Commonwealth Economic Papers: No. 11

Industrial Co-operation

Commonwealth Secretariat

COMMONWEALTH ECONOMIC PAPER: No. 11

INDUSTRIAL CO-OPERATION

Papers prepared for the
Commonwealth Secretariat by
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PREFACE

Industrial cooperation between countries has been an item on the international agenda for some time past and the concept is generally considered to have a significant role to play in efforts to secure a new international economic order. It is an area in which Commonwealth Heads of Government have expressed considerable interest and in which the Commonwealth Secretariat has undertaken some work, including commissioning the four papers reproduced in this volume. It is hoped that these papers will be found helpful in the ongoing dialogue on ways in which international industrial cooperation can assist developing countries to raise the living standards of their peoples.

The first of the papers is on 'Technology Transfer and Development' by Mr. R.K. Sethi of Pers India Pvt Limited. This paper enumerates problems encountered by developing countries in the transfer, adaptation and development of technologies and suggests programmes which might be launched by individual countries and by the Commonwealth collectively to overcome them. It is based on the conclusions of field visits to various Commonwealth countries in Africa and the Caribbean in order to determine the problems actually being encountered by these countries and to endeavour to initiate the processes of technology identification and selection in respect of some potential projects.

The second paper, on 'Selected Issues in Industrial Cooperation', was prepared by Dr. Wall of the University of Sussex. It is concerned with the nature and potential of policies which developed countries might adopt in order to (i) promote the transfer of uneconomic or declining industries or parts of industries to the developing countries, and (ii) encourage greater involvement in the industrialisation of the developing countries. It is also concerned with the policies and supporting institutional framework which the developing countries might adopt in order to promote their industrial development.

The third paper, by Dr. Deepak Lal of the University of London, is entitled 'Industrial Cooperation Agreements'. It considers the usefulness of this type of agreement in fulfilling the developing countries' desire for a greater share of the world's industrial capacity. In analysing these matters, Dr. Lal reviews India's experience in industrial cooperation, the role of

trade liberalisation in assisting developing countries to industrialise, and the adjustment problems encountered by the developed countries. He then makes a proposal for the swapping of industrial plants between countries as a novel way of providing an operational content to the form of industrial cooperation that is increasingly being demanded by developing countries as part of the NIEO.

The fourth paper, on 'Transfer Pricing in Assembly Industries' prepared by Dr. Sanjaya Lall of Oxford University, is concerned with the automobile and electronics industries in Malaysia and Singapore. Dr. Lall states that in the case of the electronics industry, "it is difficult to conclude that transfer pricing is, or will be, an important problem" in Malaysia or Singapore. In the case of motor vehicle assembly, "the Singapore authorities did not feel that transfer pricing was being used against them", but "a strong impression was given in Malaysia that it was being practised in the valuation of CKD packs imported from parent firms". Recognising the large potential area for the misuse of transfer prices by transnationals, he suggests a comprehensive series of measures to monitor and control this practice and thus to seek to ensure that these enterprises pay their proper taxes and provide the maximum beneficial effect on the economies of their host countries.

Finally, it should be noted that the views expressed in these four papers are those of their authors and do not necessarily reflect the views of the Commonwealth Secretariat or of member Governments.

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December, 1978.

TECHNOLOGY TRANSFER AND DEVELOPMENT

Problems and programmes

Pers India Pvt Ltd
New Delhi, India
February 1978

Prepared for
The Commonwealth Secretariat
London

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I. PREAMBLE

1.1 To assist the Team of Industrial Specialists, appointed by the Commonwealth Secretary-General, to submit a programme of practical measures of cooperation designed to accelerate the industrialisation of Commonwealth and other developing countries,* field investigations concerning the availability, identification, evaluation, selection, utilisation, adaptation and development of technologies were carried out by Pers India Pvt. Limited, New Delhi, India. Apart from an examination of these problems, the work undertaken included the processing of a few specific industrial projects selected from amongst those already identified by countries for implementation.

1.2 Inter alia, the investigations were required to :

i) demonstrate the problems faced by developing countries in the process of technology acquisition, utilisation and development ;

ii) identify the inadequacies of existing mechanisms for this purpose ; and

iii) make recommendations on possible mechanisms of cooperation to overcome such difficulties.

1.3 The problems and difficulties faced by developing countries in the processes of technology acquisition, utilisation and development were investigated through endeavours to initiate the processes of technology identification and selection in respect of a few projects of immediate interest to certain countries. Because of time constraints, the field investigations were carried out in selected Commonwealth countries in Africa and the Caribbean.

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* Note by Secretariat: The Team were appointed in late 1976 and completed their assignment in May 1978. Their Final Report has been transmitted to Commonwealth Governments and released for general circulation; it is soon to be considered by a Commonwealth Ministerial Meeting.

1.4 While the results of the investigations in these countries cannot be said with certainty to be fully representative of the problems and difficulties faced by all Commonwealth developing countries, they helped to indicate some of the directions in which future efforts of international cooperation will have to be aimed.

1.5 In respect of those projects selected, hereinafter referred to as the 'Field Projects', the work undertaken related to locating possible sources of the technologies required, and to evaluating the preliminary proposals received and their subsequent processing in the target countries.

1.6 Since, for historical reasons, India has had some years of experience in the processes of technology acquisition, utilisation and development, a study was made of the experiences of that country. Examination was also made, through desk research, of the programmes for disseminating technology information by international agencies, and some of the problems facing the industrially advanced countries as donors of technology to developing countries.

II. OBSERVATIONS

2.1 The following countries were included in the Field Projects :

A. Africa
Kenya, Nigeria, Sierra Leone, Tanzania, Zambia.

B. Caribbean
Barbados, Guyana, Jamaica, Trinidad & Tobago.

2.2 Nine Field Projects were selected on the basis of information furnished by these countries and that otherwise available to the consultants. In selecting these Field Projects, preference was given to those :

i) relating to basic needs ;

ii) utilising indigenous produce ; and

iii) processing agricultural and other waste materials.

The projects were also selected so as to give a mixture of large/medium and small enterprises. They are detailed in Annex I.

2.3 Enquiries for the technologies needed were sent to 159 firms / organisations in the United Kingdom, United States, Canada, West Germany, Japan, Australia, New Zealand and India. Of these firms/organisations, 37 showed interest in providing the technologies, 8 stated their unwillingness to do so, while 5 were not in a position to do so because of the size of the projects concerned; 16 stated they did not have the required technologies and the balance (93) did not respond. A preliminary evaluation was made from the details furnished, and the firms/organisations screened for further consideration were asked to provide additional information and to indicate the extent to which they would be willing to assist in providing the services relating to effective technology transfer.

2.4 The collected information was reviewed with the country authorities during the field visits. In each case the needs were examined and the appropriateness of the technologies offered evaluated against them. As a result of these investigations, decisions were made to process some cases further. Thereafter, the technology package needed in each case - conditioned by indigenous circumstances - was evolved, and the selected firms/organisations were asked to submit their detailed commercial offers to the respective countries.

2.5 It proved possible to process some of the Field Projects to a stage where the countries were able to locate sources of appropriate technology and initiate steps for further processing. It should thus be possible for these countries to enter into substantive negotiations and to finalise the arrangements for technology acquisition in respect of the projects concerned.

2.6 The experience of the field studies suggests that the basic difficulties relating to technology transfer and development are the same in most developing countries, though the magnitudes and effects vary. In general terms, their difficulties stem from :

i) inadequate identification of potential industries ;

ii) lack of related data and information ;

iii) inadequacy of technological investigation and negotiation expertise and facilities ;

iv) inadequacy of infrastructural facilities, including those of training and R & D; and

v) inadequacy of entrepreneurial, managerial, supervisory and operative skills.

A. RECIPIENT COUNTRIES

Industry identification

2.7 Identification of industrial opportunities is the first and most important prerequisite to industrial development. Such a process is not a once for all activity, but has to be continuous, taking into consideration new resource discoveries, changing national needs and priorities, and changing environmental circumstances, etc. While many developing countries have set up industry promotion agencies for tasks which include industry identification, the extent of their work has not been uniform. Though some have been working systematically on the identification of industry potential, others have yet to make a real beginning. This is not for want of proper appreciation of the importance of such activity, but because of a lack of adequate skills and experience backed by appropriate information. There are far too few properly trained professionals available for assignment to this task.

Industry information services

2.8 Countries are aware of the importance of readily available technical, economic, social, administrative and other information relevant to the processes of industrial development. However, little so far has been done to establish proper mechanisms, at the national level, for the continuous collection, collation, analysis, storage and easy dissemination of this information. Unless effective mechanisms are established at national levels to ensure its ready availability, a serious impediment to industrial development will remain. Together with the development of an industry identification capability, this is the most critical area for urgent attention. Once these two areas are developed to effective levels, many of the problems attendant on technology identification, evaluation and selection will be minimised.

Technology source identification

2.9 The most frequently followed practice in the search by developing countries for requisite technologies is for their entrepreneurs, consultants and industry promotion agencies to approach manufacturers of products and/or related equipment. Such sources are, more often than not, the large foreign enterprises whose products are already known in the country or

whose names are familiar through advertisements etc. Following this practice means that a host of other sources are left out of the search. The worst sufferers in this respect are the small-scale industries, since their technologies usually come either from counterpart small enterprises elsewhere or from R & D establishments. Resources available to such organisations for publicising their technologies are minimal, and they therefore remain unnoticed by entrepreneurs elsewhere. This inadequate coverage in the attempt to identify possible alternative sources has frequently resulted in the acceptance of a less than appropriate technology or in a desirable industrial activity not being taken up.

Technology package identification

2.10 There are innumerable examples which show how the processes of effective technology transfer have been seriously hampered because of improper identification of what was needed from the supplier of a given technology and the manner in which the needs were to be fulfilled. There has not always been a clear understanding that effective technology transfer does not imply merely the supply of designs and process documents but a host of other services aimed at achieving a full and effective transplantation; such services include personnel training, the building of proper management and marketing systems and capabilities, alterations to designs and processes to suit local circumstances, etc. Most developing countries are still at a stage where the expertise needed to define correctly the contents of the technology package needed is very inadequate. The development of such expertise is not an easy or short-term task. It will grow largely out of experiences gained through association with such exercises, and till such time as it is built up indigenously, external help will be needed.

Technology evaluation

2.11 The complex nature of technology evaluation is apparent from the variety of factors involved and the need to assign different weights and priorities in each case, according to the obtaining circumstances. This is a highly complex professional task calling for many years of experience. In most cases, such evaluation has been, at best, perfunctory. This has been not only because of a lack of adequate expertise but also because of the continuing - though wholly mistaken - notion that a given technology if

successful in one environment will automatically be appropriate in any other. While authorities in the target countries were reluctant to identify specific instances of the difficulties their industries have been facing because of improper or inadequate evaluation, they drew attention to cases where the operational performance was below expectations in such matters as a continued excessive dependence on imports to sustain production, extended learning periods, inefficient equipment, maintenance, etc. As in the case of technology package identification, expertise in regard to technology evaluation will grow only with experience. Till then, external assistance will have to be sought.

Technology acquisition

2.12 The difficulties faced by developing countries in negotiating the terms for acquiring technologies from selected sources stem mainly from the following factors :

i) the problem of assigning monetary values to services involved ;

ii) absence of information about terms negotiated by other developing countries for acquiring similar technologies ;

iii) external pressures and influences; and

iv) a psychological handicap caused by the mistaken view that the recipient negotiates from a position of weakness because the benefits accrue only to him.

Resolution of these difficulties is not difficult. Clearer definition of government policies, a better understanding of the benefits (other than direct payments) accruing to technology suppliers, exchange of information and experiences amongst recipient countries, coupled with the engagement of expert services (inducted, if necessary) could help substantially in securing mutually satisfactory terms and conditions.

Technology development

2.13 There is growing realisation in the developing countries that substantial R & D efforts are called for in adapting acquired technologies to local circumstances, as also in developing wholly new technologies for their specific needs. They also recognise the desirability of developing such capabilities and capacities indigenously. While some of these countries have already established some R & D facilities, they are all handicapped in developing adequate capabilities and capacities for want of adequate resources and indigenous skills. Of urgent importance is the need to expand R & D efforts to adapt quickly to local circumstances technologies already acquired, and to help develop the skills for their efficient operation. This is an area in which cooperation with those developing countries which already have the necessary facilities and experience could be most beneficial.

2.14 Another area for early action is to develop new technologies suited to specific needs. These are most urgently needed in the following areas :

i) processing of agricultural and forestry products ;

ii) processing of agricultural, forestry and animal waste materials ;

iii) use of indigenous materials for construction and industrial activities; and

iv) use of locally available energy sources and equipment.

During the course of field investigations countries drew attention to the following specific areas :

i) utilisation of the banana stem ;

ii) utilisation of sisal fibres (other than for rope) ;

iii) production of sugar from locust beans ;

iv) production of pulp from agricultural waste materials ;

v) utilisation of sawdust ; and

vi) utilisation of laterite clay.

Although further investigations would undoubtedly add to this list, it could provide an early basis for cooperative endeavours.

Technology utilisation

2.15 The end-result of ineffective utilisation of a technology is the inadequate and uneconomic operation of installed production capacities. The field investigations showed that difficulties in this regard stemmed from one or more of the following :

i) installed capacity in excess of product demand potentials ;

ii) inappropriate technological processes ;

iii) inadequacy of existing infrastructure ;

iv) inadequacy of developed skills ;

v) improper or ineffective management, operational and maintenance procedures ;

vi) imbalance of production facilities; and

vii) inadequate marketing and servicing arrangements.

While the target countries and enterprises concerned were conscious of deficiencies in plant performance and their possible causes, in most cases no systematic investigations had been made to institute remedial measures.

Substantial external help in the form of expertise is therefore needed to raise plant performance to efficient operational levels.

Technology diffusion

2.16 Technology diffusion within a country (intra-national technology transfer) is a problem which most developing countries face as development proceeds. It has not proved easy to solve, and as a result, it is fairly common to observe repeated inductions of the same or similar technologies from external sources. Difficulties in this regard have arisen due to :

i) restrictions on intra-national transfer frequently insisted upon in the terms and conditions imposed by donors of technology ;

ii) aversion by indigenous owners of technology to intra-national transfers on the mistaken notion that they would thus be assisting a potential competitor :

iii) aversion by technology recipients to acquiring technologies from indigenous sources, in the belief that their competitive position would be affected by not acquiring technology from a foreign source :

iv) inadequate realisation by large-scale manufacturers and users of complex technologies of the benefits of horizontal integration - to themselves and to the process of industrial development of the country ; a nd

v) inadequate governmental measures to stimulate intra-national technology transfers.

2.17 The results of such repeated inductions of technology include :

i) avoidable increases in the foreign exchange burden :

ii) multiplication of standards inducted, causing difficulties in the formulation and enforcement of national standards ;

iii) multiplication of the efforts necessary to adapt inducted technologies ;

iv) avoidable extensions to the period for achieving self-reliance in respect of a given or similar technologies ;

v) multiplication of the varieties of materials, skills and other inputs necessary for production caused by the differences in the technologies supplied by different sources; and

vi) multiplication of the problems of maintenance and servicing.

B. DONOR COUNTRIES

2.18 The problems faced by industrially advanced countries in providing support to developing countries in their programmes of industrialisation are many, and those described in the following paragraphs cannot be considered exclusive.

2.19 Proposals which support industrial development in the developing countries frequently raise concern in the business communities of industrially advanced countries. A natural and often voiced fear is that programmes designed to share technology with developing countries will result in the industrially advanced country markets being flooded with cheap manufactures and at the same time will shrink their export potentials. On the other hand, in most cases where technologies have been shared, the suppliers from the industrially advanced countries have found an expansion in their marketing opportunities. Moreover, the growth of new activities in the recipient countries has fostered an expansion in markets for a variety of capital goods, materials and services which the industrially advanced countries can supply.

2.20 There is inadequate information in the industrially advanced countries on the policies and objectives of developing countries, their plans and priorities for industrialisation and the status of the obtaining infrastructure. The result is that even where a particular owner of technology is otherwise willing to transfer it to a developing country, he is just not aware of the opportunities available. Unfortunately, for want of proper resources, the developing countries themselves have been unable adequately to make their potentials known. Other means will therefore have to be found to bridge this information gap.

2.21 There is a fairly large portfolio of technologies available from within the developing countries which are readily adaptable to the needs of other developing countries. However, most of these are possessed by relatively small operators who do not have the necessary resources to advertise their technologies. Even when identified through other mechanisms, such operators will need considerable support and guidance to be able to transfer effectively their technologies to users in other developing countries.

2.22 Research establishments in the industrialised and some developing countries have the necessary capabilities and capacities to undertake development of a variety of technologies appropriate to the needs of developing countries. However, because of the information gap, they are not aware of the specific needs of such developing countries, nor are the latter fully aware of the facilities available; at the same time, because of resource limitations - particularly of a financial nature - the developing countries are unable to undertake such development activities themselves. This is an area offering considerable potential for mutual benefit through international cooperation.

23. Mention has been made earlier of the inadequacy of identification of industry potential in developing countries and of information availability to potential suppliers of technology in the industrially advanced countries. In this connection the Experimental Programme of Industrial Cooperation (EPIC) set up by the Canadian International Development Agency (CIDA) in 1976 is of interest. The objective of the Programme was to identify linkages between the resources and capabilities of Canadian industry and

priority industrial projects in selected developing countries, and to establish mechanisms for effective technology transfer, development of management skills, marketing and entrepreneurship. Teams comprised of Canadian consulting firms with specialised knowledge and experience were sent for extended periods to each country, where they interviewed a variety of government agencies, central and private banking institutions, and private businessmen. The teams were thus able to identify areas of high priority and to draw up lists of potential projects. They then sought out potential partners in Canada for ventures which appeared to have the best possibilities for mutual advantage and which could benefit from a transfer of technology, and financial and marketing experience from Canada. The exercise resulted in the identification of 92 projects, some relating to new ventures and others to expansion or upgrading of existing ones. Nearly 150 Canadian firms showed interest in these projects and work on them is progressing.

2.24 Particularly noteworthy conclusions of the Experimental Programme are :

i) programmes of industrialisation in developing countries can be materially accelerated if technology supplying countries take the initiative in identifying specific gaps of importance to the recipient country ;

ii) for such investigations to be really meaningful, they should be undertaken by professionals conversant with a wide spectrum of industry and of development problems ;

iii) such investigation programmes should include follow-up action at home by the same team, which can identify specific sources of technologies required and thereby bring together technology donors and recipients ;

iv) industrialised countries should prospect more agressively for opportunities in the Third World, since developing countries do not

themselves have the resources to go to the industrialised countries, nor at times do they fully recognise the industrial capacity of these countries ;

v) it is neither automatic nor easy to translate industrialised country technologies into forms that are ideal for developing countries ; and

vi) development of a cooperative industrial venture in any country is clearly dependent on the economic and absorptive capacity of the country and on the priority which it gives to industrialisation.

C. INTERNATIONAL PROGRAMMES FOR INFORMATION

2.25 Various agencies in the UN system have been seized of the problem of disseminating technology information to developing countries. A brief summary of the resultant programmes is given in Annex II. The programmes themselves are aimed essentially at developing technology information systems at the international and regional levels, and thus to reinforce, but not replace, the national systems.

2.26 On the other hand, the field investigations undertaken helped confirm that, in the ultimate analysis, it is the national system which will be most directly and crucially concerned with serving the detailed information needs of individual entrepreneurs in a country. Also, the mechanisms envisaged at the international and regional levels are intended primarily to be concerned with techologies themselves. But the type of industrial information needed by an entrepreneur or a technology supplier goes far beyond these confines. They need complete and accurate information on local circumstances, infrastructure facilities, unit factor costs, availability of materials and skills, etc. The coverage of information to be sourced by national mechanisms, therefore, is much wider. Not enough has been done so far to build up effective national mechanisms for providing such information in these developing countries. This is an area in which international cooperation can contribute effectively.

III. INDIAN EXPERIENCE

3.1 Since India has had some years of experience in the processes of technology acquisition and adaptation, and also in the development of small-scale industries, its experience was examined as an aid to the work of the Commonwealth Team of Industrial Specialists.

3.2 Investigations were undertaken into the problems encountered in India concerning technology identification, evaluation, acquisition, adaptation and development. Because of the very considerable emphasis placed on the development of small-scale indutries in that country, their problems of technology acquisition were investigated separately.

3.3 Government assistance to large/medium industry - referred to in India as 'organised industry' - has been mostly at the policy level. On the other hand, the small-scale sector has in addition been assisted by a variety of institutions set up by the Government. Experience, in general, concerning technology acquisition and development in India are set out in Annex III; those of small-scale industries are elaborated in Annex IV.

3.4 Briefly, the Indian experience points to the following conclusions :

i) development of institutional capabilities for identifying, cataloguing and disseminating information on industry potentials have substantially assisted in the processes of industrial development ;

ii) inadequate appreciation of, and attention to technology evaluation, and the formulation of technology packages, in the earlier years, led to undesirable results ;

iii) growth of indigenous institutional capabilities in technology evaluation and adaptation processes has minimized the problems of subsequent utilisation, and also made for more balanced negotiations for technology acquisition ;

iv) growth of small-scale industry has been substantially accelerated through the establishment of institutional facilities ;

v) development of technologies appropriate to small volume production has contributed significantly to the growth of small-scale industries ; and

vi) difficulties in readily identifying sources of technology have been encountered for want of adequate information.

IV. POSSIBLE APPROACHES

4.1 To set the stage for defining more specifically the possible approaches to international cooperation for industrial development, with particular reference to the development, transfer and utilisation of 'appropriate technology', it would be advantageous to recapitulate the many connected recommendations which have emerged from the work of the various organisations in the UN system, the Commonwealth Secretariat and others. These recommendations, though usually conceptual in nature, provide useful pointers to the approaches for possible programmes of action. The more pertinent of the recommendations are summarized in Annex V.

4.2 Concepts considered useful in evolving specific programmes for international cooperation include the following:

i) international cooperation could contribute much more if aimed at assisting countries to work for themselves. Emphasis in future international cooperation programmes in the technological field could, therefore, be on training and assistance in establishing required mechanisms/institutions at the national and regional levels;

ii) developing countries should endeavour to cooperate more amongst themselves to cover the gaps in their technological needs. International programmes could be designed to foster such cooperation;

iii) it would be desirable to lay greater emphasis in future programmes of international cooperation on the provision of total software services in processing even a small number of industrial schemes up to implementation, rather than spreading the effort and resources in partially covering a wider range; and

iv) developed country aid programmes and cooperative efforts could more usefully focus to a greater extent on utilising technical resources and R & D facilitities to help develop technologies appropriate to the circumstances of developing countries.

Industry promotion, identification and information

4.3 One of the most important areas where cooperative assistance could make a significant contribution to a developing country's industrialisation programme is in the development of capabilities and capacities for industry identification, industry information and other industry promotional services. This is an area in which some developing countries have already acquired a measure of competence, and the approach here, therefore, may be to harness these resources from amongst the developing countries themselves. However, some countries may not be able to assign the necessary manpower for this purpose, and in these cases, regional or international cooperative effort would have to remain the mainstay.

Technology information sourcing

4.4 The investigations undertaken showed all the countries selected to be handicapped for want of readily available information on sources of technology. Various agencies are already publishing country directories of machinery and equipment. The need has now become apparent for country directories of technology suppliers to be published on similar lines. This is an activity which necessarily will have to be undertaken at country levels. It would therefore be most helpful if countries in a position to supply technologies would recognise the importance, urgency and advantage of compiling and publishing technology source directories.

Technology evaluation, selection and negotiation

4.5 An inadequacy of indigenous expertise, and even of information on suitable sources of expertise, to undertake technology evaluation, selection and negotiation is the main handicap faced by most developing countries. Barring the very small ones, which may not be able to assign the necessary human resources, all the other countries need to build up their own capabilities for this purpose. Experience already gained by some developing countries provides an excellent source for such capability development. The existence of these capabilities, however, needs to be better publicised. In this respect, international assistance aimed at demonstrating the potentials of bilateral cooperation in this field could help. Programmes devised and executed through an international mechanism could bring developing countries closer together while at the same time assist in resolving some of their technology problems.

Appropriate technology development and adaptation

4.6 The need for capabilities and capacities in R & D activities in developing countries is well recognised. There are many such facilities in the industrialised countries and in some of the industrially more advanced developing countries. Cooperative efforts in R & D have not yet got underway to any significant extent; and yet, there is much to be gained through such an approach. International programmes should, therefore, be devised to demonstrate effectively the benefits of cooperative R & D efforts. Such international programmes would have greater validity when the benefits accrue to more than one country.

4.7 Lack of financial resources has been an impediment to accelerating the required R & D activities in the developing countries. Fortunately there are a few countries who are today in a position to provide such financial assistance. International efforts should be directed towards persuading them to participate in cooperative R & D programmes - even when such cooperation is on a strictly commercial basis.

Technology utilisation

4.8 The problem of how to improve the utilisation of investments already made is assuming serious proportions in some developing countries. While some of the causes may be beyond the direct control or influence of plant managements, there are others which, if properly studied, can be rectified. Of immediate assistance to the countries concerned would be programmes designed to investigate cases of inadequate utilisation of installed production capacities and to help in instituting remedial measures. Individual countries could themselves identify plants facing these problems. Thereafter assistance could be provided through devising suitable mechanisms of international cooperation. The experiences of other developing countries in solving such problems could also usefully be employed.

Small-scale industries

4.9 From the evidence forthcoming, it is fairly certain that small-scale industries will play an increasingly important role in the industrialisation programmes of many developing countries. The problems relating to small-scale industry development are, however, susbtantially different from those concerning large and medium-sized industries. Through recognition of these problems, some developing countries have found it advantageous and, indeed, necessary to:

i) lay down specific administrative and fiscal policies aimed at encouraging such industries;

ii) establish special institutions and mechanisms for providing preferential financial assistance;

iii) establish institutions and mechanisms to provide extension services such as those of industry information, entrepreneurial development, project development, technology development, equipment selection and procurement, personnel training, trouble shooting, marketing, etc; and

iv) provide a variety of physical facilities such as industrial estates, common facilities, prototype centres etc, which materially assist the development of small-scale enterprises.

Experience has shown that much greater institutionalised assistance is necessary for fostering the growth of small-scale industries.

4.10 Where small-scale industry is expected to play a significant role in industrial development therefore,developing countries should be assisted in examining their needs for such mechanisms and in establishing them. Through suitable bilateral arrangements, they could be helped to get assistance from those developing countries which have already acquired relevant experience and expertise.

4.11 The Commonwealth Secretariat may wish to re-examine its existing mechanisms and arrangements in order to assist the growth of small-scale industries. More specifically, consideration could be given to the institution of special programmes in the following areas:

i) institution building assistance;

ii) specific contributions, both physical and financial, to the development of technologies appropriate to the circumstances of small-scale operations; and

iii) more effective cooperation and sharing of experiences between developing countries in respect of small-scale industries.

Some approaches for donor countries

4.12 A whole variety of aid and assistance programmes have already been instituted by governments and industry of the industrialised countries. This notwithstanding, the present difficulties of developing countries point to the need for:

i) special agencies, designated (if already existing) or set up in industrialised countries to act as focal points through which the information sought by developing countries and by enterprises in the industrialised countries could be channelled and readily furnished;

ii) the agencies to be encouraged to enter into bilateral arrangements with their counterparts in developing countries for arranging exchanges of personnel, training and orientation programmes, etc;

iii) policies and programmes instituted whereby available R & D facilities in the industrialised countries could more readily take up the development of appropriate technologies for developing countries; and

iv) programmes evolved whereby industry in the industrialised countries could itself take greater initiatives to identify potential sources for technological cooperation for the mutual benefit of themselves and the developing countries.

Commonwealth Secretariat

4.13 The Commonwealth Secretariat has, no doubt, been making contributions in a variety of ways to the socio-economic development programmes of developing countries. The present investigations, however, point to new areas where help from the Commonwealth Secretariat could make significant contributions in the processes of industrial development. In evolving its future programmes, the Commonwealth Secretariat could give consideration to :

i) fostering greater cooperation among developing countries, and demonstrating the benefits thereof;

ii) laying greater emphasis on the development of indigenous capabilities and capacities;

iii) affording priority to programmes leading to the implementation of specific projects, rather than on investigative studies forming only part of preplanning activities;

iv) evolving special mechanisms to provide technical and financial assistance to the development of small-scale industries; and

v) packaging of assistance in software services, from inception to production for given industrial projects.

V. SPECIFIC PROGRAMME RECOMMENDATIONS

5.1 Based on the problems and difficulties faced by developing countries and on some possible approaches to their resolution, it was possible to identify some specific programmes and practical measures for implementation. The Team of Industrial Specialists will wish, no doubt, to examine these in keeping with the other issues under consideration and their judgement as to the resources available for implementation and the extent to which the cooperation of countries could be secured. The specific recommendations have been sub-divided into two groups, viz :

i) programmes for initiation by, and active participation of, the Commonwealth Secretariat ; and

ii) actions which may be recommended by the Commonwealth Secretariat to governments for their consideration, and in whose implementation the Commonwealth Secretariat may need to assist only marginally.

A. PROGRAMMES BY COMMONWEALTH SECRETARIAT

Industry information services development programme

5.2 The investigations revealed many instances of the handicaps faced by developing countries for want of adequate national mechanisms to disseminate industrial information to entrepreneurs, technology suppliers and others. While present international programmes are aimed chiefly at developing such mechanisms at the international and regional levels, the Commonwealth Secretariat could contribute by assisting developing countries to create and develop such mechanisms at the national level.

5.3 A programme for this purpose could, inter alia, cover the following:

i) each developing country to be asked to review its present facilities and deficiencies. The aim of the programme would be to develop the basic facilities and required human resources, and not the industry information itself;

ii) countries, preferably developing countries, known to be in a position to assist develop such services, to be asked to formulate their views on the extent to which they can render such assistance, the manner in which it could be provided, and the contributions they would be willing to make in achieving the objectives;

and

iii) the Commonwealth Secretariat to help country organisations in formulating and implementing assistance programmes on a bilateral basis.

Technology transfer package assistance programme

5.4 Despite lack of time, progress made in respect of some of the Field Projects showed that assistance in the processes of technology identification, evaluation and selection could materially help many developing countries. A Package Assistance Programme could, therefore, be instituted for the following purposes:

i) to train indigenous professionals in the processes of technology evaluation and selection;

ii) to demonstrate the advantages of appropriate technology package identification and selection;

and

iii) to demonstrate the benefits of cooperation among developing countries in this area.

5.5 Developing countries would be asked to identify the specific indigenous agency or other institution in which they would like to develop such expertise and also a few industrial projects they would wish to process with a view to early implementation. The Commonwealth Secretariat would then appoint consultants with experience of the problems of evaluating, selecting and acquiring technologies relevant to the environment of the developing country, to carry out the programme with the active participation of the agency nominated by the country. The functions to be performed by the consultants, with the active participation of the agency, would include:

i) reviewing the techno-economic feasibility and other investigations already carried out;

ii) developing the technology package needed for each project;

iii) identifying sources of technology and inviting proposals;

iv) evaluating alternative technology proposals; and

v) assisting entrepreneurs to negotiate the terms and conditions of technology transfer.

5.6 It would be an important feature of the programme that the consultants should carry out their tasks in the recipient countries and not in their home offices. Through active participation in the programme, the nominated agency should be able to acquire a measure of competence and to shoulder progressively more responsibility for future work.

Roster of technology transfer consultants

5.7 The Technology Transfer Package Assistance Programme would help country professionals to acquire a measure of competence in technology identification, evaluation and selection. However, it would still be necessary for some time to come, particularly for larger and more complex projects, to introduce expertise from outside. The Commonwealth Secretariat could assist in this by:

i) maintaining a live roster of orgnisations and individuals who have the requisite knowledge and experience to provide services in the field of technology transfer;

ii) making available this roster to countries as and when the need arises; and

iii) assisting the countries negotiate satisfactory terms with the selected organisations or individuals, as and when such services are needed.

Appropriate technology development and diffusion programme

5.8 There is widespread acceptance of the importance of developing technologies appropriate to the circumstances of developing countries, particularly in respect of small volume production. With a preponderance of Commonwealth countries in need of such technologies, it would be in the fitness of things if the Commonwealth Secretariat were to establish a programme to assist in the development and diffusion of such technologies. This programme, which could become permanent, would have the following main objectives:

i) to keep under continuing review the needs of developing countries for the development of new and appropriate technologies, particularly those required for small volume production and the utilisation of regenerative natural resources, waste materials and new energy sources, etc;

ii) to foster the development of such technologies in suitable R & D institutions, and their exploitation on a cooperative basis between such institutions and recipients;

iii) to encourage the financial participation of countries in these programmes on a commercial basis;

iv) to institute such programmes with marginal financial assistance by the Commonwealth Secretariat, if this is found necessary; and

v) to increase awareness of the availability of technologies which have been developed elsewhere and are available for commercial exploitation in developing countries.

5.9 To implement the programme, the Commonwealth Secretariat should set up a Standing Advisory Committee on Appropriate Technology, comprising senior professionals familiar with the problems and needs of appropriate technology in developing countries, and charged with the following functions:

i) identify specific programmes for the development of appropriate technologies needed by developing countries from information furnished by these countries and the Committee's own knowledge;

ii) select R & D institutions where such developments could be undertaken most appropriately, economically and speedily;

iii) determine the terms and conditions on which such work would be done, and investigate possibilities of funding by donor and recipient countries, and of contributions from the Commonwealth Secretariat itself;

iv) assist the Commonwealth Secretariat in having the development work done on the basis determined above;

v) monitor the progress of such work and the subsequent utilisation of technologies developed;

and

vi) act as Governing Council for a permanent display of technologies appropriate to the needs of developing countries, as an aid to their effective diffusion.

5.10 For more effective diffusion of technologies appropriate to the needs of developing counties, it is necessary that potential recipients should have a ready means to familiarise themselves with such technologies as have already been developed and those which are at present undergoing development. One effective way to achieve this would be to establish a permanent display of such technologies. London is focal point where many representatives of developing countries go quite frequently, and a permanent display in that city should help these countries become more familiar with available technologies appropriate to their needs. Basic facilities for such a display could be provided by the Commonwealth Secretariat, with the display materials, etc., normally provided by the technology owners at their own cost. The display facilities should be

extended only to those technologies which are judged by the Standing Advisory Committee as being of relevance to the needs of developing countries, and which the technology owners are willing to transfer on suitable terms.

5.11 For some time to come, the scope of the programme proposed above might be limited to those types of technology which are suited to small volume production. Such types should make use of:

i) agricultural and forestry produce in developing countries;

ii) agricultural, animal and other waste materials in developing countries; and

iii) new sources of energy.

Package R & D assistance programme

5.12 The need for R & D into appropriate technologies for specific industrial activities is well recognised. A few of these technologies were identified during the course of the investigations, and with greater time, a more detailed list could be drawn up. However, facilities and resources for such work are very limited in the countries concerned, and international cooperation would be necessary if such work is to have a significant impact. In this, the Commonwealth Secretariat could play an effective role if it instituted a programme aimed at:

i) demonstrating the potential benefits of cooperative R & D efforts;

ii) demonstrating the potentials for financial participation in such R & D activities; and

iii) resolving at least a few urgent problems relating to the development of appropriate technologies.

5.13 As a first step in such a programme, developing countries should be asked to furnish lists of industrial technologies they would wish to have developed. These lists would be analysed by the Standing Advisory Committee referred to in para 5.9 above, which would then select R & D projects to be taken up under the Package Programme. This list would be

sent by the Commonwealth Secretariat to governments of countries where the requisite facilities existed to undertake such work, with an enquiry:

i) if specific R & D institutions would be willing to take up the identified projects, and their time and cost estimates for doing so;

ii) if the identified institutions would be willing to associate scientific personnel from target developing countries in their R & D work;

iii) the contributions the donor country would be willing to make to the projects assigned to its institutions; and

iv) the terms and conditions on which the institutions would be willing to be partners with the recipient and other countries, in the commercial exploitation of the developed technologies.

5.14 Simultaneously with the above, the Commonwealth Secretariat may approach countries and institutions in a position to provide financial assistance, to enquire about their willingness to fund the identified R & D projects with the object of becoming partners in the commercial exploitation of the technologies developed. Once these initial enquiries and investigations have been made, the Commonwealth Secretariat - through its Standing Committee - would assist the parties enter into firm arrangements for the projects to be taken up. It would be an essential feature of the programme that scientific personnel from recipient countries should be directly associated in the R & D work, and, as far as possible, that field tests should be carried out in the recipient countries.

Small-scale industries' aid programme

5.15 Proper development of small-scale industries calls for substantial institutional and other assistance. There are a large number of Commonwealth developing countries where small-scale industries will play an important role in their development programme. It would, therefore, be appropriate for the Commonwealth Secretariat to devise a suitable programme to help these countries in this sector.

5.16 The assistance programme by the Commonwealth Secretariat would be directed essentially at:

i) helping developing countries to establish the necessary institutions to aid small-scale enterprises in technology identification, selection and acquisition, in training of personnel at all levels, in the establishment of common facilities, and in trouble-shooting, marketing, financing, etc;

ii) helping developing countries to establish bilateral arrangements with other countries, on a mutually satisfactory basis;

iii) arranging the training and orientation of key personnel in other countries;

iv) assisting in procuring technologies and in arranging joint ventures on satisfactory terms;

v) promoting the development of technologies appropriate to small-scale operations; and

vi) providing package services assistance for establishing specific industries in developing countries.

For more effective and concentrated attention, the Commonwealth Secretariat may wish to identify a specific Division for this purpose.

Regional industry advisory committees

5.17 As a result of the various recommendations which the Commonwealth Team of Industrial Specialists may make for practical programmes of international cooperation, the Commonwealth Secretariat could become even more involved with work in the field. Emphasis in the aid and assistance programmes could shift from studies to specific programmes of implementation. This would require that the Commonwealth Secretariat remain in constant and active touch with the field problems as they arise. For this, it might be desirable to set up Standing Industry Advisory Committees in the various regions, in order to fulfil the following functions:

i) to monitor the progress of specific programmes in which the Commonwealth is interested or is participating;

ii) to help resolve difficulties in the proper functioning of these programmes;

iii) to maintain direct and continuing liaison with recipients and donors;

iv) to examine potentials for new programmes;

v) to render advice to the Secretariat and to the governments concerned on problems relating to industrialisation in the countries of the region, etc.

The Regional Committees should preferably comprise representatives of the industry promotion and development agencies of countries in the region.

B. RECOMMENDATIONS FOR ACTION BY COUNTRIES

Technology directories

5.18 Many of the present difficulties in locating sources of technologies stem from lack of compiled information in this regard. Country directories of machinery and equipment are already published regularly. Similar directories identifying sources willing to provide technologies would be of immense help. The Commonwealth Secretariat should consider bringing to the notice of those countries in a position to provide technologies, the desirability of publishing such directories. In the case of some developing countries able to supply technologies, marginal assistance by way of expert advice on compiling technology directories, or even some financial assistance, may need to be provided by the Commonwealth Secretariat. This could further assist by ensuring that donor countries distribute the directories to developing countries.

Bilateral technical cooperation arrangements

5.19 Mutual benefits can be derived through bilateral technical cooperation arrangements between counterpart industry promotion agencies, consultancy organisations, R & D institutions, organisations, and similar bodies. Bilateral cooperation in such cases should cover the following:

i) exchange of information and development of industry information systems;

ii) personnel training in related fields;

iii) exchange of personnel;

iv) orientation-visit programmes to familiarise personnel in one country with developments in others; and

v) assistance on specific assignments, essentially on a 'twinning-arrangement' basis, etc.

The Commonwealth Secretariat could encourage governments to direct their agencies to enter into such arrangements as early as possible, particularly amongst developing countries themselves.

R & D extension centres

5.20 Establishment in developing countries of fully-fledged R & D institutions - involving sizeable financial and human resources - will take time. On the other hand, problems of technology adaptation, improvement of operational technologies, up-grading of technological skills, etc. call for relatively small resources, though benefits can be substantial. In some countries, such work is done by extension centres of field stations set up by the parent R & D institutions concerned, in close proximity to the industry they serve. Such R & D extension centres would be most helpful in developing technologies in the following fields:

i) leather;

ii) food processing;

iii) forest products;

iv) building materials and techniques;

v) metallurgical engineering; and

vi) mechanical engineering.

5.21 Governments of countries having suitable R & D institutions might with advantage be urged to encourage the latter to set up extension centres in those Commonwealth developing countries where the need is

already felt. Such centres should be set up with the direct involvement and cooperation of the recipient countries. In some cases it may be necessary for marginal assistance to be provided by the Commonwealth Secretariat. The centres, when fully operational, would serve the needs of industry with the objective of becoming self-supporting in time. Their specific functions would include:

i) identification of manufacturing problems of a technological nature;

ii) resolution of such problems using the facilities of the extension centres, other R & D institutions and industry, to the maximum extent possible. At times, it would be necessary to refer the more complex problems to the parent institutions for resolution or advice;

iii) identification of new areas for R & D effort. Such activity to be undertaken through direct local contact, either in the extension centres, other indigenous R & D institutions or in the parent institutions, according to needs and capabilities;

iv) familiarisation of manufacturers and entrepreneurs in the host country with development and improvements in related technologies;

v) training of local professionals in indigenous institutions and industry in R & D work; and

vi) providing the nucleus for future expansion into an R & D institution itself and/or assisting in the growth of other institutions.

Technology diffusion

5.22 Developing countries are already aware of the problems of technology diffusion or intra-national transfer of technology. Their attention might be drawn to the following suggestions as measures based on experiences elsewhere:

i) suppliers to avoid, as far as possible, placing restrictions on recipients sub-licensing technologies after they themselves have mastered the subject;

ii) suitable agencies be identified and encouraged to become the mechanism(s) through which available technologies can be transferred within the country;

iii) governments to consider formulating suitable fiscal and other assistance programmes to encourage intra-national technology transfer, either direct or through agencies referred to in (ii) above; and

iv) financial institutions to evolve suitable programmes to assist agencies such as those mentioned in (ii) above, including indigenous consultancy organisations, in acquiring technologies with the object of subsequent diffusion.

Information agencies in industrially advanced countries

5.23 Developing countries at times find it difficult to locate readily sources of technology assistance from the industrially advanced countries. This leads to disadvantages to potential suppliers and recipients of technologies. Governments of such countries might be urged to identify specific agencies through which entrepreneurs in developing countries could seek and obtain information on :

i) technologies available and their sources;

ii) equipment supply sources;

iii) agencies/organisations in a position to provide technical services relating to the establishment of industrial projects; and

iv) R & D establishments in a position to take up programmes.

The same agencies could also be the focal point giving information about developing countries to potential technology suppliers in the industrially advanced countries.

Industry investigations by donor countries

5.24 The EPIC Programme of the Canadian International Development Agency is a good example of how an investigatory initiative by a technology supplying country can lead to an acceleration in the industrial programmes of a developing country. The Commonwealth Secretariat may wish to inform governments of those countries in a position to provide technologies, of the desirability of instituting similar programmes. The attendant benefits would accrue to both recipients and donors.

FIELD PROJECTS SELECTED FOR INVESTIGATIONS

Project	Country / Plant Size					
	Size	Kenya	Tanzania	Zambia	Nigeria	Sierra Leone
1. Sheet glass	L	5,000 t/ annum	-	-	7,000 t/ annum	-
2. Industrial alcohol from molasses	L	7,000 t/ annum	-	-	-	7,000 t/ annum
3. Bakers' yeast	S	1,500 t/ annum	1,000 t/ annum	-	-	1,000 t/ annum
4. Soaps	S	-	5 t/day	10 t/day	-	-
5. Sugar from sugarcane	S	150 - 200 t/day crushing	150-200 t/day crushing	-	-	150-200 t/day crushing
6. Fruit & vegetable processing	S	-	3-5 t/day	3-5 t/day	3-5 t/day	3-5 t/day
7. Peptone and meat extract from slaughterhouse wastes	S	8.5t/annum peptone 1.5t/annum meat extract	8.5t/annum peptone 1.5t/annum meat extract	-	-	-
8. Pulp and paper from agricultural waste materials	S	-	-	20 t/day	-	20 t/day
9. Rubber reclamation	S	1,500 t/ annum	1,500 t/ annum	1,500 t/ annum	-	-

Size: L = Large/Medium
S = Small

FIELD PROJECTS SELECTED FOR INVESTIGATIONS

Project	Country / Plant Size				
	Size	Jamaica	Barbados	Trinidad & Tobago	Guyana
1. Sheet glass	L	-	-	-	-
2. Industrial alcohol from molasses	L	-	-	-	7,000 t/ annum
3. Bakers' yeast	S	1,500 t/ annum	-	1,000 t/ annum	-
4. Soaps	S	-	-	-	--
5. Sugar from sugarcane	S	-	200 t/day (St. Vincent)	-	-
6. Fruit & vegetable processing	S	-	1-2 t/day (St. Kitts)	-	-
7. Peptone and meat extract from slautherhouse wastes	S	-	-	-	8.5t/annum peptone 1.5t/annum meat extract
8. Pulp and paper from agricultural waste materials	S	20 t/day	-	20 t/day	20 t/day
9. Rubber reclamation	S	1,500 t/ annum	-	1,500 t/ annum	1,500 t/ annum

Size: L = Large/Medium
S = Small

INTERNATIONAL PROGRAMMES FOR INDUSTRIAL AND TECHNOLOGICAL INFORMATION SYSTEMS

INTRODUCTION

1. In December 1975, the United Nations General Assembly adopted Resolution 3507 XXX on institutional arrangements in the field of technology transfer. The Resolution reaffirmed the importance of wider dissemination of scientific and technical information and stressed the need for developing countries to have access to information on advanced and other technologies needed by them as well as on the new uses of existing technologies, new developments and the possibilities of adapting them to local requirements, and the need to enable developing countries to select technologies appropriate to their requirements and circumstances.

The Resolution further called for the establishment by UNIDO, in consultation with the appropriate organisations of the UN system, of an Industrial and Technological Informational Bank; it called upon other UN organisations, including the Regional Commissions, to undertake feasibility studies on the establishment of regional and sectoral information banks; and requested the organisations to build up appropriate linkages among these banks.

2. The Lima Declaration and Plan of Action on Industrial Development and Cooperation gave particular attention to the importance of industrial and technological information. In paragraph 61 (k) of Section B III, 'Cooperation between developing and developed countries', it made the following recommendation :

> 'Appropriate measures, including consideration of the establishment of an industrial and technological information bank, should be taken to make available a greater flow to the developing countries of information permitting the proper relation of advanced technologies'.

3. At the fourth session of UNCTAD held at Nairobi, the Conference adopted Resolution 87 (IV) which recommended, inter alia, that in order to

supplement national efforts, action should be taken at the sub-regional, regional, and inter-regional levels for the establishment of centres for the development and transfer of technology.

4. Arising out of these Resolutions, the following actions have already been taken :

i) setting up of an Industrial and Technological Information Bank by UNIDO in Vienna ;

ii) setting up of a Regional Technology Transfer Centre by ESCAP in Bangalore, India; and

iii) setting up of an Information Referral System by UNDP in New York.

The planned activities for these are briefly described in the following section.

INDUSTRIAL & TECHNOLOGICAL INFORMATION BANK (UNIDO) Vienna

5. The results of surveys carried out by UNIDO in the developing countries reflect the diverse levels of their industrialisation and hence, of their requirements in this field. In the case of the African countries, the proposed Bank would, in addition to collecting and storing information, be expected to assist its clientele in analysing their information needs in order to respond adequately to their specific requirements and development objectives. In the case of the Asian countries, the requirements for technological information relate to the processes of industrial planning, technology selection and transfer, and industrial operations. In the Latin American countries, the need is for techno-economic information to enhance the bargaining position of recipient countries. The survey stressed the need for an integrated system which, on the one hand, would develop and reinforce the national capabilities and infrastructure and, on the other, would provide a meaningful and effective set of services consisting of access to a wider range of information sources, the unpackaging and assessment of information, and its analysis for specific needs. Emphasis is to be given to building up and maintaining adequate links between the Bank and the relevant institutions in the developing countries.

6. The Bank, envisaged as an apex of the existing national systems to facilitate institutional cooperation and to foster intensive cooperation amongst developing countries, is thus expected to accelerate the transfer of technology. Users of its services are expected to be governments, R & D organisations, technology transfer centres, financial institutions, manufacturers, potential entrepreneurs, chambers of commerce and industry, technical institutions, etc. At the government level, the Bank will provide industrial and technological information designed to assist in the policy and decision making processes. At the institutional level, information will be oriented to enhancing capabilities. At the enterprise level, it will be provided to enable entrepreneurs to take investment decisions and to establish and operate manufacturing units.

7. Activities initiated by the Bank will include the preparation of document lists, technological profiles, guides to information sources, and special documentation on relevant areas such as choice of equipment, licenses and patents, and on specific industrial sectors or products.

8. It was decided by the Industrial Development Board at its Eleventh session held in Vienna in May-June 1977 that a pilot operation of the Bank would be undertaken for eighteen months from July 1977. The sectors selected for the pilot operation include iron and steel, fertilisers, agro-industries and agricultural machinery. In this first phase, the Bank would not be in a position to serve individuals or specific firms, and would confine itself to selected institutions in developing countries. The pilot activities would include :

i) mobilising and organising in-house information in the sectors chosen ;

ii) collecting selected information from external sources ;

iii) creating an information network for the identification and selection of technologies through joint action with United Nations agencies and other international or national institutions;

iv) establishing links between the Bank and developing country users, including a continuing appraisal of their information requirements ;

v) preparing technology profiles in the sectors chosen ;

vi) building up a stock of technology information in the chosen sectors and processing it for selection purposes; and

vii) identifying and utilising technology sources and capabilities available in developing countries.

REGIONAL TECHNOLOGY TRANSFER CENTRE (ESCAP), Bangalore

9. The Regional Centre for Technology Transfer was established at Bangalore, India, by ESCAP with the object of establishing an institution to disseminate information on technology transfer among developing countries in the region and to facilitate improved cooperation for enhancing technological and industrial capabilities.

10. The functions of the Regional Centre for Technology Transfer include :

i) promoting the establishment of appropriate institutional machinery, including assistance in designing effective national institutions for the development and transfer of technology and in forging links between these and other relevant institutions ;

ii) helping to strengthen existing national institutions for technology transfer ;

iii) assisting countries personnel in the various aspects of technology transfer activities ;

iv) intensifying the search for suitable technologies by investigating their characteristics, costs and conditions, and finding alternative sources where necessary ;

v) promoting the exchange of information and experience on technologies and their transfer among the countries of the region through regular meetings of national centres and of government officials and other decision-makers, including those in commercial enterprises ;

vi) assisting, where possible, in the harmonisation of national legislation, regulations, and guidelines relating to the import of technology, foreign investment, etc.;

vii) arranging, on request, for expert advice on the evaluation and selection of technologies, on implementing a code of conduct on the transfer of technology, and on preparing model contracts for licence agreements ;

viii) promoting and organising regional cooperation in R & D of technologies appropriate to several countries of the region, including networks in specific critical sectors ;

ix) acting as a focal point for the conduct of detailed studies on technology aspects of interest to the region or to several countries, including comparative studies of technology costs ;

x) acting as a medium for inter-regional cooperation in technology adaptation, development and transfer, and supplementing the efforts of national centres; and

xi) functioning as a 'think-tank' for the region in technology development and transfer, with a view to initiating innovative projects and helping members collaborate in negotiations for technology transfer; sponsoring of research into basic technologies required by the region; and negotiation of standard licence fees, if called upon to do so.

11. The functions of this Regional Centre, which has yet to become fully operational, are thus directed primarily at assisting governments and national institutions.

INFORMATION REFERRAL SYSTEM (UNDP) New York

12. The purpose of this system is to prepare, publish and distribute directories of bibliographies of technologies, equipment and consulting engineering services, R & D services, and training facilities available in various developing countries. The primary purpose of these directories is to make known to the developing countries such capabilities as are available in other developing countries so that an increasing use could be made of each other's capacities and capabilities.

TECHNOLOGY EVALUATION, SELECTION AND DEVELOPMENT COMPETENCE IN INDIA

I. Industrial growth

1.1 Although the engineering industry in India is over 100 years old, it was only after Independence in 1947 that significant developments took place. Such developments, in both the public and private sectors, have been guided and directed by the Industrial Policy Resolutions of the Government and by the successive Five-Year National Plans.

1.2 The primary objectives of industrial development in India have included:

i) increasing the potential for productive development;

ii) exploiting the natural resource endowments;

iii) accelerating the growth of the agricultural sector;

iv) removing the regional economic imbalances;

v) maximising self-reliance in the provision of manufactured goods; and

vi) increasing the contribution by manufactures in the exports of the country.

1.3 Much of the effort since Independence has been directed at laying the foundations for the self-reliant and self-generating growth of industry. There has, therefore, been great emphasis on basic industries such as steel, aluminium, machine-tools, machine building, castings, forgings, basic and intermediate chemicals and dyes, drugs, etc. Between 1950 and 1976 industrial production rose from Rs. 808 million to Rs. 91, 850 million, industrial employment from 170,000 to 6.8 million, and exports from negligible values to Rs. 5,500 million; between 1950 and 1975 productive capital rose from Rs. 724 million to Rs. 37,410 million.

1.4 Impressive in itself, the foregoing does not account for the growth of the infrastructure related to industrial development. It was recognised from the start that self-reliant industrial growth would not be possible without the necessary institutional and technical supporting

infrastructure. As such, equal, if not greater, emphasis has been laid on these developments.

II. Industry identification

2.1 As an aid to the processes involved in planning for industrial development, the National Council of Applied Economic Research was set up to undertake, amongst others, investigations into the natural resources of the country and their potential for exploitation. These investigations were followed by detailed techno-economic surveys to establish, at macro-level, the possibilities and potentials for specific industries.

2.2 Similarly, the National Industrial Development Corporation (NIDC) was set up in 1954 to identify gaps in the industrial spectrum and to study the methods and schemes for filling them. Since then, the work of industry identification has also been undertaken by the NIDC and other institutions in the States, by industrial financing institutions and by consultancy organisations.

2.3 These endeavours, supplemented by individual investigations by prospective entrepreneurs, have meant there is continuously available a substantial catalogue of potential industrial projects in the country.

III. Technology source identification

3.1 In earlier years there were few occasions when deliberate attempts were made to locate and evaluate alternative sources of technology before a choice was made. Where large investments were involved, the choice was predetermined by the sources of foreign funding. In the case of smaller projects - essentially those in the private sector - the choice was generally made by an ex-importer or agent who had graduated to industrial entrepreneurship. It was natural, therefore, for him to seek assistance from the foreign principals with whom he had been dealing and whose product already had a market in the country. Examples of these products include tractors, bicycles, paints, airconditioning and refrigeration equipment, machine-tools, and process instrumentation. This does not mean that specific searches for sources of technology were never made in the early years; teams were frequently sent to the industrially advanced countries to endeavour to locate such sources.

3.2 With time, more information was collected by the various organs of Government, Industry Promotion Agencies and consultancy organisations, the search for sources of technology became more extensive. Today attempts are invariably made to locate alternative sources, both from within the country and from abroad.

3.3 The position, however, remains far from satisfactory. While a substantial amount of information has been collected, it is far from comprehensive; moreover, the information is fragmented and dispersed in a bewilderingly large number of organisations and institutions. An entrepreneur or his consultant has, therefore, to expend a significant amount of time and money in the search. For want of both, the search is rarely sufficiently exhaustive and, at times, schemes tend to suffer because of this.

3.4 Despite the large variety of technologies now available in India, either through indigenous R & D efforts or through adaptation of imported technologies, no systematic attempt has yet been made to compile information on them except for the limited work done by the National Research and Development Corporation (NRDC) to compile information on indigenously developed technologies which are offered through it for commercial exploitation.

3.5 It would not only assist Indian industrial development efforts, but would be of help to other developing countries, if steps were taken to compile and publish a directory of technologies available in India. This would be particularly useful to other developing countries in respect of technologies evolved for small-scale operations and of those acquired and adapted to local circumstances.

IV. Technology package identification

4.1 During the first decade after Independence, identification of the required technology package was left largely to the selected technology supplier. This was predicated not merely by the lack of adequate indigenous competence to undertake such work, but also under the mistaken notion that the foreign technology supplier knew best. The importance of complete familiarity with the operational circumstances obtaining in the country - an area of considerable darkness to the foreign technology supplier - was not fully appreciated.

4.2 The result was that quite frequently the technology package did not provide adequately for the problems encountered in the course of technology transference. Some of the difficulties which began to manifest themselves fairly early included:

i) provision of excessive plant and machinery caused by inadequate understanding of local productivity capabilities;

ii) substantial extensions in gestation periods, for want of adequate provision for training at all levels;

iii) excessive and extended dependence on external sources for materials and components for want of adequate familiarity with indigenous programmes and capabilities;

iv) unnecessary provisioning of large numbers of expatriate personnel, caused by inadequate information on indigenous capabilities in related fields;

v) provision of plant facilities and utilities not in keeping with obtaining climatic conditions, availability of materials etc; and

vi) extended delays in adapting product/process designs to conform to user needs and available production inputs, caused by lack of familiarity with indigenous circumstances and inadequate provisioning for required R & D effort.

4.3 Fortunately, the causes and effects of such problems were recognised fairly early. In the second decade after Independence, therefore, greater insistence was placed on a direct association of Indian technical agencies/organisations familiar with the circumstances obtaining in the country and with the processes of technology package identification. Such association - generally by the appointed Indian consultancy organisations -

not only brought a substantial measure of realism to the formulation of the technology package contents but also provided an opportunity for the local organisations to acquire expertise in developing the package.

4.4 It is relevant in this connection to cite an instance which illustrates not only the above point but also how the need for external assistance reduces with the growth of indigenous capabilities. When Government established Hindustan Machine Tools Limited in 1953, it entered into a technical collaboration agreement with Oerlikon Machine Tools Co. of Switzerland. Pursuant to the provisions of the technology package to be supplied under that agreement, Oerlikon provided a considerable amount of technical assistance, even though production concerned simple centre lathes. In 1976, the same company took up the manufacture of 'special purpose transfer line automatic machine tools' with technical collaboration from Cross Company of USA. Because of the build-up of indigenous capabilities in the intervening period, and the allowance made for this in the technology package, the assistance needed was substantially reduced. This is evident from the following tabulation:

	Item	Oerlikon Collaboration	Cross Collaboration
i.	Product design	F.C.	F.C.
ii.	Adaptations to product designs	F.C.	F.C./HMT
iii.	Manufacturing operation sheets and data	F.C.	F.C./HMT
iv.	Jigs, fixtures, and tooling designs	F.C.	F.C./HMT
v.	Production facilities identification and layouts	F.C.	F.C.HMT
vi.	Production planning procedures, etc.	F.C.	HMT
vii.	Personnel training abroad	Substantial	Negligible
viii.	Induction of expatriate specialists	Substantial	Negligible

(Note: F.C. - Foreign Collaborator
HMT - Hindustan Machine Tools Ltd.)

4.5 With the growth of competence in Indian technical organisations, it is now normal practice for the required technology package to be developed by these Agencies. It is only in the case of highly complex and sophisticated technologies that it is found necessary to associate the selected technology supplier in this activity. This is a field of activity in which the expertise acquired by Indian consultancy organisations can be of significant benefit to other developing countries.

V. Technology evaluation

5.1 Most entrepreneurs, both in the public and private sectors, have become alive to the importance of evaluating alternative technologies before making a choice. New entrepreneurs depend on consultancy organisations to help in this regard. Existing enterprises introducing new programmes generally depend on their own technical resources, though occassionally they do seek the help of consultants. Assistance in this regard is provided to small enterprises and entrepreneurs through various technical assistance programmes.

5.2 A few recent examples of detailed evaluation prior to selection and negotiations for acquisition may be cited here:

i) manufacture of heavy duty process pumps and compressors;

ii) manufacture of high pressure gas cylinders;

iii) manufacture of fibre glass;

iv) manufacture of 500MW power generation equipment;

v) manufacture of process valves;

vi) manufacture of GLS lamp manufacturing equipment; and

vii) manufacture of high horse-power diesel engines.

5.3 When permission is sought for technology acquisition from abroad, the results of such evaluations have to be furnished in detail to the Director General of Technical Development. Because of the pressure from Government to employ technologies more appropriate to the obtaining circumstances and to ensure optimum utilisation of indigenous materials, equipment and skills, consultants engaged in such evaluation exercises have acquired expertise in determining the relevance of a particular technology. This is an area of technical activity in which Indian consultancy organisations can provide assistance to entrepreneurs in other developing countries.

VI. Technology acquisition

6.1 There have been many instances where, with hindsight, one can say that the terms and conditions on which technologies were acquired from abroad were unduly weighted in favour of the technology suppliers. Examples of such terms and conditions included:

i) payments unconnected with results achieved from effective technology transfer;

ii) undue restraints on adapting product/process designs to suit local circumstances (e.g. standards, materials, skills etc.);

iii) inadequate provisions for development of indigenous R & D capabilities, resulting in avoidable extensions to external technical dependence;

iv) severe constaints on use of patents;

v) unnecessarily long periods of collaboration;

vi) restrictions on export;

vii) restrictions on diffusion of acquired technology.

6.2 In time, not only was experience gained from the difficulties encountered, but it became more obvious and better understood that technical collaboration allowed technology donors to derive benefits in addition to the direct payments received. These benefits included:

i) improvements in product/process designs to make them more appropriate to developing country circumstances, at little or no R & D cost to the donors;

ii) improvements in marketing potential in other developing countries, arising out of (i) above;

iii) better appreciation of the problems attendant on technology transfer - an asset for future business;

iv) experience gained by technology donor personnel of working in an alien environment; and

v) increase in sales - largely through supplies of components, with minimal competition.

6.3 Arising from these benefits the Government formulated a set of guidelines for the induction of technologies from foreign sources. Recognising that there cannot be a standard set of terms and conditions to cover all cases, the guidelines are largely indicative of the approaches to be adopted for technology acquisition from abroad. Apart from indicating the Government's own views on what would be considered as satisfactory, the guidelines have assisted the recipients in their negotiations. At the same time, they have provided a better appreciation by the technology supplier of the Government's views.

VII. Technology development

7.1 Amonst the first steps taken by the Government after Independence was to set up a chain of national research laboratories. Today, there are 43 such laboratories; in addition, there are a number of research institutions sustained by industry itself,while some of the larger manufacturing

establishments, particularly in the public sector, have their own R & D facilities.

7.2 A preponderance of the work done by R & D establishments has hitherto been directed at import substitution, i.e. on developing technologies indigenously even though they were already available elsewhere. Apart from the benefits of self-reliance, these technologies had the additional advantage of being based on indigenous materials, machinery and skills, developed in conformity with the obtaining environment. In other words, they were instances of the development of 'Appropriate Technology.'

7.3 The NRDC, established in 1953, is charged with:

i) commercial exploitation of technologies developed by indigenous R & D institutions;

ii) promotion in collaboration with industry, of R & D programmes in fields of national importance;

iii) promotion of technology diffusion within the country;

iv) promotion of technology transfer to other countries; and

v) encouragement of the inventive talent in the country.

The number of technologies developed in India and offered through the NRDC for commercial exploitation has reached 1605, of which 834 have been granted licenses.

7.4 A substantial amount of R & D effort has been expended by manufacturers in adapting acquired technologies. This adaptation has been influenced by the volumes of production required, the need to conform to national standards, and directives from Government to increase the indigenous content of technologies.

7.5 In so far as small-scale industries are concerned, dependence on foreign technologies has been negligible and nearly all requirements have been satisfied indigenously. In this case, though, the contribution of the

national and other research establishments has been marginal; much of the effort has come from equipment manufacturers, but enterpreneurs and their technical personnel have played an equally significant role. In recent years, Government influence has also brought action by the large industrial establishments in providing technolgies to their ancillary suppliers - mostly in the small-scale sector.

VIII. Technology diffusion

8.1 Considerable success therefore has been achieved in the diffusion of technology among small-scale industries. Unfortunately the same cannot be said for large and medium scale industries.

8.2 This situation has largely been caused by:

i) constraints in the terms and conditions of technology acquisition imposed by foreign suppliers;

ii) reluctance of Indian owners to transfer technologies, in the belief that the entry of a competitor would be adverse to their interests;

iii) fears by technology recipients that they would acquire something less than the best, or that their costs would increase while operating in the same market; and

iv) lack of adequate effort by consultancy organisations to acquire technologies for subsequent diffusion, mostly due to inadequate financial resources.

8.3 Of late, there has been greater awareness of this problem. Encouragement is, therefore, being given to consultancy organisations to acquire and diffuse technology within the country, while the NRDC is also now taking a more active interest in this aspect. However, there is as yet no clear overall plan of action for the effective diffusion of technology.

IX. Consultancy organisations

9.1 It was recognised fairly early that self-reliance in industrial development necessitated the development of capabilities in consultancy and engineering services. This development received substantial support from Government, which directed that the prime consultant in any project must now be an Indian organisation, except in very special circumstances.

9.2 At present there are over 200 consultancy organisations ranging in size from less than 10 persons to over 1,000. Not all these organisations are in the private sector; some have been set up by Government in specialised fields, such as petroleum and petrochemicals, fertilizers and heavy chemicals, metallurgy, engineering, etc.

9.3 For a variety of historical reasons, such organisations have been independent of manufacturers or contractors. Whilst good from a professional standpoint, this position has led to these organisations having inadequate funds either to finance new developments or to acquire technologies for subsquent exploitation. They do not receive any preferential treatment for this purpose by way of assistance from financial institutions.

9.4 In the last decade, a few of these consultancy organisations have found recognition abroad. They have rendered services relating not only to the planning of industry or the engineering of specific projects, but also to augmenting and developing the indigenous technological capabilities of some developing countries.

9.5 The role of these consultancy organisations in the various activities leading to technology acquisition has been mentioned earlier. Their capabilities are of particular relevance to the need for rendering such services in developing countries.

DEVELOPMENT OF SMALL SCALE INDUSTRIES IN INDIA

1. Through the Industrial Policy Resolution of 1956, the Government of India clarified its approach to the development of small-scale industries as a vehicle for creating more employment opportunities and for removing regional, social and economic disparities. Such industries offered considerable potential for mobilizing the traditional skills and resources of the country. Encouragement to their development was also envisaged as a means of creating new growth centres in rural and semi-urban localities and of avoiding the excessive concentration of industry in urban centres.

2. With a view to evolving a well planned and coordinated policy for the development of small-scale industries, the Government invited a Team from the Ford Foundation of USA to carry out investigations in 1953 and 1956, and as a result a number of significant steps were taken during 1956-61. Such steps included the establishment of:

i) the National Small Industries Corporation Ltd., for the supply of machinery, raw materials and facilities for the marketing of end-products;

ii) Small Industries Service Institutes and their extension centres for providing necessary technical guidance and training;

iii) prototype centres for the adaptation and development of product designs and technologies, and for training of personnel;

iv) State Finance Corporations for providing financial assistance to small industries;

v) industrial estates at suitable locations; and

vi) common facilities' centres to provide such services as those of tool rooms, machinery maintenance, foundries, etc.

3. From modest beginnings, small-scale industries recorded phenomenal growth during the last two decades; the extent of this growth can be seen from the following table:-

	1960	1975
No of units registered	361,000	500,000
Persons employed	1.3 million	5.5 million
Fixed capital investment (Rupees million)	1,700	15,000
Gross output (Rupees million)	8,000	110,000

4. Of significance is the diversity of technologies which have been developed during this period. Whereas in the early 1950's production was mainly of products involving relatively simple technologies, such as those for manufacturing handtools, hosiery, sports goods, stationery articles, builders' hardware, agricultural implements etc., small-scale manufacturing now encompasses sophisticated technologies for manufacturing such products as electronic components, cables, transformers, clocks, scientific instruments, domestic electrical appliances etc. What is more, many of them - including soaps, footwear, machine tools, automobile ancillaries, radios and electronic products - are now competing with similar products made in the large-scale sector.

5. The general quality of products produced in the small scale sector is such that many of the enterprises are now consitently exporting. Their achievements in this regard are illustrated by the following figures for 1975:

	Value (Rupees million)	% of production	% of total industrial exports
Small-scale industry sector	6,375	6%	32%
Large-scale industry (organised) sector	13,590	6%	68%

6. These achievements reflected the success of small-scale industries in adapting and developing technologies suited to their needs, and dependence on imported technologies has been minimal. Whereas in the large-scale sector nearly 35% of the operating units have had to secure technologies from abroad (some having more than one collaboration), the corresponding figure in the small-scale sector is less than 1%. The main causes of this reliance on indigenous technolgoies include:

i) the enterprise displayed by emergent small-scale entrepreneurs, particularly engineers (who are given considerable encouragement for this purpose);

ii) the force of circumstances, particularly the lack of financial resources and the inability of small entrepreneurs to go through the many hurdles in acquiring foreign collaborators or purchasing costly and sophisticated machinery from abroad;

iii) the cooperation of indigenous equipment manufacturers develop equipment and technologies suited to small-scale production; and

iv) the aids and assistance provided by Government.

7. A further factor which is now contributing to the extensive use of indigenous technology in the small-scale sector is the Government's policy to encourage the growth of ancillary production units. In this policy, an enterprise with an investment of up to Rs. 1.0 million in plant and machinery

is defined as a small-scale unit. However, if it is engaged in the manufacture of parts, components, sub-assemblies, tooling or intermediates, and if such production is not less than 50% of its total annual production, then the investment ceiling for the definition of small-scale industry is raised to Rs. 1.5 million. Greater emphasis is now being placed on horizontal rather than vertical integration of production in large enterprises. Significant success in this regard has been achieved by a number of public and private sector enterprises in the large-scale sector, including Hindustan Machine Tools Ltd., Bharat Heavy Electricals Ltd., Scooters India Ltd., and Enfield Ltd. These enterprises have not only allocated sections of their production to small-scale units, but have provided the necessary technological support, training and guidance. Some of them have even established industrial estates with attendant facilities for this purpose. This development, though relatively recent, demonstrates the substantial benefits to be derived through the diffusion of technology, and the role which large scale industry can play in this process.

8. Significant contributions to the up-grading of operational technologies have been achieved by the extension centres set up by some of the national research laboratories. In the last 20 years, these laboratories have set up over 45 extension centres/field stations located near to the industries they serve. The specific function of these R & D extension centres is to bring the knowledge and facilities of the laboratories to the operational enterprises. The centres are staffed by experienced scientists from the parent institution. These scientists, being in direct and daily communication with enterprises in the area, are familiar with the problems of industry, help to solve technical problems and to upgrade the operational technologies. Where the facilities of the centres are not adequate to solve the problems encountered, these problems are transferred to the parent institutions.

9. In large measure, the choice of technology has been predicated by the equipment available to an entrepreneur and by his personal experience. Contributions to technology evaluation and selection are made by the Small Industries Service Institutes and their extension facilities, but they are only marginal. One of the handicaps faced by small-scale entrepreneurs is a lack of ready information on sources of technology. Discussions with a

number of such entrepreneurs, and with agencies concerned with providing them with technological assistance, point to the benefits that could be derived if, at least, an Indian Directory of Technologies were made available. Similarly, there is no established mechanism whereby the entrepreneur can obtain at nominal cost a proper evaluation of alternative technologies before making a final choice. Consultants offering services in this field are generally too expensive for the limited resources of such entrepreneurs. With small-scale industries moving towards the higher and more sophisticated technologies, the need for proper evaluation of alternative technologies has become more critical.

10. It was recognized fairly early that for such industries to develop, the entrepreneur needed a variety of aids to overcome difficulties in mustering adequate financial resources and technical management skills. The success of small-scale industries has been due substantially to the various assistance programmes of Government which has established a large number of mechanisms for this purpose. Some of these are summarized at the end of this annex.

11. An important contributor not only to the growth of small-scale industries, but also to their dispersal and the creation of new growth centres has been the setting up of industrial estates. By the end of 1976, over 470 such estates had been established, over 200 of which are in rural and semi-urban areas. The majority of these 470 estates have been highly successful, providing accommodation for over 14,000 units, of which 12,000 are already operational. A comparatively recent development has been the setting up of functional industrial estates, established primarily to locate similar and/or related technologies at one place. This is particularly advantageous for the more sophisticated technologies, which require capital-and skill-intensive common facilities, particularly those of tool-making,quality control and testing.

12. Following requests by Governments, Indian Survey Teams have been sent to 39 developing countries, while experts in various fields relating to small-scale industries have been sent to over 40 such countries. Besides visits by foreign officials to study the growth of small-scale industries in

India , a large number of foreign personnel have received, and are receiving, training in India in these fields. The most recent example of bilateral co-operation to assist in the development of small-scale industries in another developing country is the agreement between India and Tanzania. A Team of Experts from India made an in-depth study of the potential for small-scale industries in Tanzania, with particular emphasis on those areas where technical assistance could be provided. As a result, 64 small-scale industry units were identified. There followed an Agreement between the two Governments under which the National Small Industries Corporation Ltd. of India was assigned overall responsibility for collecting and providing the required technology packages for setting up these units in Tanzania. The Industrial Development Bank of India agreed to provide the necessary financial assistance for related supplies. Tanzanian personnel are receiving training in India to man these units.

13. The experience of India in developing small-scale industries, though not totally or directly applicable to other environments, does point to the potential of this form of organization in furthering a country's economic development. Particularly noteworthy in this regard is the success achieved by the Indian small-scale industries in scaling-down production volumes by adjustments in technology. This led to economic production at small volumes with the attendant social benefits of higher employment generation per unit of capital invested, reduced regional economic imbalances and the establishment of new growth centres.

14. For India also, there is much to be learnt from past experience. Difficulties are still faced by entrepreneurs in locating sources of technology and properly evaluating them. Another problem arises from the multitude of organizations concerned with this activity in India, an aspect which makes it difficult for foreign entrepreneurs to make speedy contact with the appropriate agency when seeking information. It would be helpful therefore if a single Nodal Agency could be nominated (or, if necessary, created) and given responsibility for disseminating information on Indian small-scale industries, particularly the availability of technologies, names of agencies competent to undertake work and provide services relating to the establishment of such enterprises, sources of R & D, training facilities, arrangements for financial assistance, etc.

SOME ORGANIZATIONAL AIDS TO GROWTH OF SMALL-SCALE INDUSTRIES

Organization	Level	Functions/Aid Programmes
1. Development Commissioner, Small-scale Industries, Ministry of Industry, Government of India	Central	As the organ of the Central Government to formulate policies and programmes for the growth of small-scale industries, to coordinate and direct programmes and to provide advisory services to various institutions.
2. Directors of Industries, State Governments	State	As organs of State Governments to carry out above functions and supply industrial inputs such as land, raw materials, etc.
3. National Small Industries Corporation Ltd.	Central	To assist small enterprises to manufacture and supply goods for the use of Government, supply machinery and equipment on hire purchase, undertake marketing of specific products, distribution of scarce raw materials, running of prototype-cum-training centres and provision of technological inputs.
4. Small Industry Extension Training Institute	Central	Training of Government and managerial personnel, research programmes for development of small industries, consultancy services, modernization studies, etc.

Organization	Level	Functions/Aid Programmes
5. Small Industry Services Institutes	Central	Operating in the Status and through their extension centres, they provide technical services including technical know-how, problem-oriented consultancy, designs and drawings, workshops and laboratory services, operator training.
6. State Finance Corporations	State	To grant term finance and equity capital to small and medium industries.

Annex V

SUMMARY OF SOME RECOMMENDATIONS BY INTERNATIONAL AGENCIES ON QUESTIONS OF TECHNOLOGY TRANSFER

i) A world industrial programme cannot be built in a vacum. It must start from national programmes, for which countries must strengthen their institutional capacities for planning, control and decision-making, and develop their information system.

ii) The free-play of the market mechanism is not sufficient to reconcile the various interests existing in the world to produce an international industrial structure acceptable to all concerned.

iii) Adequate mechanisms should be created to organize, in a progressive manner, interdependence and complementarity among the various partners. Industrial cooperation must embody not only the complementarity of the means for industrialization, but also of the results.

iv) Decisions to transfer industries or establish new ones cannot be made on the basis of identical criteria applicable to all situations.

v) Economic progress in the industrially advanced countries is very much related to that of the developing countries. Consultations between the two groups and amongst the developing countries themselves is, therefore, of very great importance.

vi) Industrialization cannot be looked at in isolation. The contribution of other sectors is clearly crucial to any increase in manufacturing production. Thus, there must be complementary expansion in the primary sector, such as agriculture, forestry and mining, and in the tertiary sector such as power, communications, transport and distribution.

vii) The developing countries have widely varying capabilities to absorb and sustain industrialization. There is, therefore, need in both multilateral and bilateral arrangements for industrial cooperation to be structured to meet these diverse requirements.

viii) Programmes of selective import substitution on a national or regional basis and of regional cooperation to exploit natural resources are necessary to provide the major thrust for future industrialization of developing countries.

ix) Arrangements for widening market access to the developing countries must be complemented by systematic programmes and measures for the location in these countries of certain industries or parts of industries in which they have or can develop a clear comparative advantage. This necessitates carefully devised government policies, including appropriate adjustment measures, to encourage resources in those industries which are less competitive internationally, or which, for environmental reasons, are considered no longer suitable for countries, to move into more viable activities.

x) It is necessary that the transfer of technology to developing countries is undertaken in a manner consistent with their stages of development and internal requirements and in conformity with their strategies for future growth and development.

xi) There is need for a Code of Conduct in the Transfer of Technology, evolved within a framework which is basically acceptable to all parties.

xii) For many industrial opportunities, technologies are available from sources other than the transnational enterprises. Most developing countries lack adequate knowledge of appropriate technologies, but they can acquire much of this through adopting methods already used by countries with production and market conditions similar to theirs.

xiii) While establishment of data banks may be valuable, it is necessary to introduce new arrangements nationally to enable developing countries to have ready access to information. Industrially advanced countries should support early implementation of schemes to improve the information systems available to the developing countries, including the establishment of data banks on technology and technical investigations.

xiv) Inadequate research has been applied to developing new uses for the products of developing countries. Universities, private foundations and research institutions in industrially advanced countries can make an important contribution to solutions in this area. These institutions should be mobilized for this purpose.

xv) There is an urgent need to establish management training facilities and arrange for exchanges of management personnel between industrially advanced and developing countries, and among developing countries themselves.

xvi) Developing countries must develop their own capabilities through effective institutional mechanisms, including the establishment of training and research centres for the adaptation, development and diffusion of appropriate technology.

xvii) Industrially advanced countries should review their patent laws.

xviii) Industrially advanced countries should assist, through their universities and other research institutions, the search for methods to use materials in the developing countries which are now wasted.

xix) High priority should be given in aid programmes to the early establishment of training and research centres aimed at the indigenous development, adaptation and diffusion of technology.

xx) Industrially advanced countries should establish mechanisms for stimulating the interest and involvement of their industries in the industrial development of developing countries.

xxi) Industrially advanced country governments can make a significant contribution to the flow of crucial industrial information to developing countries. Such technical knowledge which is in the public domain and of considerable benefit to industrialists in developing countries includes bibliographical material on industrial processes, ownership of patents, structure and location of existing firms in different product lines, trade and market data etc.

xxii) Where the market itself does not produce proposals for industrial ventures at an acceptable rate, governments of developing countries should create industrial promotion centres charged with such responsibilities.

SELECTED ISSUES IN INDUSTRIAL COOPERATION

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Contents

1. Introduction

This note is concerned with three issues which are currently receiving attention in the debate over the prospects for the industrial development of the Third World. These issues cover, first, the nature (and potential) of policies which the developed countries might consider adopting in order to promote the transfer of uneconomic or declining industries, or parts of industries, to the developing countries and the nature of possible institutional frameworks for supporting such industrial cooperation. The second issue concerns the nature (and potential) of policies which the developed countries might adopt in order to encourage greater public and private sector involvement in industrial development in developing countries. And the third issue concerns policy frames which developing countries might consider in order to promote their industrial development, and the institutional frameworks they might adopt in order to support such a programme. Each of these issues will be examined in turn, with particular attention being given to the possibilities for international cooperation efforts to overcome the problems identified.

The starting point of the examination is the theory that industrial development on a national basis concerns two crucial parties - profit orientated industrialists (in both the public and private sector) and the government. Any analysis of industrial development which ignores the basic profit orientation of industry is naive and irrelevant. In the international dimension we are concerned with two sets (at least) of industrialists and two sets of governments, and our analysis must show how possible solutions to various problems relate to the interests of these four groups. In particular we must be able to show that the creation of industrial

opportunities which are profitable to both sets of industrialists can also be politically acceptable to both sets of governments; any proposal which fails to meet this criterion is leading to a conflict situation which reduces the chances of the proposal achieving its objectives. This point can be best illustrated in the context of the first of the issues identified above - that of redeployment.

2. The Redeployment Issue

It is of the nature of the dynamics of comparative advantage that the cost minimizing location of given industries will change over time, so that an industry which located in one country at one point in time will later find that its unit total costs of production could be lowered by moving to another location. This fact provides the essence of the standard argument for redeployment, which in its efficiency form holds that, in order to ensure the efficient exploitation of the world's resources, measures should be taken to ensure that uneconomic and declining industries are transferred to minimum production cost locations. In its equity form it holds that governments should not take measures to protect their declining and uneconomic industries as this impedes the development of those countries where those industries could be more efficiently located. The proponents of both forms of the argument have carried out extensive research to develop possible mechanisms for redeployment, once their arguments have been accepted, and this aspect of the subject needs no further expounding here. This note will concentrate on the implications of the need to obtain common cause positions among the two sets of governments and two sets of industrialists before redeployment actually takes place.

The first thing to note is that while the debate on redeployment issues has been proceeding in academic and intergovernmental circles, considerable redeployment has actually been taking place. This indicates that, for one reason or another, common cause on redeployment is not an uncommon occurrence. The argument can be maintained only because the proponents are not content with the speed of redeployment, so that the question we are faced with is "what are the constraints thought to be slowing down the speed of redeployment?". The common response to this question by the proponents of the argument for redeployment is that there is a lack of political will on the part of the governments of the countries in which the declining and uneconomic industries are located. To substantiate this response, those who make it will point to the extensive protection (in various forms) that governments throughout the world, developed and developing (this case being ignored by those who maintain their position on equity grounds - incorrectly) provide for what they argue to be uneconomic and declining industry. One implication of this line of reasoning is that the governments which provide such protection might not share the objectives of global efficiency or equity. Another implication is that such governments might not be willing to adopt redeployment policies derived from such global objectives on a unilateral basis, on the grounds that such a move might not improve either world efficiency or equity. And a third implication is that even if a government completely or partially accepts the implications of an objective of global industrial efficiency or of equity it might disagree that redeployment might be called for in specific instances. We will take each of these points in turn.

It should be obvious that, unless all the governments of the world shared an objective which implied a specific level and distribution of the world's industrial production, there need be no basis for an agreement on what level of redeployment should take place over a period of time, nor for any agreement on the composition and distribution of the industry it is proposed to redeploy. To put it another way, if there is no agreement on what constitutes acceptable levels of inefficiency and inequity for governments to accept when establishing their individual industrial strategies, then there is unlikely to be consistency between their planned rates of industrial development, or on the scope for aggregate redeployment. Thus in this case the lack of political will for redeployment in general or a specific programme of redeployment is simply the reflection of a legitimate difference in the objectives being sought by different governments. In the absence of agreement on global objectives attempts to reach agreement on a sub-group basis, such as by the members of the EEC, the COMECON, or the Group of 77 and its supporters (e.g. the Lima Declaration) are likely to produce targets which are inefficient, inequitable, and/or non-operational (except in those cases where the bulk of an industry is contained within the sub-group members' territories). Even if it were possible for the world's governments, or some sub-group of them,to agree on a programme for redeployment it does not follow that such a programme would be carried out - such an agreement would be based on a social evaluation of the costs and benefits involved and they might not correspond to the private evaluations of those costs and benefits as perceived by the industrialists concerned.

The second reason why governments might lack the political will to support redeployment programmes is that they might feel that the resources released by such a programme might not be taken up by industries where

they could in theory be efficiently employed because of foreign distortions imposed on the expansion of those industries. While the multifarious discriminatory trade and aid relationships, which characterize the world economy, and the protectionist commercial policy regimes maintained by most developing countries can be justified in terms of the objectives of those participating in and maintaining them, it should be realized that those objectives will not be shared by those countries being requested to implement redeployment measures. While such divergences from the efficiency criteria could be justified on equity grounds, the realpolitik is such that any country being requested to implement a redeployment programme leading to the transfer out of its economy of industries which have been identified as uneconomic and/or declining will be looking for evidence of expanded opportunities for their other industries, so that they can feel assured that beneficial internal redeployment will actually take place. [1] If they do not feel assured of such an outcome then they will be less inclined, that is to say they will appear to lack the political will, to take part in a redeployment exercise.

The third reason why a government may actually or apparently "lack the political will" to implement a specific redeployment programme is that as there are no unambiguous criteria for identifying uneconomic and/or declining industries they can have legitimate grounds for questioning the selection of any given industry as a candidate for redeployment and might seem to lack the political will to redeploy it; but it might well be that the government has strong grounds for arguing that the criteria used by the

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[1] We are assuming through this brief note that the current state of the art of designing adjustment assistance measures is such that if a decision to implement a redeployment programme were to be taken, resources which were unemployable in other uses would be compensated to their satisfaction.

advocates of redeploying that particular industry are inappropriate or misapplied in that specific case. In a world characterized by stochastic shifts in the international spectrum of input prices it is difficult to see how it could be otherwise. An industry which would be classed by all as uneconomic in a given location on the basis of one set of actual or assumed input prices might appear perfectly commercially viable on the basis of a different set of input prices, or input availability, which might be reasonably assumed to be likely to obtain in the same location in the near future; the argument holds in reverse with respect to the case made out for the location to which it is proposed to transfer the industry. In the absence of any clearcut operationally significant definitions of the concepts of "uneconomic" and "declining" it is clearly possible for a government to agree with an industry's assessment of its future as commercially viable, and to reasonably resist proposals to redeploy it. To those proposing the redeployment such a position may well appear to indicate a lack of political will to redeploy.

In sum, a government might legitimately lack a political will to mount a redeployment programme because (i) such a redeployment would not be seen by it to be in the interests of its people; (ii) it might not see that it is able to obtain the benefits from such redeployment due to what it considers to be the failure of other governments to mount compensating complementary redeployment programmes; and (iii) it might disagree on the choice of specific industries to be included in the programme. It may also be the case in the democratic developed market economies that the government may have the political <u>will</u> but not the political <u>ability</u> to carry out a programme of industrial redeployment. In other words a government may well accept that a programme of redeployment would be

in the national interest, but be unable to carry out such a programme because of actual or potential political resistance from those who would be affected by the programme. In such a situation a government may shelve the programme in order to maintain itself in office or to maintain the political support of the vested interests in question. The potential gainers from the redeployment can mostly be ignored politically as they either have no political weight (foreigners), or their power is diffused (consumers), or they are unaware of the potential gains and therefore form no lobby.

As indicated above, considerable redeployment continually takes place in all market economies in response to pressures of market forces and, although of wider theoretical significance, the redeployment issue usually attracts attention in those cases where vested interests are successfully resisting their redeployment and have obtained protective support from their government. In such cases the pressure for redeployment, while it might come from consumer groups (particularly where the product in question is an intermediate industrial good and the consumer therefore an industrialist), normally comes from foreign competitors and their diplomatic representatives. The resulting conflict is resolved between government officials of the two countries and the outcome will be normally in favour of the position taken by the stronger of the two countries, which in the case of a developing country/developed country confrontation will usually be that of the developed country.

In conclusion, then, because (a) redeployment as a general policy proposal is likely to highlight inconsistencies between the objectives of participating countries (witness the complaints from the Third World countries at the 1976 World Employment Conference that the sort of proposals

put forward by the developed countries would turn the developing countries into "hewers of wood and drawers of water"); (b) currently developed countries see no quid pro quo in a redeployment programme based solely on the developed/developing country framework; (c) there are no unambiguous criteria for identifying uneconomic and declining industries; (d) the way in which specific redeployment issues currently emerge (an industrialist in a developing country complains to his government of restricted access to a given market, his government then negotiates the issues with the government of the market) pushes the governments of the developed countries into a defensive position where they are the stronger; and (e) redeployment cannot be forced on unwilling industrialists; developing countries would be best advised not to make redeployment a key element of their international industrialization negotiating strategy. Few, if any, "issue" approaches to such negotiations are likely to provide the basis for progress in international industrialization, because they are unlikely to find common cause agreement among the four parties required for the successful implementation of any negotiated strategy - the two sets of governments and the two sets of industrialists. A successful strategy would take account of the fact that there are many examples of common cause being found in specific product lines which has led to effective redeployment - and such examples are not restricted to declining and uneconomic industries. (It should be noted that the reasons why an industry might be uneconomic or declining in developed countries might also be good reasons for developing countries not to enter those lines.) Common cause occurs when, and only when, industry on both sides considers the industrial venture profitable and both governments consider

the profit making activity to be in their national interests. If we take note of this and of the facts that (a) multilateral based intergovernmental agreements are more likely to be honoured than bilateral agreements, (b) many firms in developed countries are suspicious of investing in or collaborating with firms in developing countries, (c) firms in developed and developing countries are suspicious of multilateral agencies acting as intermediaries in their business, and (d) continued industrial development in developing countries is to some extent dependent on direct investment from or collaboration with private sector business in developed countries, then we can begin to move towards the establishment of an international programme of industrial cooperation which will result in redeployment without making what we have indicated is a nihilistic issue out of it. The key elements of such a programme would be ones seeking to achieve:

1) Improvement of the potential for expansion of trade in industrial products via mutually binding negotiations for the liberalization of world trade under GATT and via negotiations for a GATT based procedure for the international surveillance of discriminatory and non-discriminatory escape clauses, and a multilateral procedure for supervising appeals against their invocation.

2) The establishment of a code of conduct for international business operations of all sorts. Such a code is long overdue and could be negotiated either in the context of the UNIDO/UNCTAD Joint Study or some other OECD/Group of 77 dialogue; it should have a legal framework enforceable in international courts or in some specially established quasi-legal international entity. Such a code of conduct, backed up by arbitration and guarantee

> schemes, would seek to ensure that when businessmen in two countries undertake an investment or collaboration programme according to the rules established by the code of conduct, and with the support or acceptance of the two governments, either or both of those governments or firms could not change the rules of the game on the basis of which the calculations of profitability were based. If either or both governments or firms did change the rules of the game on which the venture was based,then the firms would have rights of appeal, arbitration and compensation under international guarantee. Such a code of conduct would help remove the suspicions which currently constrain the development of international industrial ventures and would also help developing countries towards the achievement of their industrial development targets.

The establishment of these two key elements of an industrial cooperation programme would be the responsibility of the governments and would be best negotiated and maintained within a global, multilateral framework. Emphasis is put on the word "global" because any sub-global arrangement would necessarily involve discriminatory practices, which should be avoided in order to remove the potential for political conflict and in order to maximize the potential social and commercial advantages of the programme. The emphasis on the word "multilateral" is there partly for the same reason and partly because the greater the number of governments involved in government-to-government negotiation, the greater will be the scope for application and the greater the confidence of business in the framework; but perhaps most importantly it would reduce the grounds for suspicion

that the developed countries involved in the negotiations are primarily concerned with the interests of business in their own countries. These first two elements of an industrial cooperation programme involve bringing together two of the four sets of parties involved in international industrialization - the two sets of governments - in order to establish a framework within which the two sets of industrial firms can seek and engage in mutually profitable industrial ventures which are acceptable to their governments. While as far as governmental cooperation is concerned we can pose the rule "the more the merrier", for cooperation between firms we can pose the opposite rule - "the fewer the better". Successful business ventures (and we do not distinguish between private or state owned businesses) are based on the commercial exploitation of specialized knowledge, and firms understandably prefer to negotiate on a confidential firm-to-firm basis. This fact allows us to identify the third key element of an industrial cooperation programme.

3) Any industrial cooperation framework established by governments should seem to create a business climate which encourages and supports the secure negotiation of mutually profitable contracts for industrial business ventures between firms in developing and firms in developed countries; such contracts would be enforceable under the code of conduct.

The first three key elements of an industrial cooperation programme would establish the all important climate for the development of commercial industrial cooperation and, to some extent, the market itself would respond to them and accelerate the rate of industrial expansion in developing

countries. The market itself is, however, unlikely to stimulate sufficient industrialization to satisfy the objectives of the developing countries. To be acceptable to the developing countries, therefore, any industrial co-operation programme must contain within itself schemes for the positive stimulation and support of industrialization in developing countries. At this point we can simply specify two further key elements for an industrial cooperation programme; each of them is the subject of more detailed examination below.

4) Developed countries should establish mechanisms for stimulating the interest and involvement of their industries in the industrial development of developing countries.

5) Developing countries should take appropriate measures to establish a domestic policy frame which will encourage and support the rate of industrialization which they have set as their objective.

3. Positive Policies for Developed Countries

It is worth reiterating at this point that in the developed market economies, industrial concerns, both private and public, are profit orientated and to the extent that industrialization in the developing world requires the collaboration of Western industry in any form then any industrial cooperation programme which fails to take full account of this basic fact will not have much operational significance. The point is reiterated here because it is essential to realize, but frequently forgotten, that Western governments cannot force their industry to involve itself in the industrialization of the developing world but only (a) point out that there are profitable opportunities to be found in such involvement, and (b) enhance through their domestic policy-frames the net realizations which their industrialists obtain from taking .dvantage of such opportunities.

The most obvious way in which developed country governments can enhance the net realization accruing to their domestic industrial concerns from their business activities in developing countries is via favourable tax treatment of profits generated from those activities. The scope of such a scheme is obvious and needs no amplification. A second way to enhance net realizations is for the government to subsidize, or provide on less than market cost basis, inputs supplied from their countries which are required by their businessmen for undertaking their industrial activities in developing countries. Again, the possibilities are obvious and do not need spelling out.

Perhaps less obvious to those involved in debating and negotiating programmes for industrial cooperation - for the simple reason that they tend not to have had industrial experience - is the significance of risk and information gaps which can slow down the flow of investment and other collaborative industrial activities from developed to developing countries. The riskiness of such activities would be reduced to some extent by the introduction of an international code of conduct such as that discussed above, but there is also scope for individual governments of developed countries to introduce national measures providing insurance schemes to cover risks involved in industrial ventures undertaken in developing countries by their businessmen. Risk of losses from natural disasters, civil and international strife, abnormal exchange rate movements or failure to abide by a negotiated code of conduct could be covered by such schemes. There are two sorts of information gap, relating to the two crucial prerequisites of a successful business partnership. First, a businessman must have the knowledge that a potentially profitable business venture exists, and then must be aware of the existence of a foreign partner with whom he feels able to establish a collaborative business arrangement. The first required systems for filtering, screening and disseminating information to relevant businessmen and/or for moving businessmen to the information sources. The second requires systems for bringing businessmen into contact with one another. On the assumption that governments know their own businessmen, and their needs, best, such systems are best arranged on a national basis, although there is no reason why such national systems should not be integrated into an international network, except insofar as commercially confidential data is involved.

Developed country governments could make a significant contribution to the flow of crucial industrial information to developing countries by harnessing the considerable storage and retrieval potential of modern computer systems. The use of such systems would, of course, necessarily be restricted to non-confidential data, but there is an all-important stock of technical knowledge which is in the public domain and which would be of benefit to industrialists in developing countries. Such information covers bibliographical material on industrial processes, the ownership of patents, the structure and location of existing facilities and firms in different product lines, and trade and market data. From such a system a domestic or foreign firm considering the possibility of establishing a production facility in a developing country, or a developing country examining its own industrial prospects, could obtain a portfolio providing a profile of the industry in question. The system could also contain an annotated register of industrial design consultants, engineering consultants and marketing agents with expertise in the relevant product or process, and of existing firms currently engaged in the business and their willingness to engage in collaborative activities. The staff of such an information service could help fill the second information gap mentioned above: initiators of requests for product (or process) reports from the system could either open up direct firm-to-firm contacts, or they could request the staff of the system to make the initial enquiries and thus retain anonymity. The staff could also act as initiators by arranging seminars, field visits or industrial fairs in product lines or areas for which several of their clients had indicated general interest, or for which they had made their own assessment of potential. Finally

the staff of the system could maintain a capacity for assessing the commercial viability of project proposals emanating from their activities and also the capability for evaluating the appropriateness or the technological components of the projects. A limited version of such an information and contact development system is planned to be one of the basic functions of the Centre for Industrial Development being established under the Lome Convention. Access to the system would however be restricted to member states of the ACP/EEC. It could be argued that advantages would accrue from having the system mounted on a multilateral basis, perhaps under the auspices of UNIDO, although in that case emphasis might have to be placed on the establishment of national centres with terminals linked to the system in order to maintain contact with, and the confidence of, potential clients in industry. Once the system was established it would be essential to provide it with an advertising budget in order to make industrialists aware of and interested in its facilities.

4. Policies for Developing Countries

Assuming the developing countries were to press for and avail themselves of the schemes outlined in previous sections, they would still need to ensure that their domestic industrial policy frames were so designed as to allow them to reap the maximum benefits from those schemes. The optimal policy frame for any single developing country will vary with its economic circumstances and its politically established targets for, and constraints imposed on, its industrial sector. Recalling, however, the terms of reference for this note, and recalling that we

have dismissed the seeking out of declining and uneconomic industries in developed countries as a meaningful basis for an industrialization strategy, and recalling further that we have restricted our attention to industrialization which involves collaboration, in one form or another, with the (public sector and private sector) industry in the developed market economies, then we can indicate some general guidelines for industrial policy formulation (the elaboration of which would take us beyond the scope of this note).

On the assumption that general domestic economic policies have been established with domestic objectives in mind and their consequences for collaborative activities have been assessed and calculated, then we can restrict our attention to those policies which bear directly on the involvement in domestic industry of foreigners through the various possible forms of collaborative arrangements. It will be appreciated that the attraction to foreign firms of collaboration agreements with domestic industries will be determined by how far the nature of such policies assist or constrain the foreign interests in the attainment of their own legitimate objectives. It is a fundamental assumption of this note that the rate and composition of the industrial development of a developing country will be determined by the nature and extent of the collaborative arrangements its industrial sector maintains with industry in developed countries, and that the nature and extent of that involvement will be affected by the attitude of the government of the developing country towards that collaboration, as expressed through those of its economic policies which directly affect the interests of those involved in the collaborative agreements. Domestic and foreign Governments

have three basic options in this respect: they can establish their policies towards such issues as foreign ownership, repatriation of capital, dividend and royalty payments, restrictive business practices (such as market sharing arrangements), and patent law etc., and then accept whatever collaboration arrangements emerge on the basis of those policies; they can decide to fix their industrialisation targets, assess the extent to which they are dependent on collaboration arrangements, and then set their policies in such a way that the required degree of collaboration is forthcoming; or they can establish a dualistic policy framework, with different policy treatment of collaborative arrangements depending on whether or not the collaboration takes place in areas (product-wise or geographical-wise) in which the government wishes to encourage or discourage collaboration. The important point is that it is necessary to appreciate that there will be a trade-off between the treatment of collaborative arrangements implied by the government's policy frame, and the amount of collaboration which it is able to attract.

The second general guideline for industrial policy in developing countries follows from the first. It is that governments of developing countries should have well defined industrial strategies - not in the sense of a catalogue of industries they would like to have, but in the sense of well defined and stable views on the areas of their economies within which they would be prepared to accept industrialization - and on the social and economic conditions such industrialization should meet. Only in this way can industrialists know whether or not ventures in which they would have an interest will be acceptable to the government or not. The government can of course seek to interest industrialists - domestic

and foreign - in those ventures for which it would welcome investment and can modify its policies to attract industrialists into them - but it must be emphasized that the basic policy frame itself must be seen to be stable. Unless a government is prepared to accept the losses from ventures which are not commercially sound, and such a strategy is obviously not applicable to a country's whole industrial sector, it must make clear the areas in which it is prepared to accept industrial ventures and the conditions on which it expects or insists such industrial ventures should be based; the market itself will then respond (or can be encouraged to respond) to the opportunities which are available and determine the actual production lines to be established.

Finally, governments of developing countries which are not satisfied with the rate and speed at which the market produces proposals for industrial ventures should, as a matter of policy, create industrial promotion centres (of any institutional form) charged with the responsibility of establishing a research capability aimed at generating and maintaining a register of industrial ventures which it believes would be commercially viable if undertaken. Such centres could then use existing and proposed information systems to seek out industrialists in order to inform them of and interest them in investing in the ventures.

5. Conclusion

The subject of the industrialization of developing countries is a complex issue with many ramifications of which our understanding and experience is limited. This note has been written on restricted terms of reference and has necessarily left untouched many crucial problems in

the subject area. It has argued that the redeployment approach to industrialization is of limited value, on the grounds that, basically, there are no criteria for identifying declining and uneconomic industries in developed countries and that, even if there were, there can be no presumption that such industries as were identified in this way would be a suitable basis for the industrialization of developing countries. Furthermore, such a process would have a limited chance of success, as it would proceed by creating vested interests against its potential success. This note has offered some ideas towards an alternative strategy for the international community, the governments of the developed countries, and the governments of the developing countries, which would be instrumental in fostering the industrialization of these countries. This strategy is based on the assumption that international cooperation is a prerequisite to successful industrialization and that such cooperation requires the identification of common cause among the industrialists and governments - private and state, domestic and foreign - of the countries involved in collaborative ventures of any form. It has stressed measures for the expansion of world trade in industrial products, measures to expand the flow of information about industrial opportunities in developing countries, measures to increase the flow of contacts between industrialists in developing and developed countries, measures to establish a code of conduct for international industrial ventures, and measures to be taken by developing country governments to encourage the collaborative industrial ventures required to sustain the industrialization of their economies.

INDUSTRIAL COOPERATION AGREEMENTS

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PART I

GENERAL ISSUES

Background

A recurrent theme in the Third World's demand for a new international economic order is their desire for a greater share of the world's industrial capacity to be transferred from the currently industrialised countries to countries in the Third World. The preferred instrument for effecting this transfer is so-called bilateral or multilateral international co-operation agreements.[1] UNIDO is recommended as the forum for negotiating these agreements, but the form such co-operation should take is, as in the Lima Declaration, left rather vague, with the only injunction being that:

> "to promote co-operation between developed and developing countries, both should endeavour to disseminate appropriate information about their priority areas for industrial co-operation and the form they would like such co-operation to take" (U.N.p.30).

The Lome Convention signed between the EEC and 46 African, Caribbean and Pacific (ACP) countries in February 1975, included a chapter on industrial co-operation. It sought to promote measures to stimulate the flow of EEC technology, capital and knowhow to the ACP (including the establishment of a Centre for Industrial Co-operation, to disseminate information) and to promote ACP industrial products in Community markets. This part of the Convention has been dismissed by at least one observer as "being only an exercise in wishful thinking without operational significance" (Wall,1976,p.8).

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1. See the Lima Declaration (UNIDO, 1975, pp.5,15,17, and the Resolution of the UN's Seventh Special Session (UN,1975, p.30).

The EEC itself seems to see the role of the industrial co-operation agreement embodied in the Lome convention as, at most, the provision of information and the easing of the way for the normal commercial functioning of businessmen. (See EEC, 1975, pp.7-8). It is a mildly promotional role with limited operational significance.

The smoothing of relations between governments and businessmen of different countries was also the major form of co-operation envisaged by the Commonwealth Group of Experts in their first report (See Commonwealth Sect., 1975, p.39). In their further report however, whilst enlarging on this theme they, more importantly, noted the essential link between industrial co-operation and trade policy, and emphasised the importance of removing non-tariff barriers to trade in manufactures from developing countries as an important aspect of such co-operation (Commonwealth Sect., 1976, pp.27-29). They also made the important observation that:

> "the centrally planned economies exercise closer control over their markets and this gives them, in some respects, a relative advantage to assist the developing countries through allocating some of their industrial activities to these countries and at the same time assure them a market for their output". (Com. Sect., 1976, p.30).

2. Assumptions, objective and rationale for industrial co-operation

The stated objective which industrial co-operation agreements are expected to serve is thus the redeployment of industrial capacity between developed and developing countries, but as these agreements are expected to be bilateral, they are presumably meant to be discriminatory.

In order to derive an economic rationale for such bilateral, discriminatory, industrial co-operation agreements, it is necessary to pinpoint the implicit assumptions underlying the developing countries' demands regarding the components of social welfare in these (and in developed) countries. These assumptions, as we seek to show in this section, are at variance with those normally made in conventional economic theory, which presents a strong case for dismissing the LDC demands as being irrational, as they do not subserve their (conventionally defined) self-interest. If, however, in practice the LDCs are nevertheless going to pursue what might be considered to be 'irrational' objectives in any case, traditional theory can still yield useful 'second-best' rules which may provide a rationale for some types of industrial co-operation agreements.

There are three implicit assumptions about the components of the social welfare function of different countries, and of their economic environment, in much LDC thinking. The first is that industrialisation is held to be desirable in itself, and hence the level of industrialisation is taken to yield directly social utility.[1] The second is a strong presumption that direct government intervention in trade and industry is unavoidable, and moreover that the more impersonal allocative mechanisms of the market are unlikely to yield socially desirable results.[2] Third, that domestic industrial policies in both developed and developing countries have important trade policy implications and hence are important determinants of the locational distribution of world industry.[3]

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1. See the Lima Declaration (UNIDO, 1975,p.5).
2. Thus the Lima Declaration also states: "that the unrestricted play of market forces is not the most suitable means of promoting industrialisation on a world scale, nor of achieving effective international co-operation in the field of industry" (op.cit, p.7).
3. See Commonwealth Sect. (1976) pp. 27, 29.

Traditional economic theory would take exception to the first two of these assumptions, whilst recognising the third as a sad fact of current economic life. For conventional economic theory economic welfare is derived from the satisfaction of individual consumer's wants in terms of goods and services (with suitable account being taken of any socially non-optimal inequalities in the distribution of income and consumption). Within such a framework, it would be irrational to promote industrialisation per se, if this meant that, as a result the availabilities of goods and services for consumption and investment in the economy would be lower than otherwise.

Moreover, as the modern theory of trade and welfare has shown, there is a straightforward case for a 'modified free trade position' (Meade, 1951), namely that in order to maximise welfare in any country, free trade is optimal except for the so-called 'optimum tariff' argument. Most other arguments for trade intervention are at best 'second-best' arguments, as they are cures for various domestic distortions in the working of the price mechanism which require domestic instruments (e.g. domestic taxes and subsidies) for their ideal treatment. (See Bhagwati and Ramaswami (1963), Johnson (1965a), Corden (1974)). It follows, therefore, that with the deployment of these ideal domestic taxes and subsidies the level and composition of industrial output of different countries, with free trade, would reflect their comparative advantage and would be optimal, in the sense that any attempt to raise or lower the level or change the composition of industrial output of any (or all) country(ies) would necessarily entail a lowering of the actual welfare of that (or all) country(ies). In such a world there would clearly be no place for industrial co-operation, or for any attempts by governments to alter the extant pattern of production and trade.

Furthermore, even in the absence of universal free trade, conventional theory provides a strong case for a unilateral reduction in a single country's own protective devices, as this would raise the conventionally defined level of economic welfare of its citizens. Hence, even in a tariff-ridden world, there would not seem to be any place within conventional theory for industrial co-operation agreements. To obtain the optimal location of world industrial output, universal free trade should be sought. Failing this, any country wishing to maximise its own feasible level of economic welfare should adopt unilateral free trade.

Unfortunately for the conventionally (and in my view correctly) defined economic welfare of the world's citizens, their governments seem strangely reluctant to follow these prescriptions, largely because of their non-economic preference for industrial production per se, which the Lima Declaration now enshrines as being a justifiable part of a country's own social welfare function. This preference though undoubtedly irrational from an economist's viewpoint is nevertheless a fact of life with which we must live. Neither is it confined to developing countries, for developed countries too, seem to suffer from the industrialisation fetish, as witness the current worries about 'de-industrialisation' in the UK; moreover, as a number of economists have noted (Johnson (1965), Cooper and Massell (1965), Bhagwati (1968)), many aspects of international economic policy only make sense if this non-economic preference for industrialisation as a component

of most countries' social welfare function is explicitly recognised.[1]

For our purposes, the recognition of this non-economic preference for industrialisation of most governments has two implications. First, it will now be necessary to envisage co-operation amongst countries to obtain a satisfactory division of world industrial output, which all countries value for its own sake. Secondly, following from the first, we need to find ways (through international bargaining) in which this preference for industrialisation can be indulged with the least trade diversion (from the equilibrium that would exist in a free-trade world) and hence the lowest loss in terms of real national income. It is in these 'second best' terms some justification can be provided for industrial co-operation agreements.

Much of the discussion of preferential arrangements (which are also supposed to be subsumed under industrial co-operation agreements) in the past, has been in terms of fully fledged customs unions. However, starting from the trade and industrial production levels amongst countries in a tariff ridden world, the twin objectives of maintaining or increasing the level of industrial production in each of the countries concerned, together with that

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1. Thus, for instance, reciprocity in tariff reductions only makes sense in the context of the non-economic preference for industrialisation: "in the classical analysis it is lower cost satisfaction of private consumer wants that is involved, and this could be achieved without the co-operation of the other country through unilateral tariff reduction; whereas in the preference for industrial production model it is lower cost satisfaction of the demand for collective consumption of industrial production that is involved, and this can only be achieved through the co-operation (via bargaining) of the other country" (Johnson (1965) p.120). Similarly, the case for customs unions and other preferential forms of regional integration also only make sense if it is recognised that given their preference for industrialisation, unilateral MFN tariff cuts, which involved no trade diversion as compared with a preferential trading system, may not be preferred as they may involve a reduction in industrialisation. Hence the trade diversion of a customs union may be deemed to be socially desirable if it involves no change or an increase in the country's industrial production (see Cooper and Massell (1965), Johnson (1965)). This also explains why contrary to the predictions of economic theory, most developing countries exhibit a preference for trade diverting regional integration schemes. (See Bhagwati (1968)).

of raising the actual level of real income in the countries concerned, can also be subserved by sectoral bilateral (or multilateral) tariff reductions in the countries concerned.[1]

It follows, therefore, that for any given preference for industrial production in two countries, and hence their existing levels of tariff protected industrial output, industrial co-operation agreements could be devised which involve the swapping of relatively efficient for inefficient industries with the partner country.[2] Moreover, given the preference

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1. Caves (1974) explicitly notes the similarities between customs unions and more limited preferential trading arrangements. "Suppose that m entities barter n commodities among themselves, and that some subsets of entities form clubs and agree to trade some set of commodities among themselves at price ratios which differ from those prevailing between club members and the remaining traders. The general equilibrium theory of preferential trading (Kemp (1969), Vanek (1965)) deals with arrangements taking this form. A club that we call a customs union covers all n commodities and normally commits its members to internal free trade... a preferential trading area could clearly involve less than the full n traded commodities. or less than complete unification of internal opportunity cost ratios among club members, or both" (p.18).

2. That this will raise the level of economic welfare in the two countries follows directly from what Kemp and Wan (1976) have termed the basic proposition of customs union theory, namely: "Consider any competitive world trading equilibrium with any number of countries and commodities, and with no restrictions whatever on the tariffs and other commodity taxes of individual countries, and with costs of transport fully recognised. Now let any subset of countries form a customs union. Then ther exists a common tariff vector and a system of lump-sum compensatory pa ments, involving only members of the union, such that there is an associate tariff-ridden competitive equilibrium in which each individual, whether a member of the union or not, is not worse off than before the formation of the union" (p.95). The argument carries over if we substitute for a "subset of countries form a customs union", the phrase "subset of industries in some countries form a trading club".

for industrialisation. it may be more difficult to negotiate customs unions, than these more piecemeal, sectoral bilateral agreements. In Part III of this paper we present a proposal for industrial co-operation agreements which relies on these basic ideas.

However, in order to assess the more amorphous and essentially modest role that such agreements seem to have been assigned in past international discussions and in the Lome convention, we examine the record of India's experience with such bilateral agreements in the past in Part II. This conventional role is that of smoothing the path of normal commercial transactions between the participating countries. India has placed some emphasis on this role of bilateral government agreements, and hence, in the next part of the paper, we seek to answer the question: "given the preferences for industrial production of India and its various 'partners', did the bilateral government negotiations on industrial co-operation yield any results, in the sense of leading to a higher level and/or more efficient composition of industrial production than would have taken place in their absence?"

PART II: INDIA'S EXPERIENCE IN INDUSTRIAL CO-OPERATION

India's experience in industrial co-operation is best studied in terms of broad groups of countries, namely, the Socialist countries of Eastern Europe and the Soviet Union, the OECD countries, and other Third World or developing countries. In practice, India's objectives in the area of industrial co-operation are part of its trade policy, as is evidenced by the administrative machinery for its implementation, which is located in the Ministry of Commerce which deals in general with India's foreign trade. The Ministry of Commerce is also responsible for overseeing, monitoring and sanctioning the major practical form of industrial co-operation in the form of the participation of Indian firms (chiefly private) in joint overseas industrial ventures. In this part of the paper therefore, we will briefly outline India's experience at the official bilateral level in negotiating industrial co-operation agreements with the three broad groupings of countries - the practical as compared with the diplomatic outcome of these negotiations and thus the possible utility of this type of government initiative. We conclude this part with a brief discussion of the dimensions of Indian joint ventures abroad and whether bilateral government accords have had any utility in furthering overseas Indian investment.

1. Socialist countries

Prima facie, bilateral government negotiations on industrial co-operation would be expected to yield the highest returns in dealings with the centrally planned economies of the Soviet Union and Eastern Europe, as all industrial production in such economies is in the public sector and foreign trade is normally conducted by state trading organisations on the

basis of bilateral agreements. Any attempt to shift the location of industrial production on lines of comparative advantage between India and these countries must necessarily involve government decisions on these issues in the relevant socialist country. Moreover, there has been a rapid growth in India's trade with the socialist bloc, with bilateral trade growing at the rate of 11 per cent per annum between 1960-61 and 1972-73, and their share of India's foreign trade more than trebling over this period. In keeping with the overall diversification of India's export trade, the share of manufactures in Indian exports to socialist countries rose from 15 per cent in 1960-61 to about 40 per cent in 1972-73, but despite this - "the socialist countries absorbed a relatively lower proportion of manufactures in comparison with the rest of the world" (Nayyar, 1975, p.282).

It has been hoped periodically by both sides (particularly in Indo-Soviet negotiations) that there would be more direct industrial production co-operation, with production capacities in the respective countries earmarked for the partner market. As a significant part of the Indian heavy industry capacity has been built to Russian design the Indians have hoped that they might be able to use part of this capacity (which is surplus to their own needs) to provide heavy industry products for the Soviet plans. At the moment these ideas for production co-operation are still at the stage of preliminary discussions, and there have been no firm commitments as yet except for some joint ventures in third countries. Thus for Soviet aided steel mills in Cuba and Turkey, the Soviets will supply various components of steel mill machinery to the Soviet built plant of Bharat Heavy Engineering in India, which will then produce and export the completed steel plant. India will also supply electrolysed buckets to Soviet aided projects in Cuba and Bulgaria and heavy cranes to others in Cuba. A few

East European countries have shown an interest in setting up joint ventures with Indian private industry in third countries: the Poles have expressed an interest in joint ventures for producing vodka and ham (from Indian pigs), the GDR in canning pineapples and oranges, and the Czechs in heavy engineering products.

The areas in which long term industrial production co-operation is being considered are mainly with the Soviet Union. One is cotton textiles, with the USSR supplying the cotton which India would convert into textiles and garments for sale in the Soviet Union; another is in the production of castor oil; a third is machine tools, with the USSR and India specialising in different lines and supplying each other's needs from their respective lines of production; a fourth is in some resource intensive industries with, for example, India supplying alumina for the USSR to convert into aluminium for her own and India's needs.

It is the Indians who appear, on the whole, to be reluctant to tie themselves too closely through such direct long term production agreements with socialist countries for a number of reasons. First, they fear that such agreements might entail their plants becoming redundant if the East European demand for which they would be set up diminished in the future. Secondly, they are also deeply committed to self-sufficiency and do not seem to be willing to give up certain lines of production and become dependent upon the Soviets through such production co-operation. This can be illustrated by the case of leather garments and haberdashery. Russia and the East European countries are very keen to enter into some sort of long term agreement which would tie up Indian supplies of leather and leather products for their own markets, because there is expected to be a long-run

world shortage of hides and skins. The Soviets suggested that they would supply a tanning plant and other machinery required to produce leather goods to Soviet specifications. The Indians have been reluctant to accept this scheme as they do not think that the Soviet designs of both the plants and products could be viable, except for sales to the Soviet Union. There is thus the danger that if the USSR retracts on its commitment at some future date the Indians would be lumbered with an uneconomic plant.

The same problem of design and specification also bedevils the possibilities of production co-operation in many engineering goods. For some engineering goods the Soviets are interested in production co-operation, because the Indian products embody Western technology. However, for some of these Indian goods based on foreign technology there are export restrictions in the Indian foreign collaboration agreements, which prevent the Indian firms from exporting these Western designed goods to the USSR. At the same time the Indians are suspicious of adopting Russian designs and specifications because they consider these to be inferior to Western or indigenous ones.

Underlying this Indian reluctance to be too closely tied to the economies of the socialist bloc by meshing together their respective industrial structures, on the lines of their comparative advantage, is clearly the fear that by doing so they are likely to be giving hostages to fortune. But, it may be asked: is not any act of investment, which means committing current resources into specific forms of capital goods, for use in meeting future, and hence uncertain, world (or home) demand, equally likely to be a hostage to fortune? The major difference lies in the extra dimension of uncertainty that is introduced by tying one's economic future to possible future political

action. For the very reason that makes bilateral government negotiation for industrial co-operation meaningful in the case of the socialist countries also increases its risks for a country such as India. Where all economic decision-making is politically centralised, whilst government directives can ensure that the centralised commands to institute production co-operation are in fact carried out, there is, however, also the danger that at some later stage for political reasons the co-operation agreement may be abrogated. Basing one's industrial structure on comparative advantage in a multilateral trading framework, where purchases and sales approximate closer to the arms-length dealings of atomistic markets, rather than on that with a planned economy whose sales and purchase decisions are centralised and may serve political ends, could therefore minimise some of the risks inherent in international specialisation. This is not to deny that political factors may also be of importance in the trade policies of various non-socialist countries. But the essential difference is that the risks of unilateral retaliation for essentially political reasons are likely to be smaller.

2. Third World Countries

As in many developing Third World countries too much of the industrial sector is either in the public sector or else directly controlled by the government, we would again expect that bilateral negotiations between governments could lead to meaningful industrial co-operation, though as in the case of the Soviet bloc, there would be the danger that political factors would impinge both upon the creation and maintenance of such co-operation, thereby making any resultant (purely bilateral) interdependence that much more risky than a more multilateral interdependence, say through the possibly utopian ideal of universal free trade.

India's attempts at industrial co-operation with Third World countries have consisted of two major elements, both of which can be looked upon as part of its general desire to improve its trading position. The first, and quantitatively more important has been its recent policy of allowing joint ventures overseas by Indian private firms, against the export of Indian machinery or know-how. We discuss these in greater detail in section (4) below.

The second is the result of the large rise in oil prices following the Yom Kippur war, which left India as one of the 'most seriously affected nations' in UN terminology. As part of its trade strategy, to meet the gaping balance of payments deficit that ensued, India attempted to negotiate various industrial co-operation agreements, whose chief element would be to combine the financial resources of the oil-rich countries with India's technical skills and natural resources. As much of the economic decision-making in the OPEC countries was highly centralised, bilateral government negotiations were naturally the appropriate means to facilitate this marriage of OPEC finance and Indian technology and natural resources. The main fora for the discussions were various high-level joint economic commissions that India set up with various OPEC countries and which were modelled on the Indo-Soviet joint commission which had been functioning for some time, and which also set the pattern for the recent government negotiations with various OECD countries.

As most hope was placed on the outcome of bilateral government negotiations with Iran, we outline the outcome (till end of 1976) of the deliberations and negotiations conducted around the Indo-Iranian joint Commission, below. This should provide an important illustration of the

prospects for, and limitations of, such industrial co-operation with other Third World (and in particular OPEC) countries.

In early 1974, largely as a result of political initiatives at the highest levels in India, the Kudremukh project was launched. This involved Iranian finance for the extraction of iron ore, which could then be shipped in slurry form from the port of Mangalore (whose extension was part of the project), to a pelletisation plant in Iran. The ore would be mined from a mountain in Kudremukh in Mysore. This iron ore project had been on the shelf of potential iron ore projects of the Indian planning commission, but had not been implemented because it was considered to be marginal as compared with other potential iron-ore projects. In a preliminary investment appraisal that was done of the project in the Planning Commission, it appeared that the project would not be viable, in terms of yielding India a social rate of return of at least 8 per cent, if the iron ore were priced at existing and likely future world prices. The negotiations therefore turned on the terms on which India would sell the iron ore to Iran. By the time the Indo-Iranian Joint Commission's Committee on Industry met in October 1975, the two components of the Kudremukh project had been finalised: (a) a loan agreement with Iran, which was to provide the complete capital costs of the project and (b) a purchase contract between the Steel Authority of India Ltd. and the National Iranian Steel Company for the sale of the iron ore at a price which was higher than the world price. This has probably led to a positive social rate of return above an 8 per cent accounting rate of interest for India. It is however doubtful whether the social return to Iran is as high as it could have been on another alternative project in India or from purchasing iron ore from elsewhere at the world price. To this extent

it would be plausible to argue, that without the political nature of the deal and the resultant involvement of the two governments at a very high level in its negotiation, this project would not have borne fruit.

Various other measures of industrial co-operation were also mooted at the Joint Commission's meeting in 1975. One was the possibility of Iranian development (with the provision of financial credits) of Indian bauxite to be used in the expansion of the Iranian aluminium industry. The two parties "agreed to constitute a team of experts to study the commercial and other terms for the immediate requirements and to investigate the technical and economic aspects of co-operation in respect of likely additional requirements". The Iranians "agreed in principle to extend to India a credit for implementation of the projects to be agreed upon, on terms and conditions mutually agreeable to both parties".

The second was the possibility of Iranian finance for two pulp and paper mills to be set up in Cachar and Nowgong in Assam, India. The Iranians had agreed earlier, in principle, to co-operate with India in setting up these two mills. At the meeting in October 1975, the Iranians said they were carrying out a study to prepare a master plan for the pulp and paper industry for Iran and after it had been completed negotiations could begin on possible Indo-Iranian co-operation in this area, on the basis of the Iranian requirements to be determined in the master plan.

The third area in which co-operation was mooted was more general. "In the context of the possibilities of utilising existing capacities and/or augmenting these capacities in certain industries in India with financial and other inputs from Iran with a view to meeting Iran's requirements".

the Committee recommended that a team should come from Iran to India in the near future to visit various factories in India to see if there were any concrete possibilities in this area of co-operation.

Finally "the Committee reiterated the desirability of expanding mutual co-operation in the area of providing consultancy services in Iran, India and third countries".

The deliberations of the Committee on Industry were followed by the signing of a protocol at the 5th session of the Indo-Iranian Joint Commission in November 1975. In the areas discussed by the Committee on Industry and noted above, the only additions were in the specification of one other condition regarding the proposed aluminium venture, and the possibilities of co-operation in the establishment of a fertiliser plant in India. On the aluminium project "it was agreed that because economies of scale are an important factor in the satisfactory implementation of the scheme, the two sides would co-operate in the selection of a partner from a third country with established markets for aluminium at its disposal in order that production beyond the requirements of Iran and India would be assured of outlets in third markets".

The protocol also suggested areas of co-operation in other areas which have an industrial content. It noted with satisfaction the establishment of the Irano-Hind Shipping Company, and agreed to give it the required support to ensure "its adequate growth and success". It also noted that the preliminary survey for a new double electrified line in Iran had been entrusted to Rail India, and agreed that, given the vast development programme of the

Iranian railways, the two countries should explore further possibilities of co-operation in this field. The Indians reiterated their "readiness to supply railway equipment on competitive prices and delivery terms to Iran".

In the field of trade, the protocol stated that the performance in respect of the long term contracts for the supply from India to Iran of sugar, cement and steel rails had been satisfactory, and hoped this area of co-operation would continue. It identified the commodities of special export interest to Iran as machine tools, lubricants, insecticides, sulphur, ammonia, sulphuric acid and plastic goods, and those of special export interest to India as billets, structurals, railway accessories, meat, tyres, commercial vehicles and agricultural machinery.

Thus it would appear that the Indo-Iranian Joint Commission had been sucessful in promoting a number of co-operative industrial ventures. These hopes, however, were to be belied. It soon became apparent that the Iranians were really not interested in co-operating on the paper and pulp projects. They seemed to be much more interested in obtaining Indian pulp, than in the establishment of Nowgong and Cachar. The Indians soon got the message, and in late 1976, the Indians decided to go ahead with these projects on their own.

On the proposed aluminium project (though till after the visit of the Iranian prime minister to India in May 1976 the proposal was still alive), it increasingly became clear to the Indians, that the Iranians were not interested in the project, an impression which was confirmed when it appeared that the Iranians were looking elsewhere (reportedly to Soviet assistance in developing their own natural resources in North West Iran) to meet the requirements of alumina for their proposed aluminium plant.

The Indians also found that the financial offer made by the Iranians for the establishment of a fertiliser factory in India was not very attractive, and so decided not to pursue that proposal any further. The proposed co-operation in the field of railway equipment also fell by the wayside when the Iranians signed a technical collaboration agreement with the Austrians for the manufacture of railway wagons, and hence the Indian proposal in this area became redundant. Neither have the Iranians been more forthcoming in the proposed areas of production co-operation between the two countries, so that it would be fair to state that in the industrial field the sole area of co-operation between the two countries remains the Kudremukh iron-ore project. It is also probably the case that without direct government negotiations this project would not have been set up. It is also a project which the Iranians seemed to be keen to set up, at the time it was mooted, largely for the politcal reason of trying to mitigate the effects of the oil price rise of 1973 on the Indian economy. Even if this were the objective, it is arguable whether this was the ideal way for India to receive some transfer of resources from Iran. There were (even for iron ore) superior projects available for development.

The Indian experience in negotiating a greater degree of industrial co-operation than would have taken place in the absence of government intervention, with Iran, does not therefore seem to be very encouraging for proponents of industrial co-operation agreements. This does not imply that when public sector organisations in two countries are dealing with each other, some form of government involvement is not unavoidable and, as in the case of Kudremukh, could lead to projects which would not otherwise have been set up being established. It is arguable, however, whether this sort of 'additionality', based as it is on political factors, is necessarily

in the interests of either of the two countries. From India's viewpoint the judgment turns on whether or not the Iranian 'aid' would have been available in any case, or whether the funds were in effect 'tied' to the Kudremukh project. There can be no doubt, however, that India would have been better served if it could have chosen a project (even in the same sector) with a higher social rate of return to itself for Iranian financing.

Amongst other OPEC countries, the only one which has shown any marked interest in Indian industrial products, technology and know-how is Saudi Arabia. Recently, Bharat Heavy Electricals (a public sector undertaking) has won a contract for building a 50MW power station and the laying of a 180 km. high tension transmission line in Saudi Arabia, whilst the Steel Authority of India is currently involved in talks for setting up a steel plant. However, in both cases it appears that the projects have been (or will be) offered to Indian firms not because of any bilateral government negotiations in the form of industrial co-operation agreements, but as the result of normal commercial transactions, in which the Indian bids happen to be lower than that of their competitors. Thus, for the electricity project, as the Saudi Minister for Industry and Electricity stated, the Saudis gave the project to BHEL after rejecting Western and Japanese bids because they were too high. Whilst in recent talks on "Indo-Saudi industrial co-operation, it was urged that the Indian government bid for global tenders for Saudi Arabia's industrialisation programme. The first will be for a large sewerage plant" (Financial Times, March 1st 1977). The role of bilateral government negotiations therefore in setting up Indian industrial projects in Saudi Arabia, as in many other Third World countries, is likely to be at best promotional, the actual deals being determined on conventional commercial criteria. Industrial co-operation agreements have

therefore had little effect in creating any additional advantages for Indian industrial enterprises, in general, with most Third World countries, and where they have had some influence, as in the case of Kudremukh, their basis has been essentially political, and their economic advantage to India is by no means clear cut.

3. OECD Countries

In contrast with both the socialist countries of Eastern Europe, and many countries in the Third World, the essential feature of these so-called 'free market' economies is the relatively decentralised nature of their economic decision making. Thus whereas in the other two groups of countries, to the extent the government itself undertakes an entreprenurial role in industrial investment and production, there is some basis for the view that negotiations with (and between governments) may be required for facilitating both investment projects and trade in industrial products, this would by no means be necessary or in most cases even practical in establishing industrial co-operation between India (or other developing countries) and the OECD countries. This is essentially because the government cannot centrally direct private firms, who are the ultimate arbiters in these countries, to undertake or accept industrial investment and/or industrial products from Third World countries. The most that governments can do in these countries is, by changing various indirect instruments of public policy like taxes, subsidies and tariffs, to induce certain desired changes by altering the relative private profitabilities of different lines of action. Whilst this mitigates to some extent against the possibilities of political retaliation which might accompany production and industrial co-operation agreements

with socialist and some Third World countries, it also means that the role of bilateral government negotiations to foster such co-operation, as traditionally conceived, is likely to be fairly limited.

This judgment is borne out by India's attempts at industrial co-operation with these countries. The fora for negotiating such bilateral co-operation with these countries are joint commissions which have been set up with UK, France, Italy, the Netherlands, USA and Japan. The EEC as a whole has also entered into a Commercial Co-operation Agreement (CCA) with India, but this is largely concerned with trade. Its main practical outcome for India has been to bind the tariff suspensions "already applied autonomously in respect of some products" (mainly primary products like tea, pepper, nutmeg and mace, leather) of export interest to India. There is however, one article (9(b)) of the CCA which instructs the joint Indo-EEC commission (set up under the CCA) "to study and devise ways and means of overcoming trade barriers and in particular existing non-tariff and quasi-tariff barriers in the various sectors of trade, taking into account the relevant work undertaken in this field by the international organisations concerned", which can (as discussed in the next part of this paper) be used as the basis for devising some meaningful industrial co-operation agreements between the EEC and India.

The format and content of the various bilateral economic co-operation agreements signed with various OECD countries is fairly similar. In Article 1 (c) of the Indo-UK agreement, the Committee is instructed to "examine possibilities for joint manufacturing programmes between industrial groups in both countries with a view to taking maximum advantage of relative production costs in the two countries in the manufacture of various components and

finished goods". No criteria are, however, laid down for determining how such joint manufacturing programmes can be implemented, and at best the role of the Commission in practice, has turned out to be of providing one more fora for officials to meet and vent pious hopes. The actual co-operation will have to be between firms in the two countries, and apart from the role of midwife in bringing firms in the two countries who (in the unlikely circumstance) did not know each other, it is these relative commercial interests which will determine whether or not the joint manufacturing programmes envisaged by the Commission materialise.

Some co-operation between Indian and EEC firms has taken place, though whether this was the result of, or despite the existence of bilateral economic commissions is debatable. Thus a number of UK firms have shown an interest in joint ventures with Indian firms in third countries (mainly in the Middle East) partly because of the Indian success in winning Mid-East contracts in many fields independently; partly because a number of UK firms had entered into fixed price contracts for projects in the Mid-East, which became unprofitable for them with the higher rate of inflation in the UK, and for whose fulfilment they looked to Indian firms (e.g. Kirloskar for electrical and other engines), whose costs were lower than those in the UK; and partly because collaboration with Indian firms in the Middle East can provide them with management and other supervisory and skilled staff at lower cost than that of expatriate UK staff. For the Indians the advantages of such collaboration are essentially in providing them with the name and prestige which can be important in winning investment contracts. That this, however, cannot be adduced to be the effects of any industrial co-operation agreement that India and the UK may have signed is borne out by the various other European countries, with whom India does not have any such agreements, whose firms

are also devising collaboration agreements with Indian firms in third countries. For instance an Indian and a Swiss firm have reached agreement recently whereby the Swiss firm supplies the brand name and the Indian the actual product. This type of collaboration can be important for many products where the buyer wants to be assured of quality control, and hence the brand name matters. However, the role that bilateral government negotiations can play in arranging such essentially commercial deals seems, at best, to be dubious.

4. Joint Ventures

Since the mid-sixties, various Indian firms have been allowed by the Indian government to set up joint industrial ventures abroad. The Indian equity is to be acquired solely against the value of Indian machinery and technical know-how supplied to the venture from India. "The machinery exported should be of Indian make; no second-hand or reconditioned machinery (is) allowed for export against Indian investment".

By the end of March 1976, 239 joint venture applications had been sanctioned by the government. They were spread over 43 countries. By that date 103 or 43 per cent of the proposed joint ventures had failed to fructify and the proposals had been withdrawn. Of the remainder, 67 or 28 per cent of those sanctioned had led to joint ventures which were in production, and 69 or 29 per cent were in the process of implementation. Table 1 of Appendix II provides a breakdown of the agreements by country, in terms of sanctions, those in production, those being implemented and those where the proposal had been withdrawn; whilst Table 2 ranks countries in the order of those with the highest number of Indian

joint ventures currently in production, and those where they are currently under implementation; whilst Table 3, provides a breakdown by country of the products for which joint ventures have been sanctioned, implemented and withdrawn.

From Table 2 it is apparent that Malaysia accounts for the bulk of Indian joint industrial ventures and that in general the agreements which have borne fruit have been in South East Asia. Amongst the OECD countries, only the USA and UK are countries with Indian joint ventures, but from Table 3, it will be apparent that unlike Indian joint ventures in other Third World countries which cover a whole range of industrial products, those in the USA and UK are mainly for restaurants (hardly an industrial venture!), with the exception of a project for magnet wires (which has been approved in principle) in the USA, and a plant of Birla Brothers for producing asbestos cement products, which has been in production in the UK since 1967.

What role have government negotiations played in promoting these joint ventures by Indian businessmen abroad? The answer seems to be: virtually none. All the joint ventures have been initiated by the businessmen themselves and the government only comes in at the latest stage, in determining whether or not to allow a particular joint venture which an Indian business has negotiated. The government's role is thus regulatory rather than promotional. Indian businessmen are fairly keen to set up such joint overseas ventures, as it gives them some extra flexibility in their operations, by enabling them to escape the full brunt of the domestic controls on investment and production that till fairly recently were a virtual stranglehold on the operations of industry in India. In particular the so-called large

business houses were restricted from expanding into a whole host of domestic industries in India as a result of the government's policy of trying to reduce concentration in Indian industry. They have, therefore, found it attractive to set up operations abroad and thus diversify their investments, a course which was increasingly not open to them within India.

Most recently, a consortium of Indian public and private sector firms has been formed to bid for contracts for the large Saudi Arabian development plan. [1] These are chiefly engineering firms and they hope to receive turnkey contracts for rail development, electrification projects, construction projects like port expansion, housing, schools and hospitals, development of infrastructural facilities and establishment of industrial estates. They are also hoping to obtain sub-contracts from Western companies (particularly British companies with consultancy agreements in Saudi Arabia) for a number of industrial and infrastructural projects. The role of bilateral government negotiations in furthering such industrial co-operation has, however, been minimal, for the Saudis are interested in giving these contracts to Indian firms primarily because Indian bids and delivery dates are highly competitive for many projects and commodities with those from various OECD countries.

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1 The firms are, public sector: Rail India Technical and Economic Services, and Bharat Heavy Electricals (which has already won the electrification contract discussed above); private sector: Crompton Greaves, EMC Steel, Garden Reach Ship-builders and Engineers, India Tube Company, KG Khosla Compressors, Larsen and Toubro and Stewarts and Lloyds of India.

PART III: INDUSTRIAL CO-OPERATION AGREEMENTS, TRADE LIBERALISATION AND ADJUSTMENT PROBLEMS - A PROPOSAL

In the first part of this paper we have argued that in the 'second best' situation where most of the countries of the world exhibit a non-economic preference for industrial production, industrial co-operation agreements which lead to the swapping of efficient for inefficient industrial production amongst two or more countries, could lead to a rise in (conventionally defined) economic welfare. Moreover, given the non-economic objective involved, and the differing degree of preferences for industrial production amongst countries, multilateral trade liberalisation, based on the MFN principle, will stop well short of the attainable 'second-best' welfare maximum, because the requisite unilateral or multilateral tariff cuts (implicit or explicit) on an MFN basis will not be feasible. For, whilst subserving the objective of raising conventional economic welfare, they are likely, at some stage, to be inimical to the satisfaction of the non-economic preference for industrial production. Preferential and hence discriminatory arrangements amongst two or more countries may, therefore, yield higher levels of actual economic welfare in the countries concerned than relying on the feasible extent of MFN trade liberalisation. This is particularly important in the current state of the commercial policies of developed towards developing countries.

1. Trade Liberalisation

It is now widely recognised that in order to indulge in their preference for industrialisation it is better that developing countries do this via the development of their manufacturing export industries than through indiscriminate

import-substitution (see Little-Scitovsky-Scott, 1970); for policies which emphasise export promotion as much as import substitution, in order to raise the level of domestic industrial output, will entail less damage (for any given desired level of industrial production) to the conventional economic welfare of these countries, than policies which emphasise import substitution alone. Industrial development of this more balanced sort however, requires that the nascent manufactured exports of developing countries should have relatively free access to the markets of developed countries.

One of the more ominous trends in the recent commercial relations between the developed countries and the relatively more industrialized developing countries is the emergence of various non-tariff barriers to imports of manufactures from developing countries. As a result of various rounds of tariff reductions amongst OECD countries under the auspices of various GATT negotiating rounds, there has been a steady erosion in the nominal protection provided by the formal tariff structures of the developed countries. Hence, in order to protect their declining industries, developed countries have increasingly relied on various non-tariff barriers, particularly in the form of (misnamed) voluntary export restrictions (VERs), negotiated with the various developing countries. The GATT rules, under Article XIX, allow particular countries an 'escape clause' to institute protection from imports on alleged grounds of 'market disruption', but in practice declining industries in developed countries have found the GATT criteria for invoking the 'escape clause' too restrictive, and have succeeded in exerting pressure on their governments to bypass GATT altogether in seeking restrictions on imports for cases where 'market disruption' is defined much more weakly than under GATT. Bhagwati (1976), provides details of US and Canadian

escape clause actions under GATT, as well as on the alternative route of seeking VERs. In fact, as Bhagwati has shown for the US, there is (for Japanese imports into the US) a high correlation between "industries that failed to win protection by the escape clause route, (and) then proceeded, through executive action, to secure VERs on imports" (Bhagwati, 1977, p. 1001); whilst Magee (1972) has estimated that about $5 billion worth of US imports in 1971 were subject to VERs.

Moreover the negotiation of the Generalised Scheme of Preferences (GSP) has not had much success in countering this trend, partly because the US and Canada, till recently, had not implemented the agreed scheme and more importantly because the GSP schemes as negotiated, had implicit VERs built into them (see Tracy Murray, 1973, Cooper, 1970). This has led to the legitimate fear amongst the developing countries that in the industrial division of labour they are likely to be frozen out because of the continuing, and in some cases (eg. the Burke-Hartke proposals in the US) of the increasing industrial protectionism in the developed countries. The continuing world recession following from the October 1973 oil price rise, has led to rising protectionist sentiments in many developed countries. Hence, the prospects for most developing countries (particularly the late starters) of finding continuing access for growing manufactured exports into developed countries appear bleak.

2. Adjustment Problems

The conventional answer to this problem is straightforward - an increase in adjustment assistance to the declining industries in the developed

countries, to enable them to redeploy their labour force in industries in which they have a comparative advantage. For such redeployment would mean that consumers would gain from receiving lower cost imports as a substitute for the previously higher priced, protected, domestically produced substitutes and, in the long run, real output would be higher, as existing factors of production would have been redeployed in lines where they were relatively most efficient in production. It is, therefore, in the rational economic self-interest of the concerned countries to let declining industries decline, as the real income losses of the losers from such a policy will be more than made up by the gains of the rest of the community. However, for the losers such an adjustment will only appear attractive if they can in fact be assured of compensation for their losses. This is the purpose of adjustment assistance. Though in principle, most developed countries accept the case for adjustment assistance, the actual experience of their workers with such adjustment assistance has obviously not been satisfactory. Thus in the US, as one commentator has noted:

> "One reason for organized labour's opposition to liberal trade policies is that the United States has achieved little success in assisting workers displaced by import competition. The Trade Expansion Act of 1962 broke new ground by providing adjustment assistance for groups of workers injured by competition from new imports. Under this legislation, injured workers could be eligible for extended unemployment compensation; counselling, retraining, and placement services; and assistance in relocation to obtain new employment. Injured firms were also made eligible for benefits which could include special tax assistance, loans and loan guarantees, and technical advice. Labour's enthusiasm for adjustment assistance was short-lived when the eligibility criteria proved so stringent that not a single petition for assistance was approved until 1969 (when the criteria for eligibility were re-interpreted). Even after 1969, long delays between application and approval, along with administrative obstacles to usefulness of some provisions, left most displaced workers, even those eventually judged eligible, to adjust without assistance" (McCulloch, 1976, p.37).

The same observer notes that whilst the US Trade Reform Act of 1974 removes some of the administrative shortcomings of the above measures, it "does little to smooth the adjustment process itself", and hence what is needed are "active steps to assist displaced workers in finding suitable employment. In contrast, the present program emphasises extended unemployment benefits, leaving largely to the workers themselves the problem of finding new jobs" (McCulloch, op.cit. Also see Corbet and Jackson, 1974).

Though an obvious economist's retort is to say that, if the pressure of aggregate demand and the exchange rate are maintained at the appropriate levels, there should be no long run problem of providing suitable employment for the workers of declining industries, this argument may not be sufficiently persuasive to convince workers, unfamiliar with the general equilibrium ramifications of the economy, to cease exerting political pressure to prevent change, on the general risk-averse grounds that a bird in hand is worth two in the bush.

More importantly, however, as Elliott (1973) has emphasised, the degree to which workers in industries subject to pressure from imports from developing countries may seek to resist change may be exaggerated. Thus one important trend in recent years has been the growth of international sub-contracting, or what has been called the international putting out system, whereby many international companies have exported whole chunks of their vertically integrated operations, in the form of particular labour intensive processes, to lower wage developing countries. (see Elliott, 1973, Helliner, 1973, Sharpston, 1975, 1976). The most important example is that of electronics components manufacture in South East Asia,

for use in the home production of international companies' electronic products. Elliott, notes that the growth of international sub-contracting has led to less protests from labour in developed countries than might have been expected. Thus though "American labour has been strongly critical of 'runaway plants' and... the Burke-Hartke Bill reflected this concern, but at least some elements of the labour movement find persuasive the view that the export of labour intensive processes is a necessary condition of the effective survival of the whole industry" (Elliott, 1973, p.68).

It is the resistance of the owners of declining industries which is likely to be more serious. Thus Elliott argues: "Although it would be rash to generalize there is evidence from both Britain and the US that the political power of the entrepreneur, either individually or as a group, in defensive situations such as we are now visualizing is greater than that of organized labour. Certainly it is true that in many such situations the entrepreneur has more to lose. Capital equipment, trading skills, business associations have no alternative use. And a loss-making company is hardly a saleable asset". (Elliott, p.35).

More generally, we can put the point as follows. To the extent that capital (both physical and human) is not shiftable, closing down activities which use that capital is equivalent to making it redundant, and hence depriving its owner of the quasi-rents he could have expected from it over its otherwise 'normal' life. The specific capital which labour owns is its specific skills which do not have a value (and hence earning capacity) outside the existing industry. This human capital is made redundant by the closure of the declining industry. However, to the extent that these declining industries in the developed countries are likely to be ones at the

relatively unskilled labour intensive end of the spectrum, the labourers in them are unlikely to have much specific human capital invested in them. The entrepreneur, however, will have the major share of his investment in the firm in the form of specific physical capital. The costs to him from a closure will therefore entail a larger capital loss than to the workers, particularly if as is usual in most forms of adjustment assistance, explicit compensation is paid to workers for their loss of specific human capital through retraining grants etc., but no equivalent means of compensating the entrepreneur for his loss of physical capital are provided. This suggests that, to mitigate the continuing political pressures exerted by both workers and entrepreneurs in declining industries, in addition to the usual adjustment assistance measures which are meant to compensate workers for their loss of firm specific human capital, some method must also be found to compensate the owners of firm specific physical capital for the loss which a closure of thier firm would entail. Finally, it may be noted that this problem of overcoming the resistance of pressure groups of workers and owners whose industries are threatened by imports, and which should be allowed to decline in the interests of maximising the economic welfare of the country as a whole, is not confined to developed countries. A number of the more industrialized developing countries have recently come to see the limitations of the import-substituting industrialisation they have fostered behind high protective walls in the past. They are thus keen to develop a more efficient industrial structure. Given the non-shiftability of much of the capital in most industries, they are then faced with the problem of the closure of their relatively inefficient industries, in favour of the expansion of the more efficient. Though the economic criteria for deciding when and what to close are clear cut, in practice, such countries (of which India is a recent example) find that there is fierce political resistance from the workers and producers in the threatened industries.

The proposal we make in the following section of this paper, concerns the possible use of international co-operation agreements as a device for overcoming these continuing obstacles to the development of the efficient international division of labour, due to the particular private costs, which are unevenly borne in practice, of closing relatively inefficient industries. The proposal is also explicitly based on the assumption that both developed and developing countries have a non-economic preference for industrial production in itself, and hence the economist's traditional case for unilateral or multilateral tariff reductions, coupled with lump sum compensation of the losers, to maximise attainable economic welfare is irrelevant, as it does not recognise this non-economic objective. We assume instead that countries will be unwilling to see the overall level of industrial production being run down from existing levels and will want to find ways in which given this constraint the existing industrial structure can be made relatively more efficient, in the sense of yielding increases in conventional economic welfare to the countries concerned, as well as ensuring that incremental resources devoted to subserving the industrialisation objective will be deployed in relatively more efficient lines in the different countries of the world.

3. The Proposal

Our proposal is very simple. It is for the literal swapping of industrial plants between countries. For illustrative purposes consider just two countries, who have entered into an industrial co-operation agreement of the type we envisage. Both countries at the moment, in order to indulge their preference for industrialisation, have a number of inefficient industries, in the sense that the output of these industries could be supplied more

cheaply from imports from the other country than from domestic production. Unilateral tariff reductions by either is ruled out, because though this would raise the trade-liberalising countries real income, it could entail a reduction in the overall level of industrial output. Neither does mutual tariff reduction offer a feasible route to increasing their respective real income levels, because the workers and capitalists in the respective declining industries would suffer losses in their industry-specific capital, and would, we assume, successfully thwart any such trade liberalisation through the exertion of political pressure. [1] The two governments, however, now arrange for the owners of the two industries to export their respective industrial plants to the partner country, and the initial owners of these plants still retain their ownership of the plant in the foreign country. The owners of the declining industries will thus suffer no (or little) loss in their investment in specific physical, and other capital, and should not resist the deal, whilst to the extent the displaced workers can be directly absorbed in the swapped plant, their fears of finding jobs should be mitigated.

It may be asked why this sort of deal requires government to government action, and why it does not already take place in terms of normal commercial transactions. For essentially, given the specificity of capital, and the fact that the economic value of a plant is dependent in part upon its location, it should be relatively profitable for owners of plants in declining industries to export their plants to locations where they would be profitable. Apart from the usual forces of ignorance and lack of information which might

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[1] Even though the losers may be fewer than the gainers from trade liberalisation, their pressures may be more successful in most democracies, because the consumer interest is usually weakly, if at all, organised.

inhibit such action, there are two other powerful reasons why we do not observe more of such transfers, though as we have noted above, the growth of international subcontracting by multinational firms can be said to correspond in many respects to our proposed scheme. The two reasons are, first, the restrictions that governments in many developing countries place on foreign investment, particularly in what are considered to be their relatively efficient domestic industries. Thus, for instance, India allows foreign investment only into areas where there are new technologies to be absorbed. (see Lal, 1975). This means that most manufacturers of textiles, or shoes or garments, in developed countries, threatened by imports would not find themselves welcome as foreign investors bringing their own second hand plants into most developing countries. As the barriers to entry which prevent this type of foreign investment are erected by governments, at the least, government action to remove these barriers is called for.

Secondly, though in theory there is a strong case for the relatively capital poor countries with low wages, to import second hand machinery (see Smith 1974), and it has been estimated that about 10-20% of the manufacturing capital stock in developing countries is supplied by imports of second hand machinery (James, 1970, cited in Smith op.cit.), there are a number of practical difficulties connected with their use value which essentially relate to problems concerning the assessment of the operating characteristics of the second hand machinery (see Cooper and Kaplinsky (1974)). As a result many developing countries are reluctant to allow freely importation of second-hand machinery. Some of the barriers to the use of second-hand machinery which are based on the lack of certain

knowledge by the buyer of the characteristics of these machines will be overcome by our proposal, where the initial owner of the machines just transfers their location, but still continues to operate them.[1] (There may however be certain losses entailed by transporting and lifting machinery from one location to another and this will tend to lower the value of the machines to the owner in their new location).

Thus governmental action would seem to be necessary to promote the type of industrial plant swapping we envisage. This could be the major component of industrial co-operation agreements which try to go beyond the purely informational or diplomatic functions that current agreements, as exemplified by Indian experience, seem to embody. Though the case has been put in terms of bilateral swaps, it would be better, as in any form of barter, to arrange triangular or multilateral trades. The advantages even from bilateral swaps, however, would be immense if as a result the major barrier to the expansion of exports of manufactures to the countries concerned were thus removed, by the virtual removal from within their borders of the industries whose markets were increasingly claimed to be disrupted.

The choice of industries to be negotiated for transfer from developed countries to developing is relatively easier to determine than those from or between developing countries. For developed countries, the industries (or suitable parts of them) which are currently subject to VERs would be an obvious starting point in industrial co-operation agreements between

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1 Our proposal, in other words, overcomes some of the problems of qualitative uncertainty that may attach to trade in second hand machinery. (see Akerlof 1970).

them and various developing countries. Textiles, leather products including footwear, are obvious candidates. Less obvious are a number of industries which are highly polluting, and whose pollution control costs are high. With the increased concern with the environment in most developed countries, there is a move to incorporate stringent environmental standards on industrial producers in many developed countries. By contrast, because of their low levels of current industrial output, developing countries should be able to tolerate the pollutants generated by a number of industries without any environmental damage, at least till the time when the industrial pollution generated is near the threshold level of currently developed countries. This means that processes which will increasingly incur additional pollution control costs in developed countries, could be cheaper to produce in many developing countries. A GATT study [1] has tried to establish the industries which are both heavy polluters and have high pollution control costs (in meeting the US Clean Air Act 1967 standards). They conclude:

> "that certain sectors of energy production (thermo-generated electricity and petroleum refining) as well as iron and steel production are the leading polluters with the relatively largest cost increases in store for them, followed by a group of industries within which it is difficult to establish precise ranking and which includes non-ferrous metals, certain types of metal fabrication, basic chemicals, pulp and paper, leather tanning and cement" (GATT, 1971, p.8)

Many of these industries moreover are relatively labour intensive (namely with a relatively low value added per employee, to use a criterion developed by Lary (1968)). Developing countries are therefore likely to have an incremental comparative advantage in many of them. Thus Lary (1968) summarised his findings of the industries which were labour intensive

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[1] GATT: Industrial Pollution Control and International Trade (GATT Studies in International Trade, No.1, July 1971).

(on his criterion) and hence likely to be ones in which developing countries were likely to have a comparative advantage as including:

> "such major industry groups in the census of manufactures as textiles, clothing, lumber and wood products, furniture, leather and leather products, and the broad group of miscellaneous manufactures. They would also include many important components of other groups, such as motorcycles and bicycles, cutlery and various other metal products, chinaware and pottery, ceramic tiles, glass containers, paperboard containers, pleasure craft and other small boats, and various kinds of printed matter and printing services" (Lary, 1968, p.14-5).

All these industries, or sections of them would presumably be worth a swap from the viewpoint of the developed countries.

From the developing countries viewpoint, the industries worth a swap would be ones on which their social rates of return (estimated on the lines suggested by Little-Mirrlees, 1974) were relatively low. Thus for India I have made some crude estimates of the relative social rates of return to various industries for 1968. (see Lal, 1975a). There are a number of industries like basic industrial chemicals,phosphoric acid, ball bearings, some types of transport equipment, confectionery, some petroleum products which had negative social rates of return. These could be potential candidates for a swap.

Naturally, none of the industries mentioned above can definitively be said to be ripe for swaps. The lists should be taken as illustrative. Ideally, the governments concerned should provide a clearing house for information on possible industries which are seeking redeployment, and negotiate amongst themselves to remove the barriers which might exist to the type of mutual foreign investment through the transference of locally uncompetitive plants to a more profitable location, that we envisage. It might be felt that the

developed countries would not want to import second hand plants from developing countries as these might embody outmoded technology. This, however, is unlikely as the uncompetitive industries in developing countries are likely to be their more capital intensive ones, which moreover are usually based on imported plant and technology.

Finally, it may be advisable to tie adjustment assistance in the form of training grants for workers in industries transferred to foreign locations to specific training to work the swapped machines in the industries which have been transferred from the partner country. This would reduce the frictional unemployment, which accounts in large part for the private costs of workers made redundant by trade liberalisation (see Bale, 1976,for some estimates), and thus also reduce labour's resistance to the more efficient deployment of the world's industrial capacity.

Thus our proposal for mutual foreign investment, through the swapping of industrial plants in relatively inefficient industries in the negotiating countries, could provide an operational content to the form of industrial co-operation that is being increasingly demanded as part of the NIEO by developing countries. Moreover, it could help to overcome the growing obstacles to a movement towards genuinely free trade in the world. For if free trade (or more strictly 'optimal' trade) became a reality, it would obviously achieve the objective of redeploying world industrial output in an optimal manner. As long as countries continue to attach social value to industrial production per se, the ideal of universal free trade is unlikely to be achieved. Nevertheless, even whilst subserving this non-economic objective, a movement to a second-best economic welfare configuration is possible through the type of arrangements we have recommended. If these proposals have the air of bringing the mountain to Mohammed, this may nevertheless be the best that can be done when Mohammed refuses to come to the mountain.

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Appendix II: Indian Joint Ventures Abroad

Table 1 : Numbers

Country	Sanctioned	In Production	Under Implementation	Withdrawn
1. Malaysia	46	23	15	8
2. Indonesia	16	3	8	5
3. Sri Lanka	15	3	1	11
4. Kenya	15	7	2	6
5. Mauritius	14	5	5	4
6. Nigeria	12	3	-	9
7. Iran	11	2	3	6
8. Singapore	10	1	6	3
9. Ethiopia	9	2	-	7
10. USA	8	4	3	1
11. Afghanistan	7	1	2	4
12. Thailand	7	3	3	1
13. Canada	6	1	2	3
14. Dubai	5	-	5	-
15. Saudi Arabia	5	-	1	4
16. Zambia	5	-	2	3
17. Philippines	4	1	3	-
18. U.K	4	3	1	-
19. Ireland	3	1	-	2
20. W.Germany	3	1	-	2
21. Tanzania	3	-	-	3
22. Fiji	2	1	1	-
23. Hong Kong	2	1	1	-
24. Iraq	2	-	1	1
25. Oman	2	-	2	-
26. Uganda	2	1	-	1

Table 2

Ranking of Countries by number of Joint Ventures in Production and under Implementation

(A) In Production (numbers)

1. Malaysia (23)
2. Kenya (7)
3. Mauritius (5)
4. U.S.A (4)
5. Sri Lanka, Indonesia, Nigeria, Thailand, UK, (3)
6. Ethiopia, Iran (2)
7. Afghanistan, Phillipines, Canada, Hong Kong, Fiji, Ireland, Uganda, W.Germany, Singapore (1)

(B) Under Implementation (numbers)

1. Malaysia (15)
2. Indonesia (8)
3. Singapore (6)
4. Mauritius, Dubai (5)
5. Philippines, Iran, Thailand, USA(3)
6. Afghanistan, Canada, Kenya, Oman, Zambia (2)
7. Sri Lanka, Fiji, Hong Kong, Iraq, UAE, Nepal, Saudi Arabia, UK(1)

Source: Table 3

Table 3

Indian Joint Ventures Abroad at end March 1973
By Country, Industry and Status

Country	In Production	Under Implementation	Withdrawn
Afghanistan	corrugated boxes	leather tannery; corrugated board and card	sewing thread; bicycles; ice plant, spinning plant
Canada	hardboard	Indian ham; re-processing and marketing shrimp	starch; liquid glucose; textiles
Cyprus			cotton yarn and thread
Sri Lanka	sewing machines; glass; PVC; leather cloth	auto electrical parts;	mica mining; air-conditioners; pharmaceuticals; electric motors and pumps; hotel; electro-static tea leaves/stalk separater machines; trucks; AA ACSR conductors; filters; textiles; bobbins, shuttles and steel reeds
Dubai		cylinders; fabrication of architectural equipment; sulphuric acid; soda chlorine plant; consultancy services	
Ethiopia	textiles; woollen textiles		soap; fibres; aluminium sheet rolling mill; plastic processing; clock assembly; razor blades; malt house

Table 3 (cont...)

Country	In Production	Under Implementation	Withdrawn
Fiji	flour mill	glass bottles	
Philippines	diesel engines	coconut processing plant; spinning mill; copra crushing and extraction	
Hong Kong	engineering consultancy	stationery	
Indonesia	textiles; steel files; spinning plant	high tensile reinforcement; cold rolled box strappings; water meters; textiles; oil seeds crushing; solvent extraction; art paper; steel furniture; malleable iron pipes	storage batteries; castings for pipe fittings
Iran	auto components; construction	shock absorbers; steel bars; auto shock absorbers	trailers; non-ferrous semis; hose pipes; elect motors and transformer repair service station; malleable castings
Ireland	tufted carpet yarn		steel balls; nylon bristles
Iraq		civil construction	soft drinks
Kenya	textiles; gripe water; woollen textiles; cork; paper pulp; cast iron foundry; pharmaceuticals	synthetic filament yarn; pipe fittings	pharmaceuticals; fluorescent fixtures; printing; scooter assembly; light engineering; bicycles
Mauritius	mosaic tiles; textiles; garments; terry towels; steel rolling mill	hotel; cement; cables and wires; power pumps	rubber products canning; textiles; flour

Table 3 (cont...)

Country	In Production	Under Implementation	Withdrawn
Malaysia	cotton textiles; steel furniture; glass bottles; confectionery; pumps; precision tools; electrical accessories; steel foundary; auto chains; cycle chains; palm oil fractionating; hydrogenation of palm oil; stationery; cosmestics & pharmaceuticals; safety glass; vanaspati; soap; piston components; sugar, tube valves; textiles; flex cord; solder wire; graphic anodising; management and consultancy	biscuits; pharmaceutical; sandalwood soap; fatty acid and glycerine; metallic tubes; heating elements; pumps; radiators oil coolers; nylon and polyester yarn and fabrics; spinning mill; coconut processing; electrical auto parts; commercial vehicle assembly plant; handling equipment; high density polythyleme	electrical fans and sewing machines; coated abrasives; zinc oxide; insulated conductors; hair oils; talcum powder; auto remote control and speedometer cables; air compressors; shock absorbers
UAE		engineering unit	
Nigeria	engineering goods; razor blades		solvent extraction; air conditioners; textiles; palm kernel crushing plant; textiles; cycle tyres and tubes; scooter assembly; steel re-rolling mill
Nepal		jute mill	
Oman		trading; consultancy	
Singapore	auto accessories	shipping; stearic acid; auto streights; enamelled wire; soft drink concentrates; erection and technical services	welding electric fans and sewing machines; fluorescent fixtures

Table 3 (cont...)

Country	In Production	Under Implementation	Withdrawn
Saudi Arabia		rubber ring and other rubber products	vanaspati; refrigerators; asbestos cement; transistor assembly
Thailand	synthetic fibre spg; steel mill; textiles	viscose staple fibre; semi-conductors; hack-saw blades	newsprint
Uganda	jute mill		sugar
USA	restaurants (4)	magnet wires; restaurant; consultancy services	hard-board
UK	asbestos cement products; sweet meats; restaurant	restaurant	asbestos cement products; light eng. goods
W. Germany	oil engines; rice milling machines		hose clips; non-ferrous forgings
Zambia		drum reconditioning; assembly of tractors and agricultural equipment	construction; enamel wire; refining used lubricants
Australia			carbon and graphite products
Colombia			twist drills
Qatar			construction international port
Ghana			agricultural tractors
Grenada			canning unit
Japan			single spindle automatic lathe assembly
Lebanon			pesticidal formulation; sodium silicate

Table 3 (cont....)

Country	In Production	Under Implementation	Withdrawn
Libya			pipes; asbestos cement products
Morocco			cork factory
Senegal			refrigerators and air-conditioners
Togo			radio assembly; enamel ware
Trinidad			canning unit
Tanzania			mini-steel plant; pharmaceuticals; re-rolling mill
Yemen			builders hardware

TRANSFER PRICING IN ASSEMBLY INDUSTRIES

A Preliminary Analysis of the Issues in Malaysia and Singapore

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Table of Contents

I. Preface

This paper presents the results of a preliminary study of problems of transfer pricing in assembly industries in Malaysia and Singapore. It is based on a very brief visit - two weeks in all - to these countries. In the course of this visit I was able to interview a number of government officials and some foreign as well as domestic firms engaged in assembly operations, as well as to collect some published as well as unpublished material on assembly industries. This report summarises the information gathered and the impressions gained: since it is based on such a quick survey, it should be treated more as an exploration of the issues than as a completed piece of research.

I wish to express my gratitude to all those who helped me during my stay. Tan Sri Thong Yaw Hong, Director General of the Economic Planning Unit in Malaysia, and Dr. Michael Wong Pak Shong, of the Monetary Authority in Singapore, were kind enough to provide overall support for my research. Zainal Yusof of the EPU took an immense amount of trouble to organize my work and to accompany me in Kuala Lumpur. Pang Eng Fong, Director of the Economic Research Centre in Singapore, provided great help, and the time of his staff, in arranging interviews and meeting various people in Singapore. To them, and to everyone else who spared me time and effort, I would like to extend my thanks.

II. Introduction

This report is intended to cover two separate areas: the experience of assembly industries in Malaysia and Singapore, and the problem of transfer pricing. 'Assembly industries' may be defined to cover those manufacturing operations which consist of simply putting together imported parts and components without further processing, whether for sale domestically or abroad. In this study, we concentrate on the two major industries of this type in developing countries - automobiles and electronics.

The automobile industry is an example par excellence of import substitution behind heavy protective barriers, with its output destined almost wholly for domestic consumption, and characterized by a long-standing domination by a few transnational corporations (TNCs) from developed

countries (what is known in the literature as a 'mature oligopoly'). The transnational automobile industry has been fairly widespread in the Third World for two decades or more, and its analysis can illustrate the problems that this type of import substituting, TNC-dominated industrialization raises for developing economies.

The second industry, electronics, is a very different animal. It is a relatively 'new' industry, based on a rapidly evolving technology, with a large number of competitors who are using facilities in developing areas to economise on the labour-intensive parts of the production process. Its output is intended primarily for export, so that tariff protection is irrelevant to the success of the investments. TNCs are, again very important, though their role differs from one sub-sector of the industry to the other: in the very sophisticated field of semiconductors, TNCs (especially from the U.S.) hold a virtual monopoly because of the pace and complexity of technological change; in the less demanding field of consumer electronics, domestic enterprises also play an important role, through transnational buyers as well as transnational manufacturers retain a strong hold over the marketing of the final product. The growth of the transnational electronics industry has been concentrated in a few countries of Latin America (including the Caribbean) and South East Asia, but the lessons that it may offer for the rest of the developing world - in terms of prospects for manufactured exports, employment generation, the role of TNCs, industrialization and trade policy[1] - are of vital importance.

While the present study can do no more than scratch the surface of the issues raised by these two industries, interested readers are referred to the wider literature in existence on their experience in developing countries.[2] We shall concentrate here on the specific experience of Malaysia and Singapore, though the preliminary nature of the comments should be borne in mind.

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(1) See Helleiner (1973, 1976), Dela Torre (1974), Adam (1972), Watanabe (1971, 1972) and Sharpston (1975).

(2) For general works an automobiles see Baranson (1971), Jenkins (1977), Hu (1973), Sundelson (1970); on electronics see Caulkin (1977), Chang (1971), Finan (1975), Lake (1976), Moxon (1974), UNCTAD (1975) and U.S. Tariff Commission (1970).

'Transfer pricing' refers to the problems raised for economies which play host to TNCs from the fact that a large part of the imports and exports of subsidiaries takes place with related companies i.e. with firms wholly-owned or controlled by, or at least associated with, their parent. The pricing of such trade may be discretionary, allowing the TNC concerned to show higher or lower costs (and so, profits) in different countries in which it operates. The problems raised, for tax authorities, local shareholders, industrialization policy, trade unions, and so on, have been discussed at length[3], but very little progress has been made, either in terms of discovering the true extent, incidence and determinants of transfer pricing, or in terms of providing developing countries with a system which can come to grips with an extremely difficult administrative, juridical and analytical issue. I am in this paper unable to add much by way of new data on transfer pricing, but the very inability to get hard information, and the lack of a monitoring mechanism, are symptomatic of the problems which need to be solved by host countries over the long run if they are to come to terms with the new demands raised by the growth of international production.

In section III, I shall briefly review the growth and present position of the automobile and electronic industries in Malaysia and Singapore. In Sections IV and V, I shall discuss the problems of transfer pricing in assembly industries and the means to tackle them. In Section VI, I shall touch on some larger issues which should be considered when negotiating the terms of investment in these two industries.

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(3) See Lall (1973), Vaitsos (1974), Lall and Streeten (1977), Robbins & Stobaugh (1974), Musgrave (1972), Verlage (1975) and Kopits (1976).

III. Assembly Industries in Malaysia and Singapore

III. a. Background to Foreign Investment:- Malaysia and Singapore

Malaysia and Singapore are among the few countries of the Third World which have remained consistently attractive to foreign investors over a long period, and which follow more or less open door policies to TNCs in almost every sector of their economies. Both countries have strong currencies and healthy balance-of-payments; both have a good measure of political stability (though Malaysia has recently suffered from the backlash of the Indo-China War) and an excellent record on labour relations: infrastructure is highly developed, especially in Singapore, and there is an adequate supply of skilled labour supplemented by various schemes for labour training and education; both offer substantial fiscal incentives to foreign investors in designated industries, and both offer extremely liberal terms on profit remission and capital repatriation.(4) Tax rates (at 45% plus an excess profits tax of 5% in some cases in Malaysia, and 40% in Singapore) are in line with, or slightly lower than tax rates in developed countries but the existence of several rebates lowers the effective tax rates substantially. Export-oriented investments are offered special incentives in Malaysia (in Singapore most investments are export oriented anyway, so the distinction is not particularly meaningful).

There are differences between the two countries, of course, both in terms of policy and in terms of their economic position. Malaysia is slightly more restrictive towards foreign investments than Singapore: Malaysia has launched upon a policy of achieving 'racial balance', aimed to improve the relative position of the Malay group *vis a vis* the Chinese and Indians, and this places certain conditions on firms as concerns their equity participation (though this is interpreted flexibly where export oriented or otherwise desirable investments are involved) and employment. Malaysia also has an expressed preference for joint ventures over wholly-owned subsidiaries. It has instituted a system, still in its infancy, of monitoring

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(4) Details of policies on foreign investment are available from the Federal Industrial Development Authority for Malaysia, and the Economic Development Board for Singapore.

and regulating technical agreements, though an earlier attempt to fix a rate of 1-2% on royalties has been dropped. Singapore has none of these requirements (though it does have a system of wage negotiation which serves to make it slightly less 'free market' than Hong Kong, where wages are unregulated).

On terms of economic structures, Malaysia is relatively less industrialized and offers less skills and a less-developed infrastructure than Singapore - compensated in part by lower wage rates. Singapore is better located for maritime trade, and its long entrepot tradition has endowed it with an excellent international communication and financial network. Its administration is reputed for its honesty and efficiency, while its workforce is credited with high productivity, adaptability and dedication. In general, it is easy to see why both countries are favoured by TNCs, when these companies face far more restrictions, higher costs and greater risks in investing and producing in other countries of the Third World (and some of the developed world).

Let us look quickly at the role of foreign firms in the economies of the two countries. Data on Malaysia are available from three sources: (a) the Report on the Financial Survey of Limited Companies, Malaysia, (1972) (Department of Statistics), which covers all limited companies in operation in that year; (b) the Annual Report of the Federal Industrial Development Authority (FIDA), the latest being 1975, which provides statistics on pioneer establishments in the country (accounting for the bulk of foreign investments in manufacturing, though not in the automobile sector); (c) the Survey of Manufacturing Industry, Peninsular Malaysia (1972) (Department of Statistics), which provides detailed census data, though not always by foreign/local breakdown at the 4-digit level, for the Peninsular part of the country.

The Financial Survey data for 1972 covers 1,631 companies in manufacturing, of which 1,267 are locally controlled and the rest foreign controlled (divided between 294 limited companies incorporated in Malaysia and 70 branches of foreign companies). Table 1 summaries some of the main statistics extracted from this survey, and shows a number of interesting facts:

Table 1

Limited Companies in the Manufacturing Sector of Malaysia:
Main Statistics for 1972 (Million Malaysian $)

	Locally Controlled	Foreign Controlled	Total
Numbers (%)	1267 (77.7)	364 (22.3)	1631 (100)
Sales (%)	2,245.6 (39.3)	3,472.3 (60.7)	5,717.9 (100)
Sales/Firm	1.8	9.5	3.5
Profits (%)	108.8 (32.7)	224.3 (67.3)	333.1 (100)
Profit/Sales	4.8	6.5	5.8
Total Assets (%)	2,016.8 (48.0)	2,186.8 (52.0)	4,203.6 (100)
Profits/Total Assets	5.4	10.3	7.9
Exports (%)	486.2 (30.0)	1,147.8 (70.0)	1,634.0 (100)
Exports/Sales	21.7	33.1	28.6
Imports (%)	421.2 (35.2)	775.9 (64.8)	1,197.1 (100)
Goods & Services Purchased (%)	1,682.2 (38.5)	2,684.0 (61.5)	4,366.2 (100)
Imports/Goods Purchased	25.0	28.9	27.4
Total Employment '000s (%)	98.4 (61.2)	62.3 (38.8)	160.7 (100)
Net Fixed Assets/Employee ($'000)	9.3	14.0	11.1

Source: Department of Statistics, Report on the Financial Survey of Limited Companies Malaysia, 1972, Kuala Lumpur.

(i) Foreign controlled firms as a group are much larger by size of sales (M$9.5 m) than locally controlled firms (M$1.8 m).

(ii) Foreign controlled firms are also more profitable, especially when this is measured as a percentage of total assets employed.

(iii) Foreign controlled firms perform better, in terms of exports as a percentage of total sales, than domestic firms; they also tend to be more import intensive. Both sets of firms export more than they import, but the net balance of trade gain is higher for foreign controlled firms.

(iv) Foreign controlled firms generate relatively little employment, and employ far more capital per head than locally-controlled firms.

These general data do not tell us how foreign and local firms as such perform:[5] the differences may arise simply from the industries in which the two happen to be concentrated or from their relative size. One needs to allow for inter-industry differences to really discover whether or not transnationality by itself makes a firm larger, more profitable, or more capital intensive. We cannot pursue these questions here, but the figures given above suggest that foreign firms are concentrated in industries characterized by larger size, more capital-intensive techniques, greater exports and higher profitability - all according to expectation - and that they may in addition be more efficiently run.

Table 2 gives some data for 1972 (for Peninsular Malaysia only) for a larger sample of manufacturing establishments[6], based on the industrial census which covers all establishments with 5 or more employees and accounts for some 95% of value added in manufacturing industry in that area. The figures confirm the general impression conveyed by Table 1, with the additional advantage that we can now distinguish between foreign firms of different origin. We see, for instance, that U.S. firms are much larger than other foreign firms, followed at some distance by U.K. firms. Singapore firms are larger than local firms, but do not seem to use much more capital/employee, indicating that they are concentrated in industries with similar (fairly simple) technology: their higher value added/employee indicates, however, that they are more efficient or attain economies of scale. U.K. and U.S. firms seem to be the most capital intensive as well as the most productive, which suggests that they are located in the most sophisticated branches of manufacturing industry. The detailed industrial (4-digit) data given in volume 2 of the Survey contain a wealth of information which could yield extremely interesting information if one wanted it.

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(5) For a discussion of the relative performance of TNCs and local firms and a survey of the literature see Lall (forthcoming).

(6) An 'establishment' is not the same as a firm, since a large firm could own several establishments. In the absence of firm-level data, however, we assume that the two are identical. This would probably tend to reduce the average size of the foreign firm, which are usually large and may be multi-establishment.

Table 2

Principal Statistics for the Manufacturing Sector of Peninsular Malaysia by Ownership, 1972

(M $ million)

	Total	Malaysia	Singapore	U.K.	U.S.	Japan	Other
Number of Establishments	3,685	3,134	260	105	17	7	162
Output	5,119.7	2,466.5	772.4	814.3	205.7	38.0	822.6
Output/Est.	1.4	0.8	3.0	7.8	12.1	5.4	5.1
Value added	1,524.9	665.4	221.9	278.1	81.1	13.8	264.7
V.A./Est.	0.4	0.2	0.9	2.6	4.8	2.0	1.6
V.A./Output	29.8	27.0	28.7	34.1	39.4	36.3	32.2
Fixed Assets	1,658.9	839.6	161.0	212.7	68.4	14.5	362.7
Employment ('000)	206.2	139.3	24.4	12.3	4.0	1.0	25.2
F.A./Employee ($000)	8.0	6.0	6.6	17.3	17.1	14.5	14.4
V.A./Employee ($000)	7.4	4.8	9.1	22.6	20.3	13.8	10.5
% Distribution of Output	100.0	48.2	15.1	15.9	4.0	0.7	16.1
% Distribution of F.A.	100.0	50.6	9.7	12.8	4.1	2.2	21.9
Employees/Est.	56	44	94	117	235	142	156

Source: Department of Statistics, Survey of Manufacturing Industries, Peninsular Malaysia 1972, Volume I, Table 5.

The two tables together show that just over half of total manufacturing output in Malaysia is contributed by foreign firms, and about one-third of manufacturing employment. Foreign firms dominate in the export of manufactured products, and tend to concentrate in the more capital-intensive sectors of industry. They are significantly larger than domestic firms, and far more productive, though it cannot be decided whether this is due to their size, industrial distribution or efficiency.

Finally, let us look at some figures for Malaysian 'pioneer' companies, i.e. companies given special tax incentives (for up to 8 years) because of their technological importance or export potential. Table 3 gives the most recent figures for the distribution of paid up capital by source and by industry. While these figures do not show the distinction between locally-controlled and foreign-controlled firms, they do indicate the main sectors into which foreign capital has been attracted (since pioneer establishments account for the bulk of foreign manufacturing investment). It is interesting, therefore, to note that in terms of value of paid-up foreign capital, the electrical

Table 3

Pioneer Establishments in Malaysia: Paid-Up Capital by Local/Foreign Sources by Industry, 1975

(M $ million)

	No. of Firms	Local	(%)	Foreign	(%)	Total
Food Manufacturing	36	106.2	(57.3)	79.0	(42.7)	185.2
Beverages & Tobacco	2	5.1	(14.2)	30.9	(85.8)	36.0
Textile & Products	29	98.7	(63.2)	57.4	(36.8)	156.1
Leather & Products	1	-	(-)	1.0	(100)	1.0
Wood & Products	31	90.0	(82.2)	19.5	(17.8)	109.5
Furniture	-	-	-	-	-	-
Paper & Printing	4	3.9	(61.9)	2.4	(38.1)	6.3
Chemicals	44	48.2	(44.9)	59.2	(55.1)	107.4
Petroleum, coal	5	18.6	(20.0)	74.2	(80.0)	92.8
Rubber Products	7	22.3	(35.0)	41.5	(65.0)	63.8
Plastic	16	42.1	(83.7)	8.2	(16.3)	50.3
Non-Metallic Products	15	39.7	(47.1)	44.6	(52.9)	84.3
Basic Metal Products	13	39.3	(48.5)	41.8	(51.5)	81.1
Fabricated Metal Products	27	30.6	(60.7)	19.8	(39.3)	50.4
Machinery	13	13.8	(73.0)	5.1	(27.0)	18.9
Electrical Machinery	52	36.3	(25.6)	108.9	(74.4)	145.2
Transport Equipment	6	2.8	(41.8)	3.9	(58.2)	6.7
Other (including hotels)	22	116.7	(82.5)	24.8	(17.5)	141.5
TOTAL	323	714.1	(53.6)	629.0	(46.4)	1333.1(100)

machinery sector - its most important constituent being electronics - has attracted the largest amount of foreign investment, followed by food products and petroleum. Domestic capital has gone mainly into food manufacturing, textiles and wood products (and hotels). Transport equipment has attracted very little; since the automobile assemblers are import-substituting firms, and somewhat older than other TNCs, it is likely that they were not granted pioneer status, or have outlasted them.

Let us now glance at Singapore figures.(7) The census figures do not, unfortunately, give a breakdown of foreign/local ownership by industry, so that a comparison of performance is not possible in any detail. The 1975 census does, however, give some aggregate figures for manufacturing industry (apparently for the first time) which allow us to get a clear picture

(7) The Singapore dollar is very slightly higher in value than the Malaysian Ringitt; for practical purposes we may treat them as the same.

Table 4

Singapore: Principal Statistics by Ownership in Manufacturing Industry, 1975

(S $ million)

	Total	Wholly local	More than half local	Less than half local	Wholly foreign
No. of Establishments	2,385	1,595	265	228	297
Output	12,610.1	2,276.5	1,346.2	1,901.5	7,086.0
% Distribution of Output	100.0	18.1	10.7	15.1	56.2
Output/Establishment	5.3	1.4	5.1	8.3	23.9
Value Added	3,411.1	826.4	444.3	521.4	1,617.1
V.A./Output	27.1	36.3	33.0	27.4	22.8
Employees ('000)	191.5	62.9	29.0	39.2	60.4
Employees/Establishment	80	39	109	172	203
V.A./Employee ($000)	17.8	13.1	15.3	13.3	26.8
Sales	12,401.0	2,268.7	1,233.0	1,857.1	7,042.3
Exports	7,200.7	641.8	500.6	1,295.6	4,762.7
Exports/Sales	58.1	28.3	40.6	69.8	67.6
Gross Margins[a/]	18.0	21.2	21.1	15.1	17.2

Source: Department of Statistics, Report on the Census of Industrial Production 1975, Singapore, Table 9.

[a/] Gross profits before tax as a percentage of sales.

of the importance of foreign firms in the island's economy. Table 4 presents some of these figures and a few ratios of interest. The census covers firms with 10 or more employees.

Wholly foreign firms contribute 56% of total manufacturing output and 66% of total exports in Singapore. If we add the foreign-majority firms and half the values shown for 'more than half local' firms to cover the sector controlled by foreign investors, we find that 77% of total output and 88% of exports fall in this category - a much higher proportion than the 52% of output shown for Peninsular Malaysia in Table 2. Singapore clearly has, by any measure, foreign 'penetration' of a high degree[8] and has managed to use this to attain a close integration with the developed world.

(8) For data on other developing countries see Lall (forthcoming). Data on Singapore by individual industries are not available.

The average size of establishments in Singapore is nearly 4 times higher than in Malaysia, though the difference is less marked for wholly local firms than for wholly foreign ones. The 291 non-Malaysian and non-Singapore firms in Malaysia (Table 2) have an average output of M $6.5 million, as compared to S $23.9 million for the 297 wholly foreign firms in Singapore and S $17.1 million for the wholly foreign and foreign-majority firms taken together. The difference may partly be explained by the lower cut-off point of coverage for the Malaysian census, but partly it must reflect real differences in size.

Singapore firms, especially wholly foreign-owned ones, achieve a higher value added/employee than Malaysian firms, signifying higher levels of productivity (due to more capital-intensive techniques), or of efficiency, or of scale. The export performance of wholly-foreign and foreign-majority firms is distinctly superior to that of other (especially wholly local) firms in Singapore (comparable data are not available in the Malaysian census).

Profitability figures are not available for Singapore firms, but a rough indicator - commonly used in industrial organization studies for this purpose - may be calculated in terms of 'gross margins' (profits plus depreciation before tax as a percentage of rates). This variable shows, somewhat surprisingly, that local firms perform better than others, the worst being foreign-majority firms. There may be several reasons for this - lower age of foreign firms, lower levels of efficiency (this is improbable), concentration in low-profit industries (also improbable), the use of transfer pricing (discussed later) and the effects of the world-wide recession (possible). An industry-wise breakdown over a longer period would be needed to discover the true extent and causes of this phenomenon.

Let us now review the industry-wise distribution of foreign investment and its growth over 1970-75 as shown by the Annual Report 1975-76 of the Economic Development Board of Singapore. Total foreign investment has grown some 2½ times in 5 years, an impressive annual rate of growth of some 20%.

Table 5

Singapore: Foreign Investment in Manufacturing as at end 1970 and 1975 (in terms of Gross Fixed Assets)

(S$ million)

Industry Group	1970	(%)	1975	(%)	% growth[a]
Food, Beverages & Tobacco	31	(3.1)	123	(3.6)	296.7
Textiles) Apparel and Footwear)	45	(4.5)	235	(6.9)	422.2
Leather & Rubber Products	26	(2.6)	30	(0.9)	15.4
Wood & Cork Products	17	(1.7)	160	(4.7)	841.2
Paper Products	18	(1.8)	41	(1.2)	127.8
Industrial Chemicals) Other ")	61	(6.1)	171	(5.1)	180.3
Petroleum & Products	555	(55.8)	1,426	(42.2)	156.9
Plastics	8	(0.8)	41	(1.2)	412.5
Non-Metallic Mineral Products	31	(3.1)	57	(1.7)	83.8
Basic Metals	19	(1.9)	39	(1.2)	105.3
Fabricated Metal Products) Non-electrical Machinery)	34	(3.4)	327	(9.7)	861.8
Electrical Machinery & Apparatus	82	(8.2)	354	(10.5)	331.7
Transport Equipment	81	(5.1)	209	(6.2)	309.8
Precision Equipment, Photographic) Goods) Other)	17	(1.7)	167	(4.9)	882.4
TOTAL	995	(100)	3,380	(100)	239.7

(a) Due to reclassification of companies in 1974 some industry groupings may not be strictly comparable for the two years.

Source: Singapore Economic Development Board, Annual Report 1975-76, page 12.

The largest single sector continues to be petroleum and its products, though its share has declined markedly in recent years. Some smaller sectors, like wood and cork products or precision equipment and photographic goods, have grown very rapidly but from a small base. The electrical machinery sector - including electronics - has grown faster than the average and continues to be the second largest single attractor of foreign capital. It is being rapidly overtaken by the non-electical machinery and fabricated metal sector, which has grown on average at some 170 per cent per annum (not compounded) - though the electronics sector may have slowed down because of the recession more than the machinery sector and may revive. The transport sector mainly comprises shipbuilding - automobiles have not attracted much capital. The EDB has been trying to promote the upgrading of skill, technology and

sophistication in the facilities set up by foreign capital, and there is little doubt that this has been accomplished over a broad range of industries.

To sum up this section, therefore, foreign capital plays a crucially important role in the manufacturing sectors of both countries, and will continue to grow even more important if present trends continue and the governments' avowed policies are successful. Singapore has a more advanced industrial sector and greater foreign 'penetration'; to some extent it may represent the path that Malaysia may follow in terms of industrial development. Let us now come to our two assembly industries.

III. b. The Automobile Industry

The automobile industry in both Malaysia and Singapore is almost a pure 'assembly' operation based on imported CKD (Completely Knocked Down) packs. Despite efforts to raise local content and to stimulate the growth of domestic supplier industries, the vast bulk of components are imported, and many of the locally purchased ones - tyres, batteries and paint - are in fact made in foreign controlled companies. Thus, there have been very few direct 'linkages' created by this sort of assembly operation, though some small scale operations are starting in the manufacture of cables, hoses, radiator cores, pistons and filters[9] in Malaysia. The government there is constantly pressing for higher local content, but the process of building up the necessary industries has been very slow.

In Malaysia, there were several car importers supplying the market until the mid-1960's. Local assembly started in 1967, and by 1968 the Census of Manufacturing Industries in West Malaysia shows 11 establishments in operation. While the ownership breakdown is not given, it may be assumed that most of them were foreign-owned. High tariff protection and fiscal incentives were provided to local assemblers, and the number of units produced grew as follows:

Table 6

Numbers of Passenger Cars & Commercial Vehicles Assembled in West Malaysia, 1967-75

	1967	1970	1972	1974	1975
Passenger Cars	319	20,963	24,653	52,457	38,596
Commercial Vehicles	947	7,016	6,126	11,803	4,290

Source: FIDA (unpublished).

(9) See Menon (1976).

The Census does not give the number of firms which own the establishments covered (so we cannot comment on the progress of manufacturing companies), but by 1972 the number of establishments had fallen to 8. Later figures provided by FIDA show that in fact there were 9 companies in production by 1975. Table 7 gives the names of the companies and the percentage of foreign equity participation in each.

Table 7

Automobile Assembly Companies in Malaysia (1975)

(M$ thousand)

	Name of Company	Total Paid-up Capital	% Local	% Foreign
1.	Asia Automobile Industries	4,400	20.5	79.5
2.	Associated Motor Industries	3,500	-	100.0
3.	Motor Associated Services	7,500	-	100.0
4.	General Motors	6,346	-	100.0
5.	Kilang Pembina Kereta-Kereta	7,000	-	100.0
6.	Swedish Motor Industries	3,000	50.0	50.0
7.	B.G. Motors	291	100.0	-
8.	Cycle and Carriage Industries	3,500	-	100.0
9.	Sarawak Motor Industries	2,104	100.0	-
	Total	37,641 (100.0)	12.7	87.3

Source: FIDA (unpublished).

Of these firms, the two with wholly local capital do not appear to be active in the passenger car market, which is in effect completely dominated by 7 foreign (or foreign-controlled) firms. Between them, these firms assemble some 64 models of 21 different makes of cars; the maximum annual output per make reached 8,973 for Toyota, 7,263 for Datsun, 6,755 for Ford and 5,453 for Mazda in 1974 (the peak year for production): these were the market leaders. At the other end, there were only 285 Audi, 268 Vauxhall, 441 VW and 326 Honda assembled.

The 1972 Census gives a breakdown of costs of production for the car assemblers (p.302); and shows that of the total cost of raw materials, 80 per cent was accounted for by the cost of CKD packs. Since many of the

assemblers undertake work on packs imported by dealers, it is not possible to get a clear picture of the costs and value added for the operation as a whole, but the nature of the industry and its ownership structure make it clear that value added accruing locally in probably small. If we take the census figures, we see that of the total value of output in 1972 of the $94.3 million, total value added was $23.1 million, of which $9.8 million accrued to wages and salaries, and the rest was spread over depreciation, profits (mostly foreign) and taxes. Employment generated in 1972 came to 3,195 at year end (of which 34 were expatriates); this had risen rather slowly from 2146 in 1968 (70 expatriates).

It is difficult at this stage to comment on the efficiency of the industry, because detailed studies and comparisons have not been carried out. However, it seems reasonable to argue - and the literature on other developing countries (see footnote 2) supports this - that the tiny scale of operations and the variety of models assembled must lead to considerable inefficiency. One plant manager commented that the number of man-hours needed to run low-volume, multi-model assembly lines were about 50 per cent higher than to run high-volume, single-model lines as in developed countries. The low wage costs do, of course, compensate for the high labour requirement, but, from the viewpoint of sheer technical efficiency, it would certainly appear extremely costly to set up industries of this sort. A FIDA official roughly estimated that local models needed up to 40 per cent protection to compete against imports.

In Singapore, the 1975 Census shows that there are 5 establishments assembling motor vehicles, of which two (Ford and Cycle and Carriage, owned by Mercedes) make passenger cars. In 1976, according to an unpublished paper by the EDB, the assemblers produced 1535 passenger cars, 2185 light commercial vehicles, 1028 heavy commercial vehicles, 400 buses and 2170 scooters. The Census figures show no exports for this industry, but apparently some components - batteries, tyres, radiators, oil-seals and brake-linings - are made locally and exported in small quantities to neighbouring countries. The government has not been encouraging the growth of the passenger-car assembly industry, though imports of finished cars are charged tariffs at 45 per cent and buses and lorries at 30 per cent (an indication of the relative inefficiency of local assembly, surprisingly close to the FIDA estimate for Malaysia). This lack of encouragement seems to be due mainly to environmental reasons, though the government is keen to participate in the manufacture of an ASEAN vehicle, and hopes to set up the manufacture of diesel engines in the island. It encourages the growth and exports of component parts.

The slowdown of demand in 1975 due to general recession created substantial excess capacity in both countries, but demand in Malaysia seems to be reviving quickly, and rather slowly in Singapore. Due to its relatively small size - it only employs 570 workers in Singapore - the car assembly industry is not an important one for Singapore, and it is unlikely that it ever will be except as part of a regional cooperation project. In Malaysia, the long-term prospects for the industry are better, but the proliferation of models and small-scale reduce the potentially beneficial effects of the activity. The government is fully aware of the problem, and the Minister of Trade and Industry said recently that

> "The development of the motor vehicle industry has fallen far below expectations. When government first envisaged the establishment of local assembly plants through strong tariff protection, great hopes were entertained that the industry would in turn create numerous ancillary enterprises... /but/ the industry has failed to generate the level of employment which we had hoped and the creation of jobs has so far been negligible compared to the costs involved". (10)

It is also reported that this Minister urged manufacturers to cut down on the number of models, but it is difficult to see how such exhortation could work without more positive steps to ensure a rationalisation of industrial structure. If the ASEAN 'complementation scheme' to concentrate production of different components in different countries does come to fruition, it may enable the rationalisation to be accompanied by rapid growth of selected parts of the industry. Otherwise the prospects in this sector are for a continuation of privately profitable but socially costly industrialization under the aegis of automobile TNCs.

III. c. The Electronics Industry

The electronics industry in developing countries has been the subject of several studies in recent years, particularly with respect to the semi-conductor sector where 'offshore processing' by TNCs has led to a new type of foreign investment and the growth of new species of manufactured exports (see references in footnote 2). While this sector is certainly the largest and most dynamic element of TNC investment in electronics in

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(10) Quoted in Asian Business and Industry, April 1976, p.18.

developing countries, it would be misleading to concentrate all our attention on it: there are other sectors of the industry which are also of significance for domestic industrialization and export expansion, and indeed, of greater significance to the growth of indigenous industry.[11]

Let us, therefore, divide the industry into two broad groups: (a) The high technology sector, mainly producing semiconductors, heavily dominated by wholly-owned TNC subsidiaries, and (b) the medium technology sector, mainly producing consumer goods like radios, televisions, simple calculators, and so on. The distinction between them is not a very hard one, since some TNCs in the very advanced fields of consumer electronics (e.g. sophisticated calculators) are indistinguishable from those in the semiconductor field, in terms of their trade, production, structure, management and marketing policy. However, a broad separation of the two groups in a useful one, and we shall keep to it here.

(a) The high-technology sector is "characterised by very rapid technological change, especially in the semiconductor field, and a relatively short product life. Research and development results are applied very rapidly so that technologies and equipment quickly become obsolete. The trend has been for the total amount of labour and material incorporated in electronic products to decrease, and for a large number of components to be made only by sophisticated automatic machines and in large volumes. Nevertheless, the manufacture of certain electronic products or components remains quite labour-intensive. This is so because many assemblies are so complex that they are difficult to mechanise; also sophisticated automated equipment costs a lot but may rapidly become obsolete, so less specialised, more labour-intensive equipment may be preferred".[12] These factors account for the spectacular growth of offshore assembly of semi-conductors in S.E. Asian countries, led by U.S. firms (the world leaders in this technology), followed at some distance by Japanese and European firms.

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[11] This section of the paper has benefited greatly from a paper by Lim and Pang (1976).

[12] Lim and Pang (1976) p. 9-10. For detailed description of the technology see UNCTAD (1975).

The move has been facilitated by the tariff provisions in the U.S. and other countries, which levy duties only on value-added abroad; this has led to capital and R&D intensive functions being performed in the home bases of TNCs and labour-intensive functions being located abroad.

The extreme sensitivity of the overseas investment decision to costs of production (predominantly of semi-skilled labour), the requirements of large and continuous production flows, and close vertical integration with facilities located elsewhere, has meant that TNCs choose investment bases which (i) offer an ample supply of cheap, easily trained and docile labour; (ii) are socially and politically stable; (iii) permit full ownership of foreign investments and allow the free flow of intra-firm trade; (iv) have the requisite infrastructural and transport facilities; and (v) give the maximum of fiscal, financial and infrastructural incentives. A number of countries were chosen in the S.E. Asian region, starting with Hong Kong, followed by Taiwan and Korea in the mid'60s, Singapore in 1969, and Malaysia in 1972-73.[13] As wage rates rose in the older centres, the processing activities were transformed into more skill intensive operations and the labour-intensive processes were moved to cheaper areas. The development of investment and production in electronics provides one of the clearest possible examples of the law of 'dynamic' comparative advantage which advocates of TNC growth are fond of stressing.

The main benefits to host countries offered by high technology TNC investments are in terms of employment creation. There are few other advantages, at least in the early years of offshore assembly: almost all firms operate under tax and duty-free regimes; there are few skills imported which can be used in other industries; there are practically no direct 'linkages' with other sectors, since the components are so sophisticated that local firms cannot begin to compete with large research-based TNCs. As time passes, however, some of these latter factors change, and other benefits begin to emerge. Tax holidays are running out in the older centres, so that TNCs which decide to stay on will contribute to host government finances. As labour costs rise, more skill-intensive operations are

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(13) Average hourly earnings of workers in semiconductors in 1974 in S.E. Asian countries were (US$); Singapore 0.57, Hong Kong 0.6, Korea 0.4, Malaysia 0.37, and Philippines 0.2. (UNCTAD(1975) table 10).

undertaken - both in terms of doing more testing of semiconductors as well as in terms of producing more sophisticated products like computer, control and medical equipment - and TNCs appear eager to stay on. Thus, the host country gains by the transfer of skills and technology of a type which can create 'spillover' effects and so stimulate indigenous entrepreneurship and the upgrading of wages.

The employment potential of the high-technology electronics sector is illustrated by the data in Table 8. Our sample countries have benefited substantially from TNC investments in this sector. The figures for the very late 'newcomers' (the last three countries) are small, but, given political stability and the amenability of the labour force in host countries, and favourable conditions in home countries, may grow rapidly.

Table 8

Employment by TNCs in Manufacture of Electronic Components (1974)

Singapore	24,000
Republic of Korea	23,000
Malaysia	18,000
Hong Kong	9,000
Indonesia	2,600
Philippines	2,000
Thailand	2,000

Source: UNCTAD (1975) table 7.

(b) The medium technology sector of the industry has also expanded in developing countries because of cheap labour availability, but it differs from the high technology sector in several important respects:

- The technology is more stable, older and more widely diffused, so that local firms are capable of competing with TNCs.
- The entire product can be made in the developing countries, so that close vertical linkages with R&D centres and capital-intensive facilities in developed countries are not essential(several components

need to be imported, of course, but this may be done easily on open world markets by any producer).

- This sector is particularly conducive to subcontracting to small producers[14], who may be provided with materials, specifications and technical assistance (sometimes finance) in order to produce parts or the whole product.
- The main factor which governs the exporting of products is marketing in a broad sense: the use of well-known brand names, the availability of retail outlets, advertising and product differentiation, meeting specialist specifications, design and packaging, and so on. This gives a tremendous advantage to firms based in developed countries in handling the final product, but with two distinct effects. First, it encourages the entry of large retailing organizations into developing countries as sub-contractors to domestic firms. Second, it encourages the (competing) growth of manufacturing TNCs as direct investors, to take advantage of low wages as well as the possibilities of sub-contracting within host countries. In the former case, the local enterprise usually retains a fair degree of freedom in its purchasing and production practices from its buyer; in the latter, the buying, production and selling decisions of the affiliate are closely controlled by the parent company. (For the purposes of transfer pricing, we are interested more in the latter case). It appears that the TNC controlled manufacturing operations - the Philips complex in Singapore is a good example - embody a higher technology than the operations of buying groups.

It is evident that this sector creates many more domestic 'linkages' than the sophisticated components sector of the industry. Not only does it enable the growth of indigenous supplies, it also encourages the diffusion of technology and gradual improvement of skill and knowhow. The main disadvantages of this sort of activity are the risk of losing markets or the imposition of unfavourable terms by buyers (these are

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[14] See UNCTAD (1975) P.6-7.

especially significant for small local producers in high cost areas like Singapore), and the danger of exaggerated effects of recessions in developed countries. We shall return to these below.

So much for the general background to the electronics industry. Let us now consider our two sample countries.

The electronics industry in Singapore started in the mid-1960s with the manufacture of medium technology products (TV sets) by local firms. In 1968 several U.S. TNCs set up semi-conductor assembly facilities (starting production in 1969), followed later by some European and Japanese firms. The medium technology sector continued to attract foreign and local investments over the period 1970-74 but U.S. investment trailed off after 1970 when the initial impetus of semi-conductor investments wore off. To quote Lim and Pang:

> "With the exception of two European and one local firm, all the semi-conductor firms are U.S. multinationals. Firms producing final consumer goods are of all nationalities, while firms producing other components tend to be mostly Japanese or Singaporean. As the industry has developed, it has moved from being dominated by U.S. and semi-conductor firms to being characterised by many different nationalities of investors and a greater variety of product types. In particular there is increasing investment by European and Japanese firms, and a wider development of both the electronic consumer goods industry and of electronic supporting industries supplying the consumer goods and semi-conductor sectors. In 1975 the output of the consumer goods sector outstripped that of the electronic components sector for the first time. In 1971 components accounted for over 70 per cent of electronics output". (P. 16).

Table 9 shows the evolution of different parts of the industry from 1968 to 1975. The "active" and "passive" components and industrial electronic products may be grouped into the high technology sector and consumer electronics into the medium technology sector.

Table 9

Output of the Electronics Industry in Singapore

(S $ million)

	1968	1969	1970	1971	1972	1973	1974	1975
Active Components	-	50.4	129.9	185.4	300.1	577.7	507.2	409.5
Passive Components	-	0.8	0.8	20.3	54.1	112.6	151.2	111.0
Consumer Electronic Products	8.4	15.3	35.7	84.4	155.5	307.6	485.7	640.4
Industrial Electronic Products	-	0.4	8.8	29.0	46.9	46.4	42.4	16.6
TOTAL	8.4	66.9	182.4	319.1	556.6	1,044.3	1,186.5	1,177.5

Source: Economic Development Board, 'The Development of Singapore's Electronics and Electrical Industries and the Opportunities for Further Investment', Singapore, 1976 (Mimeographed).

The relative importance of electronics to Singapore's economy may be judged from the fact that in 1974 the industry accounted for 21% of the entire manufacturing work force (the largest single employer), for 10% of manufacturing output (second to petroleum) and for 16% of manufactured exports (the largest single exporter). Details of its performance are given in Table 10.

Table 10

Singapore: Performance of the Electronics Industry,[(a)] 1968-75

(S$ million)

	1968	1970	1972	1974	1975
No. of establishments	n.a.	35	53	81	83
Employment	700	11,251	27,270	43,350	28,599
Output	8.4	212.8	616.8	1,379.8	1,273.2
Value added/Worker (S$ thousand)	2.0	8.8	10.5	9.5	13.6
V.A./Output (%)	16.7	40.0	44.9	29.2	30.5
Exports/Sales (%)	n.a.	86.0	93.0	92.0	88.8
Exports/Total mfg. exports (%)	n.a.	12.0	21.0	16.0	15.7

Source: Lim & Pang (1976) table IV, and Census of Industrial Production (1975).

(a) Covers items 38321, 38322 and 38329 of the Industrial Code.

If we compare some of these figures with those shown in Table 4, we see that value added per worker in electronics is clearly lower than for industry as a whole, while employment per firm (345) is higher. This is due to the nature of some of the assembly operations, especially in semiconductors, where the bulk of local wages goes to low-paid female employees. However, value added as a percentage of sales is higher than average because of high labour content and high profit margins. Lim & Pang (1976) remark that profit rates are higher than average in semiconductors, for which they advance two reasons "First, part of the profits represents the recoupment of heavy investment in technological research and development.

Second, profits may be exaggerated through intra-firm transfer pricing to take advantage of profit tax exemption in one location" (Footnote 17, P. 18). The latter point is of obvious significance to the next section, and we shall return to it there.

A comparison of 1974 and 1975 figures for employment and production clearly shows the effects of the world-wide recession, which hit the electronics industry quite badly. Several TNCs laid off workers (Texas Instruments 1,000, Fairchild 1,167, General Electric 425, Electronic Memories & Magnetics 1,000 and so on), while some shortened the working week or got workers to agree to cuts in wages. Furthermore, "a survey conducted in August 1974 showed that at least three firms had closed down and eight others were shifting operations out of Singapore*". (Lim & Pang P. 20). Part of the trend of shifting operations reflected the longer-term trend, encouraged by the government, to reduce low-skilled labour-intensive operations in Singapore.

By mid - 1975 the recession hit bottom and the situation began to improve. By March 1976 it was reported that most factories were running at 70% of capacity and later firms were embarking on "vigorous recruitment drives" (ibid.). The EDB predicts that "1976 will be better than the previous two years for the whole industry".(15)

The policy of the government is to assist (by tax incentives) and encourage the industry to improve its skill levels, to reach more complex forms of technology and manufacture more sophisticated products. "So far there has been some limited success along this line. In the semiconductor industry, for example, the three major firms have integrated forward from assembly into testing, finishing and centralised warehousing activities, as well as automated many assembly processes. However, backward integration into silicon crystal growing, wafer slicing and diffusion has been slower to take root". (Lim & Pang P. 21).

There is a large and (allowing for the recession) thriving sub-contracting industry in Singapore, encompassing foreign buying groups as well as local TNC affiliates. The GSP scheme, to qualify for which locally

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(15) EDB, Annual Report 1975-76, P. 14.

* Editorial note: subsequent information indicates that the eight companies were only considering shifting part of their labour-intensive operations elsewhere.

assembled products must have a certain local content, has encouraged this industry to make special efforts to develop local suppliers. One of the major problems faced by Singapore firms is their high cost of labour relative to Hong Kong and Taiwan : the fact that subcontracting has proceeded quite rapidly testifies to the skill of local entrepreneurs and their concentration on new markets in Europe where the other countries have not got entrenched. Small local firms feel the shortage of finance and technology as inhibiting factors rather than a shortage of buyers : as they are not in direct competition for markets with local TNC affiliates, they feel resentful of these giant firms only in terms of access to local finance and to official incentives. There seems to be a common feeling that the government is not doing enough to help them grow. In the long term, their survival is threatened by the growing cost of Singapore labour, and the only solution seems to lie in gaining access to better technology.

Few of the foreign firms in electronics conduct R & D in Singapore, and those that do concentrate on design rather than process improvement. This is hardly surprising, since the research-orientated part of the industry requires massive investment, and is unlikely to be located in developing countries for some time to come.

All in all, the Singapore electronic industry has been a great success. It has created substantial employment, has added to local skills and foreign exchange earnings, and seems likely to stay on in the island despite rising costs, by moving into the more technology-intensive parts of the industry. There is little evidence of 'footloose' behaviour on part of TNCs, though certainly many of them have relocated the more labour-intensive parts of their operations elsewhere, chiefly Malaysia, with the approval of the host government. The effects of the recession reflect the close integration of Singapore with the international economy. Local subcontractors to foreign buying groups may have been subjected to difficult terms and squeezed by financial and technological pressures : there are indications that new policies are needed to assist this sector of the industry.

Let us now come to Malaysia. The electronics industry here is of much more recent origin, and has been in existence only for some 4-5 years. Detailed information of the type given above is not, however, available for Malaysia : the last detailed census only goes up to 1972, and even that

does not break down the electrical sector into sufficient detail to separate the electronics industry from the rest. The indications are, however, that with rising costs in the older production centres, a number of TNCs (including several from Singapore) have set-up facilities there. As the UNCTAD (1975) study notes, "In Malaysia....employment in the electronics industry at the Penang Free Zones had reached 18,000 by the end of 1973, compared with virtually zero 18 months earlier" (P. 25, para. 86). Exports of electrical machinery rose from M$38 million in 1973 to $218 million in 1974 and (despite the recession) to M$285 million in 1975; we may be safe in assuming that most of this increase after 1973 was due to the electronics sector, most of which, in turn, was accounted for by TNCs.

Data provided in the FIDA Annual Report 1975, Table IX, on projects approved show that, in 1974-75, 85 approvals were granted to the electrical and electronics industry (of which 47 had Pioneer Status), out of a total of 986 approvals. These projects were to create 16,676 jobs (the third largest job provider on the list after food manufacturing and textiles), and to use 56% of local capital (though it is not clear whether this means joint ventures or separate foreign and local firms). In view of the nature of the industry most firms in the high technology sector are wholly-owned subsidiaries of TNCs, while joint ventures and local firms are more common in other sectors. As far as profitability of the industry is concerned, figures are not available, but during interviews, a FIDA official remarked that electronics subsidiaries were (like Singapore) exceptionally profitable, though all of them were still on tax holiday.

The Monthly Industrial Statistics of Peninsular Malaysia (September 1976) gives some figures on production in the electrical applicance sector (which inludes electronics) and shows that the index (1968 = 100) rose from 313.6 in 1972 to 538.6 in 1975. It hit a peak at 648.4 in mid 1975 and fell to 482.6 in February 1976, showing a gradual if unsteady recovery since. The FIDA promotional pamphlet entitled Malaysia : Your Profit Centre in Asia, notes on page 31-32 that "there is an established electronic components industry. Practically all the multinational electronic component mamufactures have set up operations in Malaysia and these include RCA, Texas Instruments, Motorola, Matsushita, Siemens, National Semiconductor and Intel. Many of those companies have expanded their operations in

Malaysia and some of them have even introduced more sophisticated products into their Malaysian operations". Table 8 of UNCTAD (1975) also names some firms, like Hewlett Packard, National, Teledyne, Litronix, Industrial Electronics, Monsanto, R.C.A., Advanced Micro Devices, Plessey, Toshiba, Sanyo and others, which have established operations there. It also notes that recently complexes like Philips' in Singapore have been developed in Malaysia by U.S., Japanese and European firms in Malaysia (Para. 46).

In the absence of better information, it is difficult to speculate on the experience of the industry in Malaysia. Clearly it is at its early stages, and shows signs of following the same pattern of development as in Singapore. Whether it will be equally dynamic and successful in extending its technological base cannot be forecast now : a great deal turns on the world-wide evolution of the electronics market and technology, and on the success of the government's new industrial policy. A simple projection of present trends, of course, shows a very bright future for the industry, and the fact that in other industries the expiration of Pioneer Status has not led to the departure of any TNCs bodes well for their presence in Malaysia.

IV. The Problem of Transfer Pricing

The problem of transfer pricing, as we noted in the Introduction, is well known in the literature and to all governments who play host to TNCs. Its emergence is only a part of the wider problems created by the rise of giant companies whose international operations bypass, or indeed encompass, the sphere of what were traditionally 'free' market transactions. With large chunks of commodity, technology, managerial and financial markets becoming internalized by these firms, prices on all such transactions between their different parts become subject to some arbitrariness. Thus, prices for intra-firm trade, managerial or technical fees, charges for patents and trademarks, interest payments, and so on, may all be manipulated by the TNC in order to achieve some objective which may not conform to the best interests of a host country.

The largest single item on which prices can be manipulated by TNCs is intra-firm trade of raw materials, intermediates and finished products. It has been observed that the proportion of intra-firm trade in TNC trade is very large and growing (see Lall (1973)), so that the scope for using transfer pricing is also large and growing; and, clearly, in the economies of Malaysia and Singapore the potential dangers of uncontrolled use of this tool in the hands of TNCs are very large. Several comments are, however, in order before we come to discuss the problems raised specifically for assembly industries.

First, the incidence of transfer pricing seems to be highly variable across different industries. Most of the examples come from the pharmaceutical industry, where many of the products traded are highly specific to particular firms and are developed after heavy R&D expenditures and considerable screening and testing. It is, therefore, very difficult to work out what the 'correct' price for such commodities should be, since this involves working out the 'right' rate of return on risky R&D investment: This, on the one hand, allows the TNC to use arbitrary prices more easily for tax minimisation, and, on the other, makes control and price comparisons extremely difficult for host governments. In other industries, where products are more standardized, it is far more difficult to use transfer pricing: comparable prices are more easily available, and there is little justification in terms of recovering

R&D expenditures. The experience of one industry cannot be generalized to that of another. The danger of losing revenue is always present where intra-firm trade and TNCs exist, but the nature of the industry determines the counter-measures to be taken by host governments.

Second, the existence of high prices for certain products sold by TNCs may not necessarily reflect a deliberate use of tax-avoidance devices so much as a use of monopoly power - high prices may, in other words, be charged to unrelated firms as well as to affiliates. The pharmaceutical industry again provides an example; new patented products, and sometimes old unpatented ones, are sold at extremely high prices to independent buyers (say in Sri Lanka, (see Lall and Bibile (1977)),and prices may be reduced by bargaining or by going to other suppliers. To the extent that this is so, host governments should aim an undercutting the monopoly power of particular TNCs, bargaining, 'shopping around' and so on, rather than simply institute mechanisms for checking transfer prices.

Third, the deliberate use of transfer pricing by TNCs varies from one firm to another, depending upon their organisational structure, their accounting and management practice, their attitude to government policy and their experience in past operations. TNCs with old-fashioned, diffuse organisations, giving relatively more freedom to subsidiaries, are far less likely to use transfer pricing as compared to those with tightly-knit hierarchical structures with authority centralized at the head office. Similarly, TNCs which use the 'profit-centre' method of accounting and managerial control, leaving each centre to maximise its profits, cannot use transfer pricing without altering the accounting and control system. In fact, there is a constant refrain running through recent business school writing on the subject, urging firms with overseas operations to rationalise their structures and concepts to make use of the potential for transfer pricing. However, as long as there are important differences between the practice of different TNCs, host governments must take this into account.

Fourth, different host countries are clearly likely to be differently affected by transfer pricing, depending on their tax and tariff rates, their socio-political situation, pressures on prices and wages, local shareholding, and the like. Governments which impose high tax rates and low tariffs invite the overpricing of imports; if the TNC is an exporter (and particularly

if export subsidies are offered) they invite the underpricing of intra-firm exports. Even when tax rates are in line with those in the home countries of TNCs, some of the intra-firm trade may be routed through tax-havens and profits transferred to these havens. Countries with tough price-control policies, political pressure on TNCs, strong labour unions, or large percentage of local shareholders, are also more prone than others to losing revenue through price manipulations. There is also a countervailing point that an exceptionally tough government may keep TNCs in line simply by means of raising the risk of bad relations and retaliation if transfer-pricing misuse is discovered.

In sum, then, the potential danger of losing revenue through transfer pricing by TNCs certainly exists for every host country, but the incidence of transfer-pricing is likely to be highly uneven. How do these considerations affect the two industries in Malaysia and Singapore?

To start with, neither country is, on a priori grounds, a very strong candidate for the use of transfer pricing by TNCs: each gives liberal, stable and often generous conditions to foreign investors; each welcomes reinvestment of profits and permits free repatriation of profits or capital in a strong currency; wage or union pressures are not such as to encourage clandestine profit remissions; tax rates are more or less in line with developed countries, and distinctly lower than in the U.S., U.K., Germany or France, though slightly higher than Japan, and tax concessions on foreign investment (backed by numerous double-taxation treaties) lower the effective tax-rates substantially.(16) There are, however, other factors which may cause firms to use transfer pricing to remit profits from Malaysia: there are pressures to increase local shareholding; some sectors (like automobiles) are subject to price control, so that firms may raise the cost of inputs to secure higher price increases; and some trade may be chanelled through tax havens like Hong Kong.(17) The last factor also applies to Singapore, but the others do not.

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(16) See table 2 of Kopits (1976).

(17) See Rea (1977) and Edwards (1975).

To place the matter in perspective let us glance at the trade figures for both countries and see how much is actually routed through Hong Kong. Table 11 gives data for 1975 and January-June 1976, and shows that for both countries such trade is minuscule, accounting for 1-2% of Malaysia's exports and imports, and about the same for Singapore's imports, but higher (7-8%)for its exports. The two countries in fact trade very heavily with each other, but in view of their similar fiscal policies this has little significance for transfer pricing problems. The Hong Kong connection is so weak that its deliberate use as a transfer pricing haven, though possible, is not of great importance.

Table 11

(US $ million)

Malaysia and Singapore: Value of Trade and Trade with Hong Kong

		1975	Jan-Jun 1976
A. Malaysia:	1. Total Exports	3805.7	2339.3
	Exports to Industrial Countries (%)	2098.9(55)	1365.1(58)
	Exports to Singapore (%)	773.2(20)	457.4(20)
	Exports to Hong Kong (%)	43.9(1)	30.1(1)
	2. Total Imports	3526.1	1776.4
	Imports from Industrial Countries (%)	1912.7(54)	952.3(54)
	Imports from Singapore (%)	300.5(9)	148.4(8)
	Imports from Hong Kong (%)	64.4(2)	35.3(2)
B. Singapore:	1. Total Exports	5375.2	3004.5
	Exports to Industrial Countries (%)	2047.3(38)	1271.1(42)
	Exports to Malaysia (%)	924.4(17)	462.2(15)
	Exports to Hong Kong (%)	395.3(7)	241.9(8)
	2. Total Imports	8133.7	4160.6
	Imports from Industrial Countries (%)	3901.0(48)	1856.1(45)
	Import from Lalaysia (%)	941.7(12)	581.4(14)
	Imports from Hong Kong (%)	179.9(2)	99.7(2)

Source: IMF, Direction of Trade, Dec. 1976.

Both assembly industries are, of course, ideal candidates for the use of transfer pricing if the TNCs were so inclined, since both depend exclusively on intra-firm imports (and, for electronics, exports). However, the electronics industry is operating almost wholly under tax holidays in both areas, though it is, as we noted above, reaching the end of this period in Singapore. There is thus no real reason why TNCs should be using intra-firm trade to remit profits abroad, and such evidence as exists on their profit (and the remark of Lim and Pang quoted previously) indicates that they are quite happy to show high profits there. The existence of double-taxation agreements, or their current negotiation with the major capital exporting countries (though Singapore does not yet have one with the U.S.), would tend to reinforce such a preference.

The situation may, of course, change once tax holidays run out, and this may be especially significant for Malaysia because of the pressure for taking on local shareholders. The Malaysian government has shown itself to be flexible on this issue as far as high technology and export-based firms are concerned, so even this may not provide a strong incentive to use transfer pricing. Taking all these factors together, it is difficult to conclude that transfer pricing is, or will be, an important problem for the electronics industry.

Matters may be different for automobile assembly. It proved impossible to obtain any hard data on the use of transfer pricing in either country, but a strong impression was given in Malaysia that it was being practised in the valuation of CKD packs imported from parent firms. There were two indications that this may be so: first, the incentive for such practices offered by the existence of price controls on cars (coupled with the absence of duties on imports of intermediates), which may lead firms to show high costs in order to obtain price increases; and, second, the fact that CKD packs were often priced above the cost of importing the same vehicle completely built up (CBU). It was pointed out by government officials in Malaysia that detailed cost breakdowns of the different components of the pack were never given, so that it was impossible to assess the validity of the firms' claim that the cost of packaging and handling a CKD unit (in several crates) exceeded the cost of assembling it at the TNC's home bases and transporting a single CBU vehicle (un-crated). It was also noted that when local purchase of some parts commenced, the value of the CKD

pack was reduced by a much smaller value, a clear indicator of monopolistic pricing by the TNC.

The main problem in bargaining with TNCs and with assessing correct prices on intra-firm transfers was the lack of information on the part of the host government. This was stressed again and again by officials in different ministries, and we shall return to it in the next section. The inability of the government to assess the firms' declared values meant that the incidence neither of 'monopolistic' pricing (i.e. charging unduly high prices even to unrelated buyers), nor of transfer-pricing proper, could be detected, even when the revenue collection authorities were aware of the existence of such problems.

Without a detailed study of actual and alternative arms' length prices it is impossible to assess how far the Malaysian government's fears of tax avoidance in the car assembly industry are well-founded. The Singapore authorities did not feel that transfer pricing was being used against them in this or any other industry; if anything, they thought that profits were being shifted to the island than away from it. Again, only case by case studies can prove or disprove this. Such studies involve severe difficulties of their own - we shall mention these later - and a brief visit like mine certainly could not begin to resolve them.

The large potential area for the misuse of transfer prices by TNCs does require over the long run that host governments set up an apparatus for ensuring that they realize a fair share of revenues and local shareholders realize their share of profits. Thus, many developed countries, led by the U. S., have set up special divisions in their tax offices to deal with TNCs. These use various criteria to assess arms' length prices, and in recent years many have resorted increasingly to information exchange with each other. TNCs have also been put under great pressure to disclose more information about their activities and profits in different parts of the world, and to restrict their use of blatant tax evasion devices like tax havens. However, the grey area over which price fixing will always be arbitrary is bound to remain disturbingly large, and the growing stringency of tax-collection by the developed countries may mean that developing countries are squeezed even if their tax rates and general investment climates are in line with developed ones. Thus, even if the need to take transfer pricing into account for revenue purposes is not felt to be urgent, the increasingly international nature of production necessitates that official regulation keep pace by checking international transactions. We turn now to considering some of these regulations.

V. Tackling Transfer Pricing

There are two separate levels of administrative difficulties involved in setting up an apparatus to monitor intra-firm trade and profits on a regular and continuous basis. The first relates to the collection, collation and centralization of existing information on the activities of TNCs. The second relates to using such information to ensure their proper taxation.

(a) In countries like Malaysia and Singapore a host of different official bodies are concerned with collecting data at the firm level on TNC activities. The Central Bank is (occasionally) empowered to collect data on foreign exchange transactions, the Statistical Office on production, costs and profits, the Ministry of Industry on industrial matters and on royalties and fiscal incentives, Tax Authorities on profits and customs duties, Planning Ministry on investment and production, and so on. The normal collection of data clearly covers the most important aspects of TNC activities in host countries, though without more detailed investigation it is impossible to judge how comprehensive and adequate the coverage really is.

The important point is that it is only by quantifying and assessing the performance of a TNC affiliate as a whole, and taking all its financial links with the parent organisation into account, that a host government can set about realizing its proper share of revenue. The concentration on one or two aspects in each ministry or department according to function tends to disperse available information is such a way that a clear total picture of the TNC does not emerge, and so allows the firm greater freedom to pursue policies which are not in accord with the wishes of the host government. For instance, if royalties or other fees are assessed by a committee attached to the Ministry of Industry, tax incentives are decided by a foreign investment promotion authority, interest charges are vetted by the Central Bank, customs data and tax data are collected by separate departments of the Ministry of Finance, information on annual sales, costs, capacity utilization etc. are collected by the Department of Statistics, and general data on the parent company's performance do not exist at all, there is no possible way for any single authority to monitor, on a continuous and regular basis, all these data : yet they are all in some way relevant to the proper taxation of

of TNCs. Royalties, fees, interest charges and transfer prices may to some extent act as substitutes for declared profits and for each other, as Robbins & Stobaugh (1974), Verlage (1975) and Vaitsos (1974) have pointed out. Unless all these items are centrally examined there is no way of telling how the financial channels are being operated. Further, there is no way of guessing at the (approximate) real profitability of a TNC's investment without knowing, first, its world wide performance in terms of profitability and growth, and, second, its relative performance in the host country concerned. If, say, the affiliate is running at full capacity, expanding and generally doing well, it should be asked to produce justification for its transfer prices if it shows lower profits than the parent company.

As matters stand, however, not only do the different departments concerned not pool their information, they are barred from doing so by legal requirements of secrecy. During my visit, I was continually impressed by the fact that one branch of the Malaysian government could not get access to data in the hands of another. In this administrative set up, it would be practically impossible to institute a monitoring system which could work on a continuous basis.

The inland revenue department does, of course, have the power to ask for any information it considers relevant when it suspects a firm of under-declaring profits, and some instances were reported to me of intra-firm transactions being reassessed. The drawbacks of this are, however, that, given the limited resources of the tax department, only those cases which arouse suspicion are checked. This does not cover a number of cases where a normal procedure of examination would reveal grounds for reassessment, and it does not provide a systematic method of monitoring TNC performance.

(b) The collection and collation of existing information is only a first step towards tackling the transfer pricing problem. Even if all the data mentioned above were centralized (and, say, computerized for easy access and calculation), how would the government set about checking the appropriateness of transfer prices on commodities and services?

The experience of the developed countries, especially of the U.S., shows that it is an extremely complex, and ultimately insoluble problem.

The complexity arises from the large number of items involved and from the internalization of markets into TNCs. The insolubility arises from the fact that once certain commodities are effectively monopolized by particular companies, so that there are no comparable arms'-length prices, there is no 'correct' solution to what the transfer price should be. Any price would have to take into account not just the cost of production (which is fairly easy), but also the proper share of overheads, R & D, marketing, technical assistance, and other related expenses. This in turn involves tricky problems of the 'right' rate of return on innovation, risk, good will, intangible knowhow, etc., all of which may legitimately be claimed to be components of a realistic arm's length price. There are no determinate solutions to these problems, and serious doubts may be raised as to what part of the returns are 'legitimate' and what are returns to undesirable monopoly power. Ultimately, therefore, the result depends upon negotiation and bargaining between the parties concerned, and bargaining in its turn depends upon the skill, knowledge, experience and economic power of each side.

The collection and centralization of information mentioned above is a first but essential step in building up negotiating capacity. The application of information to specific cases requires the development of expertise and understanding of how TNCs operate, and this can best be started by studying the experience of these countries which have tried to tackle the problem. The U.S. clearly leads the way, and a recent Sunday Times article by Malcolm Crawford notes that even U.K. tax authorities feel the need to learn from them.

"Following an increase in its powers of enquiry in the 1975 Finance Act, the Revenue stiffened up a small central unit which it had had for some years to deal with the problem of international shifting of profits. Previously, local tax inspectors generally had to deal with highly complex multinational companies on their own, the central unit having mainly an advisory function. Now the latter handles many more such cases. Its staff have gone to the U.S. to study how the Internal Revenue Service handles such matters, and have become much more canny and rather more aggressive in pursuit of profit shifters". (18)

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(18) M. Crawford, 'Firms caught in New Tax Squeeze', Sunday Times, January 2, 1977, P. 8.

There is a clear need for developing countries to cooperate with, and learn from, tax authorities in developed ones.[19] The U.S. authorities, under Section 482 of the Internal Revenue Code, apply one of 3 methods to determine transfer prices:

- The comparable uncontrolled price method, which tries to discover actual arms' length prices for commodities where open market transactions exist:

- The resale price method, which calculates an 'applicable resale price', reduced by an 'appropriate mark-up percentage';

- The cost plus method, applied to commodities where no open-market operations exist, based on allocating an 'appropriate gross profit percentage' on top of costs of production.

The first two methods can be used fairly easily once authorities have data on comparable open market sales: there are no conceptual problems here, only one of obtaining world-wide price data (perhaps by exchanging information with other countries). The last one raises the severe analytical difficulties noted above, and can be resolved only by negotiation and bargaining. The U.S. authorities have developed detailed guidelines for determining the negotiating procedure (for pricing technology and services as well as commodities), and their example is being followed elsewhere: developing countries need to develop similar guidelines over the long run.

One of the fundamental problems that these guidelines will have to tackle is that there may be conflicts between the comparable uncontrolled price method and the cost plus method, especially when high-technology patented products are concerned. The cost-plus method, including a 'legitimate' reward for R & D, risk, and overheads, may well give a higher transfer price (lower taxes) from a comparison in the prices charged by an imitator who has not borne the expenses mentioned. This problem arises

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(19) For a detailed discussion of the issues and the practice of several developed countries, including the U.S., U.K., Germany and France, see Verlage (1975). The International Fiscal Association (Rotterdam) has issued several papers recently on the treatment of technological payments and transfer pricing.

most commonly in pharmaceuticals, where innovators (like Hoffman La Roche) may charge prices for new drugs 4 - 5 thousand percent more than prices asked by non-patent-observing Italian firms. The Italian prices may not give the correct transfer price, nor may the price set by the TNC : the appropriate price can only be decided by negotiating the appropriate return on all the costs involved in drug innovation (with the additional complication that poor host countries may legitimately feel that they should contribute less than others for products (like tranquillisers) developed primarily for rich markets).

This discussion should have clarified that tackling transfer pricing does not simply involve the task of tracking down 'wrong-doers' by detecting the manipulation of correct prices; it largely comprises the problem of trying to replace open markets, that have disappeared into the structure of TNC operations, with an administrative machinery that tries to obtain the best possible deal for the host government. It is not an easy task. Yet if it is not undertaken, the long-term consequences may well be harmful.

Let us now mention some more specific measures that may be taken to tackle the problem in assembly industries. Since the prime need is for information in industries like automobiles (the difficult issues of high-risk innovation do not arise here), the host government can try to supplement its knowledge by

- posting members of the administration abroad to collect price data;
- exchanging price information with developing and developed governments;
- hiring consulting firms (such as the Swiss General Superintendence Company which specialises in checking price and quality on international shipments) to monitor prices; and
- launching detailed studies of the cost-price structure of the TNCs involved, in order to get a clear picture of how CKD packs are priced.

The most promising and difficult line of activity would seem to be the last one, because it is at the level of basic understanding of the TNC's manufacturing costs that the deficiencies lie. Even a detailed examination of a few TNCs would indicate the outlines of the problem - whether it exists at all, and , if so, what its rough magnitudes are. Clearly, the co-operation of TNCs would be a necessary precondition for launching the study, though a certain amount of information could be obtained from published sources.

VI. Negotiating Agreements on Assembly Industries

We now leave transfer pricing problems and return to the broader economic problems of assembly industries. The discussion of the experience of Malaysia and Singapore showed that the electronics and automobile industries raised very different sets of issues for the host economies. It would therefore be best to take the two sectors separately.

In the electronics industry the main benefits to the host economies are of employment and skill generation, and, over time, of the creation of direct linkages with domestic suppliers and subcontractors and the transfer of increasingly sophisticated technology. The main cost to the host governments seems to have been the very generous fiscal and infrastructural incentives provided to attract TNCs. In Singapore some of these costs are being phased out; Malaysia will continue to offer incentives for some time to come.

The main steps which the governments may take to ensure that TNCs have the maximum beneficial effect are:

- The encouragement of training programmes by TNCs at all levels to facilitate the speedy transfer of skills and knowhow;

- The upgrading of the skill and technology level of operations with rising wage levels;

- The creation of the greatest possible links with domestic enterprises, subject, of course, to the overriding need to maintain cost and quality standards;

- The support of domestic enterprises, by the provision of capital and technology, to enable them to compete in the booming subcontracting market and to compete with TNCs in areas where innovation has slowed down;

- The phasing out of fiscal incentives as TNCs get more firmly established and build up a stable labour force and good working relations with domestic industry and the government;

- The regulation of foreign subcontracting agreements to ensure that the terms are not too onerous and the buyers are not too 'footloose'. A 'Code of Conduct' on sub-contracting, with lists of approved buyers and sub-contractors would prove very useful, especially if this could be shared with the other leading subcontracting countries in South East Asia;

- The setting up of marketing and promotion agencies overseas to encourage the direct sale of domestic products, so as to bypass the monopolistic power of non-manufacturing TNCs, as well as of TNCs which offer mainly marketing benefits;

- The maintenance, despite all these efforts to strengthen domestic enterprise, of good investment climate for TNCs.

The automobile industry requires, in my view, much more drastic action. It is essentially uncompetitive, and does not offer very bright prospects for employment, skill, or technology generation for the foreseeable future. It has not led to the expected backward linkage effects on domestic suppliers, and it is likely that the setting up of many supplying industries would also be excessively costly.

At the minimum, therefore, the structure of the industry needs to be rationalised so that there are far fewer plants and models. This would permit some economies to be reaped in assembly and production of domestic components, and would permit the present high rate of protection to be reduced.

A more serious effort may, however, be made to change the whole structure of the industry - perhaps scrapping assembly operations altogether and setting up plants to make specific components on a large scale along

the lines of the ASEAN complementation scheme. As we noted previously, governments in the region are acutely conscious of the problems and are already making moves in the complementation direction.

To gain the maximum of benefit from this new direction of policy, it would be advisable to keep the automobile industry in domestic hands and to acquire whatever technology is required on license. This would maximise the 'learning' effects of setting up the industry as well as the linkages' with domestic suppliers. The automobile industry in developed countries has served as the focal point for a large number of ancillary activities, and it would be a pity to lose some of these spread effects by leaving it in the hands of TNCs which have a marked preference for buying components from their own organizations.

In the shorter run, given the existing structure of production and ownership, the host governments should press ahead with the reduction of models and increase of local content (with due regard to efficiency). Short term aims should not, however, obscure the serious fundamental problems with this industry in both countries.

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