, women have been displaced in traditional beer brewing by imported lager beer and cheaper, imported soap has taken over markets from women produced soap from palm oil and wood ashes. On the other hand, the export processing zone in Mauritius provided additional employment for 22 000 workers of which 80 per cent have been women. However, this is only an isolated example in Africa.

Capital intensive and high technology production requiring industrial skills and experience tend to exclude women on cultural and education/training grounds. Only a small proportion of all working women are found in production related activities.

The prevailing absence of intermediate and capital goods industries in the formal sector is not just a reflection of lacking capital but also lacking technical and engineering skills necessary for the metal processing and fabricating technologies. UNIDO's ranking of 79 developing countries in terms of their skill level (based on skill requirements of their engineering products) places about half of the 39 African countries below a score of 400 compared to 6 925 in Brazil, 4 566 in India. Only North African countries and Angola score between 1 000 and 2 800.⁴²

⁴² *ibid.*, p. 34-35.

To bring about needed changes in the manufacturing sector in Africa, a new industrial strategy is being advanced. The main features generally accepted as components of the strategy can be summarized as follows:

- (a) restructuring of the manufacturing sector to be more export oriented implying opening to regional and world competition;
- (b) more emphasis on private enterprise, especially on small and medium-scale, and integration of the informal sector in the mainstream economy implying recognition of the limited absorption capacity of the modern, public and semi-public industrial sector;
- (c) developing domestic input-output linkages, especially between agriculture and industry, promoting vertical and horizontal linkages within the manufacturing sector to bridge the gap between the informal and small-scale industries and large modern industrial enterprises;
- (d) encourage private foreign investment and joint enterprises to compensate for shortage of domestic investment and finance and serve as a vehicle for technology transfer;
- (e) emphasise an integrated approach to development of human resources (health, nutrition, education, training) and integrate women in the mainstream of economic activities; and
- (f) promote sub-regional, regional and international cooperation as the necessary condition for expanding markets, sharing the debt burden and the responsibility for "our common future" (environment).

2.8 Restructuring and Other Policy Reform

Whereas the above strategy or similar ones still largely are on the proposal stage, restructuring of national economies more or less based on World Bank and IMF guidelines is a fact in many African countries. "The number of adjustment loans approved by the World Bank to the countries in the region [Africa] has grown from about five a year in the early 1980ies to fifteen a year since 1985. Exchange-rate devaluation and trade reforms, increased producer incentives in agriculture, and restructuring of government finance and public enterprises have been the major components of structural-adjustment programs."⁴³ In order to reduce public spending, government

⁴³ The World Bank, *op.cit.* p. 109

structures have been trimmed and wages and salaries have been lowered at least relatively. Spending on health and education, however, has remained steady or decreased as a proportion of total expenditures. Some African countries have enacted various programs and interventions to address the problems of retrenched public sector workers. These include retraining and rehabilitation, incentives to increase private entrepreneurship, labor intensive public works, resettlement, and redeployment schemes.

3. Demand for Skills and Technological Capabilities

The effective demand for skills on the market is generated by a myriad of individual decisionmakers but the conscientious building up of technological capabilities may not be forthcoming quite as spontaneously.

3.1 Demand for Skills

Despite the multitude of studies and surveys that have been made for Africa as a whole, for its various regions, and for individual countries or industrial branches, alarmingly little exists on the actual, effective demand for skills in Africa. Most observers assert that the continent lacks skilled manpower, middle level managers, highly qualified technicians and engineers etc. but precious few offer any real evidence that there is an effective demand for such skills exceeding presently forthcoming supply. To put it differently: if the supply were to be augmented, would the new entrants find jobs commensurate with their education and training?

"The general education level of manufacturing labor is very low... This situation reflects to a certain extent the acute shortage of skilled personnel in Burundi; but what is more worrisome is the apparent inability of manufacturing to attract the skilled manpower available in the country. Only 8 per cent of Burundi's skilled labor work in manufacturing, as compared to 22 per cent in construction, 19 per cent in commerce, 13 per cent in agriculture and banking. Indeed, manufacturing ranks only above mining and transport services, although its GDP share is higher than these two sectors combined."⁴⁴

The scale and relevance of secondary and higher level education for the demand of the African labor market has been questioned. Even in 1978, the Economic Commission for Africa pointed out the danger of the overextension of the upper levels of the educational system that already showed evidence of feeding open unemployment among secondary and tertiary school leavers. "At present higher education in Africa is confronted by an inappropriate mix of outputs, overproduction of poor graduates, and high costs."⁴⁵ In the previous section the documented examples of Congo and Djibouti were cited to show that such concerns are not exaggerated. Graduates in Cameroon are often unemployed because their qualifications are ill-suited to the demands of

⁴⁴ World Bank, Burundi; Manufacturing Industry: Performance, Policies and Prospects, May 1984, pp. 11-12.

⁴⁵ World Bank 1989, *op.cit.*, p. 89.

the national economy. At the same time, firms struggle with shortages of skilled workers and technicians.⁴⁶

The ILO cites as one of the major causes for the deteriorated employment situation in Africa "a phenomenal expansion of educational enrollment which has led to a substantial mismatch between supply and demand for skills on the labor markets". In other words, the ILO maintains that there is too much supply of skills, given the level of demand. Since by definition, demand and supply are always in balance *ex post*, the ILO's assessment must refer to future (*ex ante*) streams of graduates and job openings. Unfortunately, however, the ILO does not indicate whether this situation pertains only to certain types of skills, only in certain geographical areas, or it holds across the board.

Similarly, the analyses in Fig. 7 and 8 on the next pages do not differentiate between specific industrial skills. Nonetheless, two for the present context interesting observations can be made. First, a ten per cent increase in MVA appears to generate a five per cent increase in manufacturing employment.⁴⁷ Second, this relationship has held steady for Tropical Africa (and incidentally in Western Asia and the Republic of Korea) throughout the 1970ies and the 1980ies. In North Africa (and on the Indian Subcontinent), however, the connection all but disappeared in the 1980ies. Moreover, looking at individual manufacturing branches shows a great deal of variance in the relations between growth in MVA and change in associated employment.⁴⁸ Hence, it may be possible to conclude that demand elasticity for total manufacturing labor with respect to value added is around 0.5 but in terms of very specific skill requirements, the functional relationship is too crude.

In order to investigate the demand for definite skills, specific surveys and studies have to be carried out. Thus, a recent UNIDO survey sets out to determine the availability of people with computer skills in African countries.⁴⁹ It found that in 26 out of 39 countries it was either difficult or impossible to find system analysts. Among these countries was Nigeria that has relatively advanced industrial sectors. Egypt, Algeria, and Kenya were among the eleven countries that did not experience difficulties in this regard.

⁴⁶ UNIDO, Cameroon. Coping with Reduced Oil Revenue. Industrial Development Review Series, PPD.146 (SPEC.), Vienna, Jan 1990.

⁴⁷ The data for Fig. 10 and 11 come from UNIDO, Industry and Development, Global Report 1990/91, Tables II.24 and II.29.

⁴⁸ *ibid.*, Table II.25.

⁴⁹ UNIDO, Computers for Industrial Management in Africa: An overview of issues. PPD.187, February 1991.

Fig 7 Growth in Manufacturing Employment as a Function of Growth in MVA, Tropical Africa

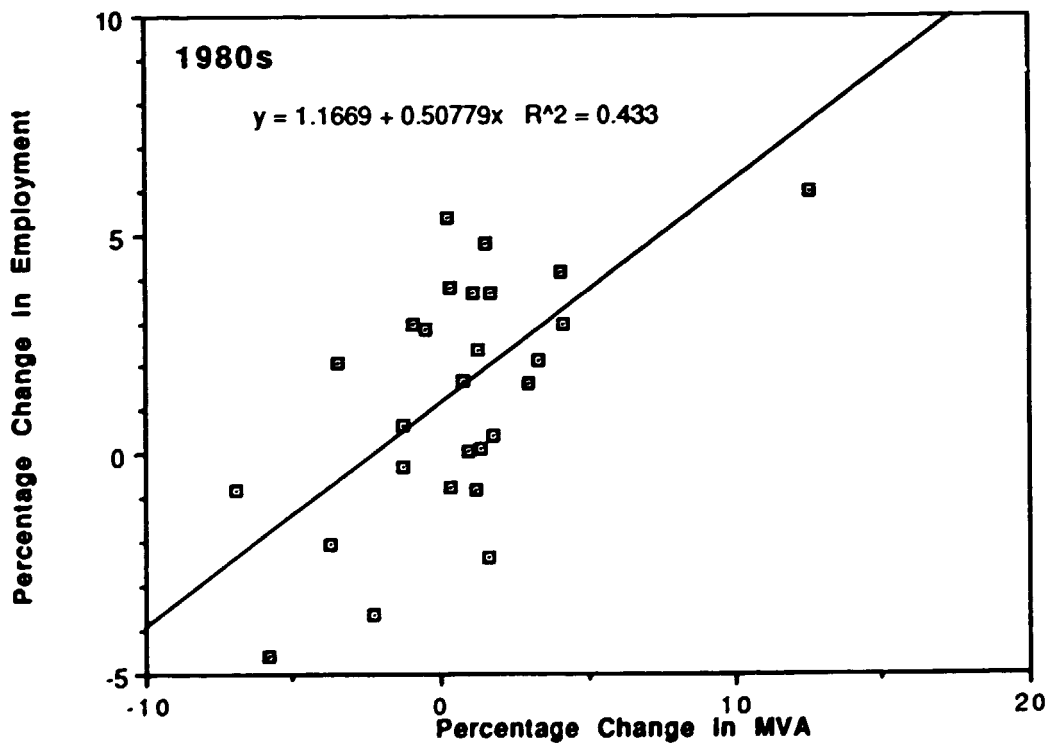
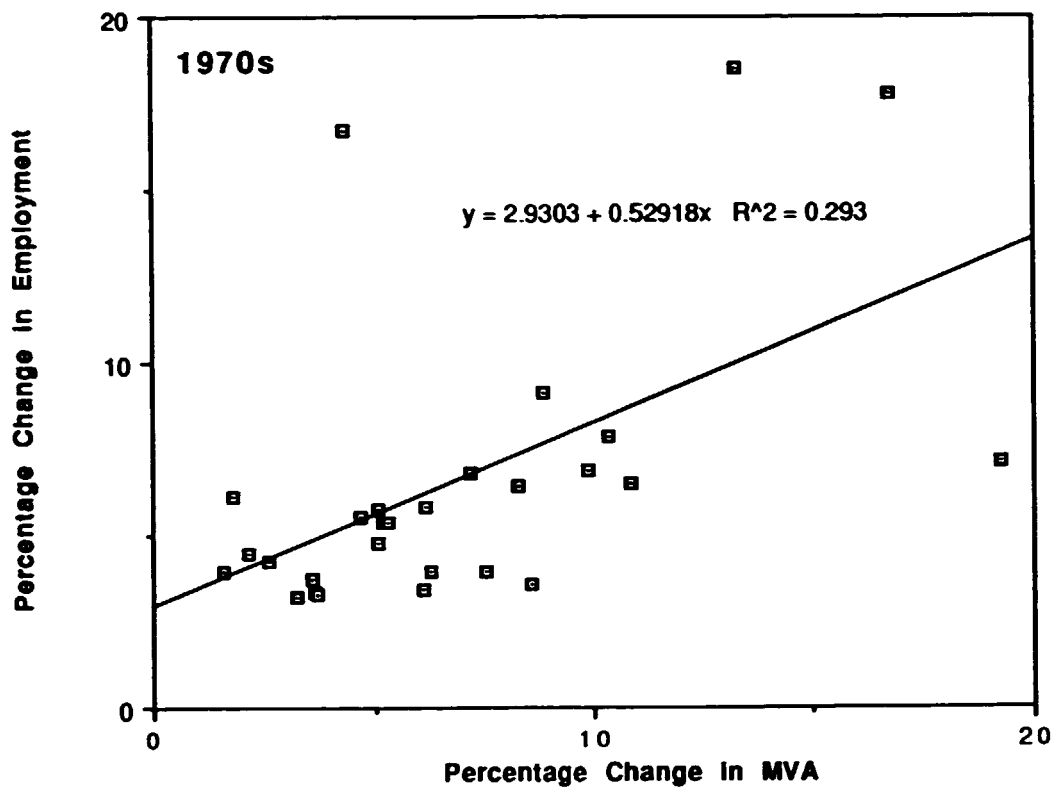
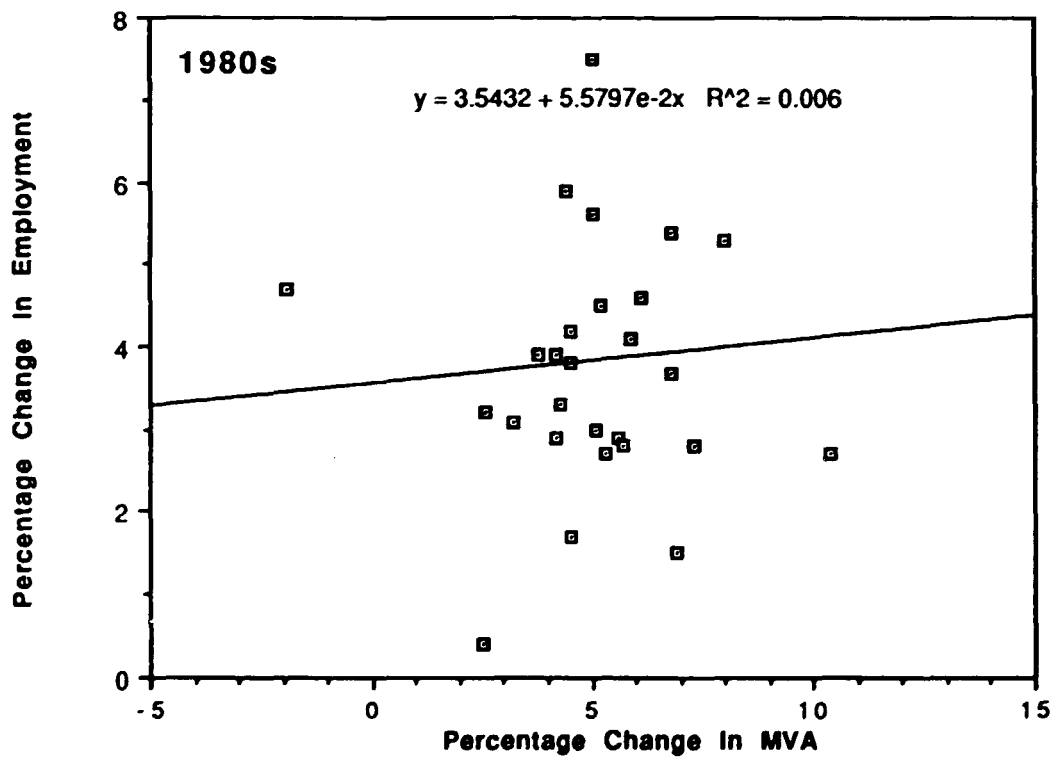
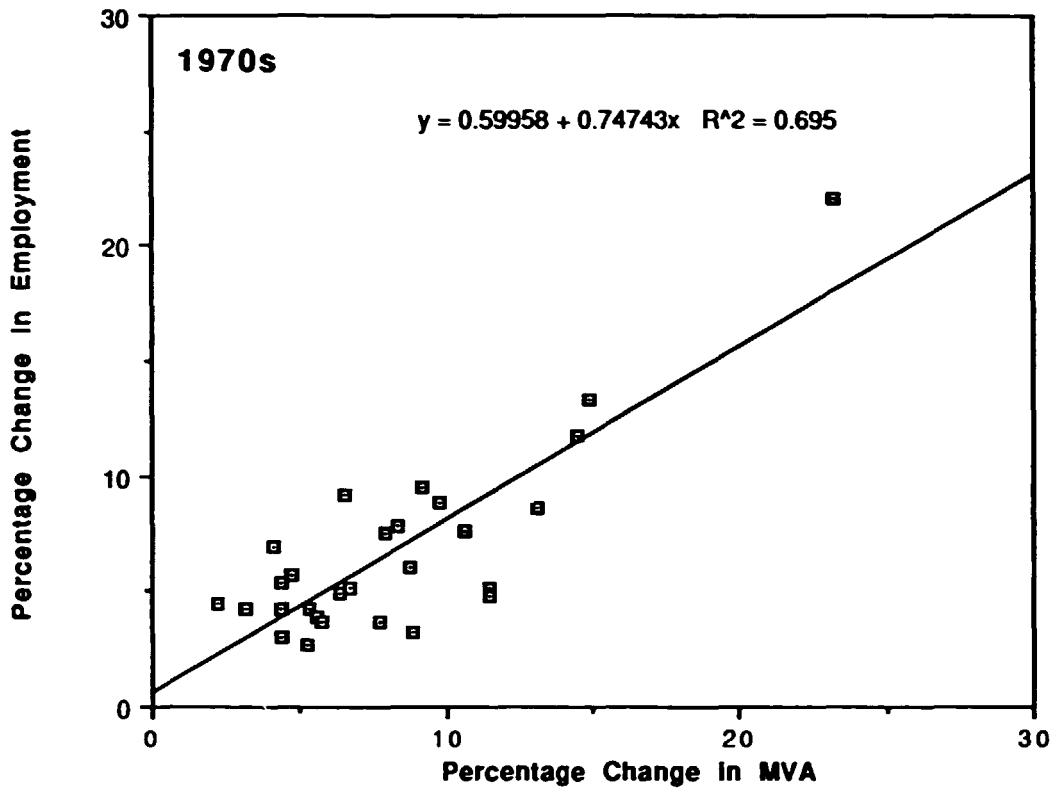


Fig 8 Growth in Manufacturing Employment as a Function of Growth in MVA, North Africa



The situation with respect to the supply of programmers is better than that for systems analysts. For 14 countries it is not difficult to obtain them locally; in 23 countries the respondents to the survey said it was difficult and in two countries they said it was impossible. For operators, the supply/demand situation gets even better. In 25 of the countries, no difficulty was reported and 12 countries indicated that it was indeed difficult to find qualified operators locally. In no case is it said to be impossible to find a computer operator.

However, even such data do not by itself indicate whether the reason there is staff available is that there is little work for them or that there is an adequate local supply of people with the required skills. Further study is required to determine whether or not to attempt to augment the supply in any given local market.

Lacking specific information on the demand for various industrial and managerial skills, one can only rely on secondary indicators of existing, potential, or emerging skill gaps. Among such indicators are the many studies or reports alleging that certain skills or professions are indeed in short supply. But the evidence is often contradictory or less than convincing. For example, the new Industrial Master Plan for Cameroon identifies as one of several main constraints to industrial development the current domestic shortage of qualified operational and management personnel, and an absence of a class of entrepreneurs. However, with some 40 000 small and medium sized firms, the latter assertion is a bit hard to believe. Facts such as the poor state of industrial machinery and equipment may be due to a lack of maintenance personnel, or poor product quality and/or competitive position could indicate a shortage of quality control staff. But the reliance on such indicators is beset with problems. For example, poor maintenance could result from a lack of spare parts and poor product quality could be offset by a low price yielding an optimum quality/price combination for the intended (local) market.

Many studies and surveys on the country or sector level indicate manpower and skill shortages in general terms without giving quantitative estimates. But, given the number and persistence of these observations, they must be assigned a certain amount of credibility. The following excerpt from a World Bank report is typical and can serve as an example with wide applicability in Africa today.

Manpower limitations are a serious constraint on Burundi's development. At higher levels of responsibility, managers have seldom been trained for the tasks they are performing and many lack professional experience, as they are hired immediately after graduation. On the job training suffers from the scarcity of experienced managers. At lower levels, severe shortages exist for white-collar positions (mid-level managers, accountants, etc.) and for skilled craftsmen (building trades, mechanics, etc.). Inadequacies and shortages affect all sectors of the economy, but they are particularly felt in the public sector where low salaries do not attract the most skilled or experienced Burundians. Given the importance of the public sector in the country's economy, the manpower situation contributes to Burundi's continued dependency on expatriate skills.⁵⁰

Factors such as traditions and relative profit margins also shape the effective demand for skills in any given market. The following excerpt from the UNIDO industrial review of Djibouti serves as an example:⁵¹

Few Djiboutians have the managerial or technical training and experience it takes for the development of present artisan level activities into industrial undertakings. The government is seeking financing for the construction of a new school for artisans and technical assistance in modern skills. But, the main constraint to industrialization—beside a very small local market—may lie in the fact that Djibouti's economic traditions derive from trade and commerce. There is no lack of experienced entrepreneurs in these fields. These traders are reluctant to abandon the relatively lucrative and easy business of importing and trading in favor of industrial enterprises with large overheads, profits only in the longer term, and problems with training and managing a large work force. Training can overcome the problem of lack of industrial skills but, in the long run, a new industrial mentality must be developed before there will be any effective demand for these skills.

3.2 Technological Capabilities

It has been recognized in recent years that productivity differentials even among developed countries and certainly between developed and developing countries stem significantly from differences in the quality of their respective labor forces. Indeed, despite many variations of developing stages from one country to another, those countries that have had great success in

⁵⁰ World Bank, Report and Recommendation of the President of the International Development Association to the Executive Directors on a Proposed Credit of SDR 65.0 Million to the Republic of Burundi for an Economic and Public Enterprise Management Project, April 1987, p. 4.

⁵¹ UNIDO (1989), *op.cit.*, p. 27.

industrialization commonly devote a large share of their current expenditures and capital investment to the education of their people. But, as noted in the previous section, it is not just the amount of expenditures that matters. What comes out of the process in terms of skills in demand and quality is what really counts.

Given the interdependence between the human and physical capital development, one explanation for the dismal industrial development record in Africa could be offered in terms of mode and extent of technology transfer. Transfer of technology has to be accompanied by a deliberate effort to develop skills involved in setting up and running the machinery ("technology mastery"), adapting and improving the technology to increase productivity ("minor innovations"), and introduce new products and processes ("major innovations")⁵². Broad and prolonged dependence on imported technology in the form of turnkey packages does not call for local learning of basic technical skills. Indeed, it can in the long term be damaging to national technological capabilities. This form of technology transfer is often associated with direct foreign investment in the form of capital goods or licensing. For such technology imports to have a longer term effect in terms of building up a local technological capability and foster further skill demands, a large input of indigenous skills, engineering and adaptive know-how is necessary. The frequent references to shortages of managerial manpower in Africa suggest that the most prevailing form of technology transfer is, or was, in a "packaged" form.

Such turnkey packages operate relatively well as long as the expatriate management and top technical personnel stays, the equipment and production machinery is new, and spare parts and maintenance/repair technicians can be imported on short notice without foreign exchange restrictions. At this stage, the demand for higher skills, whether of a technical or managerial nature, directed towards the local market typically is low. The transfer of technology tends to be simple involving local labor only at the unskilled or semi-skilled level and entailing virtually no local sourcing for parts, material, or services.⁵³ However, when the above mentioned conditions no longer are there, a steady deterioration sets in unless the foreign components—skills and material—can be gradually replaced by local

⁵² Lall, Sanjaya: "Human Resources Development and Industrialization, with Special Reference to Sub-Saharan Africa", *Journal of Development Planning*, No 19, 1989, p. 133.

⁵³ "Between 1963 and 1976, the Arab countries established 567 new projects, but in virtually none of them was there any technology transfer in the sense of acquiring the knowledge and skill to build similar projects independently of foreigners." Elias H. Tuma, *op.cit.*, p. 420.

substitutes. Therefore, for the long term viability of such foreign investments and technology transfers, it is of paramount importance to build up associated local technological capabilities: personnel with the required skills and a hinterland of local suppliers of parts, extensions, and industrial services. The demand for skills and material must be directed towards local markets, through policies and incentives if not forthcoming spontaneously. But, the local market must also be capable of supplying the demand in an economically efficient manner (price, quality, timeliness etc).

Since independence, many African countries have tried to counter the 'cocooning' effect of turnkey foreign direct investment through "localization" policies in public sector industries. In Tanzania, for example, "...one of the objectives of the First Five Year Plan (1964-69) was to raise the level of localization and attain self-sufficiency in all fields by 1980. Education and training programmes were to be designed to meet this target. As a policy on localization, the government would issue work permits to engage expatriates only after convincing evidence had been presented by the relevant employers that local personnel was not available to fill such posts and that the employer had designed a training programme which could result in localization of the posts within a specified period. ... The aggregate localization level for high level manpower has increased from 20% in 1964 to 94.4% in 1988 (Economic Survey, 1988)"⁵⁴ The economic (as distinct from political) success of such policies in terms of having been able to foster an effective demand for local skills and bring about a supply of qualified people has seldom, if ever, been evaluated. It has, however, been noted that "localization" targets have often not been achieved and that this failure has been discovered only very late into the target period.⁵⁵

"Technological capability" has been defined as a broad set comprising "the entire complex of human skills (entrepreneurial, managerial and technical) needed to set up and operate industries efficiently over time. As with all skills, the acquisition of technological capabilities is necessarily a learning process. All learning proceeds at a certain pace given the complexity of the knowledge involved and the initial capabilities of the learner. It can be speeded up or retarded by various factors, but there are inherent differences in the pace of technological development depending on the nature of the technology and the learner."⁵⁶

Similarly, there is a sequence in the industrialization process and pattern of industrial restructuring. The path of industrialization involves changes in

⁵⁴ S.M. Wangwe, *op.cit.*, p. 6-7.

⁵⁵ *ibid.*, p. 29.

⁵⁶ Lall (1990), *op.cit.*, p. 17.

the composition of economic activities where first the importance of the agricultural sector is declining while industry is growing and then the service sector is gaining importance both in its own right and as provider of industrial services resulting in part from the migration of industrial jobs out from the manufacturing establishments. The emerging pattern of industrial restructuring could be described as starting from natural resource and/or labor intensive industries moving to industries high in physical capital and finally moving to human capital and technology intensive industries. This process may not emerge "naturally" in response to competitive market forces but may have to be guided or aided by selective and balanced government interventions.

There is an interdependence between the learning process involved in the formation, adaptation and development of industrial skills and the technological progress implied in the industrialization process. This interdependence has been recognized but not incorporated into the industrial policies in Africa. It can be called the neglected human aspect of industrialization.

Broad and sophisticated engineering production requires a wide range of technological capabilities and above all, managerial and engineering skills. Such skills are gradually built up. "Experience suggests that there is a sort of sequence in entrepreneurial development: from peasant agriculture to monetized agriculture, to simple trade and informal manufacturing, to more organized commercial activity, to small scale modern industry, to traditional large scale industry and, finally, to large scale industry using modern technologies. The sequence may not be linear, and may be foreshortened in special cases, but it cannot be short-circuited or bypassed."⁵⁷ Note the parallel between the stagewise development of industry referred to earlier and the formation of a broad and adequate skill base.

Building up of national research capacities either within the university systems or in independent research establishments has not proven successful so far in preparing Africa to gain access to the new spectrum of scientific and technical knowledge. Lack of interaction between users and producers of technology, lack of middle level technicians to make use of the products, lack of continuity in research funding are some of the factors responsible for the current state. Greater commitment to science and technology and systematic provision of about 1 per cent of GDP for research and development is essential over a long period.⁵⁸

⁵⁷ Lall (1990), *op.cit.* p. 19. Despite such hyperbole as "...the sequence may not be linear..." (linear in what?) etc. Lall's observations build upon a great deal of experience in Africa itself and on comparisons with other developing regions of the world.

In order to enhance training and technological learning, industry-specific training institutes have been established in some countries. The performance of these institutions, however, has fallen below expectations as they have put more emphasis on basic and low level skills required in the operation of plants than on innovation and assimilation of imported technologies. At least partly this has been the result of these institutions being underfinanced, forcing them to offer services that attract financing from other sectors of the economy and/or foreign students.⁵⁹ Thus, they have responded to effective market demand and yet been disappointing in terms of their assigned objectives. Obviously there exists a conflict between what the market appears to want from these institutions and what industrial strategists think would be the optimal output and/or what they are willing to finance.

Technical assistance provided to Africa was meant as a short gap-stopping operation to compensate for the shortfall in production of certain skills. It has, however, proven to be more of a permanent feature. It is estimated that there are currently 80 000 to 100 000 expatriate technical assistants in Africa. The cost, according to the most recent figure from the Organization for Economic Co-operation and Development, is at least \$4 billion a year. In several countries salaries and overheads of expatriate consultants approach, and sometimes even exceed, the wage bill for the national civil service. At the same time, there are 4 000 African professionals working in the private sector and international organizations in the USA and about 70 000 in Western Europe.⁶⁰ The brain drain is one explanation for the shortages of high-level skills in Africa.

In order to progress to modern industry, many prerequisites are required to be accomplished. Among them, the human dimension of development is the most time consuming but also the most important one. So far few African countries have established the educational institutions and systems geared to develop small-scale entrepreneurs who would have not only technical skills, but also multi-dimensional skills and knowledge to develop and manage a business, and upgrade product quality and workers' skills. As the importance of the informal sector is becoming increasingly clear, the demand for management training and entrepreneurship development programs in vocational and community schools grows spontaneously or must be made through various policies and incentives to grow as is already done in some countries.

⁵⁸ World Bank 1989, *op.cit.*, p. 84.

⁵⁹ S.M. Wangwe, *op.cit.*, p. 30.

⁶⁰ Harsch, Ernest: "African economy posts upturn", *Africa Recovery*, Oct-Dec 1990.

The concept of quality control now extends into all sections of an organization, from production to administration, finance, marketing, and research and development. That's why it is called "total quality control".

All the required know-how and skills cannot be imported. For that, the absorptive capacities of African societies are too small. Therefore, local resources become all important in building up the skill base, and national policies in enhancing the existing absorptive capacities. This has very far reaching implications as a national economy's adroitness to embody foreign skills and knowledge clearly depends on, among other things, social equity.⁶¹

To sustain or gain competitiveness, and to foster indigeneous entrepreneurship, clearly, small and even micro-sized firms must be modernized. This would also serve to reduce population pressures as traditionally, the small firms and the informal sector are best suited to absorb new labor force entrants. In order to perform this function well, the technologies employed need to be chosen judiciously. "Appropriateness" in this context can be defined in terms of three dimensions: low capital intensity, uniform skill mix, and little dependence on imported material.⁶² In this respect, it appears that state-owned, para-statal, and foreign-owned firms in Africa have in the past been the least helpful. In Ghana, an analysis of 297 firms in 1970 showed that "...mixed state-foreign firms may have chosen the least appropriate techniques, being identified on average with the highest capital-labor ratio, skill mix, and import dependence. By the same token, private local firms appear to have chosen the most appropriate or the least inappropriate of techniques."⁶³

⁶¹ The issue of social equity will not be examined here. It is only mentioned here in order to draw the reader's —especially policy makers'—attention to the deep implications an effective HRD strategy will have on African societies.

⁶² James C. Ahiakpor, "Do Firms Choose Inappropriate Technology in LDCs?", Economic Development and Cultural Change, Vol 37, No 3, April 1989, pp. 557, ..., 571.

⁶³ ibid., p. 568.

4. Emerging Issues for HRD in Industry

It is HRD in the broadest sense and skill development in the narrower sense that today more and more provides the competitive edge in industry as it moves from simple processing of raw materials to the assembly and fabrication of producer and consumer goods where information and knowledge-based technologies are beginning to take over from those characterizing mass production.⁶⁴ This point takes on added importance as the advantage of cheap labor gradually disappears with technological and social progress, in particular for those countries that face small domestic markets and/or are heavily involved in the international division of labor. It follows that an industrialization strategy based on cheap labor and exports of low-skill manufactures is becoming gradually obsolete.

Increasingly today, international comparative advantage is not so much based on natural factor endowments as on man-made ones, i.e. capital investments, corporate strategies, and skilled human resources. A country's educational and training systems as well as entire social and political infrastructure in combination with good communication infrastructure and production technologies capable of swift changes determine more and more its competitiveness on external markets. New industrialization strategies must be built on these new premises.

In the following, a set of emerging HRD issues, based upon a synopsis of the analyses in the preceding chapter, will be presented. Recognizing that priorities and requirements vary greatly from one African country to another and from one industrial branch to another, there is no particular order to the presentation of the issues. The need for an integrated way of viewing the complex relationship between human resources and industry, however, is stressed by beginning with this issue.

Integrated Approach

Africa's population is growing very fast with the segment in the working age bracket increasing even faster. The public sector can no longer absorb the growing labor forces and, under severe fiscal pressure, is even shedding employees. Real wages are falling and registered unemployment is escalating. Women run at least twice the risk of being unemployed compared to men; increasing numbers of them are turning to self-

⁶⁴ UNIDO, New Industrial Technologies and Human Resource Development in Asia: Some Selected Issues, UNIDO/IS.611, Feb 1986.

employment and working as unpaid family members. An increasing burden is being placed on industry and other economic activities to raise in an equitable way the economic welfare of Africa's growing populations.

An integrated approach to the analysis of human resources in the context of industrialization, and conversely, must be adopted. Measures to build up industrial human capital should be a priority and form an integral part of industrial restructuring policies to ensure sustainment of industrial progress, "ability to cope with newly emerging technologies will depend in large part on the capabilities revealed to cope with industrial technologies in the past".⁶⁵

The formation, adaptation and development of industrial skills is influenced by an interaction of various economic, demographic, political and social factors. Provision of economic incentives determining import/export oriented industrialization influences the choice of industries and technologies which should be matched by the indigenous skill supply and measures for its future enhancement. Choice of industry and products is closely linked with the degree of technological complexity and skill requirements in the areas of investment decisions, production and product development and managerial ability. The extent and mode of technology transfer should be in line with a long term objectives of building up national technological capabilities reflected in national education, training and research policies. These principles must be reflected in the design and execution of technical assistance projects, whether directly related to HRD for industry or not.

The first and foremost thing that must be realized in drawing up HRD assistance programs and projects is that HRD is not a separate phenomenon but that it is part and parcel of the entire industrialization process. The supply of human resources for industry will not succeed if seen in isolation from the effective demand for such skills, and industrialization will be no more successful unless it realizes the importance of HRD.

Employable skills

The lack of quality labor in Africa extends over all sectors from top managers, engineers and technicians in quality control and maintenance sections to skilled and unskilled labor in production plants. At the same time, there is significant open unemployment or underemployment among those with formal education and diploma, and real wages are plummeting.

⁶⁵ Lal (1990), *Op.cit.*, p. 12.

Furthermore, the unemployment rate for the educated labor force tends to be higher than for those with little or no formal education. There are disproportionately many lower, technician level staff compared to the few engineers and scientists engaged in R&D work. The public sector is shedding employees, women more than men, often with usable skills and accustomed to working within the modern sector of the economy but with no experience in neither manufacturing nor private enterprise.

In many of the African countries there is widespread unemployment or underemployment among graduates from tertiary education establishments, women and certain minorities. At the same time in the same countries, there are shortages of employees with technical and managerial training. At best this state of affairs is a waste of useful resources; at worst it is the cause for social unrest and human misery.

At least in Sub-Saharan Africa, a ten per cent increase in MVA brings about a five per cent increase in manufacturing employment. But enrollment in vocational training does not seem related to the growing job opportunities in manufacturing. Evidence from several countries in Africa indicates that on the one hand there is an overproduction of certain skills and on the other hand, a lack of certain other ones and/or the quality of the education and training does not meet employers' demands. Skills that are expressively in short supply include quality control and maintenance engineers and technicians, middle level management, and small and medium-scale entrepreneurship and business management.

The emerging picture is one of skill demands unmatched by offerings on the supply side. This is further reinforced by employers complaining about the low level of basic and scientific education among those graduating from local institutions, and about the consequent inflexibility of the technical staff. Therefore, it appears that time and financial resources spent on especially vocational training but also general education must be more precisely focused on employable skills than hitherto. Curricula must be changed, graduation requirements tightened, and the output of educational and training institutions transformed so that it is in tune with the demands of the labor market and with the technological/industrial aspirations of the country.

Changing Technologies and Skill Requirements

The new technologies with their emphasis on automation, control, and swift change of tools result in production systems that become much more similar

over industrial branches than they have been up to now. This has several HRD implications. Skills learned for one job are more easily adapted to the requirements of another. The rate of urbanization is increasing, employees become more mobile and employers can find qualified personnel more rapidly. This means that economies of scale in general technical training may be achievable and that the financing base for such training could be widened to rely more on the direct beneficiaries—industry and the trainees—themselves rather than largely on the state as hitherto.

The above implies that HRD should be seen as an integral part of both doing business and economic policy making. Dynamic interaction between employers, educators, and government manpower planners is required to establish and maintain an employment oriented HRD program that does not waste resources and does not discriminate on the basis of either sex, age or race against anybody able and willing to work.

Because of the often long gestation periods involved, projections of future skill patterns and labor requirements must be long term. They should also be industrial branch specific, yet flexible enough, in order to avoid imbalances between manpower supply and demand within rapidly growing or declining industrial activities. Entrepreneurs, women, and minorities must be given the opportunity to exercise their skills to full extent. On all of these accounts, most African developing countries are still very weak and a great deal of technical assistance is required in order to generate and maintain industrial development momentum.

Education and Training

In Africa, training and education, especially higher education, often is geared to fulfilling the requirements of the public sector rather than meeting the skill demands of the private business and industry. Foreign direct investment and technology transfer have contributed disappointingly little to learning and capacity building among the domestic labor force as there has not been a consistent and deliberate policy, neither on the exporter or the importer side, to link these processes.

There are many more applicants to vocational training and higher education institutions than there are places available, even when such training or education does not hold out a firm promise of a job upon graduation. Still, relative to the total population, there are fewer students enrolled in vocational training or engineering education in Africa than in Asian developing

countries. Women constitute a very low part of the student bodies, especially in technical colleges. As many indicators point to an unsatisfied latent demand for such skills, the indication is that the quality of the education and training does not meet employer requirements.

The situation is not easily rectified through later, on-the-job training as this form of training in Africa suffers from an acute lack of senior staff qualified in training, and from little, if any, participation by women. Therefore, in the next few years relatively large amounts of national and corporate educational budgets must be devoted to the training of trainers and the development of valid educational material in easily accessible form.

The demand for continuing education, for example for managers, can be low even where the lack of relevant skills demonstrably is the cause of frequent business failures. Degrees and diplomas are not for ever. Attitudes must change to accept the fact that to stay competitive, whether on domestic or foreign markets, skills and knowledge must be kept up to date continuously. Workplaces should be educationally dynamic and offer facilities and motivate the employees to enhance their skills and learn new ones. This goes for the management as well. In Japan, senior managers reportedly spend one third of their time updating their own and employees' knowledge. School and other training curricula must be developed to cater to these requirements. The problem of retaining workers trained at company costs must be solved through wage and promotion policies, and contractual obligations.

Cost of Education

Most of the population, women proportionally more than men, still live in the rural areas where access to education and training facilities is the least adequate; but the rate of urbanization is increasing. This demographic fact contributes significantly to an education and training that often is expensive, of low quality, inappropriate given the realities of the labor market, reaches too few at the primary and secondary levels, and too many at the tertiary level, and too few women at all levels.

The average cost per student in Africa is low by international standards. Yet, the strain on central and local government budgets is already high, and the evidence is not that more spending would be required. Instead, the attention must be focused on cost, in particular on its structure. How much is spent on administration and teachers' salaries, on educational subsidies, on necessary teaching aids and laboratory equipment? Charging economically feasible and socially acceptable tuition for all but primary and secondary

education would not only lower net outlays but would increase the responsiveness of schools and students alike to the demand of the labor market.

User charges provide the feed back between expenditure and revenue decisions. Users are willing to pay for what they perceive as useful, and providers will not continue to supply unwanted services. User charges that reflect both production costs and externalities promote efficiency whereas subsidized rates and/or non-charges lead to over-consumption and distortions in resource allocations. Higher education in Africa frequently enjoys generous subsidies that could be reduced without substantially reducing the supply of trained graduates required to fill available vacancies. Financing of training ought to reflect such considerations better than hitherto.

Clearly, one of the most important HRD issues as far as industrial development in Africa is concerned is the cost-effectiveness of training and the direct application of training for productive use. Several alternatives exist. Training can take place in-house, on-the-job, at a specific institute, as part of general purpose technical or vocational training, via a correspondence course, in one's own country, or abroad, as part of an occasional set of training sessions, or within the context of a regularly scheduled education/training program, using domestic facilities and trainers, or those of a foreign training institution, etc. Similarly, training can be financed by the state, by employers, associations, external aid, or the trainees themselves. Many variations and combinations exist. As the following examples show, innovative schemes can be devised to achieve impressive results at comparatively small cost, provided that the aim and scope of the project stay well focused.

In Indonesia, 13 universities on various islands are linked through a single channel, narrow band telephone circuit. The system is being used for teacher and student training, administration of a newly established open university, and short term training assistance for health and agriculture workers. By 1988, the program had served 3 500 students per semester in 17 courses. The basic cost of the system is \$10 per course per student. This compares very favorably with an estimated cost of \$64 per student per course using the visiting lecturer method.

In Kenya, instructional radio is used to teach English in grades one through three. Broadcasting daily, this program provides 98 instruction hours per grade per year. Excluding capital costs, (i.e. assuming the FM stations are

already in place) but including programming, the basic cost of this USAID program is between \$.22 and \$.40 per student annually.⁶⁶

Not only public authorities and development agencies are seeking new solutions. Imaginative programs and innovative financial schemes are now actively pursued by many companies in collaboration with educational institutions and authorities. Some time ago, Toyota in the United States began working with 56 vocational schools and community colleges to develop suitable curricula. Now nearly 1 000 students are enrolled in the Toyota Technical Education Network. As a good indication that the program is working to the mutual satisfaction of both trainees and sponsor, more than 80 per cent of the program's graduates have found jobs with Toyota.⁶⁷

Engineering Industry

In Africa, manufacturing is mostly small compared to agriculture and even services. In terms of number of establishments and importance to the local economies, it is dominated by small and informal manufacturing of light consumer goods. Characteristic of the African manufacturing sector is the conspicuous gap between the few large scale manufacturing plants and the numerous small, informal industrial units. Local subcontracting networks and sourcing are rare.

Transfer of technology to embryonic engineering enterprises through either direct technical training or subcontracting arrangements is required to build up domestic networks of industrial links between large-scale and small-scale industrial plants. Assembly of goods, possibly initially behind protective trade barriers, that are now imported may provide the best vehicle in this regard with technical financial, and managerial support coming from the OEM (original equipment manufacturer) companies. The sourcing of simple spare parts to domestic small-scale manufacturers offers plenty of opportunities for technology and management skill transfer (besides helping to alleviate the chronic shortage of spare parts in many parts of Africa).

Product Quality and Inefficiency in Production

A lack of well-qualified staff in many individual industrial plants contributes greatly to low product quality and high costs due to inefficiencies in the

⁶⁶ *ibid.*, IEES Communiqué, Issue No. 41.

⁶⁷ *ibid.* p. 77.

production processes and in the management of the flow of material through the plant. Lack of maintenance exacerbate the problems in the long run. Tailor-made remedial training on-the-job by qualified, ambulant trainers would go a long way in alleviating this strictly unnecessary deficiency. The acute problem, including the reasons for the lack of trainers must be addressed urgently.

The Informal Sector

The informal sector is growing in importance both as an employer and as the "enabling" environment for small-scale entrepreneurs. However, it is important to understand that the informal sector development is not a homogeneous process. It proceeds in a certain sequence, primarily entailing entrepreneurial but also technological development. Today, the majority of those operating in the African informal sector industry have not gone beyond the stage of simple trade and informal manufacturing of consumer products for local markets requiring only rudimentary technology. Both technological and business skills within the sector need to be upgraded in order to promote a restructuring towards the development of a small-scale, modern or traditional but fairly labor intensive industry. This would be the most cost-effective and efficient way to resolve the "missing link" or conspicuous gap problem referred to above and establish a strong industrial base from the ground up. Moreover, training must be seen as a continuous process.

Statistics

Statistics on occupational skill structures by industrial branch are either missing or incompatible with other data. A systematic and comprehensive effort to collect relevant and valid information on the demand and supply of industrial skills is completely missing in most of the African countries. Many conclusions, assertions, and observations on the HRD situation in Africa are contradictory and appear to be based on perceptions rather than painstaking studies and research. Official statistics and even occasional investigations often omit gender and miss large proportions of the population under survey.

The lack of an adequate industrial statistical base makes it very difficult for researchers and policy makers to evaluate the actual problems of industry and to formulate appropriate policy measures. To establish such statistical systems is not only very expensive but takes a great deal of experience that many of the countries do not yet possess. Therefore, external assistance becomes especially valuable in this instance.

Women

Investment in women can be a very cost-effective route to genuine improvement in welfare through enhanced economic performance, reduction in poverty, increased health, and slower population growth.

Technical assistance projects focussing on small areas can be especially effective in identifying and promoting commercially viable, income generating activities for women in either existing industrial plants or in establishing entirely new enterprises. Training for women in rural areas in easily transferable industrial skills would promote increased mobility among them. The introduction of technologies that reduce women's burden within the household and the enlightening of managers and owners through awareness training would also open up more industrial job opportunities for women.

Even when the external conditions (policies, tradition, practices etc) are right, it is important to enhance women's capacity to respond to programs, initiatives, and policy changes.

Policies

Human resources development is one of the most crucial component of a modern industrialization strategy. It covers a wide range of activities. Some of these can and are planned; the majority, however, consists of autonomous actions by a myriad of actors acting according to divergent and at times opposing objectives. Therefore, HRD is also the most difficult piece of a strategy to implement. A judicious mix of policies and instruments—probably fairly unique to each country—is required to harmonize all the individual activities within the broad framework of a concerted HRD strategy. This issue is of particular concern in Africa where many governments are now moving from highly centralized to decentralized management of their national economies and privatizing large, state-owned companies .

The very different points of departure and severity of structural problems, dependability on weather and other external conditions, capacity to absorb reforms, and response time differences across African countries make it difficult to draw general conclusions on the effects of restructuring and other policy reforms. It is equally hazardous to predict in general terms what the next ten years will bring. Most every African country has to be analyzed

individually and appropriate policies devised accordingly.

In an absolute sense, disappointingly little technology and skill transfers has resulted from foreign direct investment in Africa. Preoccupation with physical production has overshadowed training and technological learning objectives, especially in the recruitment practices of expatriate personnel. In practice it was often assumed that the knowledge transfer function would be automatically fulfilled with the production targets and no particular attention was paid to training. This experience raises the question of instituting mechanisms for ensuring proportionally more attention to technology transfer than to immediate production in technical assistance and public FDI policies.

With technological change, people will change their occupation and place of work more often than before. Typically, this may require retraining, perhaps several times during the span of a working life. Public policies must take into account this new trend to increase labor mobility and flexibility, and to help people to adjust to new and complex working environments.

The trend in modern policy making is towards the root causes of economic and social ills rather than their alleviation. Central elements in this strategy are productive employment, profitable entrepreneurship, and equality in income and opportunities. This is in stark contrast to some countries where entrepreneurial initiative and embryonic industrial activity has been systematically suppressed under government policies and practices. Policies and programs must be evaluated in terms of measured performance vs. set objectives and corrective action—including abandoning of poorly performing programs and structures—taken swiftly. Research and understanding of underlying processes must be seen as the foundation for sound policy making.

Governments should make their objectives and instruments explicit through concise policy declarations, legislation and development plans. Internal consistency and accord over time are here more important than individual brilliance.

Higher education services tend to be utilized by the wealthy segments of the population. For industry, more emphasis on primary education has long term beneficial effects as general literacy fosters later, on-the-job training. Therefore, considering efficiency and equity issues, it can be argued that public spending on primary education is not only socially more profitable but also more equitable.

By decree, women have been denied access to certain occupations. In economic terms, this implies inefficiency in the allocation of a nation's resources, missed income chances, and other associated opportunity costs.

African governments' budgets are strained and can hardly stand expansion until economic growth picks up again. But, it is not only the overall amount of public spending that matters. The structural aspects - how expenditures are allocated and how revenues are raised - are at least equally important. Raising revenue and spending must be considered jointly. The World Bank points out that "... insufficient spending on cost-effective activities, inefficient public programs, and limited access by the poor - beset current public involvement in education, health, urban services, and rural infrastructure in many countries. Solving these problems calls for three sorts of public finance reform: redirecting spending toward activities in which government participation is most critical, increasing the reliance on user and other benefit-related charges to finance such spending, and decentralizing some public responsibilities to those in close touch with local needs and conditions."⁶⁸ It follows that new and innovative forms for financing technical and scientific education, vocational training and other forms of training that is more directly connected to private benefits should be sought. Such forms would favor cost-effective training techniques. Enrollment would be demand driven enforcing equilibrium between supply and demand.

Governments should ensure for all, regardless of sex, religion, or tribal/national origin, equality before the law, the provision of facilities for equal educational opportunities and training, health services, and equality in conditions and opportunities of employment. This recommendation does not rest solely, or even primarily, on equity arguments, but is valid on efficiency grounds alone. Short term technical assistance that draws on international experience in this matter can be most useful here.

Learning to Learn

Technological capabilities are acquired as part of a learning and experience process. Africa has missed part of this process. As a consequence, it is now lacking certain technological capabilities. But, since learning can be organized and experience placed in a systemic framework, learning itself can be learnt. "Thus, 'learning to learn' is an inherent part of the technological development process..."⁶⁹ Technical assistance projects aimed

⁶⁸ World Development Report 1988, *op.cit.*, p. 8.

⁶⁹ Lall (1990), *op.cit.*, p. 17 citing J.E. Stiglitz, "Learning to Learn, Localized Learning

at government officials in charge of educational development in their countries and at trainers can be built around this recognition.

Skills and Attitudes

A shortage of skilled workers reduces economic growth and undermines a country's competitive position. Big efforts to correct such a situation are required on part of all the three social partners: workers, management and owners, and government. Especially engineers, technicians, managers, and scientists are in short supply but not only because of too low a capacity among current educational and training institutes. There are not enough students going into these fields of knowledge. There are also legitimate questions as to the demand for such skills among African employers. Furthermore, skills are only part of the battle. Unless there is a change in attitudes and understanding of technological change and market requirements, the adoption of new technologies either does not come about or it could prove counter-productive. If the domestic industry does not understand that it must improve its quality to stay competitive against foreign producers, no amount of schooling of quality control personnel will much of a real difference. All training programs must recognize and guard against such eventualities by affirming that there indeed is an effective demand for the target skill.

Technical and management skills and entrepreneurial talents now have become generally regarded as decisive for economic development. Equally, it is now seen that investment in human resources can yield higher returns than does capital formation. These views are not only supported by sound theoretical arguments but the experiences with accelerated industrial development of several developing countries provide ample empirical evidence of the significance of a well trained and industrious work force, motivated management, eager entrepreneurs, and skilled policy makers.

Citing specific programs in the Organization's major priority areas, the Director General of UNIDO stated to the Third General Conference that "the human resources development program is aimed at helping developing countries build up coherent and sustainable systems for upgrading technological skills and managerial and entrepreneurial capabilities.... The emphasis lies on striking an appropriate balance between efficiency and equity, long-term targets and short-term needs, public and private initiatives, and advanced and conventional technologies."

and Technological Progress", in P. Dasgupta and P. Stoneman, eds., *Economic Policy and Technological Development*, Cambridge, 1987: Cambridge University Press, 9.125-155.

5. Priorities for Action

The findings of the preceding analysis as well as other recent development studies confirm the central role of HRD in the economic and industrial growth processes. It is now clear that the skill content in industrial production activities and in associated services have become decisive for the competitive strength of productive units as well as of entire national economies. Indeed, international trade flows in manufactures increasingly reflect the technical, organizational, managerial, and marketing skills that companies can mobilize, utilize and further build up at their chosen national locations.

The past development of Africa's industry largely was based on the abundance of agricultural, mineral and other natural resources and on the reliance on a domestic demand oriented growth process, supported by import substitution policies. However, domestic market limitations and other internal constraints as well as external challenges has made the continuation of such strategies untenable.

Therefore, African governments are in the process of reassessing their industrial strategies and policies. Private entrepreneurship and foreign direct investment are promoted through various incentive schemes in order to regenerate industrial growth. There is a general move towards policy deregulation and trade liberalization so as to create a more competitive environment and reduce direct government interference in industry. This means greater exposure of companies to domestic and foreign competition. The public industry sector that makes up the major proportion of large industries in Africa is under particular adjustment pressure. With the modernization and rehabilitation of existing companies significant productivity gains and growth impetus can be attained. On the other hand, major entrepreneurial talents can be observed in the informal sector. The task for policy makers is to strengthen this entrepreneurship and to bring it into the formal sector production network.

In the past, human resources development generally was not conceived as an integral part of industrial development and industrial policies. In the current industrial reconstruction endeavors, however, it is recognized that HRD is a critical investment in the current and future production apparatus. Major investments in HRD are needed both at the level of the national economy—through the formal education and training systems—and at the micro level—through company internal training and other commercial training schemes—if African countries are to regenerate industrial and

economic growth.

The investments in HRD, however, need to be seen as any other investment with stringent benefit cost evaluation and with complementary investments and subsequent efficient implementation and operation. In other words: HRD for industrial development is not a question of massive, broad financial resource allocation but one of targeted, carefully scrutinized and demand-oriented investments. Indeed, given the severe domestic financial resource constraints in most African countries both at the level of government budgets and in terms of company internal finance and considering the stagnant flows of ODA and foreign direct investment, there seems to be little room for launching new, major programs for HRD. Moreover, opportunity costs for associated capital investment in industrial plant and equipment and infrastructure are considerable. For such material investments, however, it is generally easier to mobilize supplementary credits, including ODA and export credits from the developed countries.

It is important to carefully target HRD for industry towards critical skill categories rather than simply increasing overall training expenditures. As has been amply demonstrated, HRD for industry needs to be synchronized with the creation of employment opportunities or—in general terms—with changing skill demands in industry and related services if human capital flight (or brain drain) and associated problems are to be avoided.

The demand side of HRD, therefore, assumes a critical importance. At the same time, assessing current and prospective demand for specific skills in an imperfect (labor) market and in periods of great uncertainty, unemployment and under-employment and general economic austerity poses a formidable, if not impossible, task. From UNIDO's industrial rehabilitation diagnoses in various African countries, it emerges that in the (small number of) examined industrial companies the requirements for skill upgrading are particularly acute in various middle management and supervisory functions. Thus, of technical, financial and marketing management, accounting (especially computer based systems) and in quality control, repair and maintenance there seem to be skill shortages.

The question arises, though, if these indications of skill requirements really reflect the concerned company's demand for training or whether other factors blur the picture (such as lack of work incentives, poor internal organization, technical inadequacies, frequent production disruptions, wage structure, labor laws). The country in question may well be able to supply skilled manpower through its education system or through better utilization of available manpower (including better recruitment procedures, active labor

market policies etc.). The concerned company management may be in the position to more systematically upgrade the skills of its work force but fails to recognize the need for such efforts or is not exposed to sufficient competitive pressures that would force it to carry out retraining and other programs to increase productivity and performance. It would obviously be a wrong allocation of resources if training would be conducted without removing other, more fundamental constraints.

Estimating emerging skill demands for new/future industrial production activities is even more difficult. Generally, past manpower development plans failed to be effective instruments for allocating resources to HRD due to lack of predictability of specific skill requirements and general uncertainty of development. It is nevertheless necessary for both companies and national economies as a whole to carry out prospective analyses of skill requirements. To this end, industrial restructuring trends as well as the use of analogical skill structures in other, more advanced countries can be used as a guidance. However, continuous demand assessments rather than forecasts of general requirements are needed.

It should be reiterated that HRD for industry concerns not only the various technical, managerial, commercial and other skills within an industrial company but also the professional staff resources in the supporting administrative and institutional infrastructure. These supporting services of public authorities, financial institutions, information centers, R&D institutes, engineering and other consulting firms etc. play an increasing role in industrial competitiveness. Hence, the skill levels in this service sector are of similar crucial importance for industry as industry's own skills. It is, however, probably even more difficult to assess or forecast the specific skill demand in these services sectors than in industry proper. Again, African countries could use as a proxy the prevailing skill structures in other comparable countries although this may not suffice to accurately reflect actual or prospective demand.

On the supply side of HRD, i.e. the training capacities in the formal public system, various professional institutions and industry itself, many African countries, often with external support, seem to have been able to build up considerable capacities over the years. The question that arises in this context is to what extent these capacities are:

- sufficiently geared and with sufficient capacity to meet the needs of industry;

- sufficiently equipped and efficiently run to provide the right quality of services; and
- sufficiently efficient in terms of training costs and overall operating costs.

There is ample evidence that in various African countries (as well as in other developing countries) industrial service institutes in general and training institutes in particular do not live up to original expectations or current requirements in terms of client orientation and costs and quality of services delivered. To enhance HRD for industrial development in Africa therefore largely means rationalization and modernization of existing training facilities towards greater up-to-dateness and client orientation of training. It may also be necessary to build up additional specialized training facilities and to induce through appropriate policy measures industrial companies, service companies and banks etc. to increasingly train and retrain their staff.

The tasks ahead for African countries to enhance their HRD for industry are thus vast and complex. In summary, the following guiding principles can be suggested for the individual African countries:

prospective analyses of critical HRD requirements for industrial development in the years to come need to be carried out at the country and branch specific level;

HRD needs to be treated as an integral part of industrial policies, including policies and measures for foreign direct investment, industrial rehabilitation and modernization, subsector programming, small-scale entrepreneurship and development, regional (subnational) development and privatization;

new institutional arrangements need to be invented and put in place for the promotion of small-scale industry and restructuring of the informal sector towards a technology oriented, modern sector;

other cost efficient and selective training systems need to be built up to (partly) replace outdated systems and new training methods applied;

HRD needs to be increasingly demand oriented and/or client oriented through, among others, commercial approaches and less subsidies to higher education;

in certain areas, economies of scale in HRD could be achieved through a

regional, market oriented division of labor entailing the development of African training capacities for specialized skill upgrading;

skills upgrading must be a major component in most any rehabilitation of existing private manufacturing enterprises;

the present lack of industrial branch, occupation, and gender specific statistics on HRD must be remedied;

the promotion of women's employment should be conceived as an integral (as opposed to a special) part of HRD policies and skill upgrading schemes; and

HRD demands need to be evaluated jointly with other emerging issues for industry in the 1990ies, such as environmental protection, energy saving, new technologies, product quality requirements, responsiveness to market changes, increasing service and information content in industrial production.

International support to African countries pursuing these endeavors will be essential. Such support is needed (i) in terms of financial support to build/reorganize and equip the training facilities in individual African countries and at regional and subregional levels; (ii) in terms of analytical support at the demand and the supply side of HRD; (iii) in terms of advice on new training methods and training institute management; (iv) in terms of training of trainers, and (v) in terms of arranging and financing specialized training abroad.

International assistance would in general need to be giving more attention to HRD as the core issue of development. Thus, international technical and capital assistance should be more focussed on and coordinated with HRD entailing greater synchronization among multilateral, bilateral and foreign commercial entities on the one hand and national effort- on the other.

It is also suggested that technical and other international assistance projects should be accompanied by a Human Resources Assessment (HRA) to ensure that the requisite skills in both quality and quantity terms are indeed available for the achievement of the project's development objectives.

UNIDO's Role

UNIDO can assume a major role in the above endeavors. Indeed, HRD is the first of five major target problem areas that are to be the subject of thematic programming in the organization's current medium term plan. The primary objective is to "assist developing countries in building up coherent and sustainable systems for upgrading local technological skills and managerial and entrepreneurial capabilities and integrating them into the industrial development process..."⁷⁰ Also in UNIDO's program on industrial rehabilitation, major attention is given to the upgrading of technical and managerial skills at the plant level.

Whereas, thus already major programs on HRD are being carried out, UNIDO envisages to launch a special HRD program in Africa focussing on the following major areas:

- integration of HRD aspects in the rehabilitation of existing private manufacturing enterprises;
- basic technical skill development for the promotion of small-scale industry and restructuring of the informal sector;
- technical assistance in the collection of industrial branch, occupation, and gender specific statistics on HRD;
- policy advise for the promotion of women's employment and training; and
- development of a methodology for assessing HRD demands in industrial investment project design and evaluation.

Specific elements within such a program could be:

1. As an integral part of industrial policies, enhance the quality of human capital for industry :

assist African countries in the formulation of quantitative and qualitative targets for HRD at the macro level, sectoral level, industrial branch and enterprise levels within the conceptual framework of HRD in industry;

assist in setting up coordinating mechanisms that would bring skill training closer to the industry's demand, i.e. participation of the private sector, industrial associations, government, and training institutions in designing, implementing, and monitoring training;

⁷⁰ UNIDO, Medium Term Plan 1990-1995, GC.3/17, Aug 1989.

assist in designing financial schemes that would facilitate cost sharing of training between industry and government;

assist in establishing gender differentiated, quantitative and qualitative information systems on HRD for industry and HRAs; and

initiate and coordinate country based research and policy analysis in the field of HRD for industry.

2. **Content of training to reflect changing trends in manufacturing production in line with technology development and the globalization of international trade:**

assist in the assessment of the impact of changing technologies in terms of labor force restructuring and skill requirements, and in the formulation of strategies for meeting these requirements by formal education, vocational training, research and development, and on-the-job training; and

assist in the formulation and coordination of industrial training at sub-regional and regional level and coordinate inputs of technical assistance in this field.

Assist in the preparation of comprehensive training materials, modern training equipment and the establishment of model laboratories for the purpose of improving training techniques and the provision of up-to-date information on changing technologies.

3. **Human resources development as an on-going process attuned to changing economic and social conditions:**

assist in the assessment of industrial opportunities and training needs to curb rising unemployment;

provide assistance in determining training/retraining priorities in terms of managerial and industrial skills emerging from rehabilitation and modernization of the public sector;

assist in designing measures where training support is an integral/complementary part of financial schemes, promoting and assisting small- and medium-scale industry in urban and rural areas;

assist in designing economic and financial measures that would promote foreign direct investment in areas conducive to development of technological capabilities;

assist in designing measures needed to assure that technology transfer and training are compatible with environment conservation and energy saving objectives; and

direct training towards narrowing the gap between rich and poor, men and women, and urban and rural population.

4. Provide factual information and quantitative data on the supply of and demand for skills in industry and related services:

detailed assistance programs must be preceded by country and sector specific surveys of skills demand and supply if such programs are to address the core issues in HRD for industry.

UNIDO Programming

UNIDO's various technical assistance programs and activities in developing countries need to be formulated with due regard to the associated human resource requirements. An HRA ought to accompany major project proposals and it should be part of UNIDO's Project Review Committee's appraisal procedures.

The actors in skill development for industry are individuals, private and public enterprises, training institutions and outside donors. Thus, the mechanisms have to facilitate not only the institutional interaction that determine the content of training but also the sharing of the financial responsibilities. The latter is becoming a crucial factor because of the curbing of public expenditure, privatization of state-owned industry, increasing unemployment, rapidly changing skill compositions in manufacturing and the short life cycle of specialized training. Therefore, it is becoming ever more important that scarce resources devoted to education and training are directed towards employable skills and the enhancement of industrial competitiveness. Such considerations have to be reflected in UNIDO's technical assistance and technology transfer programs, too.

There is a clear need for bringing education and training closer to the realities of the labor market and it may be necessary to shift the rising training costs from the government to enterprises and to students and

trainees. This could require restructuring of the training institutions' approaches, methods and area of coverage, and a system of policies and incentives.⁷¹ The proper mix of cooperation among the provider of training, the beneficiary and the investor obviously has to be determined by the individual country's training needs, financial resources available, the government's management capacity, and the state of industrial development.

Policy formulation would be another important area for which international advice—such as through UNIDO—would be important.

Coordination with the World Bank and Other International Organizations

The development impact of activities of multilateral and bilateral aid agencies can obviously be improved if these activities are properly focussed and coordinated.

As far as HRD for industry is concerned, UNIDO in compliance with its mandate, ought to play the leading role within the UN system in 'upgrading local technological skills and managerial and entrepreneurial capabilities' of the human resource'.⁷² UNIDO could initiate and coordinate joint studies and activities by bringing together expertise from organizations such as ILO, UNESCO, FAO, the World Bank, IMF and IFC to assist African countries to build up sustainable industrial systems complemented by the enhancement of human technological capabilities. Agreements between the various UN organizations should be built on the recognition of one agency being the lead agency in a particular field. Remedying this would probably increase the system-wide effectiveness.

An important input into the formulation of national HRD plans is an improved and expanded information base. The UN system has initiated several programs to strengthen national systems of social statistics.⁷³ But,

⁷¹ George Kanawaty and Claudio de Maura Castro, Towards an employment-oriented training policy: An agenda for action, Training Discussion Papers No. 60, ILO, Geneva, August 1990.

⁷² The Fourth General Conference of UNIDO adopted a resolution on the development of human resources for industrial development which recommends that UNIDO should "Assist developing countries to determine their requirements for accelerated human resources development in the field of industry and to work out appropriate plans of action to meet those requirements".

⁷³ Examples include: UN National Survey Capability Programme, launched in 1980,

many African countries still lag behind other regions in respect of an established statistical data collection system to facilitate planning and monitor manpower development. Furthermore, these systems often do not capture the industry specific variables. The apparent mismatch between industrial skill supply and demand has been pointed out on several occasions in this paper. A detailed assessment of the skill gap, however, has been difficult due to the inadequate and/or inappropriate data available. Traditional manpower surveys, if at all available, do not on their own provide the qualitative type of information needed to determine general and differentiated levels of skills required for successful industrial activities. Therefore, new statistical data systems need to be designed and implemented with the specific requirements of an integrated HRD program in mind. New initiatives for joint UN support in this area are called for.

An HRA should form an integral part of every technical cooperation project already at the formulation stage, but also in the implementation and evaluation phases. UNIDO should take the lead in assisting developing countries and other agencies in assessing the viability of technical assistance in terms of present availability of and future requirements for technological, entrepreneurial and managerial skills. This process could be complementary to the already initiated UN program known as the National Technical Cooperation Assessment and Programmes (NaTCAP).

Another area of HRD for industry where coordination of international assistance is required concerns equality and the position of women in the industrialization processes. As demonstrated in this paper and reinforced in both editions of the Human Development Report, women's contribution and potential for industry has not been fully appreciated and developed. Integration of women into the main stream of industrial activities needs a gender sensitive approach to planning and implementation, and to policy appraisal.⁷⁴ Sensitizing development actors to these issues, learning more about the different needs of women in various areas of industry related activities, and making women more visible through better methods in statistical data collection and public relations campaigns would help to

supported also in the context of Social Dimensions of Adjustment Project, sponsored by the UNDP, the World Bank, the African Development Bank and other agencies and bilateral donors; the National Technical Co-operation Assessment and Programmes (NaTCAP) consisting of data collection, policy design and technical cooperation programs.

⁷⁴ For details on the methodology see Caroline O.N.Moser, Gender Planning in the Third World: Meeting Practical and Strategic Gender Needs, World Development, Vol. 17, No.11, 1989.

narrow the present gap between men and women. A step forward in this direction has already been made by devising a "gender-sensitive human development index" in the Human Development Report 1991.⁷⁵

Financial Implications

Financing HRD is the main subject of the second edition (1991) of United Nation's Human Development Report. The report suggests restructuring of donor funding in order to increase "the aid social allocation ratio" and "the aid social priority ratio".⁷⁶ Among all categories of development aid, it singles out technical assistance as being the "ripest for reassessment". The shortcomings of technical assistance in building up local institutions and expertise has been pointed out earlier in this paper and the NaTCAP programs already under way in 30 countries are addressing this issue. What is still needed is a more determined effort to encourage and facilitate the commitment of the private sector, government agencies and individuals towards cost sharing in the development of industrial skills and related technical assistance.

The Report argues that "the potential is enormous for restructuring national budgets and international aid in favour of human development."⁷⁷ Indeed, national plans for human development setting out realistic targets and strategies are a prerequisite for policy actions by governments and international agencies. However, many developing countries are not yet in a position to carry out such an exercise entirely on their own and will require external assistance and expertise. Therefore,

"The United Nations system, in particular, must assume a major responsibility in human development in the 1990s, since UN agencies are already dealing with individual social sectors and concerns. What is needed is to bring their expertise together at the country level for integrating human development in the overall macroeconomic framework."⁷⁸

International assistance could be applied to the setting up of special financial schemes based on loans, grants, taxes, and levies for industrial skill training. Such schemes could profitably be complemented by an easily accessible pool of expertise accountable to the hiring institution or enterprise. Industrial enterprises associations, public and private training institutions,

⁷⁵ UNDP, Human Development Report 1991, New York, 1991, p. 17.

⁷⁶ *Op.cit.*, p. 1.

⁷⁷ *Op.cit.*, p. 8.

⁷⁸ *Ibid.*, UNDP 1990, page 72.

government, and trade unions could be joint negotiating partners. These financial schemes can be attached to or be a part of existing supportive infrastructures such as the International Finance Corporation's sponsored African Project Development Facility (APDF) and African Enterprise Fund (AEF), the European Investment Bank's sponsored Risk Capital Facility (RCF), UNIDO's Investment Promotion Centers (IPCs), or national development finance institutions. In this way the interdependence between capital and human investment would be reinforced.

Whatever financing mechanism is chosen, a more active participation of industry will be required in terms of signaling skill shortages, providing professional input into training courses and sharing the financial costs of training. Associations of industrial enterprises could provide one type of forum for employers to exchange experiences, discuss cost sharing possibilities and be a negotiating partner for government and donor agencies.

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