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UNIDO'S TECHNICAL ASSISTANCE IN
INDUSTRIAL PLANNING AND IMPLEMENTATION*

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CONCEPTS OF INDUSTRIAL PLANNING FOR DEVELOPING COUNTRIES

Planning involves formulation of systematic programmes of action to attain desired goals. In that general sense all governments, whatever be their political complexion, engage in planning; all budgets are after all plans. Planning, in the more specific sense of national economic planning, however, has been attempted by most developing countries, since the second world war for the purpose of accelerating their development. The case for planning was strengthened by the orientation of development economics. Several pioneers of development economics, such as Rosenstein, Rodan, Hirschman, Nurkse, Myrdal and Lewis belonged to the Structuralist School. The basic tenets of this school were that, owing to social, cultural and institutional rigidities, the resource flows in developing countries follow traditional lines and are not responsive to prices and market mechanisms. They emphasized the market imperfections and failures. Modernization, the structuralists argued, requires a massive reallocation of resources which, in turn, naturally requires government intervention. The State has thus to take an active, indeed the decisive role in allocation of resources to various sectors, and by its various controls--inducements and restrictions-- over the private sector, the State has to initiate and steer economic development.

Further impetus was given to planning by international assistance agencies, which believed that their effectiveness could be increased if they knew how their assistance fitted into an overall development programme with anticipated inter-sectoral linkages. International assistance is often directed towards bringing about improvements in infrastructure that are vital to development. The feasibility for such projects for physical and social infrastructural development is naturally based on a planned flow of benefits to various sectors in the economy. It is indeed for reasons of infrastructural development, whether physical, social or institutional, that even the most conservative development economists would support the need for planning in developing countries.

Industrial development is an integral part of economic development. Rapid economic growth of the developed countries after the industrial revolution has

proved as to how industrialization has been an engine of growth bringing about an increase in productivity in various sectors by introduction of improved technology in production across the board. Industrial planning in developing countries thus can not be thought of merely in the narrow context of the industrial sector alone. There have necessarily to be upgradations in technology across the board in agriculture, mining, construction and transport etc. Industrial planning as the very core of the national planning process, must aim at an appropriately balanced spread of resources in the various critical sectors of the national economy duly taking into account the intersectoral linkages. An industrial master plan must therefore be based on a well-conceived strategy devised for the country in question after careful assessment of the resources available and the existing physical, social and institutional infrastructure.

A broad classification of developing countries can be conceived in the context of options for industrial development strategies. The first category of countries consists of those which have a reasonable size of internal market. It may be beneficial for such countries to follow initially policies of import substitution for selected items with carefully chosen rates of protection that taper off gradually over time, so that industry can become competitive and efficient in the long run. Unduly high levels of protection stretching over unreasonably long periods tend to make the indigeneous industry less cost and quality conscious. The comparative disadvantage must after all pass off with time allowing the industry to mature from infancy to adulthood. In many developing countries following import substitution policies, initial high levels of protection continue on an ad hoc basis for years insulating the industry from foreign competition in the matter of costs and quality. A quantification of comparative disadvantages must be done periodically and the levels of protection reviewed in the light of results of this exercise.

Policies of industrial controls and licensing adopted in some of the developing countries following import substitution policies, result in

protecting the indigeneous industry from domestic competition also. Demand based industrial licensing dictated by considerations of scarcity of capital and foreign exchange often leads to fragmentation of industrial capacities with uneconomic scales of operation on account of several companies vying with each other to enter into a new area of import substitution to reap the benefits of a market protected from external as well as internal competition. Due care has therefore to be exercised to work out the size of manufacturing capacity that has the advantage of economies of scale, taking into account the cost of local factors of production. Setting up of uneconomic capacities which results in higher unit costs of production must, therefore, be avoided.

Systems of industrial approvals prevalent in some of the developing countries of this category for import of machinery and technology etc., often take considerable time thus leading to avoidable time and cost overruns in creation of manufacturing capacities. In order to ensure optimal utilization of scarce capital resources, time-bound approval systems should be introduced. For instance, in a case of no reply being received from the Government within a prescribed reasonable period (say 30 days), it shall be deemed that the industrial approval has been granted.

Provision must therefore be made in the industrial plans of such developing countries for appropriate industrial and tariff policies so that the import substitution industries become internationally competitive and export oriented, paving the way for the economy to become in the long run, an outward looking economy. Correctly devised and pursued import substitution strategy offers the prospects for building a good base of capital and producer goods. Intermediate goods like fertilizers, pesticides and agricultural machinery provide very vital links with the agricultural sector. Growing energy input requirements to produce food surpluses in developing countries can not be met by yet more labour inputs,

but only by selective mechanization, particularly engine powered mechanization. In Egypt, deep ploughing, possibly only with power machines, has resulted in a dramatic increase in the cotton yield. In India, the introduction of electrically powered irrigation pumps has had a remarkable effect on production and intensification of cropping. Without machines, the farmers of Punjab (India) could neither have carried out three or four successive crop rotations with heavy applications of chemical fertilizers, nor could they expect to harvest the bounty of the new high yielding crops. As a result of the sharp increase in productivity brought about by mechanization and technological change, farm wages doubled over five years. Introduction of selective mechanization in the agriculture sector in this category of countries should be accompanied by import substitution policies. Equipment and machinery designed and manufactured in developed countries often have to be modified or completely redesigned to ensure mechanical reliability, and suit local conditions; a process which proves highly costly and inefficient. The importance of synchronising selective agricultural mechanization and development of local capacity to produce farm machinery and equipment can hardly be overemphasized. In fact, it has already taken place in many developing countries. Small machine shops have started to produce pumps, farm implements and diesel engines etc. When agricultural mechanization develops hand in hand with the indigenous production of farm machinery and equipment suited to local conditions, the direct employment displacement effects of mechanization tend to be offset partly or wholly by the employment generated in the manufacture, distribution, maintenance and repair service activities of mechanical equipment. In fact, in some cases it has led to an overall labour shortage (e.g. in Punjab in India).

The second category of developing countries have reasonably good natural and human resources, but their size of market does not justify the creation of a diversified capital and producer goods base, though

they have a good potential for import substitution of consumer goods and some intermediate goods. Experience has shown that production of consumer goods can be viable even in the medium and small scale sector due to factors like storage costs, distribution costs and market conditions. Scale constraints are widely viewed as being fundamental obstacles in industrialization in developing countries, specially in creating a base in basic and intermediate industries. It must be examined whether there are possibilities of removing the obstacles which confront the industrialization process in developing countries by way of diseconomies of scale.

Alternative technologies may have to be found for reducing the optimal scale of production to a level more commensurate with the markets of developing countries. Existing large scale technologies may have to be modified. Technological development, particularly in the area of micro-electronics, microprocessors and computer based support offers great promise in pushing the level of optimal scale downwards in a number of sectors. Branch-specific technological breakthroughs have already taken place in sectors like, iron and steel and fertilizer. Good beginnings have been made for cement and paper.

Similar breakthroughs can reasonably be expected in petrochemicals and textiles. The obvious problem is specific R+D programmes for achieving such breakthroughs, since R+D was so far primarily oriented towards large scale plants with economies of scales. Fortunately there has been a recent trend towards more R+D for achieving efficient output at smaller scales of production. For instance the "higee" distillation unite developed by ICI, a 30.000 tonnes per year plant, is compact enough to be transported on the back of a truck and more adaptable than conventional chemical plants. (The chemical sector with its fragmented and dispersed markets appears to offer substantial scope for ECDC also). Even this plant, however, has to prove its viability conclusively on a commercial scale. A large number of mini steel plants that have been set up in many developing countries are not viable on account of high costs

of power, while they continue to use the energy inefficient technologies. (In some countries like India, their viability is being artificially maintained by props like taxation reliefs etc.).

Mini cement plants with 200 tonnes a day instead of 2.000 tonnes a day have been successfully operated in some countries. Similarly mini fertilizer plants and mini paper plants. (Even in countries with large markets, such units can serve the cause of industrial dispersal, simultaneously reaping the benefits of lower distribution costs if the size of the country concerned is large). Unit costs of production of such plants, however, often tend to be higher than large-sized plants, thereby necessitating artificial props like taxation reliefs for maintaining their viability. There is thus need for greater research in improving the efficiency of operation of such plants by achieving better raw material conservation, energy conservation, etc. This calls for specific R+D programmes, since the available results of R+D for larger plants may not exactly apply to these mini plants. Improving the viability of the mini plants to bring down the scales of economic operation is of crucial importance for this category of countries. This offers valuable scope for technical assistance by UNIDO in several sectors of production. Several developing countries have for example set up mini paper plants based on local wheat and paddy husk but despite supports like cheaper institutional finance and lower incidence of indirect taxes, such plants are often not proving viable on account of the poor and thus unviable recovery of expensive caustic soda from the black liquor formed at the stage of pulping. As compared to the liquor formed in wood pulping for larger paper plants, it has a higher silica content thereby making recovery of caustic soda unviable. Specific R+D is therefore called for first reducing the silica content of the black liquor formed in the pulping from agricultural residues and then making a pilot plant for recovery of caustic soda. Such instances can be multiplied proving that new technical assistance programmes need to be taken up to make

processes of manufacture viable at lower scales of operation which are appropriate for the markets that are not big enough for the conventional large scale plants with the advantage of built in economies of scales.

The handicap of a smaller market for this category of countries can also be met by co-operation amongst developing countries on a regional and subregional basis. Some countries in a region may not have the raw materials required to set up a particular industry while the others may not have large enough markets. Pooling of resources of such countries with some complementarity of production structures can lead to setting up of industries with economic scales of operation. Unfortunately, however, there has been very little progress in setting up of such industrial capacities on a regional basis using domestic raw materials.

Often more than one industrial raw material is needed for an industrial product, for example iron ore, limestone and coking coal for steel making. Since, as a rule, not all of these are available in any one country, there is considerable scope for industrial co-operation in the equitable and co-operative rather than the exploitative development of industrial raw materials. The prospects for trade in semi-processed industrial material, rather than in raw materials amongst developing countries can be improved considerably by a properly integrated approach and planning. Thus a country endowed with bauxite could plan to export alumina instead of bauxite to another developing country with a cheap and abundant electrical power source (say hydropower), which can convert alumina to aluminium. Another country with comparatively cheaper labour could take up the downstream activities with aluminium. Such multilateral arrangements can make the advantages of value added accrue to all the countries involved. Considerable experience and technical expertise is now available with some of the developing countries for the required survey and exploitation of minerals, agricultural and forestry resources, as well as for domestic processing of raw materials. Since the economic, social and environmental conditions

in developing countries are more or less the same, it would be advantageous for them to co-operate in such activities. Transfer of skills and training in domestic processing of raw materials would naturally be more feasible amongst developing countries themselves.

This strategy of co-operation amongst developing countries with some basic complementarity of production structures has been emphasized in the General Conferences of UNIDO and other related fora, but there has unfortunately been very little progress in this direction. It is felt that technical assistance projects should be taken up with a view to promote such co-operation. UNIDO could play the role of a catalytic agent in this field. The first step would be to identify a group of such developing countries with complementarities in production structures situated in a compact region to take care of the factor of freight costs. Due care has to be taken of the political relationships involved to facilitate smooth working of such an arrangement. The feasibility of such co-operation can be established by UNIDO after a survey of resources, costs of factors of production, taking into account the infrastructure that exists in these countries. A formal comprehensive agreement can then be drawn up for the execution of such a project by UNIDO. Technical assistance projects should therefore be devised for achieving this objective.

UNIDO could play a very useful role in materializing opportunities for international subcontracting activities. The potential for such foreign assembly activities exists to a substantial extent in the sectors of electronics and garments. In both cases, value to weight ratios are high and the transport costs low. Both types of manufactures involve segmented and separate operations in time and space. International subcontracting can, thus, play a useful role in mitigating the market size handicap of this category of countries.

The third category of developing countries are those which lack the financial and human resources needed to acquire the necessary basic infrastructure as well as the resources essential to establish internationally

competitive industries. These countries include many of the least developed countries, and many of the small island nations, with African countries clearly dominating the group.

Within this group of countries, the small island developing countries face a singular situation from the point of view of formulating industrial strategies and plans. For many of them, high transport costs represent significant obstacles to closer linkages with world industrial production and their domestic markets are extremely small. Some of these countries have mineral resources but they have to be exploited with great care, so as not to disrupt socio-economic development in the long run. In all probability, these countries will only be able to build a limited industrial structure based on local raw materials and skills in the form of small scale industries, mainly directed towards local consumption. Agro-based industries and light engineering industries in the small scale sector are primarily indicated. Industrial processing or semi-processing of marine resources has good potential.

Most of the island economies, however, have a scarcity of industrial entrepreneurship, because of the heavy dependence on tourism and preference of entrepreneurs for retailing of imported consumer goods. Promotional and support programmes for small scale industries have therefore to be planned and implemented effectively, with emphasis on entrepreneurial development programmes.

The least developed countries face severe constraints to their industrialization. Poor physical and institutional infrastructure, as well as lack of proper human resources are the major constraints. Agro-based industries and cottage and handicraft oriented industries are the first priority for growth. The African continent is richly endowed with mineral resources and mineral based industrialization constitutes a promising option for a number of African countries. Scientific and systematic

exploitation of minerals is capital intensive and besides to improve their vulnerability to vagaries of international trade in mineral ores, some processing or value addition would be desirable. The international aid for these activities has typically not been well absorbed in the past on account of poor human resources making it clear that the most important area for international action in the early stages of their growth is the development of human resources. Investments in education, with special emphasis on vocational education and support programmes for development of traditional cottage and rural industries, offer the best cost benefit returns on the scarce capital resources obtaining in LDCs. Planning and implementation of such programmes is dealt with separately.

PLANNING AND IMPLEMENTATION
OF SMALL SCALE INDUSTRY PROGRAMMES

The promotion and development of small scale and cottage industries is of crucial importance for industrial growth of all developing countries. At one end of the spectrum, LDC's would perhaps need to emphasize more on traditional handicraft oriented SSI's with a gradual growth of SSI's using modern technology. The developing countries at higher stages of industrialization have increasingly moved to SSI's using more and more modern technologies.

The economic rationale for promoting small scale industries, which provide useful training for entrepreneurs and managers, that often brings about the required industrial culture by the learning process involved, is too well known to be described at length. In developing countries, Governments have to play an important role by allocation of adequate financial resources in industrial plans for promotional and support services, devising and implementing appropriate incentive policies for growth of small scale industries.

Macroeconomic policies and measures provided in the plan for small scale industries should form a continuum with national industrialization policies and general economic policy measures to promote economic development having regard to country's economic goals. The policies for development of agriculture, natural resources, education, training, financing and public sector etc. have a strong influence on the prospects for the small scale industry sector. These policies should create the proper environment for small scale enterprises to nurture. From the standpoint of theory of economic development, economic policy initiatives that usually encourage labour intensive industries like small scale industries have strong linkages with promotion of agriculture, rural development and income redistribution. Policies promoting agriculture and rural development will increase rural incomes (also improving redistribution of incomes by programmes like land reforms, and anti-poverty programmes targetted towards poorer

sections), thus providing increased demand opportunities for small scale industries which cater to localized demand. In some developing countries, industrial policies including tariffs, investment incentives, industrial licensing etc. have so far favoured large scale industries on a comparative basis. For creation of a proper environment of a small scale industry, it is essential to give more tax incentives and more favourable institutional finance to small scale industries which tend to serve the cause of industrial dispersal and broadbasening entrepreneurship besides their higher labour intensity. For entitlement to such incentives and public assistance programmes, the first policy initiative in a developing country is to define the cut-off limit for a small scale industry. Small scale units are generally defined by cut-off limits based on either of the following factors:

- (a) maximum number of persons employed;
- (b) maximum capital invested;
- (c) maximum annual production/turnover;
- (d) a specific combination of (a), (b) and (c).

The yardstick of number of persons employed would have the obvious disadvantage of tending to reduce at least in the borderline cases the labour intensity of the given capital employed, since the entrepreneurs would often fight shy of crossing the limit of employment which would entail loss of the incentives/supports that a S.S. Unit is entitled to. The yardstick of turnover suffers from a similar disadvantage of discouraging a more efficient use of capital. On balance the yardstick of capital employed seems to be more appropriate. But even this yardstick may result in a compartmentalization which may not be conducive to growth from a small scale to a medium unit, when often investment of more capital may mean upgradation in technology, and better economies of scale. The policy based on defining a small scale unit by capital employed should, therefore, be necessarily accompanied by allowing the S.S. Units to be entitled to all the incentives for an interregnum period

(say of three years) even after they have crossed the cut-off point of capital employed, and thus graduated into a medium unit. Policies and programmes for small scale in the industrial plan need to be designed, taking into account the situation and requirements in a particular country based on an analysis of actual demand and supply constraints on small scale enterprises. Such policies have generally to be directed to infrastructural requirements of small and medium enterprises, which may be either physical or institutional. Physical infrastructure relates to work sheds and related utilities. Institutional infrastructure is required to make up for market insufficiency in supplying inputs to S.S. Units or remove their operational inefficiencies. These relate to financing, extension and consultancy services, supply of equipment and material, technical services of testing, quality control, tool rooms, repair and maintenance, training of entrepreneurs and managers, market promotion and marketing.

With the typical capital scarcity prevailing in developing countries, it is not possible to create physical and institutional infrastructure for growth of small scale industries in every nook and corner of the country. A strategy of concentrating scarce resources to develop the required physical and institutional infrastructure in carefully selected growth centres is more appropriate for the developing countries. Mention must be made in this context of the growth centre programme for development of small scale and cottage industries in Sierra Leone being implemented with the assistance of UNIDO. It is a non-traditional and innovative approach to develop small scale enterprises at grass roots level in their environments. It is essentially a rural programme organized within the framework of traditional rural community. Representatives of the Community such as elders, teachers and opinion leaders are represented on the growth Centre planning committee which is responsible for initiating, planning and implementing the small scale industries development programmes. The extension workers and the technical assistance personnel operate as

catalysts to transmit new ideas, new designs, appropriate technology, relevant management practices and knowledge of new marketing outlets. Assisted by the "stimulator" provided by the Government, the extension workers draw up realistic industrial projects taking into account the local demand, availability of local raw materials and skills. The programme involves construction of a workshop building at each growth Centre Headquarters, wherein the major activities selected for the area will be established for commercial production as well as training rural entrepreneurs in upgrading their techniques and simple management practices.

While there is the obvious merit in this programme of ensuring a delivery mechanism for financial and extension services through decentralized organisational networks, there are still some gaps in the institutional framework to be filled up. One of the main difficulties that rural and traditional artisans have been facing so far is the exploitation by middle men/traders in the matter of purchase of raw materials and marketing of products beyond the village market. In some developing countries, Government agencies have tried to give the required support by taking up these activities at nominal handling costs, but these has had very limited success on account of inefficiencies of operations. This gap in the institutional framework could well be filled by properly organized and run industrial cooperatives, which could well extend to industrial production besides marketing and raw material procurement, but individual artisans who prefer to be outside the ambit of industrial cooperatives for production, should still be members of the overall cooperative society to get the facility of raw material procurement and marketing. The cooperatives therefore need encouragement by the Government in the areas of financing, marketing and training to emerge as a viable institutional framework for effective implementation of such a growth centre oriented scheme. It is therefore felt that the growth centre programme in Sierra Leone must be further supplemented by a technical assistance programme for filling the gap by an industrial cooperative programme.

UNIDO has been involved in the implementation of the programme in Sierra Leone, and the consultants have periodically gone into the progress of implementation, with useful suggestions for improving the implementation of the programme. The main thrust of future progress reports of implementation should, however, be to ensure that the artisans set up viable units that generate incomes. In several developing countries, while a number of units are set up through such support programmes, they are not viable for various reasons. The progress of implementation of such programmes can be better monitored, if the causes of lack of viability of such units are investigated, and support services like marketing, training etc. are accordingly strengthened.

In small establishments, the owner himself is the manager in charge of organizing production, bookkeeping, sales, servicing of equipment, supervision of labour etc. Thus all important entrepreneurial and operational decisions are taken by one person, who therefore needs to be trained in techniques of organizing production, elementary bookkeeping, inventory control, correct pricing methods and marketing techniques. This should of course to be preceded by a programme to identify and promote potential entrepreneurs who are given an orientation to industry. Entrepreneurial development programmes, which are of vital importance, specially for the Least Developed Countries, should also be take up by development banks, engineering schools, small industry service institutions (like the growth centre programme agency described earlier) and cooperative training institutions. In a long term prospective, the educational and vocational training system of the country can be so geared by suitable orientation in their training contents, that the products of agricultural, engineering, vocational and commercial schools could be identified and trained for entrepreneurial development and activities.

Developing countries have, in their policies and measures for promotion of small and medium industries attempted to provide

institutional finance by setting up special lending schemes on concessionary bases. The common scheme for subsidized loans to SSI is the refinance by the Central Bank. Funds are provided through a "special business window", whereby the Central Bank refinances all the loans made to SSI at a lower rate of interest. This is intended to compensate the lending bank or agency for higher risks and costs. Credit guarantee scheme is also a common form of Government support to banks to lower the risks of credit to small enterprises. Without these risk covering schemes and encouragements to the banks, they would not extend their lending activities to rural areas to small artisans, who pose higher costs and risks. The continued importance of informal credit markets, despite the growing monetisation of the subsistence sector in developing countries is due to restrictive financial policies, and lack of innovative measures to integrate informal and formal markets. Informal credit markets have a wide spread rural coverage and their refinancing by the financial institutions on the condition that they would in turn finance the small scale units and artisans at a prescribed rate of interest, can lead to savings of overhead and expenditures involved in opening of rural branches of banks etc. The cooperative lending institutions can also provide a useful link of integration with the formal credit markets.

On account of scarcity of entrepreneurship in developing countries, the entrepreneurial development programmes must be supplemented not only by provision of favourable institutional finance, but also by offering financing of venture capital. Several developing countries have experienced good growth in entrepreneurship by providing concessional finance, and more favourable debt equity ratios for small scale units. In India, technical entrepreneurs are provided with a financial package of assistance after training and screening, but an ownership of equity of 10% is insisted upon, with the remaining equity coming as venture capital assistance. Even for non-technical entrepreneurs, who are assessed to have a good potential, there is provision for equity or venture capital sharing. In the developing countries, where, for reasons of low risk bearing attitudes, there is dearth of entrepreneurship, such venture capital assistance plays a crucial promotional role.

The industrial plan of a developing country must provide for the nature of relationship between small and large industries against the background of national development goals. The industrial structure will always include large industries exploiting economies of scales and major natural resources. Using the services of smaller units, however, enables large industries to concentrate resources on essential elements of the production process and to increase production flexibility. Special products or small production batches and special services can be handled by small outside units. The division of labour between large and small scale units is thus in principle mutually advantageous and such linkages contribute not only to coherent and integrated development, but also to effective allocation and use of scarce resources in developing countries. The Governments of developing countries have to take policy initiatives in their plans by providing a framework of institutional as well as incentive measures for strengthening the linkages between the large and small units, which in any case exist according to market forces, since the decision for in-house production or subcontracting is based on the relative costs of production within the large factory or in a small scale unit with lower wages and overhead costs. In Japan, USA and India, Government policy has played an important part in stimulating and strengthening the interlinkages. India has encouraged ancilliarization by stipulating a higher cut-off limit of capital employed for ancilliarities for eligibility for all benefits available to SSI Units. (\$ 450,000 for ancilliarities instead of \$ 350,000 for SSI Units in general), preference in licensing to large units, capable of greater ancilliasization and the public sector playing a pioneering role in subcontracting and ancilliarization. A further incentive to growth of small subcontractors and ancilliarities has been provided by the policy of reservation of a large number of items for production by small enterprises, thus making it obligatory for the large units to buy these from the small scale units. This approach, however, needs to be followed cautiously since such reservations should be done only for those items which need comparatively simple technology that can be geared for production within the limit of maximum capital that can be employed by a SSI

Unit. Where on account of upgradation of technology, a component or a part can no longer be made in the small scale sector with the requisite quality, dereservation of such an item has to be considered. A periodic review of the list of simple items reserved for manufacture in the small scale sector is therefore called for.

TECHNOLOGY PLANNING AND IMPLEMENTATION
FOR DEVELOPING COUNTRIES

Technology upgradations in various sectors of the economies of the developing countries such as agriculture, mining, housing construction, and transport etc, are essential prerequisites for development. This is the very essence of rapid economic development of the developed countries. As against this, the slow rate of technological development in the least developed countries is the primary reason for their lack of development. It is well known that agro-industries have not been able to get the required push in several African countries because of the poor growth in the agricultural sector, whereas in countries like China, India, Pakistan, Taiwan, etc, upgradations in technology in agriculture have created surpluses for agro processing industries, and also provided a strong link for creation of manufacturing capacities in agricultural implements, irrigation pumps, electric motors, fertilizers and pesticides. Similarly technology upgradations in more efficient use of local resources for cheaper house building activities can stimulate demand for housing thereby creating good potential for manufacture of building materials. Technological planning must therefore form a vital and integral component of industrial planning.

Most of the developing countries, particularly the least developed countries lack experience in the field of technological planning. A large number of them have not drawn up any technology plans at all. The technology plan of a country must provide for a sound research infrastructure for the development of indigenous R & D, as well as adaptation and absorption of foreign technology. Fiscal and taxation policies must provide for incentives for development and adoption of indigenous R & D besides legislative framework to protect domestic patents.

For improving the research infrastructure of the country, the plan must provide for strengthening the existing R & D centres, and starting new centres for sectors that are crucial to the economy. A National Central Board or a Council should be set up to integrate science and technology, to review the scientific and technological needs of different sectors of the economy, and to co-ordinate research in various sectors since inter-sectoral linkages have to be kept in view. For instance, the

commodity research centres must not only concentrate on research in agronomic practices but also in their processing at the manufacturing end. The governing bodies of these research institutions should therefore have representatives not only from the commodity sectors but also from the processing or the user sectors. The important point is to give a consultative orientation to research, since ultimately it is the industry which has to adopt at the commercial scale, the indigenously developed technology. It has been observed that in several developing countries linkages between institutions and agencies involved in R & D and users of technology have been rather weak and need to be strengthened. Instances are not wanting where entrepreneurs in developing countries are keen to acquire technology from foreign companies with good track records offering fully proven and established technologies in preference to an indigenously developed technology because of apprehensions that the commercial application of the technology developed in the research centre may not be free from teething troubles. India is a case in point, where despite a good chain of national laboratories and a sufficiently well developed base of scientific and technical manpower, the results in development/upgradation, adaption of technology have not generated enough confidence in the indigenous R & D. It is therefore felt that an institutional link is required between technology generating sources and technology users. Mention must be made in this context of the Korean Technical Development Corporation (KTDC), which has the support of all the Government backed research centres. While depending on government funding itself, KTDC has a commercial character and acts as a funnel for smooth transfer of indigenously developed technologies by licensing it to entrepreneurs. It gives to the entrepreneur drawings and designs, and other wherewithal required for viable commercial operation of the technology concerned. KTDC has in fact also entered into joint ventures with equity participation based on indigenously developed technologies, disinvesting after five years of successful operation of the technology.

The provision for such an institutionalized link between technology generating (R & D centres) and technology using sectors (i.e. industry) also needs to be thought of in the context of the technological plan for Malaysia as an integral part of the Industrial Master Plan (IMP).

The progress report on IMP plan of action for implementation (DP/MAL/79/00 - Report II) stresses the need and gives a time bound programme for setting-up a National Council of Science and Technology (NCST) and Science and Technology Institute of Malaysia (STIM). It is noteworthy that there is substantial overlapping between the functions of these two agencies. Both aim at intersectoral co-ordination in research and identification of thrust areas of R & D crucial for the economy (paras 5.2.3, 5.2.4 of subject B-02 for NCST and paras 5.2.1; 5.2.2 of subject B-03 of the aforesaid report for STIM). The report also mentions hesitation on the part of the government in setting up new institutions like STIM. In the context of duplication of some essential functions mentioned above, it should be examined whether in the interregnum only NCST may be set up and a standing sub-committee of the Council discharges the functions of STIM. Of course this standing sub-committee would need a reasonable secretariat and expertise for discharging the functions envisaged for STIM.

Planning for acquisition, adaptation, and absorption of technology from foreign sources is of crucial importance for developing countries. There is generally no transfer of technology involved when a multinational passes on technology to its subsidiaries in developing countries. The most common method of purchasing technology is by means of a collaboration involving compensatory payments for the foreign company. The suppliers of technology, as a rule, would like to have maximum royalty, technical knowhow fees, etc. Such payments can be either in the form of a lump sum as technical knowhow fees or royalty calculated generally as percentage of ex-factory cost of production (minus bought-out components) or a combination of both lump sum and royalty. One advantage of the arrangement of royalty is that the compensation to be paid is related to the quantity of production and the supplier of technology has, therefore, a vital stake in maximising production. The developing countries should, as far as possible, agree for the payment of lump sum in suitable instalments, each linked with a concrete stage in the process of transfer of know-how. The last instalment should be generally payable at the commencement of production. But obviously in the case of a closely held technology, the technology supplier may insist on payment of lump sum in one go right

at the beginning. The technology plan of a developing country should therefore provide for an institutional mechanism to assist prospective entrepreneurs in enhancing their abilities in negotiating for the acquisition of technology on fair terms. This assistance is of particular value to new entrants to the industry having no previous knowledge of fairness of terms of transfer and the related modalities, since apart from the issue of compensatory payments, the developing countries have to ensure that no restrictive clauses for exports, sub-licensing and transfer, should form part of the foreign collaboration agreement/license.

The institutional mechanism proposed earlier should have an up-to-date data bank of information on contemporary and threshold technologies. Apart from the technical features, the information should cover sources of technology, terms of technology transfer and the broad economic and commercial implications. In fact, ideally speaking, this data bank should have up-to-date information even of technologies that are not so highly capital intensive but despite their higher labour intensity, the same product can be produced competitively and without loss of quality. Such technologies have been evolved by some of the developing countries and are more in accordance with the factor endowments of the developing countries.

The Malaysian Industrial Master Plan envisages setting up of two such institutions: The Industrial Technology Information Centre is envisaged to maintain the data bank. But the implementation plan for Malaysia provides that such up-to-date information will be obtained on a worldwide basis through embassies, industrial and trading companies, and scientific and technical literature. This will be a task of gigantic dimensions.

It is therefore felt that this is precisely the kind of activity that UNIDO should take up. The proposed data bank can be computerized and some of the developing countries can have a terminal each of the computer. Alternatively the software can be continuously updated to be used on compatible computers in the developing countries. It is

strongly felt that this would be the most important and crucial technical assistance that UNIDO can render to technology upgradation in the developing countries.

The Industrial Master Plan for Malaysia also provides for setting up of a technology transfer centre, and the Industrial Technology Information Centre. The IMP plan of action also emphasizes the setting up of both these centres. It is felt that it would be better to set up a single centre which takes up the functions of creating a data bank as well as assisting the prospective entrepreneurs in improving their capabilities for negotiating for acquisition of foreign technologies, since the two activities are related. A knowledge of the fair terms of transfer of technology is essential for effective negotiations with various prospective suppliers of technology for a particular product.

The indigenous R & D centres should be associated with this institution or centre that is proposed to be set up for assistance of prospective entrepreneurs, so that acquisition of foreign technology is not resorted to in cases where indigenous technology is available. Involvement of the indigenous R & D centres would also enable them to devise and pursue appropriate research for adaptation and absorption of the technologies acquired from foreign sources. While "know-how" of a technology is generally transferred, it is very essential to acquire the "know-how" of a technology for enabling the indigenous R & D centre to make adaptational refinements.

An important issue to be kept in view while drawing up the technological plan for a developing country is the strengthening of linkages between investment promotion and transfer of technology. As stated earlier, when multinationals take up manufacturing activity through subsidiaries, foreign investment does take place but there is no transfer of technology. It is important to ensure that foreign investment becomes a vehicle of transfer of technology. From this point of view, a joint venture involving equity participation along with transfer of technology

is more appropriate and beneficial for developing countries than mere purchase of foreign technology.

A joint venture would create an abiding long term interest of the supplier of technology in efficient running of the project because of his stake in the profits. The project would have the benefits of upgradations in R & D done by the foreign supplier on a continuous basis without payments of any extra cost. It will also have the benefit of managerial and marketing support of the collaborator; and sometimes of a buy-back arrangement.

Sometimes large payments are made for purchase of multiple imports of the same technology from the same source by different entrepreneurs. A group technology import can be thought of in such cases. On a regional basis for several developing countries, there is a possibility of co-operation for such group technology imports.

For the developing countries, it is important that the technology plans provide a mechanism for continuous technology upgradation by the small and medium industries which generally go on using inefficient and obsolete machinery. Very often replacement of an obsolete machinery by a more modern one does not need any formal import of technology, but merely the drawings and designs of the new machinery are enough to enable the entrepreneur with the assistance of a foreign expert to erect and do the trial runs of the new machinery. It has to be ensured that the local understudies are trained in such cases (as well as in the cases of import of technology) to enable absorption of technology.

The technology plans must also provide for transfer of technologies in rural areas for activities like converting organic wastes for generating biogas and fertilizers. Electricity or energy for home lighting, irrigation and small industries can also be generated.

The Industrial Master Plan for Malaysia provides for enunciation of a national policy on science and technology. Such plans need to be drawn up for other developing countries also, so that keeping in view the limited financial and manpower resources, national priorities for broad sectors for R & D are determined keeping in view the intersectoral linkages.

IMPLEMENTATION OF INDUSTRIAL PLANS

Industrial plans for developing countries generally aim at targetted growth in industrial production for various subsectors and execution of some projects for infrastructural development.

Experience has shown that, because of linkages between manufacturing and other sectors, difficulties frequently stem from inadequate expansion of complementary activities. Production trends in agriculture have affected adversely industrial performance in many countries, e.g. agrobased industries may suffer from stagnation in supply of raw materials like commercial crops, shortage of cotton etc. Moreover, since agricultural exports are a major source of foreign exchange earnings in many developing countries, poor agricultural performance has not only inhibited the expansion of industrial capacity by limiting the capacity to import plant and machinery, but also restricted the supply of imported spareparts, semi-manufactures and raw materials. Shortages of such imports have led to delays in project execution and interruptions in production processes in plants, that are already in operation. Slow growth of agricultural production and incomes has caused sluggish demand of industrial goods. This is precisely what happened in 1970's in India, when the industrial production was hit adversely by the sluggishness of the agricultural sector. By contrast in Brazil, where agricultural output and rural incomes increased rapidly, excess industrial capacity dwindled and in fact, capacity constraints began to appear towards the end of plan in 1970's. Similar in mining oriented economies, industrial growth has been affected substantially by the pace of mining activity. In India, the near stagnation in coal production during 1970's contributed to the underutilization of existing capacities in such industries as steel and cement and exacerbated shortages in supply of power. Power shortage in turn impeded the expansion of manufacturing activities. Indeed, shortages of power and other utilities have been responsible for lower growths in outputs than targetted. in

several developing countries. In fact, one of the important reasons for lack of success of implementation of industrial plans is the commensurate physical, social or institutional infrastructure, either not having been contemplated and thus not provided for adequately in the industrial plans, or not having been created as envisaged in the plan on account of failure of implementation. In India, the bottlenecks caused in railway movement of coal (after coal production had improved considerably !) contributed adversely to growth in industrial production. Similarly in the field of social infrastructure, inadequate expansion in technical education of engineers was a bottleneck in the early years of planning.

It is, therefore, clear that implementation of industrial plan cannot be thought of in isolation of other sectors. It is linked with the proper implementation of agricultural production plan, power and utilities plan, transport and communication sector plan, and human resource plan etc. The preparation and implementation of plans is therefore an integrated process requiring coordination between various sectors. It is, therefore, not only important to keep in view the intersectoral links at the time of preparation of the plans, but also to take up periodic reviews or evaluation of the performance of complementary sectors in addition to the industrial sector. Targets for industrial growth may need revision in light of such exercises. Revisions in targets may also be called for on account of different reasons like the actual outlay for the industries sector or the complementary sectors being less than the originally envisaged outlay on account of the typical resource constraint situation generally prevailing in developing countries. A central planning agency, therefore, must constantly review and assess the progress. It is appropriate to set up a programme and plan evaluation cell in the central planning agency of a developing country, which must seek to identify potential bottlenecks as easily as possible, determine their causes, and evaluate the extent to which poor performance in complementary sectors has hit adversely the achievements of each sector. Needless to say that such plan evaluation cells should also be set up in the

Ministries concerned, to devise and streamline the reporting systems and to take up the analysis of causes of growth having fallen short of the targets in each sector. This would facilitate a comprehensive analysis and assessment by the central planning agency, keeping in view the intersectoral linkages. To perform these functions properly, it is important to set up reporting systems to prepare timely quarterly, semi-annual or annual evaluation of plan progress. Almost no developing country does so on a quarterly or semi-annual basis and few prepare annual evaluations where evaluations are prepared, they are often issued long after the end of the period to which they relate. The best that most planning agencies seem able to do is to issue a mid-term review of the performance followed by a review at the end of the plan period, often long after the close of the period concerned, thereby making mid-term corrections very difficult. Several developing countries lack the administrative expertise to set-up a good plan evaluation unit. It is important to devise simple and short forms for reporting while avoiding multiplicity of returns. Physical and financial criteria against which progress can be measured, should be established. In keeping with the greater interest in some countries in the financial rather than the physical aspects of a project, the progress reports often contain information about money spent, but little or nothing about physical progress. (Several developing countries consider investment virtually synonymous with development and therefore even in their plans, financial investment targets have been emphasized to the neglect of physical output targets which the investments are aimed at achieving). Project evaluation expertise must reside in the plan evaluation cells in the Ministries of Industry, and the National planning agency, since it is essential that the time required to complete a project or programme should be analysed and divided into reporting periods and a set of specific financial and physical goals are predetermined for each period, otherwise it would not be possible to judge whether progress indicated for a reporting period is satisfactory. Goals set for a project or programme are likely to

vary from one period to another. Thus when a project has just begun, it shows little progress in early reporting periods because most of the time is spent on preliminary work. As work gains momentum, however, progress may be expected to be faster than in earlier periods. But unless a time schedule and cost estimates have been worked out for each reporting period, it is not possible to determine what progress in any period is against what it should be. It is therefore essential for the purpose of progress reporting, that a project be divided into a series of discrete segments (e.g. selection of a site, acquisition of land, issuance of tenders, erection of a plant, purchase and installation of machinery, construction of an access highway, training personnel for the plant etc.), for which specific time schedules and cost estimates can be set for each reporting period. If, for instance, a plan with three major components is to be built, each by a different contractor, separate time schedules and cost estimates have to be set up for segments of each of the three components in the project.

If actual costs and physical progress do not correspond to the original goals, it is important to revise them, taking into account the experience gained. This may merely involve rescheduling work which has not been completed as scheduled originally. Sometimes discrepancies between goals and performance may be so great that it may require reappraisal of the entire project to see whether it pays to go ahead with it at all. Where, after reappraisal, a decision is made to continue with a project, review and revision of goals may point towards the need to procure more resources for completion of the project. Periodic review and revision of goals based on past experience help reveal errors and make it possible to foresee and deal with difficulties before they become serious.

Plan and project evaluation cells must therefore be set up in the Ministry of Industry, Ministries in charge of other complementary sectors, and the national body in charge of planning. This is a potential area for technical assistance by UNIDO to

developing countries in the matter of setting up of such cells and training of the skills required.

Repeated shortfalls in spending available development funds are a certain indication that something is wrong with the way the plans are formulated or implemented. This points to a lack of "absorptive capacity" which essentially reflects an inability to invest in soundly conceived development programmes and projects that can be carried on well and operated economically upon completion, is a common characteristic of less developed countries. There is often a tendency for inflated budgetary estimates springing from undue optimism about how much they can invest well. Chronic underspending is, however, due to lack of administrative organization, absence of effective programmes and projects, lack of technicians and human resources, poor construction skills and capabilities etc. Underspending can increase development costs, reduce investment and growth rates and distort the planned pattern of investments. A thorough analysis of the causes of repeated underspending or lack of absorptive capacity is called for in such cases. Remedial action constitutes potential areas for technical assistance by UNIDO, which could, for instance, take up a project on strengthening construction skills and capabilities of a developing country. Technical assistance in strengthening the technical and human resource base of least developed countries can be of crucial value. Similarly technical assistance could be rendered in strengthening the administrative organization to improve project preparation and monitoring.

It is a common phenomenon in developing countries, that industrial projects cost more than actually estimated at the planning stage. Cost overruns are sometimes due to rising prices of imported capital goods and other inputs, to increases in cost of construction and building materials. But they are more often due to shortcomings in cost estimation and delays in execution. Time overruns are the most important cause of cost overruns in the

developing countries. In fact, many projects spill over to the next singular plan resulting in sizeable cost overruns. At the end of the two years of the India's Third Five Year Plan, estimates indicated that in the public sector the costs had risen above original estimates by over 25%. Even for the private sector, costs had risen by nearly 25%. Other developing countries show similar trends in time and cost overruns in execution of industrial projects. By far the greatest number of failures to carry out projects and programmes in industrial sectors is due to deficiencies in project identification and preparation. The process by which goods projects with potentially high returns are selected and properly prepared, follows well defined lines. Ideally, the choice of projects for inclusion in a plan is preceded by sectoral or sub-sectoral studies. A sectoral study or a sub-sectoral study is an analysis which outlines the basis for a coordinated development of the sub-sector or sector and makes a preliminary identification of the nature, size and scope of the most promising projects within the terms of the sector analysis. A sectoral study for industry might indicate the relative merits of developing light as against heavy industry, given the nature of a country's natural and other resources and possibilities. When a potentially desirable project has been identified, a feasibility study needs to be made to determine whether it is practicable and justified. A feasibility study involves a detailed examination of the economic, technical, financial, commercial and organizational aspects of a project. It aims at producing all the information to determine whether and how a project can be carried out in accordance with sound principles and at a cost which is lower than the contribution it can be expected to make to a country's development. Feasibility studies vary according to the sector and the problems involved in such a study would require careful investigation of the likely demand for the plant's production, the best location for the plant, and its proper size, the availability and prices of the raw materials, the number and kind of workers needed and their availability, manpower training requirements, costs of production, reasonable given estimates of plant's construction time and costs etc. Such studies, when

carefully made on the basis of realistic assumptions, can yield sound judgements on the feasibility and desirability of a proposed investment in terms of benefits to the economy of a developing country. Without a careful feasibility study, it is usually impossible to ascertain as to how one project compares with alternative projects. This is important in the context of the capital scarcity prevailing in developing countries. While good feasibility studies cannot eliminate all investment risks or provide an infallible guide to the selection of desirable projects, they are particularly useful in identifying especially bad ones and especially attractive ones, identifying the crucial variables in a project and setting standards for controlling construction and operating costs. Feasibility studies need a good base of technical human resources: Once the feasibility of a project has been determined, preliminary and then detailed engineering and other preparatory work begins. This includes the preparation of working drawings for construction preparation of detailed specifications, list of quantities of materials required, etc.

In many developing countries, requisite feasibility studies and other preparatory work not being done is often the cause of time and cost overruns of projects. Even though a project may have been well conceived and prepared, it may be delayed on account of lack of engineering supervision. Therefore, the services of a company specialized in engineering designs and consultancy should be engaged for supervision of the execution of the project. It prepares tenders for bids, analyses bids received, advises on the selection of experienced contractors, helps set up work procedures, provides field supervisory personnel, renders progress reports on the project, recommends solutions to the problems which arise and is thus the main advisor for the execution of the project.

Several developing countries lack the expertise for feasibility studies, other preparatory technical work for the projects and engineering supervision capabilities. Even though

international agencies, and bilateral assistance agencies and foreign companies usually provide this support, it is important that the developing countries develop indigenous capabilities in these fields. This is a potential area for technical assistance by UNIDO.

Inferior construction, besides delays in construction is a general phenomenon in developing countries. Vaguely defined or otherwise inadequate specifications, poor siting, use of defective or other improper materials, poor workmanship are commonly found. Strengthening of construction capabilities is therefore of crucial importance, since civil construction capacity is often limited in developing countries. The requirements of civil construction materials often exceed the local production. (In India, cement and steel often been bottlenecks). The building material industry's manufacturing capacity has, therefore, to be planned and expanded accordingly to keep pace with the civil construction requirements in developing countries. The same also applies to infrastructure. Implementation of projects in developing countries often suffers because of bottlenecks in ports, roads and other infrastructural facilities.

On account of typical capital scarcity prevailing in developing countries, projects are often started without sufficient funds or with the overcommitment of available financial resources. Sanction of funds in dribblets, therefore, causes time and cost overruns in projects. Such dispersal of resources has therefore to be avoided by determining intense priorities in the context of resource constraints. It has to be kept in view that cost-benefit ratios are usually higher for completion of on-going projects, modernization and expansion of existing projects with a view to improve viability than starting new projects in a situation of resource constraint.

Another major reason for lag in implementation of plans in developing countries is the widespread failure of Governments to maintain the discipline implicit in their plans. Most countries make

only a token effort at coordinating fiscal, price, monetary, credit, and other economic and fiscal policies with the requirements implicit in their plans. Plans are prepared by a planning agency in one corner of a Government and the policy is made by various bodies in other corners. There is usually very little communication among them. Import licensing policies are often not in accordance with national development plans. In several developing countries, the central planning agency is weaker than several operating ministries. In some countries, one ministry may be more effective than others in preparing or carrying out projects or more influential in getting projects sanctioned even though a supporting infrastructural project may not have come up, thereby the project in question not yielding any returns. Intersectoral links and concomitant policy implementation must be watched by a strong central agency.

Poor data base is one of the crucial constraints in preparation, effective implementation of plans, plan evaluation and corrections during a plan period. Planning is concerned with where we want to go, however that task cannot be implemented unless we know where we are. A strong information system is essential for management of industrial development plans. The problems of planning without facts is well known in the context of Africa. At the project level, the absence of reliable data has hampered monitoring, evaluation and mid course correction. The rewards of a strong information system are illustrated by the experience of several countries, particularly Kenya, Bangla Desh, South Korea and India. South Korea's export oriented strategy was greatly aided by comprehensive and up-to-date statistics of foreign trade. In India, recent centralization of information on movement of railway wagaons has helped to improve the railway efficiency, with spin-off benefits for industries like coal and fertilizer. Governments of developing countries need to make more use of sample surveys and administrative records. Several developing countries lack the statistical skills required for evolving a sound data base. Recent advances in micro-

computers and associated software have revolutionized the opportunities for analysis of relevant data.

UNIDO has a crucial role to play in technical assistance to the developing countries to improve their data bases so as to improve the control of plan implementation. The least developed countries need the very basic help in the designing of sample surveys that are relatively inexpensive. Training for improvement of statistical skills is a priority area for technical assistance.

Finally, a consultative orientation needs to be given to the preparation and management of industrial plans. Japan, Korea and Brazil have employed consultations not only in various parts of the Government, but also with businessmen and academics to improve preparation and management of their industrial development policies and plans. One of the main reasons for the success of the Japanese industrial effort is the flexible consultative approach followed by MITI (Ministry of International Trade and Industry) in their constant consultations with the industry in preparation and implementation of their industrial policies and plans. It may therefore be appropriate to set up working groups for various subsectors of industry with concerned Government departments, research institutions and relevant industry associations represented on them. A more realistic assessment can then be made of the investments required for expansion, modernization and diversifications required in various subsectors. These working groups can play an advisory role not only in the preparation but in implementation of the industrial development plans. A consultative approach gives an element of realism and flexibility required for sound management of industrial development plans. This would tend to prevent shortfalls in investments in the subsectors which were envisaged to be encouraged in the plan. Such working groups in their periodic meetings for monitoring subsector-wise implementation would also provide useful feedback from industry whether fiscal, price, monetary, credit and other economic and financial policies are being implemented with the requirements implied in the industrial development plans. A consultative orientation to planning is, therefore, essential.

Summary of important recommendations
for technical assistance on planning and implementation
of industrial development in developing countries

I.

- a) The scale constraint is regarded as one of the most powerful obstacles in the industrialization of developing countries, since most of them have small markets. Alternative technologies have, therefore, to be found for reducing the optimal scale of production to a level more commensurate with the size of the markets of developing countries. Existing large scale technologies may have to be modified. Fortunately some sector-specific break throughs have been made in fields like iron and steel, cement, etc. In several developing countries, mini cement, steel, paper, fertilizer plants have been set up. The common experience, however, is that the viability of these mini plants is not as good on account of diseconomies of scale. (In countries like India, the viability of these mini plants is being sustained artificially by props like indirect taxation reliefs.) Specific R+D programmes need to be taken up to improve energy conservation and raw material conservation etc. with a view to improving viability of these plants, since the available results of R+D for large scale plants are not of direct relevance. This is a crucial area for technical assistance by UNIDO and specific projects should therefore, be built up.
- b) In the chapter on "concepts of industrial planning", it has been suggested that to mitigate the size constraint of market for industrial production, UNIDO should play a catalytic role in formulating and executing specific projects based on regional or sub-regional cooperation.

II.

- a) In the second chapter on "planning and implementation of small scale industry programmes", it has been suggested that in view of the typical capital scarcity prevailing in the developing countries, it would be more appropriate to create promotional physical and institutional infrastructure for growth of small scale industries in selected growth centres rather than spreading resources thin. Physical infrastructure relates to industrial sheds/plots and related utilities. Institutional infrastructure is required to make up for market insufficiency in supplying inputs to small scale units or removing their operational inefficiencies. These relate to financing, extension and consultancy services, supply of equipment and material, technical and testing services, tool rooms, repair and maintenance training for entrepreneurs, marketing promotion, etc. A common facility support centre could therefore be set up at each selected growth centre which covers the entire spectrum of activities starting from entrepreneurial development to viable production stage of units based on local raw materials, demands and skills. Industrial cooperatives could be dovetailed into this institutional infrastructure to eliminate exploitation by middlemen/traders in supply of raw materials and marketing of such traditional small scale units. UNIDO should take up technical assistance projects for creation of such physical and social infrastructure in the developing countries - specially LDC's.

Policy supports for promotion of small scale industries have also been spelt out in the same chapter.

III.

- a) Technology upgradation in various sectors of production is the very essence of economic development of the developed countries. Therefore planning for acquisition, adaptation and absorption of technology is of crucial importance for the developing countries. The suppliers of technology, however, as a rule, like to get the best terms for transfer of technologies. Prospective entrepreneurs in developing countries therefore, need to be armed with up to date information about terms of transfer of various contemporary and threshold technologies

for a particular product. UNIDO should therefore set up a data bank with upto date information about sources, terms, economic and commercial implications of technologies productwise. Some of the developing countries can then have a terminal each of the computerized data bank. Alternatively the software can be continuously updated to be used in compatible computers in developing countries.

- b) UNIDO can also assist developing countries in setting up viable institutionalized links between technology generating sectors (R+D Centres) and technology using sectors (industry), since in developing countries entrepreneurs often prefer to acquire technology from foreign companies offering commercially established and fully proven technologies in preference to an indigenously evolved technology which may involve teething troubles in its initial commercial application. Mention must be made in this context of the excellent work done by the Korean Technical Development Corporation (KTDC) which though backed by government with the support of all R+D Centres, has essentially a commercial character. It gives to entrepreneurs drawings and designs and other wherewithal required for viable commercial application of the technology concerned.

UNIDO should mount a technical assistance project for assisting developing countries in strengthening linkages between indigenous R+D centres and industry in some developing countries. In the first instance a study could be done of the present status of such linkages in some of the developing countries which have created a reasonable base in indigenous R+D, and keeping in view the lessons of the Korean and other experiences, a good model could be worked out.

IV. Technical assistance to reduce delays in execution of projects/plans

- a) In order to reduce the delays in implementation of industrial projects and plans in the developing countries, UNIDO could render technical assistance to developing countries in setting up plan and project evaluation cells in the Ministries of Industry and the national planning bodies.

- b) UNIDO could render technical assistance to improve construction capacities and capabilities in developing countries to reduce delays in implementation.

- c) UNIDO could also render useful technical assistance in building up indigenous expertise, in feasibility studies, in other preparatory technical work for projects and in developing engineering supervision capabilities to reduce delays in implementation.

- d) UNIDO's technical assistance in building up sound data bases for improving the control on plan implementation could be very useful. For the LDC's, even training for improvement of statistical skills for sample surveys could help improve their data bases substantially.