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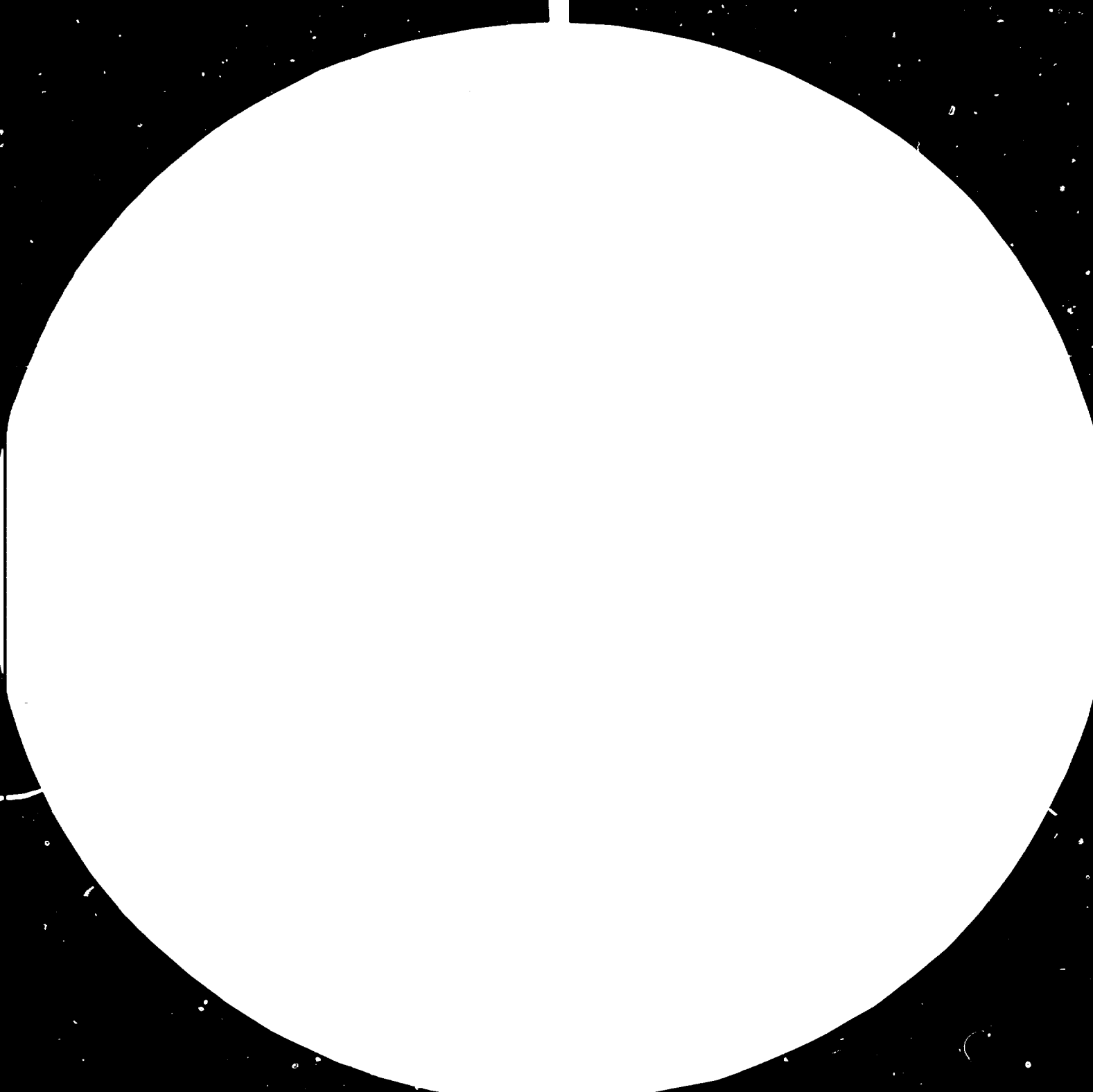
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Workshop on Selection of Technology for  
Assembly of Electronic and Electrical  
Products in Developing Countries

Utrecht, Netherlands, 4 - 8 May 1981

TECHNOLOGY TRANSFER IN MALAYSIA\*

Receivers' Views

by

F.R. Bradbury \*\*

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\*\* Professor, University of Stirling, Scotland.

Technology transfer in Malaysia : receivers' experience

A study by the University of Stirling

INTRODUCTION

In 1980 the University of Stirling was commissioned by the Business and Industry Committee of U.E.C.D. to seek the views of receivers of technology on their problems in a number of countries, including Malaysia. A selection of this material is presented here, with some supporting papers, to give participants in the Utrecht Workshop some examples of the issues which appeared to be of the greatest importance, to those in Malaysia, for successful implementation of transferred technology.

Three sets of interview notes are included. None of these concern assembly line technology but this should not detract from their usefulness as a guide to issues which are relevant to the compilation of a manual of guidance for technology choice, since many of the problems to be solved in selecting technology are common, whatever the nature of the technology in question.

The material included in this paper comprises :

- (i) the introductory statement
- (ii) a note of the Malaysian government regulations relating to import of technology,
- (iii) three sets of interview notes covering
  - tyre manufacture
  - tractor component manufacture
  - elastic band manufacture
- (iv) the set of questions used to structure the interviews
- (v) two models, one simple and one more elaborate, which attempt to present the important elements of a technology for consideration in the selection process.

The Workshop Chairman, Professor Frank Bradbury, is the author of the material contained in this note and will be glad to discuss any points arising with participants at the meeting in Utrecht.

Stirling, Scotland, January 1981

FRB

A NOTE OF THE MALAYSIAN GOVERNMENT REGULATIONS  
CONCERNING IMPORT OF TECHNOLOGY

INCENTIVES for INDUSTRIAL DEVELOPMENT in MALAYSIA

Investment Incentives Act 1968

Types of Incentives available

Malaysia's investment incentives under the Investment Incentives Act 1968 are designed to provide total or partial relief from the payment of income tax (40%) and development tax (5%) to companies investing in new enterprises or expanding existing ones. The relief is granted in various forms, and investors may select the type of tax incentives most beneficial to them. Basically Malaysia offers seven major forms of tax incentives:-

- (i) Pioneer Status, which, depending on the level of the companies fixed capital investment and other criteria allows total exemption from income tax and development tax for 2 to 8 years.
- (ii) Investment Tax Credit which allows a company to deduct from its taxable income the sum at least equal to 25% of the sum spent on the fixed assets qualifying for that relief.
- (iii) Labour Utilization Relief which provides for tax relief in the same way as for Pioneer Companies except that it is based on the number of full time paid employees engaged.
- (iv) Export Incentives consisting of three specially designed incentives for companies exporting their Malaysian manufactured products. The incentives include:-
  - Export Allowance
  - Accelerated Depreciation Allowance
  - Deduction for expenses incurred in overseas promotion.
- (v) Increased Capital Allowance which allows a company to depreciate its assets at a greater rate of depreciation in its initial years of operation.
- (vi) Locational Incentive which offers from 5 to 10 years of tax relief.
- (viii) Hotel Incentives.

Details of the various investment incentives schemes can be obtained from the Federal Industrial Development Authority (FIDA).

THREE SETS OF INTERVIEW NOTES

TYRE MANUFACTURE  
TRACTOR COMPONENT MANUFACTURE  
ELASTIC BAND MANUFACTURE

TYRES. The Malaysian Affiliate of an International Tyre Manufacturing Company

Deputy Managing Director

Technical Manager

Questions selected from the set given at Appendix II were used to structure the interview.

Background Information.

The Malaysian enterprise has a majority foreign parent holding with 49% of the equity being on the local stock exchange. Most of the technology used comes from the parent but, operating as a multinational enterprise, the company transfers its experience and problems back to company headquarters, which acts as a clearing house for all the other establishments giving the customary flow of information in two directions from many sources, this being the characteristic pattern encountered in previous studies of multinational firms.

Planning

- Q. What was the incentive to initiate this project? Substitution of imports; providing exportable products; providing consumer products not hitherto available; an approach from a supplier of technology etc.?
- A. The parent invests anywhere where the industrial environment is favourable and the market is favourable. There is in addition a traditional Commonwealth link in the case of Malaysia and the location of branch establishments round the world show such links clearly. The local availability of rubber is a further incentive to manufacture in Malaysia particularly to specialise in tyres for earth-moving vehicles because these have a very high natural rubber content. Additionally, there are incentives offered by the Malaysian Government and there is a stable political environment. The cost of labour is favourable compared with, for example, the United States but it is high level labour in the technical sense; in no way could it be dubbed "cheap labour". The

company has been here in the tyre business since 1962 and for much longer than that as rubber plantation operators.

Q. What steps were taken to assess the potential size of the market, and to consider how the products would be marketed and distributed?

A. Tyres as a product have to be sold locally and therefore if you wish to enter any market area you need to have local production. This must be linked with an export business. The range of tyres produced is dictated principally by local market requirements, but also for export where prices were competitive. Only in the case of earthmover tyres where the product is highly specialised has the company laid down capacity exclusively for export.

Q. What determined the choice of technology and how was the contact made with the supplier? Was more than one supplier involved?

A. The technology comes from the parent.

Q. What arrangements were made with the supplier? A turnkey project; a joint venture; up-dating of know-how; training of personnel; payment of royalties etc. How long did these arrangements take to finalise?

A. A joint venture. At first there were expatriates in considerable number because tyre technology is a very advanced one and therefore needs such experts in its setting up stage. This decreases with time so that now in 1979 there are only 4 or 5 expatriates and that will decrease in the coming years. This number has to be set against total employed force of some 2,000.

Q. What confidence was there that the necessary inputs of skilled people, finance, and management expertise would actually be available?

A. This should be seen in relation to the previous question. There was a cross-section of expatriates in early days and this was necessary because although one could employ skilled engineers locally one could not employ tyre specialists. Much of the middle management came into the firm from local sources in the early years and progressed through. Now the Malaysian establishment can give assistance to branches in



other parts of the world. They send people to Nigeria, they receive people from India, they send people to Trinidad and receive people from Zambia and so on.

Q. What incentives are available from the host government to finance the project?

A. The answers are set out in the government publication (see Appendix II).

#### Barriers to Transfers

Q. Are there any serious barriers to transfers, such as a ban on the import of certain capital goods and raw materials, or high tariffs or excise duties on such imports?

A. There is no problem in bringing in materials for manufacture but there will be tariffs on them if protection is being given to a local supplier. For example the company uses locally manufactured carbon black and this is produced at a premium price over the world market but is protected by tariff. The situation is unlike that in India where balance of payments problems severely restrict imports, and enables the Malaysian production to compete in world markets. The tyre business is highly competitive and the company has to meet this competition.

Q. Are there delays in obtaining internal licences for imports, or undue delays in getting goods through the customs?

A. Not unreasonable. There is some port congestion and some industrial problems at ports but these are infrequent.

Q. Are there problems in exporting goods to other countries? Does compliance with the tax regulations present difficulties?

A. Taxes are not unreasonable. There is a tax payable on imported machinery but only on those items like motors and boilers which are locally manufactured and even here one can apply for dispensation if a case can be made. The export tax on rubber gives an advantage of course to a company operating within Malaysia. Surtax and sales tax is paid on all imported machinery and additional taxes are paid on most other equipment even if not locally manufactured.

### Implementation

- Q. Were any unexpected difficulties experienced during the construction of the plant, or the training of operatives?
- A. Local contractors were used and there were no problems.
- Q. How was the start-up of the plant arranged? Was this done by the supplier, and what criterion of successful start-up was used?
- A. A start-up team is used if the project is a big one. The teams for such a project get together when the proposal is first made and they work on it and from this team come individuals who will go out with the project and become part of the start-up team.

### Factors of Production

- Q. Are the energy inputs to the technology well suited to this location? Have there been changes to the technology to match local energy supply sources? Is energy cost an important cost element?
- A. Load-shedding when the supply system fails has serious consequences for operations such as processes for making tyres which involve protracted heating periods. You cannot throw a switch and start again when power comes on. Such cuts may cost firms some \$30,000 in one tyre process alone because the interruption of processing ruins the contents of the batch. It was added that the National Electricity Board is working hard to expand the supply. The interruptions come during dry weather due to the loss of hydro electric generation capacity.
- Q. Is the labour intensity of the technology such as to satisfy the need for job creation? Could the technology be changed to increase its labour intensity without impairment of the product? How significant a cost element is labour?
- A. Quality requirements severely restrict changes in the labour intensity towards the employment of more labour. But in setting up the plant it is necessary to take into account quality of labour and the type of product made. There is in an

automated line a constraint on rapid changes in the product variety. In Malaysia, where there are a whole range of products required, many of them of relatively short runs, it is necessary to have a more labour intense process than would be the case in the United Kingdom. Tyre building machines could save labour, but at the cost of inflexibility. I was shown 2 machines in the plant for making the tyre bodies. One of these was operated by one man with various tools and the performance could be changed from one shape and size very easily, whereas alongside this was a much more automated machine for making the same kind of tyre but the work and time involved in changing this to some other size or pattern of tyre would be very much longer. There is, therefore, a limited number of such machines employed in the Malaysian factory simply because of the nature of the market. There is a limit to the degree to which tyre building equipment can be simplified to make it more labour intensive. This limitation is the need to have highly accurate assembly of components in order to meet international performance requirements.

- Q. Are any component parts made locally? Do you have difficulty in getting such components of the appropriate quality? Do you assist suppliers in testing and quality control?
- A. Every component is made in Malaysia except the textiles. Carbon black and rubber oils are supplied locally. The exception is rubber chemicals although zinc oxide is obtained locally and stearic acid providing the quality meets the specification standards. The short pipeline between supply and user is a great asset. Assistance is given to suppliers where necessary. For example stearic acid can be made from palm oil and in order to develop the quality required there were discussions between the company and the stearic acid makers where they went into details of the specifications and so on and the ways of meeting them. In 6 to 9 months, the problems were solved and the trial batches put through.
- Q. Were production equipment suppliers designated by technology suppliers? Are there host government regulations specifying local sources? If so, has this led to delays, poorer performance or failure to update the technology?

- A. Most of the equipment is imported but wherever possible there is local fabrication - things like conveyor belts and so on. Local skills in this kind of machinery operation do exist. There are advantages in using local suppliers of equipment because of the lower transport costs and because of the great importance of being able to discuss with the supplier precisely what is required.
- Q. What difficulties have been experienced in manufacture? Was sufficient know-how provided, and was the training given adequate?
- A. No problems have been experienced, once the technology was underway. Start-up, as in any other place, had its difficulties. The major time-consuming matter was the discussions on location and regulations required by government.
- Q. How long after start-up did it take to achieve 50%, 75% ?% of plant or machine utilisation?
- A. The date of achieving output was determined by market demand, not limited by technological capability.
- Q. Were the resources of skilled people, finance, and management expertise, sufficient for the operation, or was the planning not thorough enough?
- A. Experience is gained by sending people to the parent company. There is much in-factory training done in Malaysia and the local education is adequate.

#### Markets

- Q. How well or otherwise do the products of the technology we are discussing meet their users' needs?
- To what degree have the functions and properties of the products been modified and adapted to bring them closer to user needs?
- To what extent have the products of the technology changed the perceived needs of consumers?
- A. In Malaysia the variety of cars and trucks is fantastic. The company supplies tyres for this variety of vehicles and moreover the manufacturers of such vehicles world-wide have to

approve the product. The local conditions, roads and the drivers, climate and so on are taken into account. The approach here is to take the fundamental technology of the company, and to tune it to the user needs. An example is the need for wet grip and abrasion resistance which are higher here than they might be in other parts of the world. Another factor is the tendency of truck drivers to grossly overload their vehicles and therefore one has to adapt to meet up to this severe treatment. The general pattern of basic technology of the tyres will be as developed by the parent and after that variations in the composition will be used to increase the strength of the tyre to meet the more severe wear and tear in the local market.

- Q. Has distribution of product, and sale, been able to keep pace with production, or has there been an out-of-balance between demand and supply? If so, how can this be corrected?
- A. The factory in Malaysia has the Malaysian market and they can bring in from branches elsewhere any products they can find a market for and this applies to other branches operating in a similar way in their own territory. On the other hand the Malaysian branch would not themselves be selling tyres in India or any other factory's territory but this of course would not stop the Indian factory from buying Malaysian product and selling it in India for themselves. The Malaysian market for tyres is buoyant.
- Q. Is the price obtainable for the product sufficient to ensure an adequate profit margin for the enterprise, or is some form of subsidy necessary?
- A. There is a 5-year subsidising of newly created industries and, for this company, that has now passed.

Technology Development and Diversification.

- Q. Since receiving the technology we are discussing what changes have been made
- (a) to process efficiency
  - (b) to product specification
  - (c) to product diversification.

To what extent have these changes been dependent upon local inputs from market, from management, from R & D?

- A. There is a continuing updating with the latest technology from the parent. The technical manager receives a bulletin each month in which new technology is described and he is free to apply this as he thinks appropriate. Essentially the home base is the source of fundamental work but test car work and test tyres are done locally and, of course, quality control work is done locally. If something arises from the home R & D which is specially aimed at the Malaysian market the Malaysian factory will do the first production runs and send the product back home for testing using the facilities available there.
- Q. Is maintaining quality of product a problem? Are the quality standards proposed by the supplier of technology appropriate to local market needs? Are they appropriate to export market needs?
- A. Quality standards are applied for the company as a whole, but if the Malaysian branch think a higher standard is needed they will tighten it up locally. For example there are some cars that are sensitive to very small variations in tyre characteristics; in such a case this will be looked after locally. Minimum quality standards to international levels apply to the company as a whole. Reductions of these standards is not permitted, but if they need to be tightened to suit some special local requirements, this is of course permitted.
- Q. What autonomy do you have to make appropriate changes arising from technology developments, or which may better meet local conditions?
- A. The situation in the company is not at all like that found in some multinational companies, of internationally standard replaceable parts, except for the aircraft tyre where there are strictly applied international controls. Although there is freedom in this company to vary the technology locally, the plant in Malaysia does not operate in that way. The parent company allows some freedom to modify technical specifications to suit local conditions. This is however always carried out

in close consultation with the centre and standards are not allowed to fall below international levels. The company acknowledges and accepts that local knowledge of conditions and market requirements is an essential input to the on-going development of tyre technology. The position of Technical Manager has always been held by an expatriate to enable a continual interchange of such personnel around the world thus avoiding the stagnation of technology in particular territories and ensuring the maintenance of uniform quality standards throughout the company.

### People

- Q. To what extent is the supply of skills a constraint on
- (a) operating the technology
  - (b) improving the technology
  - (c) making major innovations to process and product?
- A. The technical manager's position is a special one but aside from that there is no constraint upon operations through lack of supply of skills from local sources.
- Q. Is it desirable to give people foreign experience in an industrialised country to make them into good managers? How far has indigenisation of management and control gone? When will it become virtually 100%?
- A. People are frequently sent overseas to gain foreign experience covering all aspects of the company's operations including technical, marketing and financial, and this proves highly beneficial. In addition to general training overseas, people may be sent in order to acquire expertise in some specific field of technology or particular technique.

### General

- Q. In the light of experience, would you have organised this project differently, and if so, how would you now propose to set up a similar transfer operation?
- A. The Malaysian venture is one of the company's most successful areas and there is no reason to believe that the job would be tackled differently if it were being done again, although

higher productivity standards would be aimed at.

Additional questions (1)

I asked if there was any long-term probability of a 100% Malaysian-owned tyre manufacturing venture being successful. In cycle tyres, including motor-cycle tyres, the answer is 'yes', this being the low technology end of the business. But in the high technology end, the manufacture of the tyres required for motor vehicle use, there was in his opinion no chance that this could be effectively done in isolation from the mainstream of technology development world-wide. In the area of high technology tyres, manufacture could not be effectively carried out in isolation from the main stream of worldwide technology in view of the enormous research and development commitment which is necessary in order to continue to meet international standards which continue to improve.

(2)

The company is undertaking, in association with the Federal Government, a new venture in Kedah to make re-tread tyres, bicycle tyres, scooter tyres, motor-cycle tyres, cross-ply car and truck tyres.



TRACTORS AND COMPONENTS

Director 'M' Company.

At this interview we discussed not installed technology but the early stages of negotiation with an American company for local manufacture of tractor components. Since the negotiations were continuing at the time of the interview the identity of the parties is concealed: the Malaysian company is referred to as 'M' and the American one as 'A'.

Background.

The company 'M' is not receiving technology from OECD countries but is negotiating a potential technology transfer operation with company 'A'. A multinational company in plantations, automobiles, food canning, insurance and shipping, are majority shareholders of M.

At present M have sole distributing rights for A's products in Malaysia, Singapore and Brunei, and hence do not handle competitive earth moving equipment. However, M foresees competition arising in component parts through local manufacture. To protect this market (which is important since 50% of M's sales turnover comes from replacement parts) M wish to have A engage in local manufacture: not of high technology parts like engines, transmission or electrics, but of the high wear-rate tracks and undercarriages. Other likely entrants could be FIAT or ALLIS and these are capable of setting up such component manufacturing plant anywhere at short notice. M would be happy to see A come in alone or in a joint venture with M, or to license M or other M-associated company to manufacture A's parts. This negotiation has been underway for one year now and talks are still going on, including those with government.

We noted A's practice of withholding of use of trademark when licensing without equity holdings and I learned that A sets its own Quality Control standards even where operations are licensed ones without equity.

The BIAC model (Figure 1) was useful in identifying the dynamics of technology transfer, A being in the DISTRIBUTOR, SUPPLY, DEMAND segments leading to proposals for entering the PRODUCTION segment through the proposed new venture. As a framework for the subsequent discussion we used the set of questions given in Appendix II. This being a projected operation rather than an existing one many of the questions were not applicable.

### Planning

- Q. What was the incentive to initiate this project? Substitution of imports; providing exportable products; providing consumer products not hitherto available; an approach from a supplier of technology etc.?
- A. The stimulus is none of those suggested by the question but the threat of competition by local manufacture. M controls 60% of the component and replacement market in Malaysia (this includes parts for equipment other than A's.)
- Q. What steps were taken to assess the potential size of the market, and to consider how the products would be marketed and distributed?
- A. M did market research. M and A do investment appraisal studies and exchange information.
- Q. What determined the choice of technology and how was the contact made with the supplier? Was more than one supplier involved?
- A. A is the choice because of M's acquaintance with their products and esteem for them. No other supplier is involved but this could happen (see below).
- Q. What arrangements were made with the supplier? A turnkey project; a joint venture; up-dating of know-how; training of personnel; payment of royalties etc. How long did these arrangements take to finalise?
- A. The arrangements are still to be decided as to the form of the venture. Negotiations may go on for two more years, making three in all. A are methodical to a degree and M having good records, computerised, can make a good impression in the negotiations.

- Q. What confidence was there that the necessary inputs of skilled people, finance, and management expertise would actually be available?
- A. Processes will be semi-automated (see below) and the main demand will be for management skills. But this does not present problems, neither does finance.
- Q. What incentives are available from the host government to finance the project?
- A. Tariff protection to the infant industry to protect it from imported competitive products; also the tax holiday for a limited period. For these and other incentives see Appendix III.

#### Barriers to Transfers

- Q. Are there any serious barriers to transfers, such as a ban on the import of certain capital goods and raw materials, or high tariffs or excise duties on such imports?
- A. No barriers of the kinds instanced are likely in Malaysia. The main barrier from government is the usual one of overloading with bureaucracy.
- Q. Are there delays in obtaining internal licences for imports, or undue delays in getting goods through the customs?
- A. No problem.
- Q. Are there problems in exporting goods to other countries? Does compliance with the tax regulations present difficulties?
- A. A divide the world market territorially by producing units and hence there would be little freedom in choice of market. But the project and its investment appraisal will stand or fall by the volume and income from the home market.

#### Factors of Production

- Q. Are appropriate materials available locally as inputs to the technology? Has the technology been adapted to use local materials in place of those used in its country of origin? Is efficiency in material consumption an important cost element?

- A. No, steel of the appropriate quality must be imported; the local supply is low quality for house building and rodding, but not suitable for manufacturing operations. Material consumption is an important element of cost, as is transport, but the relative propinquity of Japan makes this a lesser problem than it otherwise would be.
- Q. Are the energy inputs to the technology well suited to this location? Have there been changes to the technology to match local energy supply sources? Is energy cost an important cost element?
- A. No, energy is in surplus in Malaysia. The country imports low-grade crude oil for domestic use whilst exporting to Japan low-sulphur high-grade oil.
- Q. Is the labour intensity of the technology such as to satisfy the need for job creation? Could the technology be changed to increase its labour intensity without impairment of the product? How significant a cost element is labour?
- A. There is a trade off between automation and employment: the former makes quality control better at the cost of jobs. M would settle for semi-automatic plant with the main non-automated part being materials handling, that is, low skill work.
- Q. Are there plans to increase over time the proportion of total of value-added that derived from indigenous manufactures?
- A. Yes, for steel. Here we have a backward linkage. Malaysian government propose to promote the establishment of an integrated steel mill for high quality product. This is very capital intensive but the government will provide it as a piece of crucial infrastructure or Social Overhead Capital and would do so independently of the A/M proposal.
- Q. Were production equipment suppliers designated by technology suppliers? Are there host government regulations specifying local sources? If so has this led to delays, poorer performance or failure to update the technology?
- A. No local sources exist, so no government specification of them

Q. What proportion of equity is locally owned? Are there plans for complete take-over of the enterprise from foreign partners? What proportion of equity holding do you as a receiver regard as optimal for effective working and management of the enterprise?

A. To be determined. Local laws specify a 30:30:40 breakdown, that is, 30 Bumiputra (Malay) holding; 30 non-Malay Malaysian holding; 40 elsewhere - this could be A or shared between A and M. The project would be a \$25 million one, for which there are few takers; the 30:30:40 arrangement is therefore very flexible.

Q. Were the resources of skilled people, finance, and management expertise, sufficient for the operation, or was the planning not thorough enough?

A. M have experience and resources of people. Both M and A have good training facilities.

Q. Is the supplier closely involved in the management team, and if so how long is this expected to continue? Does the supplier really contribute to management as he was expected to?

A. Closely, and this will continue for a number of years.

#### Markets

Q. How well or otherwise do the products of the technology we are discussing meet their users' needs?

A. The market is captive, especially if government imposes a tariff protection on the infant industry.

Q. To what degree have the functions and properties of the products been modified and adapted to bring them closer to user needs?

A. Products must fit A's equipment as well as other makes.

Q. Is the price obtainable for the product sufficient to ensure an adequate profit margin for the enterprise, or is some form of subsidy necessary?

A. It must be: no subsidy other than the tax holiday; "shell out taxpayer's dollar - no way!"

Q. In the case of exports, can the necessary product specification be met, or is there a need for more product development?

- A. No problem. Territorial divisions are accepted as good, being seen as a damper for wild ups and downs of local business.

Technology development and diversification.

Q. Is maintaining quality of product a problem? Are the quality standards proposed by the supplier of technology appropriate to local market needs? Are they appropriate to export market needs?

A. A's policy is for universally interchangeable standard parts.

Q. What autonomy do you have to make appropriate changes arising from technology developments, or which may better meet local conditions?

A. No autonomy.

Q. Does the supplier have any commitment for R & D activities for the project, so as to enable products to be developed and improved, and the techniques of the process improved?

A. Yes, this is A's policy.

Q. What amount of R & D is being done at the receiving location? Can the available skilled personnel cope with meaningful industrial R & D?

A. None, all at A's home research and development establishment.

People

Q. Are there any changes in the education system which would ease the problem of supply of good people for your technology and business?

A. Yes, education could be improved for engineering work. M develops its own people but would like to see the Singapore scheme under which Singapore indoctrinates the parents to persuade their children to become engineers, and has been doing this for 15 years; "blue collar" jobs are lauded; they then devised schemes like provision of more technical school places to cope with the stimulated demand. This is just starting now in Malaysia.

M takes advantage of public courses such as Henley, Bradford and (soon) Manila. Already M spend \$1 million per year in training - 80,000 man hours in 1978. Many of these are skilled mechanics with a high wastage rate - 40 to 50% - including some to Middle East.

Q. Is it desirable to give people foreign experience in an industrialised country to make them into good managers? How far has indigenisation of management and control gone? When will it become virtually 100%?

A. M has now 2 expatriates in its employment; at management level there are no expatriates. M started as a trading arm of a multinational company and up to 1964 all seven managers were expatriates.

Additional comment

A is not overly enthusiastic about the proposed deal, being very conservative. The manufacture of spares and components is very lucrative if well managed and backed up by a good distribution system. If A will not move Italians would, readily, but M does not wish for this.

RUBBER PRODUCTS (IV) ... Bands. Central Elastic Corporation  
Sdn Berhad

Mr. Peter H.C. Ng, General Manager/Director.

The interview was centred around the set of questions, which were answered as follows.

Background

- Q. Please describe briefly the technology we are to discuss, its products and markets, and its origins.
- Q. Please give a brief account of your experience in the management of technology at the receiving end.
- A. The Japanese source of the technology started work on rubber bands in 1923 in Japan and therefore they have 56 years experience of this business. They were in the export business as well as being the major supplier of rubber bands in Japan. The joint venture started in 1973, as the CEC, and was producing in 1974. Rubber bands constitute 90% of the sales, the remainder being made of various things, but particularly latex thread. For latex thread, the Japanese are not the leaders in technology because their 50 years experience is mostly on rubber bands rather than on latex thread. There is therefore less know-how available to CEC from this side of the business. In Japan the latex thread production has been discontinued although they still make other threads.

Planning

- Q. What was the incentive to initiate this project? Substitution of imports; providing exportable products; providing consumer products not hitherto available; an approach from a supplier of technology etc.?
- A. The approach to Japan was made by the Malaysians who are part of a central securities group who had had some dealings with Loytape. Prior to the formation of CEC, Loytape were getting their technology from Taiwan sources. Taiwan experts had set up a turn-key plant for Loytape. The Japanese partners in CEC



Kyowa Ltd., had been in the tape business and were advisers to the Taiwanese plant and therefore there was an indirect link from CEC through Loytape to Japan. The Malaysian group thought it was a good idea for a rubber band factory to be established in Malaysia and so their people approached the Japanese at Kyowa to make a joint venture. The negotiations took about 1½ years leading up to the formation of the venture in 1973 etc. On the question of market research the urge of the owners was for expansion. There was no professional management but more of a family business in which the relations were the leading forces in the firm. There was very little systematic information on market - just a hunch - they could see the size of the Japanese market and its exports. It therefore seems that there was no market research and there was no distribution planning.

- Q. What determined the choice of technology and how was the contact made with the supplier? Was more than one supplier involved?
- A. The Japanese source supplied the know-how and everything connected with the technology. The local partners supplied capital in proportion to their share of the equity, and they provided local management. Peter Ng, who knows the rubber business, was in the firm but he was not in any way expert in elastic bands. The proportion of equity is 51% Malaysian, 49% Japanese and since the NEP it has become 36% Malaysian, 35% Japanese, 29% Bumiputra. It is not likely to go to the ultimate of 30%, 30%, 40% as formulated by the NEP as a general target because the government agreed that the formula adopted should be one which gave one major group of shareholders whilst leaving the Malaysians with the largest single holding of shares.
- Q. What arrangements were made with the supplier? A turnkey project; a joint venture; up-dating of know-how; training of personnel; payment of royalties etc. How long did these arrangements take to finalise?
- A. No worry on the Malaysian side on skills for management but

the Japanese did have doubts and on productivity and efficiency of management. The doubts were soon dispelled once the operation got underway. It was noticed in passing, that the Japanese are recognised as seeing themselves as superior people.

#### Barriers to Transfers

Q. Are there any serious barriers to transfers, such as a ban on the import of certain capital goods and raw materials, or high tariffs or excise duties on such imports?

A. No serious barriers but approaches for exemption licences and import tax exemption takes too long. The company may pay the duty if in a hurry and claim it back later. In the end they get it but it may take 4 months and this can be serious to an expanding business. The second barrier is that whilst it is recognised that the government has to protect local industry, this can be a double-edged weapon. It is difficult for people like CEC who find the duty on things like presses and mixing mills and moulds so high that it can be detrimental to their manufacturing processes to either use the local inferior material or to pay so highly for importing it. An example is that the duty with import and surtax and so on will amount to 40%. This should be compared with Singapore where such material comes in duty free. The third barrier is that the raw materials have an over-protective umbrella from government. For example carbon black from local manufacturers is much higher in price than the world price and the same goes too for zinc oxide.

Q. Are there problems in exporting goods to other countries? Does compliance with the tax regulations present difficulties?

A. Export is free from government tax regulations. The problems faced by exporters are twofold however. The first is that the Penang port facilities now have to compete with Port Klang facilities and the government favours the latter and this sends ships more frequently to Klang than to Penang. With the company shipping 25 containers a month there is likely to be a serious hold-up because of this reduced number of container ships coming to Penang. The container ship facilities in Penang

port are not so good as in Klang port and compared with Singapore, where ships call from any part of the world, it is a highly inferior service. But because of the distance, despite the limitations, CEC still ships via Penang or Klang, using Singapore only when needing a vessel calling at certain obscure ports. This involves trans-shipment or rail transportation and adds to the cost of goods.

The second problem faced by exporters is that the container handling is by a national container corporation, which is a monopoly operated by a quasi government board, but if the capitalist system is going to work, monopoly of this kind cannot be tolerated - there is no room for it. If all the containers of the whole industry of the nation are going to be handled by government, this is not a healthy situation.

#### Implementation

- Q. Were any unexpected difficulties experienced during the construction of the plant, or the training of operatives?
- Q. How was the start-up of the plant arranged? Was this done by the supplier, and what criterion of successful start-up was used?
- A. The training of people for receiving and starting the new technology was a costly thing. The pre-operational expenses were something more than M\$0.5 million against a \$3 million paid up capital. People were sent to Japan for training and they had Japanese people over here for the start-up.

Government approval was a difficulty also. Quoting Peter Ng "We are concerned on fire hazards etc. and also on air pollution. It is necessary to deal with these problems but if we take a page of Japan or USA legislation for Malaysia I think it is inappropriate because there is an important cost factor to be taken into account" This means that the present fire control and amount of anti-pollution devices required for the environmental protection is too strict. CEC is as concerned as government about these things but the government civil servants are diligently applying rules according to the strict letter, yet there

is no way in which the strict letter of the rules can be appropriate for each individual case.

- Q. What time interval elapsed between agreement with supplier to go ahead, and the start up of the operation?
- A. The start-up of the plant was smooth with very few problems. There was a large team of Japanese people over for this task and this proved very costly as mentioned above, but Peter Ng said he would do the same thing again.
- Q. What foreign personnel remained with the project after start-up?
- A. For one year there were 4 to 5 Japanese, for the next year there were 2 to 3 and for the third year there was one. One Japanese person stays as an engineer and also as a "watchdog" to look after the Japanese interests.

#### Factors of Production

- Q. Are appropriate materials available locally as inputs to the technology? Has the technology been adapted to use local materials in place of those used in its country of origin? Is efficiency in material consumption an important cost element?
- A. 85% of the material input is natural rubber. There are no difficulties with raw materials apart from the problem of zinc oxide and carbon black referred to above where the local inputs are in Peter Ng's opinion too expensive. There has been no change in the technology to make it more suitable for locally produced material.
- Q. Are the energy inputs to the technology well suited to this location? Have there been changes to the technology to match local energy supply sources? Is energy cost an important cost element?
- A. Availability of energy is there but CEC has to live with cuts occasionally like other to whom I have talked. Energy costs however are a worry; they are the highest in this part of the world.\* The Federation of Malaysian Manufacturers has told

\* This may no longer be true since the rate of increase, since the interview in early 1979, in other ASEAN countries in their electricity charges are higher than Malaysia. This may be due to the fact that Malaysia is a net exporter of crude oil.

the Ministry that, compared with all other ASEAN countries, Malaysia has the highest unit electric costs and indeed it is in the first ten in the world. This is an important cost element, power being one third of labour costs, although this as a percentage of the total is small of course. It is, however, a substantial proportion of the conversion cost.

- Q. Is the labour intensity of the technology such as to satisfy the need for job creation? Could the technology be changed to increase its labour intensity without impairment of the product? How significant a cost element is labour?
- A. There are two possible processes for rubber band manufacture. The first is labour intensive and the second is semi-automatic involving continuous curing. This second process cuts the labour requirement to one third. At the beginning CEC studied the second process but felt, and still feel, that with present labour costs in comparison with the raw material costs and electricity costs it is still not prudent to move to the semi-automated process. If the labour costs went up by 30% and rubber and electricity and chemicals costs down, then automation would become attractive. Another disadvantage of the semi-automated process is that it involves a higher wastage of material. On the question of providing employment, Peter Ng said that the government would not step in in a case where there was a move to semi-automatic production, particularly as, in a growing business, this would be a question of adding lines to production, not displacing production lines, and therefore giving a net increase in employment.
- Q. Are any component parts made locally? Do you have difficulty in getting such components of the appropriate quality? Do you assist suppliers in testing and quality control?
- A. The procurement of components is not difficult from local sources but there is a need for importing the more sophisticated parts. This means that if there is a repeating requirement, the company has to hold a stock of such parts. There is room for improvement in the supporting industry which is not growing in sophistication at the pace that industrialisation is taking on.
- Q. How long after start-up did it take to achieve 50%, 75% ?% of plant or machine utilisation?

- A. One to one and a half years to reach optimum output required and this was achieved by adding trained shifts one after the other. The training of the workers in the skills is time-consuming and also at the time of start-up (1974) there was a recession which affected the market growth and hence the growth was to some degree market limited.

### Markets

- Q. How well or otherwise do the products of the technology we are discussing meet their users' needs?
- A. An excellent product which survives on quality. In Peter Ng's own words "Our product cannot be sold locally - it is too dear". Locally a low quality product is accepted but CEC did not ever contemplate entering the local market; their prices are 15% higher than the locally inferior quality product.
- Q. To what degree have the functions and properties of the products been modified and adapted to bring them closer to user needs?
- A. Not much change since 1974, but over the last 4 years because of increasing capacity the company has been able to bridge the gap in price compared with the price of the competitors' materials.
- Q. To what extent have the products of the technology changed the perceived needs of consumers?
- A. Very slightly because of the 50 years' experience which the Japanese partners had already had prior to 1974.
- Q. Has distribution of product, and sale, been able to keep pace with production, or has there been an out-of-balance between demand and supply? If so, how can this be corrected?
- A. The balance between production and sales for the first 2 years showed the production higher than sales; in the 3rd and 4th years there was a match, in the 5th year the demand exceeded production and hence the extra manufacturing lines required as mentioned above.
- Q. Is the price obtainable for the product sufficient to ensure an adequate profit margin for the enterprise, or is some form of subsidy necessary?
- A./

- A. No protection was given by tariffs from the word go, but the tax holiday was received and they are still within the 5 year period during which this holds.
- Q. In the case of exports, can the necessary product specification be met, or is there a need for more product development?
- A. There is no question of not meeting quality specification because export is vital to CEC business.

#### Technology Development & Diversification

- Q. Since receiving the technology we are discussing what changes have been made
- (a) to process efficiency
  - (b) to product specification
  - (c) to product diversification

To what extent have these changes been dependent upon local inputs from market, from management, from R & D?

- A. (a) Some changes of a minor nature but the major change would be to a semi-continuous process and this, as mentioned above, was rejected although taken very seriously with a visit to Germany to see the semi-automated process in action.
- (b) See above.
- (c) Technology transfer for diversification is not occurring from the Japanese partner but CEC is diversifying on its own. They see that continuing on rubber bands alone over a long term is not wise and therefore they aim to go into other products. Under-water rubber goods such as masks, snorkels etc. are being developed. For this purpose a subsidiary company has been formed. Meanwhile the parent will be into moulded rubber products associated with the car industry, importing the process and necessary equipment. These products are aimed at the export market.

In its 3rd year CEC started to look at diversification and for two years they have knocked on other people's doors and looked at 7 or 8 projects. The question of where do you go? Peter Ng said this was partly on their own to meet and make contacts

with other potentially interested people and partly, with regard to the under-water rubber goods, looking to Italy using the good offices of MRRDP to set up the contact which was initiated at Peter Ng's suggestion.

There is an R & D department in CEC and whenever new products are considered the R & D manager will look at them. Out of a total of 520 employees there is one R & D man, the manager, and the tests are done in the technical department laboratories. New products (not completely new, of course) are the concern of the R & D manager, who identifies existing products and works back to analyse the possibilities of them being made by CEC.

Q. Is maintaining quality of product a problem? Are the quality standards proposed by the supplier of technology appropriate to local market needs? Are they appropriate to export market needs?

A. No problem.

Q. Does the supplier have any commitment for R & D activities for the project, so as to enable products to be developed and improved, and the techniques of the process improved?

A. The Japanese partner does not make inputs to technology, simply because they use the semi-continuous method and so their problems and developments are different. There is unlikely to be any development from the Japanese source because if they did make any break-throughs they would be likely to keep them to themselves.

#### People

Q. Is it desirable to give people foreign experience in an industrialised country to make them into good managers? How far has indigenisation of management and control gone? When will it become virtually 100%?

A. Foreign experience for managers and technical people is the policy of the company. It provides the executives with opportunity to go out for exposure to different business environments. The technical manager, for example, is going to



Germany shortly and the sales manager and research manager visit Europe each year. This is company policy.

General

- Q. In the light of experience, would you have organised this project differently, and if so, how would you now propose to set up a similar transfer operation?
- A. No, because the time is different and therefore the project would now be done differently, but in 1973, yes, given the prevailing conditions the approach then adopted was the correct one. If now in 1979 would they invest M\$7 or 8 million in rubber band manufacture? This is doubtful; probably they would go for another product type. They would seek a product of higher technology with a lower number of employees such as the Italian technology for making underwater goods and this of course would mean more added-value per employee.

(iv) THE SET OF QUESTIONS USED IN INTERVIEWS

LIST OF QUESTIONS

Background Information

1. Please describe briefly the technology we are to discuss, its products and markets, and its origins.
2. Please give a brief account of your experience in the management of technology at the receiving end.

Planning

3. What was the incentive to initiate this project? Substitution of imports; providing exportable products; providing consumer products not hitherto available; an approach from a supplier of technology etc.?
4. What steps were taken to assess the potential size of the market, and to consider how the products would be marketed and distributed?
5. What determined the choice of technology and how was the contact made with the supplier? Was more than one supplier involved?
6. What arrangements were made with the supplier? A turnkey project; a joint venture; up-dating of know-how; training of personnel; payment of royalties etc. How long did these arrangements take to finalise?
7. What confidence was there that the necessary inputs of skilled people, finance, and management expertise would actually be available?
8. What incentives are available from the host government to finance the project?

Barriers to Transfers

9. Are there any serious barriers to transfers, such as a ban on the import of certain capital goods and raw materials, or high tariffs or excise duties on such imports?
10. Are there delays in obtaining internal licences for imports, or undue delays in getting goods through the customs?
11. Are there problems in exporting goods to other countries? Does the compliance with the tax regulations present difficulties?

### Implementation

12. Were any unexpected difficulties experienced during the construction of the plant, or the training of operatives?
13. How was the start-up of the plant arranged? Was this done by the supplier, and what criterion of successful start-up was used?
14. What time interval elapsed between agreement with supplier to go ahead, and the start up of the operation?
15. What foreign personnel remained with the project after start-up?

### Factors of Production

16. Are appropriate materials available locally as inputs to the technology? Has the technology been adapted to use local materials in place of those used in its country of origin? Is efficiency in material consumption an important cost element?
17. Are the energy inputs to the technology well suited to this location? Have there been changes to the technology to match local energy supply sources? Is energy cost an important cost element?
18. Is the labour intensity of the technology such as to satisfy the need for job creation? Could the technology be changed to increase its labour intensity without impairment of the product? How significant a cost element is labour?
19. Are any component parts made locally? Do you have difficulty in getting such components of the appropriate quality? Do you assist suppliers in testing and quality control?
20. Are there plans to increase over time the proportion of total of value-added that derived from indigenous manufactures?
21. Were production equipment suppliers designated by technology suppliers? Are there host government regulations specifying local sources? If so, has this led to delays, poorer performance or failure to update the technology?
22. What proportion of equity is locally owned? Are there plans for complete take-over of the enterprise from foreign partners? What proportion of equity holding do you as a receiver regard as optimal for effective working and management of the enterprise?
23. What difficulties have been experienced in manufacture? Was sufficient know-how provided, and was the training given adequate?

24. How long after start-up did it take to achieve 50%, 75% ?% of plant or machine utilisation?
25. Were the resources of skilled people, finance, and management expertise, sufficient for the operation, or was the planning not thorough enough?
26. Is the supplier closely involved in the management team, and if so how long is this expected to continue? Does the supplier really contribute to management as he was expected to?

#### Markets

27. How well or otherwise do the products of the technology we are discussing meet their users' needs?
28. To what degree have the functions and properties of the products been modified and adapted to bring them closer to user needs?
29. To what extent have the products of the technology changed the perceived needs of consumers?
30. Has distribution of product, and sale, been able to keep pace with production, or has there been an out-of-balance between demand and supply? If so, how can this be corrected?
31. Is the price obtainable for the product sufficient to ensure an adequate profit margin for the enterprise, or is some form of subsidy necessary?
32. In the case of exports, can the necessary product specification be met, or is there a need for more product development?

#### Technology Development & Diversification

33. Since receiving the technology we are discussing, what changes have been made
  - (a) to process efficiency
  - (b) to product specification
  - (c) to product diversificationTo what extent have these changes been dependent upon local inputs from market, from management, from R & D?
34. Is maintaining quality of product a problem? Are the quality standards proposed by the supplier of technology appropriate to local market needs? Are they appropriate to export market needs?
35. What autonomy do you have to make appropriate changes arising from technology developments, or which may better meet local conditions?

36. Does the supplier have any commitment for R & D activities for the project, so as to enable products to be developed and improved, and the techniques of the process improved?
37. What amount of R & D is being done at the receiving location? Can the available skilled personnel cope with meaningful industrial R & D?

People

38. To what extent is the supply of skills a constraint on
  - (a) operating the technology
  - (b) improving the technology
  - (c) making major innovations to process and product?
39. Are there any changes in the education system which would ease the problem of supply of good people for your technology and business?
40. Is it desirable to give people foreign experience in an industrialised country to make them into good managers? How far has indigenisation of management and control gone? When will it become virtually 100%?

General

41. In the light of experience, would you have organised this project differently, and if so, how would you now propose to set up a similar transfer operation?

TWO MODELS OF TECHNOLOGY IN ITS ENVIRONMENT

# ENVIRONMENT

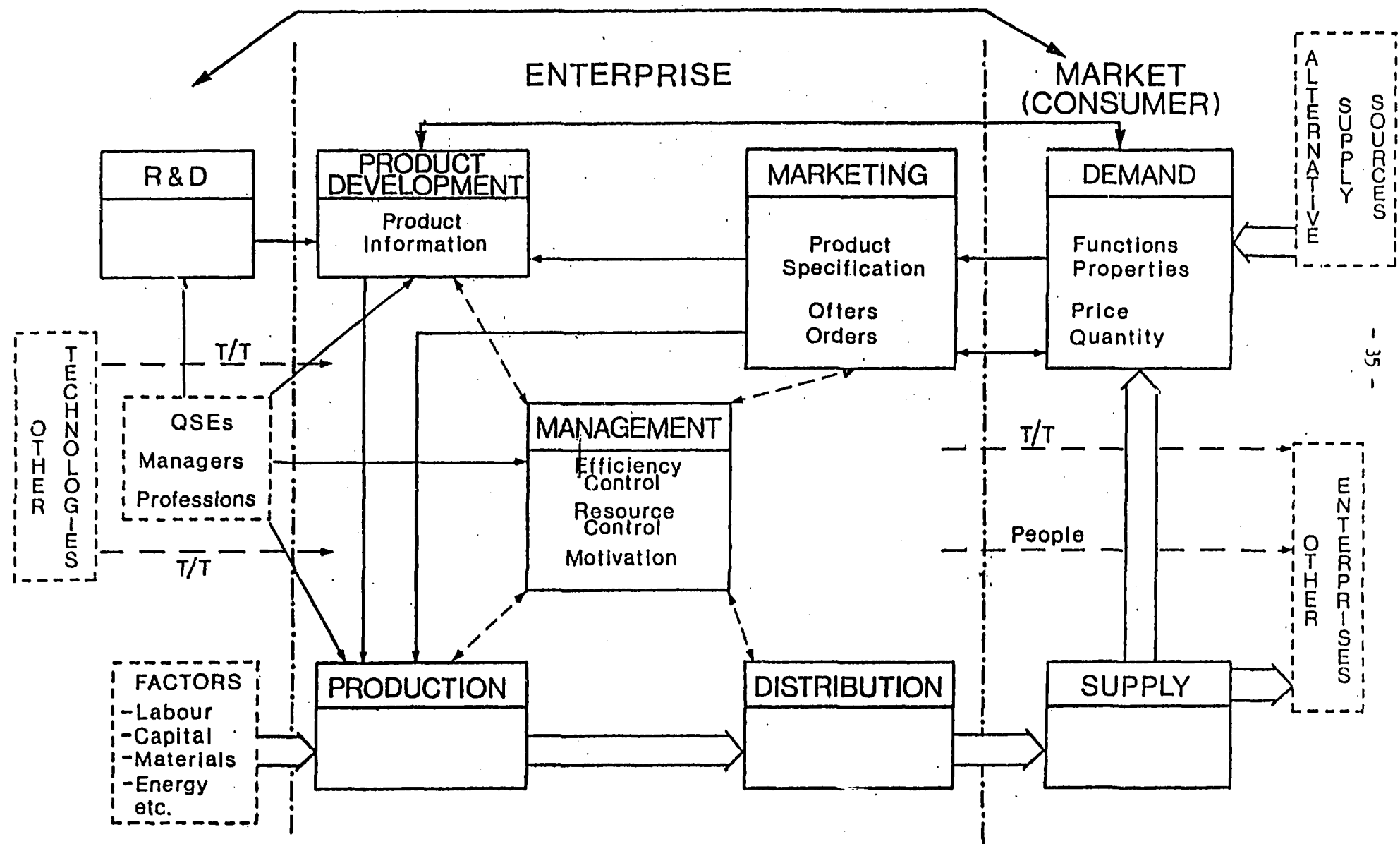


Fig. 1

FIG. 2.

