Multinational Enterprises Programme

Working Papers

Research on Employment Effects of Multinational Enterprises

Working Paper No. 17

Appropriate technology choice and employment creation by two multinational enterprises in Nigeria

by

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This is one of the working papers prepared for an ILO pilot study on the development by multinational enterprises of appropriate technology for maximum employment creation in developing countries, undertaken by the ILO's Multinational enterprise programme. Responsibility for the opinions expressed in the working papers does not constitute an endorsement by the ILO of the opinions expressed in them. The working papers are intended to provide elements for further discussion of the subjects treated in them.
I. Introduction

The issues involved in the choice of appropriate technology by two MNEs and employment creation in Nigeria are explored in this report. The methodology used to gather the data incorporated into the report was as specified by the ILO. Intensive interviews were conducted with the major functionaries of the two enterprises selected. Each company's executives were interviewed without knowledge of the other companies or executives also participating in the study. The key personnel of both companies who granted extensive interviews to us were the managing directors, production directors, marketing managers, training or personnel managers, supplies managers and production or plant managers.

One of the parent MNEs is based in the Federal Republic of Germany, while the other is a Third World multinational with operating centres in India, Africa, Europe and the USA. This Third World MNE is particularly relevant to this study because of the unique opportunity it provides for examining the dynamics of transferability of managerial practices in respect of technology choice and employment creation.

In the following report, the criteria used in selecting the two MNEs are first discussed. The profiles of both companies are comparatively presented next. Then, the legal socio-economic environment of manufacturing businesses in Nigeria is discussed. The magnitudes and varieties of employment created by the two companies through their respective choices of technology are examined. We have focused our attention on the relationship between the decisions made by the management of each company regarding particular technologies chosen and the employment potential we perceived in terms of such decisions.

The two companies studied are not being compared per se. But the similarities and differences observable in their choices of given technologies and employment creation in Nigeria will be highlighted. The fact that these two companies belong to different industries, with somewhat different economic and technological constraints, is however an asset for analysing the various employment effects of the technologies they choose to adopt in Nigeria.

An interesting question regarding the policy implications of this study is that of how MNEs actually make their decisions affecting given technologies and which to opt for in particular situations. Knowing the processes of such decisions will facilitate the establishment of national policies to attract or persuade MNEs to give priority to the employment effects of the technologies they choose in developing countries. This question may be of particular interest in the Nigerian business environment of 1981 because of the relatively relaxed attitude of the Government to the way MNEs choose what technologies they feel appropriate for their operational use.

The order in which managers actually consider the employment implications of their choices of appropriate technologies has not emerged very clearly from our study, namely: Do they choose given technologies because of employment creation considerations per se, or do they choose such technologies on the basis of economic considerations, which happened to have the employment effects we attribute to them? This study sought specific information on this "order of events" issue. The finding from our interviews at least seems to have been a resounding vote in favour of economic or productivity criteria in the choice of technologies in both companies, with the employment impact of such choices only emanating as a secondary matter.

The problem of determining the factors that were deliberately weighted by MNEs in their technology choices is also compounded by the need for most manufacturing enterprises to train their own staff. The foundation of technical and vocational education of Nigerian employees is regarded by most manufacturing MNEs as a base for more company-specific training and development programmes. The Nigerian Government instituted an Industrial Training Fund Scheme intended to encourage and subsidise companies' training activities. The two companies we studied are also engaged in training schemes for their staff. A relevant question worth exploring in this context is the extent to which an MNE may be motivated to select appropriate technologies that may generate employment in Nigeria, considering the additional training costs and problems associated with developing the staff needed for the MNEs' operations.
Employment creation by MNEs in developing countries is a topical issue because of the need of such countries for modern employment. Without the generation of technology-intensive employment by given MNEs, the importance of technology transfer in economic development schemes will tend to dwindle. The issue of motives of managers selecting particular technologies in a developing nation cannot be easily explained within the context of given countries. For instance, were the MNEs we studied in Nigeria able readily to locate and hire a pool of experienced staff needed for their operations, they probably would not have had to undertake the training activities we found them to carry out. A comparison of the way the two MNEs chose the technologies they use in Nigeria with their actions in other comparable environments tended to indicate the important link between technologies chosen and employment creation.

Our two sample enterprises were considerably influenced by their parent MNE management policies in their choice of technologies. The experiences of both MNEs in other environments influenced many of the major policies they operate in Nigeria. The employment creation records of both companies reflected the impact of the Nigerian socio-economic and legal environment. We are convinced that with proper definition and co-ordination of the employment expectations of the Government as well as those of MNEs, in connection with particular technologies chosen in given countries, the mutual goals of MNEs and developing nations can be better achieved.
II. Sample selection criteria

The two companies we selected in Nigeria were in accordance with the four basic criteria requested by the ILO. Both companies are manufacturing goods classified respectively as fabricated metal products (ISIC 3819) and motor vehicle assembly (ISIC 3843). The metal products company manufactures household cooking ware, roofing sheets, collapsible tubes, and extruded sections for windows, furniture and suitcases. The motor vehicle assembly company produces three lines of cars as well as buses. Table 1 depicts the four criteria of selection of the two enterprises in Nigeria.

Both companies have operated in Nigeria for a minimum of six years (in the case of the car assembler) and ten years (in the case of the metal products firm). The metal products firm, which was established originally in 1959 by a European owner, was taken over by the present group in 1970. The agreement to set up the car manufacturing company was signed in 1972. The company was established in 1974 and went into production in 1975.

Both companies are registered in Nigeria as private limited liability companies under the Nigerian Companies Act, 1968. They are not required by law to publish or circulate their annual operating incomes and balance sheets to non-shareholders of each company. The equity shares of the metal products company are 60 per cent owned by the MNE and 40 per cent by Nigerians. The car assembly company is owned by the MNE (40 per cent) and by Nigerian institutional interests of 60 per cent. This 60 per cent is shared by the Federal Government of Nigeria (35 per cent), banks (11 per cent), Lagos State Government (4 per cent) and the dealers of the vehicles (10 per cent). Both companies are thus joint ventures between Nigerian and MNE interests.

The home base of the metal products company MNE is India. The group does business in Africa, Europe, the USA, the Far East and Australia. Among the products manufactured by this MNE group are chemicals, metals, textiles, cables, plastics and building materials. Management services are provided by the MNE group to all the component companies from five centres: London, Nairobi, Geneva, Bombay and Singapore. The group sales turnover of the MNE, which in 1977 was US$250 million, is expected to double to US$500 million in 1981. Of the 6,000 persons working in the group, 60 per cent (3,600) are working in Africa. Thirty per cent (1,800) are working in Europe, while 10 per cent (600) are working in the Far East. Out of the 3,600 employees of this MNE in Africa, some 24 per cent (850) are working in Nigeria.

The car manufacturing MNE is based in the Federal Republic of Germany. It has manufacturing plants in Brazil, the USA and Nigeria, besides the large one in Germany. It employs 100,000 persons in Germany and about 3,000 workers in Nigeria. The lines of three cars assembled in Nigeria are also assembled in the Federal Republic of Germany and Brazil. The models in Nigeria are usually modified along the lines of cars produced originally in Brazil and Western Germany. The Nigerian plant is under the management of the German MNE, with attendant open avenues of technical services and technological support. The MNE insists on the maintenance of the international standards of quality that have been associated with their cars and buses. Hence, all the parts and local materials that are used in the assembly processes are required to satisfy the standards set down internationally in the Federal Republic of Germany.

The employment effects in the Nigerian operations of both MNEs are believed to be largely resultant of adaptive technologies for three reasons:

1. the metal products company was made profitable by the MNE that acquired it in 1970, through the avenues of -
   (a) production staff expansion;
   (b) better employee training;
   (c) use of a few generalist managers as replacements for several specialist managers who were employed by the former owners of the company;
   (d) a Third World (Indian) orientation of low technology choice as an effective means of optimising the use of cheap labour in Nigeria; and
Table 1
Criteria of Selection of the Two Enterprises in Nigeria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Metal Products Company</th>
<th>Car Manufacturing Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Manufacturing</td>
<td>Manufacturing: Hollow-ware Roofing Sheets, Collapsible Tubes and Extruded Sections</td>
<td>Assembly of three brands of cars and buses.</td>
</tr>
<tr>
<td>ISIC Code *</td>
<td>3819</td>
<td>3843</td>
</tr>
</tbody>
</table>
| 2. Employment Effects as Functions of Adaptive Technologies | (a) An unprofitable Enterprise from 1959 was made profitable in 1970 when acquired by the MNE group.  
(b) Management Technology adopted by group improved employment through  
(i) introduction of more work shifts.  
(ii) Introduction of few generalists as managers instead of old functional specialists that were largely unproductive | (a) Government contract with firm required progressive increase of local content of vehicles assembled i.e. parts must be manufactured locally as time passes.  
(b) Production efficiency could only be improved through technical training and use of Nigerian employees.  
(c) Adaptive technology was needed to adjust products to Nigerian physical conditions and level of infrastructural development. |
| 3. Operational Life of Company (5 - 10yrs) | Founded in 1959. Taken over in 1970 by present MNE group - 10 years old | Established in 1974  
6 years old |
| 4. Ownership/Distribution       | Private Ltd. Liability Company                              | Private Ltd. Liability Company                      |
| MNE Nigeria                     | 60%  
40%                                           | MNE  
Federal Govt.  
Banks  
Lagos State  
Dealers of vehicles  
40%  
35%  
11%  
4%  
10%                                           |
| Indigenisation Act 1977         | Schedule III                                               | Schedule II                                         |
| 5. Home Base of MNE            | India                                                      | Western Germany                                     |

* ISIC = International Standard Industrial Classification
(e) the tendency of MNEs in developing countries to search for low technology products that can be handled profitably, given the constraints of high-level technical skill shortage, production capacity size limitations due to market considerations, and the need for competition with mass-produced goods in developed areas;

2. the car manufacturing company in Nigeria was under government contract to increase gradually the local content of its vehicles assembled in Nigeria. This MNE does not participate anywhere in the world in parts manufacturing. So, the agreement the enterprise signed with the Nigerian Government must naturally involve it in various adaptive technology decisions. Production efficiency could only be improved in this local plant through a deliberate policy of employee training and staff development. To adapt the lines of cars being produced in Brazil and Germany by the MNE to Nigerian tropical and socio-economic conditions will entail the choice of specific technologies where a set of alternatives is available. And with the limitations of intermediate technical skills available in Nigeria, any car manufacturer must be involved in considerable schemes of technical training for needed personnel. Activities created by the need to assemble the vehicles, service them in dealer workshops, and maintain their quality standards for consumer satisfaction, can be viewed as potential sources of employment creation by this MNE’s choice of particular technologies;

3. the Nigerian Government has a policy of encouraging MNEs to create employment for Nigerian nationals. The feasibility reports of proposed manufacturing ventures between MNEs and Nigerian interests are expected to specify the types of skills which can be tapped locally for the operations involved, the ones which can only be obtained through expatriate quotas, and the type of training opportunities which will be provided for Nigerians. The two companies analysed in the present study do meet the criterion of employment creation through their voluntary choices of technologies that were directly or indirectly expected by policy makers.

Finally, the two companies we have selected in Nigeria are multinational enterprises as defined in paragraph 6 of the ILO Tripartite Declaration concerning Multinational Enterprises and Social Policy.
III. Comparative profiles of the two MNEs

These two case examinations relate to two divergent industries. One company produces a line of household metallic products, roofing sheets, collapsible tubes, and extruded sections for furniture, windows and suitcases. About 60 per cent of the company's business is accounted for by direct consumer sales. The remaining 20 per cent of sales are made to industrial users of the products concerned. The demand for the products of this company largely depends on factors affecting ordinary demand for consumer products in Nigeria. Among such factors are government spending, disposable income, minimum wages, political stability, employment levels, inflation control and governmental policies regarding incomes and prices, importation of raw materials and finished products. The usual infrastructural problems of access roads, drainage, water and electricity supply are also experienced by this company, but to a largely controllable extent. The company has invested money in generating plant facilities and water boreholes in order to counter some of such infrastructural problems.

The company did not report any adverse effects of governmental instructions and price guidelines (which are announced by the Government every budget year) on their sales performance. The problem of convincing the Government on the need for expatriate quotas to make up for technical personnel not yet obtainable in Nigeria was mentioned. Even though the company did not seem hamstrung in eventually obtaining the expatriate quota needed, the fact of their having to spend much precious time bargaining with ministry officials was touched upon. The request of many MNEs for expatriate quotas can be genuine and reasonable especially when experienced and qualified Nigerians are not available. The position of the ministry officials concerned with granting the permit for such quotas is that the onus of proof of need for such expatriates should rest on the MNE applicants. The issue of expatriate quotas is tied up with that of sophisticated technology transfer. It takes several years to train a dependable and efficient technician.

Another determinant for the localisation of personnel is that Nigerians earn from less than half to about a third of the pay of expatriates. This particular company was sensitive to the considerable savings that could be made by employing Nigerians instead of expatriate staff. The difficulty, however, was in finding suitable Nigerians, especially those willing to accept manual factory work.

This company employs only three expatriates in the plant location we visited. There were about 800 Nigerian employees. Nigerians held the positions of administrative manager, marketing manager, personnel manager, production engineer and accountant. The three expatriates were the managing director, the production director and the financial controller. There were eight other technical personnel in two other plants of this company in Lagos.

The second company produces cars and buses. The company is obliged by official agreement with the Nigerian Government to sell its outputs through its dealers. These dealers own 10 per cent of the shares of the company. There are a total of 58 dealership's operating in each state of the Federation, except Ondo State. The dealership ranged from 1 to 12 per state, with the modal distribution being 2 for each state. There are no direct company sales to consumers.

The auto industry in Nigeria is still at an infant stage in terms of the extent of parts manufacturing being undertaken at present. Most car and vehicle manufacturers in the country, including this company, are mainly assembling imported parts. The current production output of the company is said to be too low to justify any investment in major parts production in Nigeria. The capacity of the plant is for about 140 cars per day in two shifts. An output of some 250 to 500 cars per day is said to be needed in order to justify the setting up of facilities for producing engines, gear boxes, chassis and a body press shop. The policy of this MNE car manufacturer is not to be involved in businesses pertaining to parts manufacturing. The company accepts the international quality standards set for the parts used in their cars and buses by the West German home office. Such parts are purchased from any manufacturers meeting the stipulated quality standards. However, the company was obliged by the official agreement it signed with the Nigerian Government at the inception of its operations gradually to increase the local content of its products.
The company therefore has to facilitate the production of high quality parts by other independent firms in Nigeria. In 1979 a Local Parts Incorporation Committee was set up as an arm of a Local Content Committee. The members were the director of the engineering department of the Ministry of Industries, staff of the home office of the MNE, the Nigerian representative of the company and the Federal Institute of Industrial Research located at Oshodi, Lagos, Nigeria. The Committee was to encourage and assist foreign parts manufacturers to start operations in Nigeria. The Federal Ministry of Industries was alleged to be impatient with the pace of progress made by the Committee. This company's role in this Committee was explained essentially as that of a "linking pin" between Nigerian and foreign partners. There was press criticism of car assemblers in Nigeria while this study was in progress. The adviser to the Nigerian President on parastatals recently expressed official disappointment with the very low pace of the auto industry's increase in the local parts and materials content of their products.

The ramifications of employment creation through appropriate technology choice may be briefly referred to in the context of the local content debate. The sample company pointed out that the 30,000 cars being produced per year signified a rather restrictive market size for now. The question of exploring the prospects of producing more cars for export to the Economic Community of West African States (ECOWAS) was a matter for the future rather than the present. However, the Nigerian Government purchased 100 cars from the company in early 1981 for official delivery to another ECOWAS country as aid.
IV. Legal and socio-economic environment of manufacturing businesses in Nigeria

The Companies Act, 1968, provides for the establishment of private and public limited liability companies in Nigeria. A private limited liability company, unlike a public limited liability one, is not obliged to publish its income statements and balance sheets every operating year. Only the shareholders of a private limited liability company may be informed of the financial status of such a company. The two companies we studied are private limited liability companies. The scanty sales and financial data we mention in this report were provided in slightly disguised form by the managers we interviewed.

The Indigenisation Act, 1977, modified an earlier 1972 Act of the same title. This Act classified the businesses operating in Nigeria into three schedules. Businesses falling under Schedule I are mainly services and distribution, which must be 100 per cent Nigerian in ownership. Businesses falling under Schedule II may be owned jointly with foreigners. The Nigerian ownership share must be at least 60 per cent, while the foreign partners may not own in excess of 40 per cent of the business equity. The businesses in Schedule III may be 40 per cent Nigerian and 60 per cent foreign.

The Industrial Training Fund (ITF) was set up to co-ordinate and subsidise the industrial training activities in Nigeria. All employers of labour in the Nigerian industry are by law required to contribute 1 per cent of their total payroll to the Fund annually. The contributors to the Fund may claim up to 60 per cent refund of their training expenses every year from it. This Fund is an incentive for companies to invest time and money in the training of their employees. The car manufacturing company of our case contributed about Naira(N)100,000 to the Fund in 1980; the second sample company indicated spending between N5,000 to N10,000 annually on employee training. These two figures are thus not comparable due to the fact that one relates to the contribution to the ITF while the other concerns annual training expenditures.

The responsibility for setting minimum wages in Nigeria is that of the National Assembly. In 1979, the minimum wage in Nigeria was raised to N100 monthly by the Government. Besides, employees in the public sector were paid transport allowance for the first time irrespective of whether or not they purchased or owned any vehicles for official use. All employees were also paid a housing allowance. Even though these payments were supposed to be for public sector employees, the Government has indirectly mandated the same benefits for employees in the private sector. All workers in Nigeria may belong to any relevant industrial union under the umbrella of the Nigerian Labour Congress (NLC). The NLC in June 1981 obtained the raising of the national minimum wage from N100 to N125 monthly.

As private limited liability companies, the two enterprises studied have not published their operating costs and income statements. The car manufacturing company found wages in Nigeria to be still fairly reasonable considering the level of labour productivity. The labour productivity increase between 1976 and 1980 was estimated at about 10 per cent. The car manufacturing company in our two cases falls under Schedule II, while the other company falls under Schedule III. These two Schedules were intended to encourage meaningful joint ownership and control of the businesses involved, between Nigerians and foreigners.

Schedule I of the Indigenisation Act reserves retail and distributive trade to Nigerians. The two sample companies naturally could not engage in elaborate retailing of their products in Nigeria without contravening the provisions of the Act. The car manufacturing company even had to conclude an official agreement to sell its products only through recognised dealers, who incidentally also own 10 per cent of the equity shares of the company. The need to develop the managerial and technical competence of such dealers and their workshop staff was a natural source of further employment creation by the MNE. The metal products company was not officially tied to any contract regarding its relationship with its consumers. Though the company sells about 80 per cent of its products through selected dealers, it does however about 20 per cent of its business directly with consumers who have specialised needs for some of the products. A particular product brand is only made to industrial user specifications, and thus sold directly by the company to the user. The need for dealer training in handling the products of this firm is minimal, being regular household consumer items. But the fact that these dealers are appointed to handle the products also creates more indirect employment.
This avenue of employment creation, through regulatory provisions of which business activities are open to MNEs in Nigeria, should be appreciated in the historical perspective. Most MNEs in Nigeria in the sixties and early seventies were strictly interested in selling their products through other expatriate business units in retail trade. The closure of retail trade to MNEs is therefore an indirect opportunity for Nigerians to participate fully in the distribution of products that are being increasingly manufactured or assembled in Nigeria. In terms of "forward linkages" in the business strategies of most MNEs in Nigeria at present, there is practically little or no room for the MNEs to engage in mass distribution of their own products. It is, however, possible for such MNEs to set up manufacturing ventures in chains that may constitute given companies into the receivers or producers of parts or products in input/output networks.

The second company called our attention to the importance of comparing the labour cost in Nigeria with the cost in India and other Far Eastern countries (Singapore), rather than with the cost in Europe. The labour content of the products of this company is about 15 per cent of the unit cost. This amount is considered very low when compared with the labour cost of identical products in Europe. Though the managers interviewed conceded that labour in Nigeria is still relatively cheap, they also indicated that Nigerian wages are now about twice the rates prevailing in India and Singapore.

The managers interviewed in both companies recognised the tendency in Europe to resort to automation as a means of saving on labour cost. In Nigeria, however, the relative cheapness of labour is not seen as the counter argument against automation trends. The fact that trained and experienced intermediate technical employees are so scarce to find in Nigeria is viewed as a possible reason for exploring automatic production processes. Employers who need to produce their products as cheaply and reliably as possible may be tempted to utilise machines and automation in place of labour. The more sophisticated a machine is, the higher level of operator skill needed to operate it. The more advanced a production process is, the better controlled the output of such a process is likely to be. The two basic operational problems complained of by manufacturers in Nigeria are availability of functionally qualified technical personnel, and the efficiency of output production. The major issue arising in this context is therefore that of which factors will usually weigh more heavily on the consideration scale of MNEs in choosing given technologies. Will it be the employment creation goal or the production goal of the company?

Ordinarily, both goals of employment creation and production output realisation at reasonable costs should not be viewed as being contradictory. Utilising labour as a substitute for expensive machines is a basic economic logic. Such a logic should appeal to Third World countries interested in generating modern industrial expertise for their citizens. Governmental policy-makers in Nigeria as well as in many other developing countries do need to appreciate this simple fact. Any government interested in employment creation for its citizens in industrial settings should evolve appropriate policies in this respect.

For example, there should be more concessions extended to MNEs that are faced with the dilemma of either automating given production processes and retrenching some workers, or retaining less modern production facilities in order to provide employment. The investments made by MNEs in advanced production technology should be accorded some priority treatment by official policy-makers. The routine decisions made at factory levels in Nigeria as to whether one simple production operation is eliminated (through machine use) or extended (through addition of more hands working in an assembly line) is potentially more crucial for employment creation than official policy-makers appear to realise.

The philosophy of the Government of Nigeria appears to be basically that of creating the general framework within which MNEs may operate productively. In fact, the two companies studied did not complain of any restrictive or anti-business ideologies attributable to the Nigerian Government. The approach of the Government is to make its official aims and aspirations known to MNEs, and then withdraw to the background while the MNEs operate their businesses. There is much to recommend this strategy in the modern context of developing nations desperately trying to attract modern technology transfer into their economies. The alternative approach is to become interventionist at the risk of not succeeding in securing the technology transfer needed. To attempt any effective control of the decision-making of MNEs in respect of employment creation through technology choice, is to accept a monitoring and supervisory role for the Government over the technical operations of such MNEs. Apart from the obvious difficulties of finding the specialised manpower for carrying out the monitoring roles, there exists the
possibility of hindering the production processes of the companies concerned. Most MNEs tend to prefer lesser regulatory operating conditions than more of them in developing nations. Both of the two companies commented favourably on the relatively free business environment provided by Nigeria for MNEs.

A question we put to managers on this issue in the two companies concerned was regarding the Comprehensive Import Supervision Schemes (CISS) introduced by the Government in 1978. The CISS required all importers of machines, parts and other materials from overseas to subject their goods to a pre-shipment inspection and valuation, by a Swiss consulting group in Europe. Many manufacturers complained so much about the formalities they experienced in the process of complying with this CISS policy that the Government had to modify its operation in 1980. Industrial users of specific materials and parts were to apply as "registered users" for exemption from CISS. Both companies were relatively satisfied with the way the policy had affected them so far. But the car manufacturing company mentioned the point that a competitor located in the hinterland enjoyed about 10 per cent reduction in duties payable on imported materials. The Government apparently provided this duty concession to the competitor as an incentive to reward the willingness of the company to locate its factory very far away from the southern industrial centre near the seaport.

The Nigerian Government issues some guidelines on incomes, prices and dividends to the private sector every budget year. A basic problem faced by MNEs is that of dividend repatriation after they have been declared according to the maximum rates allowed by Government. The incentive for MNEs to be enthusiastic in promoting host country objectives in areas such as technology choice and employment creation, may be found in the extent to which their subsidiaries are able to deploy their funds as they deem fit. Neither of these two companies, even in the absence of full financial statistics, had any complaints about the Government's incomes and dividends policy. However, there were understandable grumblings from the managers interviewed in the car manufacturing company about price controls. The prices of cars manufactured in Nigeria are fixed by the Government after detailed reviews of operating and production costs of given manufacturers. Nigerian consumers are complaining of the fact that locally assembled cars are more expensive than imported ones of the same make and model. This is a national sacrifice which all consumers of developing nations are known to make in the interest of industrial development. From the standpoint of the company, the need to increase the local content of cars manufactured in Nigeria must be appreciated also in terms of its extra cost implications. The car components being currently obtained locally by this company are said to be about two to three times more expensive than imported ones. Yet, the company's hands are relatively tied by the price control machinery of Government from reflecting such additional costs in car prices.

Our own assessment of the price control function being performed by the Nigerian Government is slightly biased. It may be serving the purpose of effective technology choice and employment creation in the MNEs affected. When an element of price control is viewed as an independent variable in an economic system, then changes in such controls are an emphasis on efficiency. And where the utilisation of local materials and parts are concerned, the question of appropriate technology choice for optimising the production processes of affected companies cannot be overlooked. Indirectly, the decision-making processes of the managers faced by such cost and price imbalance are more likely to be tilted by this government factor, in favour of technologies that stimulate employment. The operating diotum of companies finding themselves in this kind of situation would probably be: "If you can recover the costs of local parts and materials through price adjustments, you are better off streamlining your production processes in a way to reduce over-all costs". This broad hypothesis was roughly confirmed by our two companies.

The data and ideas in support of the hypothesis are as follows. Both companies have paid attention to production cost control. Both companies have tried to improve their production process cost experiences by reducing spoilage of parts (through better internal transportation between work stations); by reducing the percentage of defective parts or products handled; by cutting down on the amount of scraps generated by specific operations within their factories. Both companies have also carried out extensive examinations of their plant layouts in different operational units. Production lines have been introduced in situations that tripled production output (in the metal company), and increased efficiency on the assembly line (in the car company). Thus, relationships of reinforcement (and also retardation) of trends may be noted in the interface between MNEs and the Nigerian, as well as any other developing nations' business environment.
V. Comparative employment creation by two manufacturing MNEs in Nigeria

The two companies created different magnitudes of employment in Nigeria due to four factors. First, the car manufacturing plant operates on a larger technical scale than the metal products company. Hence, the car manufacturer will tend to generate more employment than the metal products firm. Second, the requirements of the production distribution and servicing processes of both metal goods and cars, for employees, do vary significantly. For instance, the products of the metal company do not call for any labour-intensive after-sales servicing as do cars.

Third, the varieties of technologies open to both companies for selection in the interest of employment creation are limited to the extent to which faster machines or automatic equipment may be substituted for labour. And the opportunities for making such substitutions with profitable results are greater in the metal products company than in the car manufacturing plant. For instance, it was easy to double technical staff through the addition of an extra line of production; whereas the same employment effect could not be created in the car company.

Fourth, the nature of market demand for the two companies' products may permit different rates and degrees of technological application aimed at meeting such demand and also creating employment. Where the car manufacturer will require a plant extension to solve its production capacity problem, the metal products firm may easily (as in fact it did) increase output by hiring more hands to work more shifts.

These four factors provide the background for the different data reported in tables 2, 3 and 4. Table 2 shows the distribution of the dealer outlets through which both companies sold their products in 1979. For the metal products firm, 3 supermarkets, 2 large companies and 35 indigenous companies accounted for 1.5, 37 and 61.5 per cent respectively of the total sales of the firm. The car manufacturing firm, on the other hand, sold its cars through 2 large companies and 56 exclusive dealers. The units of cars sold yearly by the smallest dealer were about 600, while the largest dealer sold about 5,000. These distribution channels are also sources of indirect employment creation by both MNEs in Nigeria.

Table 3 identifies three categories of training provided by the two MNEs for their employees and dealers. The first training category relates to the technical courses run for production employees. Seventy-two employees in the metal products company and 53 employees in the car assembly benefited from such courses in 1980. The car manufacturing company also trained 561 of its dealer staff, 136 of its fleet owner staff, from a total of 750 trained staff in 1980. The second category of training provided was for 36 supervisors in the metal products company. The car company also sends its supervisors to such training, though exact figures were not readily available.

Table 2
Distribution of Two Nigerian MNE Sales By Dealer Outlets

<table>
<thead>
<tr>
<th>Dealer Outlets</th>
<th>1979 Sales Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Metal Products Co.</td>
<td></td>
</tr>
<tr>
<td>3 Supermarkets</td>
<td>1.5%</td>
</tr>
<tr>
<td>2 Companies</td>
<td>37.0%</td>
</tr>
<tr>
<td>35 Indigenous Companies</td>
<td>61.5%</td>
</tr>
<tr>
<td>2. Car Assembly Co.</td>
<td></td>
</tr>
<tr>
<td>56 Exclusive Dealers</td>
<td>(100%)</td>
</tr>
<tr>
<td>Yearly Car Sales (Units)</td>
<td></td>
</tr>
<tr>
<td>Smallest Dealer</td>
<td>600 cars</td>
</tr>
<tr>
<td>Largest Dealer</td>
<td>5,000</td>
</tr>
</tbody>
</table>

Source: Interviews with Managers of both Companies.
Table 3

Distribution of Categories of Training Provided by Two Nigerian MNEs (1978 - 1980)

<table>
<thead>
<tr>
<th>Training</th>
<th>Metal Products</th>
<th>Car Assembly</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Production Employees (Technical Courses)</td>
<td>72</td>
<td>53</td>
</tr>
<tr>
<td>Dealer Staff</td>
<td>n/a</td>
<td>561</td>
</tr>
<tr>
<td>Fleet Owner Staff</td>
<td>n/a</td>
<td>136</td>
</tr>
<tr>
<td>Sub-Total</td>
<td>72</td>
<td>750</td>
</tr>
<tr>
<td>2. Supervisory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Organisational Courses</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>Dealers Workshop</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Managers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dealer Spare Parts</td>
<td>29</td>
<td>130</td>
</tr>
<tr>
<td>Fleet Owner Spare parts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub-Total</td>
<td>n/a</td>
<td>162</td>
</tr>
</tbody>
</table>

Note: Fleet owners own 20 or more vehicles

Source: Interviews with managers in both companies.

The third category of training provided by both MNEs, organisational courses, covered managerial, administrative and professional staff. Twenty-nine workshop managers, 130 spare part managers from dealers, as well as 3 fleet-owner spare parts staff benefited from such courses in the car manufacturing company in 1980.

Table 4 shows the classes of employment created by the two MNEs in Nigeria. Among the 800 employees in the metal products company, 700 are direct productive. Among the 2,800 employees in the car assembly company, 1,000 are direct productive. The metal products company is estimated to account for about 45 per cent of the total industry employees in Nigeria. The car manufacturing company accounts for an estimated 30 per cent of the vehicle assembly industry employees in Nigeria. This table 4 also indicates that the range of employees per dealer is 5 to 50 with an estimated dealer mode of 15 for the metal products company, whereas the car company has a dealer employee range of about 6 to 1,000, with an estimated dealer mode of about 30 employees. These dealerships are estimated to generate 600 and 4,000 indirect employment respectively for the metal products company and the car company. The basis of all estimates in table 4 is given in the annex to table 4.

Table 4 reveals some interesting relationships between classes of employees. The metal products company appears to generate more direct productive employees per total employed (700 out of 800) than the car company (1,000 out of 2,800). If the technologies being transferred through the skills developed by MNEs in such employees are assumed comparable in both companies, there may be a case for governmental inducement of many more of the metal products manufacturing businesses. The table also indicates that where the metal products company only generated about 100 per cent of its direct productive employees in indirect employment through dealers, the car company generated 400 per cent. This is a result of the nature of production and servicing processes of both companies. However, the need for the car
manufacturing company to use so many more technical employees in the dealership is an opportunity for the propagation of technologies adaptable to the functions involved.

The metal products company accounted for about 1,400 jobs, and the car company for about 6,800 jobs in Nigeria (directly and indirectly). These estimates exclude the employment traceable to the suppliers patronised by the two MNEs. The question to address next is the issue of what exactly determines these levels of employment creation in both companies. The choices of technologies made by the two companies are considered relevant to the magnitudes of employment created by them. It is, however, not possible within the methodological framework of the present study to find out whether other companies in Nigeria not selecting given technologies are generating less or more employment than our sample MNEs.

Table 4
Comparative Employment Creation by Two Manufacturing MNEs in Nigeria

<table>
<thead>
<tr>
<th>Employment Category</th>
<th>Metal Products</th>
<th>Car Assembly</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Company</td>
<td>Company</td>
</tr>
<tr>
<td>Total Employees</td>
<td>800</td>
<td>2,800</td>
</tr>
<tr>
<td>Direct Productive</td>
<td>700</td>
<td>1,000</td>
</tr>
<tr>
<td>Employees as percent of Industry Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(estimated)</td>
<td>45%</td>
<td>30%</td>
</tr>
<tr>
<td>Dealerships in Nigeria (Total)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>58</td>
</tr>
<tr>
<td>Indigenous Dealers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>Exclusive Dealers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>56</td>
</tr>
<tr>
<td>Employees per Dealer Range</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>5 – 50</td>
<td>6 – 1000</td>
</tr>
<tr>
<td>Estimated Mode</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td>Estimated Indirect Employment Through Dealers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>600</td>
<td>4,000</td>
</tr>
</tbody>
</table>

Note: See Annex for basis of estimates.

Source: Interviews with Managers in both Companies.
Annex to Table 4

1. Estimated industry total employees was based on:

(a) A firm of 300 workers (about 2000 employees for
    11 product lines)

(b) 5 other small firms with about 200 employees each = 1000.

Industry Total

\[
\begin{align*}
\text{MNE} & = 800 \\
\text{A firm} & = 300 \\
\text{5 Others} & = 1000 \\
\text{Total} & = 2,100
\end{align*}
\]

\[
\text{MNE \% of total} = \frac{800}{2100} = .45\% \text{ (approximate estima-}
\]

2. Estimated modal number of employees per dealer was arrived at
   as follows:

(a) Metal products Company
   
   Range per medium sized dealers = 5 - 20,
   Mode estimated as about (20-5) = 15

(b) Car Manufacturing Company
   
   No. of employees used as working base per dealer workshop = 6
   
   Indigenous range = 6 - 35 workers.
   Mode estimated as 35 - 6 = 30

3. Indirect dealer employment was calculated thus:

(a) Metal products company.
   
   Dealers = 40
   Mode = 15
   Total = 40 x 15 = 600

(b) Car manufacturing company
   
   Exclusive dealers = 56
   Mode = 30
   Total = 56 x 30 = 1680
   Largest Company = 1000
   Second Company = 320
   Fleet owners = 1000
   Total = 4,000
VI. Determinants of the two

MNEs employment effects

The factors listed in Table 5 were explored in the interviews with managers in the two companies. Comparatively speaking, the technologies open to either company's production processes were described as being relatively basic. The operations entailed in metal goods production in Nigeria are the same as those to be found in similar factories in developed countries. The only distinction is the extent to which machines are used as substitutes for human operatives in plants located in better technologically developed areas. The same is true of the car assembling company. The operations entailed in parts assembling are standard, for instance, between the plants in Brazil and Nigeria. But where the plant in Brazil produces 1,000 cars daily of a particular brand, the plant in Lagos only produces 100 cars daily. Apart from differences in production capacities of the two plants, reflecting market size differentials, the level of technological development in Brazil is higher than that in Nigeria. The Brazilian level is even said to be comparable to that existing in the USA for purposes of producing the given line of car concerned. More advanced technology will only become relevant where car parts are being manufactured as components of the assembly processes. The Nigerian plant has the potential for local parts incorporation eventually, since only about 10 per cent of the cars assembled are locally obtained by early 1981. The proportion is expected to rise to about 20 to 30 per cent by the end of 1983.

The criteria of choice of technologies by the two MNEs were generally related to the issue of how easily the skills needed to manipulate the technologies were obtainable locally. The problems of maintaining the machines and of training the local personnel to produce wanted output were very important on the scale of consideration of the managers. Both MNEs defined their economic policy in terms of the economic viability of the chosen technologies.

Other highlights of Table 5 are in items 3 to 7 and 9. The R and D efforts of both companies in Nigeria are limited. The metal products company depends on the experiences gained in marketing given lines of products in other countries before their introduction to Nigeria. The car company tests each car model change by first importing samples of it for use in Nigeria. The modifications suggested by such test-usages are then made before the model will be assembled in Nigeria. Two lines of cars have been so tested and modified by this MNE before their recent production in Nigeria.

The metal products company actually introduced two new products into the local market between 1980 and 1981. One is an electric cooking utensil and the other is a deep frying pan. The managing director of the company suggested that the potential for introducing other more sophisticated cooking utensils exists in the country. Each new product introduced carries with it the possibilities for marginal elaborations of the plant's production technologies. The two new products were said to have created further employment through the new work stations that had to be opened for their production.

The scope for "backward linkage" was said to exist in the metal products company. A new plant for producing up to 60 per cent of the raw materials needed for the metal products of the MNE is expected to start functioning by September 1981. On the other hand, the car company does not see any such scope for backward linkage, since as a matter of policy it does not engage in parts manufacturing. The potential for buying locally produced car parts was, however, recognised, subject to their meeting the international quality standards set up by the parent MNE for such parts. An example of a local supplier of clutches, expected to start production in August 1981, was mentioned. The company hopes to patronise this supplier if its clutches meet the quality standards desired.

The local inputs of skills are the trade and vocational school leavers who are said by both companies to need better training and technical work attitudes. Both companies have factory training facilities for their technical staff. Even the OND and HND certificate holders were said to be unwilling to work with their hands in factories, besides expecting to be paid wages too high for their modest contributions to the supply of raw materials and parts, as indicated in Item 6 on Table 5, is rather limited for both companies. The import contents of three lines of products in the metal company are 45, 35 and 60 per cent respectively. The car company still had 90 per cent import content for its models as at the time of interview.

1. OND - Ordinary National Diploma
2. HND - Higher National Diploma
<table>
<thead>
<tr>
<th>Factors</th>
<th>Metal Products Company</th>
<th>Car Assembling Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. (a) Types of Technology</td>
<td>Standard</td>
<td>Standard and Simple</td>
</tr>
<tr>
<td>(b) Level (high and low)</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>(c) Parts Fabrication Press shops Tool Rooms Stamping Shop</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>2. (a) Criteria of choosing technology</td>
<td>(a) Profitability (b) Ease of skill development (c) Machine maintenance requirements (parts, power supply, water needs etc.)</td>
<td>(a) Product (model) requirement (b) Ease of worker manipulation without interruption. (c) Cost.</td>
</tr>
<tr>
<td>(b) Economic Policy</td>
<td>Economic viability of choice</td>
<td>Economic viability of choice</td>
</tr>
<tr>
<td>3. R &amp; D Efforts of Company</td>
<td>(a) None locally (b) Tested products in other markets are introduced in Nigeria as consumers desire them.</td>
<td>(a) Each Car model change must be introduced in Nigeria first for test use. (b) Modifications suggested by test use are then made in Nigerian model.</td>
</tr>
<tr>
<td>4. Nature of Products</td>
<td>Two new products: (a) Electric utensil (b) Deep frying pan (c) Potential exists for other cooking items</td>
<td>(a) New Car models are adaptable to Nigerian condition (b) Two models were first tested, modified, before being assembled in Nigeria.</td>
</tr>
<tr>
<td>5. Scope for &quot;backward linkage&quot;</td>
<td>(a) Yes (b) Some 60 percent of raw material for metal products to be produced from September 1981</td>
<td>(a) No (b) Only in terms of buying local parts meeting MNES quality standards (c) A local supplier of clutches will start production in August, 1981</td>
</tr>
</tbody>
</table>
Table 5 (Contd)

<table>
<thead>
<tr>
<th>Factors</th>
<th>Metal Products Co.</th>
<th>Car Assembling Co.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Local Inputs:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) Technical skills</td>
<td>(i) Staff trained in factory.</td>
<td>(i) Staff trained in own training centre</td>
</tr>
<tr>
<td>(ii) Raw materials:</td>
<td>(ii) (a) 45 percent import content</td>
<td>(ii) 90 percent import content</td>
</tr>
<tr>
<td>(a) Utensils</td>
<td>(b) 35 percent import content</td>
<td>(iii) Purchased normally (never made by MNE)</td>
</tr>
<tr>
<td>(b) Extrusions</td>
<td>(c) 60 percent import content</td>
<td></td>
</tr>
<tr>
<td>(c) Tubes</td>
<td>(iii) Some local fabrication.</td>
<td></td>
</tr>
<tr>
<td>(iii) Parts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Forward-linkage</td>
<td>(a) 40 dealers all over Nigeria.</td>
<td>(a) 58 dealers in Nigeria.</td>
</tr>
<tr>
<td></td>
<td>(b) Rather limited prospects.</td>
<td>(b) Some contractual dealer development obligations.</td>
</tr>
<tr>
<td>8. Governmental Policies</td>
<td>No problem with governmental policies.</td>
<td>(a) Uniform impact on all car assemblers - but for 10% duty rebate to a competitor located far from the port.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(b) Price control problems.</td>
</tr>
<tr>
<td>9. Local R&amp;D</td>
<td>(a) No effect on products</td>
<td>(a) Desire to train own staff without governmental consideration.</td>
</tr>
<tr>
<td>(a) Capacity</td>
<td>(b) No effect yet</td>
<td>(b) No effect yet.</td>
</tr>
<tr>
<td>(b) Science and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>technology policy.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Marketing efforts</td>
<td>(a) Nigerian market focus.</td>
<td>(a) Nigerian Market only</td>
</tr>
<tr>
<td>(a) Of company</td>
<td>(b) No effect</td>
<td>(b) No effect</td>
</tr>
<tr>
<td>(b) Of government</td>
<td>(c) Sales in Nigeria only - though some dealers sell outside Nigeria</td>
<td>(c) Official purchase of 100 cars by government as aid to another West African Nation.</td>
</tr>
<tr>
<td>(c) For Export</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Attitude of Company to Employment creation.</td>
<td>Produce low technology products because of economic returns and market situation</td>
<td>Use adaptive technology and local parts provided full costs are allowed to influence price.</td>
</tr>
</tbody>
</table>
"Forward linkage", in terms of utilisation of own outputs as inputs into other production processes, was influenced for both companies by governmental policy. Both companies sell their outputs through dealers who, however, are open to direct company development and control for purposes of better handling and distribution of the products involved.

The local R and D capacity of Nigeria as well as the new science and technology policies of the Government are not expected to affect either company materially soon. Both companies are dependent on their MNE parent organisations for the necessary support.

The last item on table 5 concerns the attitudes of the managers interviewed in the two companies to employment creation through appropriate choice of technologies. The metal products firm generally seemed to us to possess an attitude of deliberately selecting low technology products that generate employment in developing countries. The rationale presented for this attitude was also readily observable in terms of market situations in given nations of the Third World as well as the need for reasonable economic returns. The car manufacturer, on the other hand, believed in the use of adaptive technologies and local parts that will generally tend to increase employment and rate of technology transfer to Nigerians. But the company was not satisfied at all with the situation in which locally purchased parts, that are about twice or thrice as expensive as imported parts, could not be routinely reflected by the company in higher product prices.

The fact that an MNE finds it hard to pass on to consumers the extra costs of incorporating local parts into its products may affect its attitudes to such parts. Already, there are official grumblings that many MNEs in Nigeria are attempting to set too high standards for local Nigerian parts manufacturers as a means of improving the production costs of MNEs in the short run, with cheaper imported parts.

The car manufacturing company managers mentioned some genuine difficulties they have had with the quality of paint, special diagonal tyres needed for a car model, and batteries. While local paint supply to their plant was said to be close to being perfectly satisfactory, the special tyres as well as batteries are yet to be obtainable locally. The local firms producing such products are said to be trying hard to meet the quality standards wanted by the MNE.
VII. Peripheral technologies and employment creation

Peripheral technologies relate to the operational systems or tools instituted by management in order to improve overall efficiency of production activities. These will usually include implant transport of goods in process, the finishing of products, labelling and packing methods. The two companies had examples of these peripheral technologies, as shown in Table 6.

The examples given in Table 6 indicate that peripheral technologies do contribute to employment creation by MNEs. The processes of such creation may be identified in three ways. First, management concern with production efficiency will usually entail periodic reviews of the general performance of machines, workstations and work-flow in a plant. The problems identified by way of production bottlenecks often require that management design some technical plans for resolving them. The choice of specific technologies by MNEs in such situations may either expand or curtail employment. The elimination of a workstation, or the acquisition of a machine to perform an operation that was being manually handled, curtailed employment of one category in the metal products, as well as in the car manufacturing companies. Employment was expanded in both companies in the instances of decisions made (a) to pack the household metal products manually (rather than by machine), to polish the finished products by using many operators on slow (rather than fast or even automatic) machines, and (b) to retain the use of a spray painter in the car manufacturing plant (instead of adopting a dipping system which has the advantage of uniformity of painting quality).

This leads to the second process of MNE employment creation in the two companies. The technologies chosen may create different categories of employment from the ones eliminated or curtailed in the pursuit of production efficiency. The managers in the factory operations of both Nigerian companies indicated clearly that better (or advanced) technologies will often imply the use of less rather than more people. But the fewer people needed with such advanced technologies must be more highly trained. The machines used as substitutes for several operatives must be properly maintained by skilled hands; and keen observation of equipment will be demanded of the fewer persons deploying such gadgets. To use better technology is to accept the responsibility for finding or training the skilled personnel warranted by the technology. And in the processes of improving plant operations in Nigeria, the tendency for either of the MNEs to think in terms of automation is basically limited by lack of an existing pool of highly trained technical manpower in the country.

A third process of MNE employment creation relates to the types of peripheral technologies that would be chosen for future operations or in their new plants in Nigeria. Experience of managers with operational problems in given factories may influence their choice of technologies for such plants. The metal products company managers pointed out the fully automatic and modern nature of their new factory to start production in late 1961 of raw materials for their lines of metal goods. The technologies open to this MNE were few in terms of basic systems. The production process involved was the continuous type requiring regular power supply and trained hands. When in full operation, the factory is expected to be comparable to any of its class in Europe. The plant cost $30 million. It will employ 16 expatriates to start with, 16 Nigerians will receive higher technical training abroad, and about 300 employees will be needed for the operations. The quality of the employment created by this type of plant is definitely higher than employment in low technology areas. The managers of this MNE mentioned that their desire to secure increasing value added in their Nigerian operations has meant the search for appropriate technologies in their manufacturing activities.

The car assembling MNE was not thinking of opening a new factory yet in Nigeria. The technology for assembling cars is said to be relatively basic for their plants in Brazil and Nigeria. Differences exist only in (a) the daily production capacities and (b) the extent of machine substitution for labour that is feasible in either country. The existence of a pool of trained technical skills in Brazil, coupled with the higher daily production rate of the plant, made it more sophisticated than the Nigerian plant.
<table>
<thead>
<tr>
<th>Peripheral Technologies</th>
<th>Implications</th>
<th>For Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Central Supply of Oxygen gas for storage, instead of old gas bottles.</td>
<td>(a) Better control over minimum quantity stock on hand.</td>
<td>More welders could be serviced centrally and faster.</td>
</tr>
<tr>
<td></td>
<td>(b) Faster operations by users served by central supply lines rather than</td>
<td></td>
</tr>
<tr>
<td></td>
<td>through bottles.</td>
<td></td>
</tr>
<tr>
<td>2. Special lifts for carrying major vehicle parts to Assembly Stations (Instead of by hand)</td>
<td>(a) 50 percent reduction in spilt parts.</td>
<td>Operatives now are to devote more time to their real operations.</td>
</tr>
<tr>
<td></td>
<td>(b) Reduced accident rate from former manual handling.</td>
<td></td>
</tr>
<tr>
<td>3. Materials Transfer Through Special Racks and Trolleys.</td>
<td>(a) Reduced parts spoilage.</td>
<td>(a) Staff use of more effective hand tools.</td>
</tr>
<tr>
<td></td>
<td>(b) No more need for use of fork lifts.</td>
<td>(b) Better opportunities for applying the training received.</td>
</tr>
<tr>
<td></td>
<td>(c) No more need for training staff in operating fork lifts.</td>
<td></td>
</tr>
<tr>
<td>4. Better plant-layout of metal products machines.</td>
<td>(a) About 30 percent increase in output per man.</td>
<td>(a) Introduction of general purpose machines became possible in a few stations.</td>
</tr>
<tr>
<td></td>
<td>(b) Better employee morale due to fewer accidents and bottlenecks.</td>
<td>(b) Workers were trained to operate the machines.</td>
</tr>
<tr>
<td>5. Major motion and time study of metal products operatives.</td>
<td>(a) Improved work-flows resulted.</td>
<td>(a) Specific training courses for operatives were introduced.</td>
</tr>
<tr>
<td></td>
<td>(b) Operatives assigned to suitable jobs became happier and more efficient</td>
<td>(b) General practical and theoretical staff training became more systematic.</td>
</tr>
<tr>
<td>6. Job evaluation and review processes for promotion up to supervisory level.</td>
<td>(a) The best persons got their just rewards</td>
<td>(a) Technical and administrative courses outside the factory were used widely.</td>
</tr>
<tr>
<td></td>
<td>(b) Employees and staff accepted the system as open, fair and competitive.</td>
<td>(b) Staff careers became easier to chart and supplement with training programmes.</td>
</tr>
</tbody>
</table>
The car manufacturing company markets its vehicles through official dealers, who are also part-owners of the company. The marketing manager of the company described their marketing strategy in Nigeria as the provision of cheap, reliable and good transportation for car buyers. A marketing plan prepared once a year sets the framework for their targets of sales performance. The dealers constitute critical factors in the company's marketing mix, since all sales have to pass through such dealers. Production plans are based on quarterly forecasts of the volume of vehicles they expect to sell. The marketing and production goals of different departments in the organisation are thus tied with the activities of the dealers in terms of sales and services. The personnel of the dealers, mechanics, managers for spare parts, workshop and dealership are also trained by the marketing division.

The company spends about 2 per cent of sales revenue on advertisements. All their company's vehicles are promoted nationally for the dealers. The emphasis is on the services obtainable from dealers as well as on the reliability of the vehicles. Products are donated, in exchange for publicity, to national organisations, charities, staff clubs, beauty contests and other sporting events, sometimes in collaboration with other sponsoring companies.
VIII. Some dilemmas in technology transfer and employment creation

Even when the executives of MNEs find it more convenient and potentially profitable to manufacture many parts locally, the constraint of local technical manpower supply may be too difficult to handle. We sought information from the managers we interviewed in respect of their experiences with technologies they chose, but found reasons to abandon later. The table below illustrates some of the examples mentioned.

<table>
<thead>
<tr>
<th>Company and Technology</th>
<th>Cost Factor</th>
<th>Quality Factor</th>
<th>Manpower Factor</th>
</tr>
</thead>
</table>
| 1. Steel Handles made in Nigeria up to 1978. | 60 percent more expensive than imported Handles. | (a) Poor, Rough, Not looking nice  
(b) Competitors were importing theirs | (a) No skilled Nigerians.  
(b) Expatriates not viable in tool shops.  
(c) 3 - 4 years training to become an apprentice. |
| 2. Cooking utensils polishing up to 1970 | (a) More expensive to consumers than necessary  
(b) Product Line not profitable. | (a) High European quality standard  
(b) Local Consumer needs not reflected. | (a) More hours spent on polishing items.  
(b) Concentration of saved time on more production. |
| 3. Electronic Ignition on Vehicles - for fuel consumption considerations - 1979. | Low | High | (a) Owners could not service it at roadside informal motor workshops.  
(b) Company changed back to old ignitions. |
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<td></td>
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IX. Appropriate technology, training processes and staff motivation

The link between the choice of a specific technology and employment creation may be viewed in terms of training processes and staff motivation. Technology transfer necessarily entails the problem of identifying, recruiting and training the local staff required by the operations of a particular technology. The more relevant core production technologies in this regard are those involving machinery, assembly and selected parts manufacturing. The manipulation of core technologies in the two cases we studied revealed that the most critical factor in the relationship between technology choice and employment creation is manpower selection and training.

A rather unique problem faced by the automotive industry in Nigeria is how to recruit, train and retain skilled employees. This company in particular conducts a technical training programme for its employees. The course covers mechanical technology, turning, milling and shaping processes, engineering drawing, welding and the layout of Nigerian school certificate holders for this course is phenomenal. There are a total of 9 trainers (including 3 expatriates) for some 78 trainees that were undergoing the course in 1981. Many of the trainees readily go on to pass their Trade Test I and City and Guild I.

In 1978, 3,500 persons applied for the course, as did 4,500 persons in 1979 and 2,500 persons in 1980. The number of persons invited to take the tests in the three years were respectively 1,000, 1,500 and 600. About half of those invited for the test will usually show up, with only the best 50 persons or so admitted to fill a class of 30 for the years of 1978 and 1979. The year 1980 was a slightly unusual year because some 78 persons admitted for the course actually showed up for it, and are still undergoing the training in 1982.

The course combines both practical and theoretical training on a full-time basis. Each trainee receives free books, medical care, meals, an allowance of $28-89 monthly, a $30 housing allowance, free transportation in company buses to and from work and a $100 bonus award on successfully completing the course. The trainees are then placed on monthly salaries ranging from $130 to $150.

According to the training manager of this company, the 30 persons admitted yearly into this course do not usually respond favourably to the incentives built into the course. About four or five persons in the class will leave for no stated reason. One or two trainees may be terminated for poor performance. Only about 66 per cent of intakes will pass out. After the first year of finishing the training, only about six or seven of the class will remain in the company. The others are said to go to other companies for jobs, to set up their own car repair shops or to further their training.

The training manager of this car manufacturer intimated that the company experiences 100 per cent labour turnover every two to three years. There are currently some 2,800 employees in the company. For this employee size at present, the company had recruited and utilised some 9,000 employees over the period of its operations from 1975 to 1981. This implies that the company records about 33 per cent employee turnover yearly. This rate appears unusually high in Nigeria, considering both the administrative costs of effecting the necessary replacements, and the implications of it for employee productivity. It seems plausible to hypothesise that the more experienced the employees in an organisation, the better their prospects of being productive and efficient on the operations or jobs they perform. The production director of this company estimated that employee productivity in the company improved by about 10 per cent between 1978 and 1980. However, in the absence of any reliable Nigerian industry estimates of such employee productivity indices, it is hard to assess whether this particular company's experience is typical. But from the general tendency for newspaper advertisements of vacant technical positions to require some years of work experience post-qualifications, one may readily assume that some positive correlation between years of work experience and productivity will exist in Nigeria. Therefore, this company must be paying some shadow prices for the number of employees it seems to be discharging rather magnanimously into the Nigerian industrial manpower pool.
The employee turnover issue was company-wide. The technical personnel trained by the company under the inducements earlier described appeared to be the least willing to stay with the company. Of the 17 persons that passed out of the training course in 1976, only 10 were still in the company in 1981. Also, out of the 15 that finished the training in 1977, and the 17 that finished in 1979, 6 and 5 persons respectively remained in the company in 1981.

There are two direct and indirect objectives of training by an MNE derivable from these data. A direct training objective may be inferred in terms of the desire of a company to develop the manpower needed for its technical activities. This may be a national motive for most company-sponsored training ventures. The failure of such trainees to stay with the companies furnishing them with the training may be a motivational problem. Somehow, this particular company is not interested in trying to bond the trainees to a few years of practical service in the company before they may leave for other jobs in the Nigerian economy.

In motivational terms, it is also possible to wonder further if the working conditions provided for the workers after training might be responsible for the skill drain to other companies. In the absence of any data on this point, we requested the training manager for some explanation of the company's attitude to this rate of employee loss after training.

The central reasons given by the manager are (a) that the company has an open training policy, (b) that the training of such persons actually serves the twin needs of the company and the Nigerian economy generally, (c) that the trainees who leave this company diffuse their knowledge and experience in ways that enhance the company's reputation; the trainees proudly mention the periods they spent in the company when they apply to other employers, (d) that the trainees that go for more advanced studies locally and overseas on the strength of their company training improve the image of the company, (e) that the urge to get rich quickly is accountable for the fact that some employees go to set up their own roadside mechanical workshops for car maintenance and repairs, and (f) that some young Nigerian workers are simply difficult to motivate up to a level necessary to keep them on a job in this company. Although hard data are missing on this point, the training manager agreed that many of the companies attracting the employees away do pay higher wages than this company does. From this indication, we are inclined to note the logical tendency for an employee-raiding employer to be slightly more generous in its financial handouts to prospective employees. However, any MNE desirous of retaining the services of trainees that have been expensively and painstakingly nurtured may have to consider the fit between its motivational incentives and employee desires. There are advantages derivable from ensuring that the employees trained in an organisation do remain for reasonable lengths of time with such an organisation. The central problems of shortage of intermediate technical manpower in Nigeria may be attenuated by a company's conscious policy to retain its staff. Clearly, the years of experience gained by the staff within a particular organisation will enhance the efficiency of such staff in executing specific operations.

An indirect training objective of MNEs may be viewed in terms of the benefits perceived by managers from the satisfaction of those trained and allowed to pursue the realisation of their industrial best selves in Nigeria. The managing director of the metal producing company indicated that a former factory supervisor was now one of the company's smaller competitors in Nigeria. The skills and training obtained from this MNE by the employee was translated into a manufacturing venture that was successful enough to count as a visible competitor to the giant firm he used to work for. The market for the household cooking ware products to which this competition relates is an expanding one. The demand for the products is still in excess of the local output production. The industry enjoys protection from imported brands of the household products, through an official ban on their importation. The extent to which an MNE may be positively influencing the total economy in this sort of situation bears further analysis in developing countries. The goal of technology transfer is paramount to the thinking of many developing nations whenever the question of MNE role in industrial progress is touched. The choice of technology made by a given MNE, in terms of simplicity and relevance to production manipulation in a developing country, is a basic determinant of modern employment generation. The need for MNEs to deliberately seek the nurturing of small local suppliers of parts and materials has been identified as a worthwhile social responsibility. This type of social responsibility may not be problematic where the MNEs are simply trying to develop local entrepreneurs that will be able to supply some local parts or services which will be purchased by the MNEs. However, some problems may be anticipated in situations calling for the nurturing of potential competitors for MNEs by the MNEs themselves. If the
industrialisation goals of a developing country can be facilitated by the creation of small competing manufacturers by MSEs, there may arise a need for policy makers to fashion out incentive systems that may attract or compensate the MSEs.

The managing director of the household metal products company did not give us any impression as to whether they did anything to help or hinder their old employee who became a competitor. There are about seven firms competing in this industry. None of the largest three firms, of which our sample enterprise is the most important, derives more than 60 per cent of its total turnover from the line of products concerned. The smaller companies are indeed "very small operators" in the word of the production director we interviewed. An indirect measure of the attitude of this MSE to the smaller operators in the industry was sought through an analysis of the strategies the MSE is currently adopting towards general competition in the industry. The company appears relatively comfortable with the growing emergence of such competition. There were indications that varieties of higher technology product lines that once were not profitable in Nigeria are now becoming more and more feasible. The superiority of the MSE in readily diversifying into such product lines was indicated as a major competitive strategy. The fact that the company's brand name has already attained a position of pre-eminence and wide consumer acceptance was also mentioned. Specific examples of three relatively expensive lines of products that were put on the market between 1973 and 1981 were shown to us. But the strongest competitive weapon at the disposal of the MSE seemed to be the fact that it has been already producing in many other countries the lines of products they are manufacturing in Nigeria. The research and development services of their home office were also of paramount importance.

Regarding the aim of a further development of the Nigerian market for the metal products of this company and the industry as a whole, the managing director saw no problems in the increasing competition observable. The products were basically made profitable by this MSE in Nigeria through deliberate marketing efforts. As more Nigerians get used to the products through the emergence of more competition, the managing director expects better opportunities for product differentiation.

The nooks and corners of Nigerian major cities are populated by informal motor workshops where vehicles of all descriptions are repaired or serviced. The technicians in such workshops are usually either self-employed or are fully employed by motor repair outfits. The workshops are run as competitors to the formal motor servicing establishments in such cities. The technicians, mechanics, welders, painters and panel beaters operating the small workshops are usually former-trained employees of some specialised motor servicing companies in Nigeria. Many mechanics and other technicians of such companies indulge in the practice of setting up small roadside workshops where they carry out motor repairs for extra income. The services provided by such mechanics usually vary in quality. But Nigerian motorists generally patronise the small workshops for two reasons. First, the skilled mechanics in these workshops are about 40 per cent or less of what is obtained in the formal companies. Second, the turn-around time for jobs in the small workshops may range from a few minutes to some hours, whereas identical jobs could take days in the formal motor servicing and repair companies.

These roadside workshops are also used as training centres for other apprentices interested in trades such as welding, mechanical and electrical repairs, panel beating, vehicle spray-painting and motor servicing. The technicians operating these small workshops never exceed groups of about two to around ten. The experienced and specialised members take on trainees who may spend up to five years to become adept in given technical trades. Many of such small workshops specialise in the servicing of particular vehicles, according to which established motor servicing companies give the key technicians in these their on-the-job training. The operators of the small roadside workshops are usually very proud of their association with the established motor servicing companies that trained them. Typical signboards will read: (1) "ABC Volvo and Toyota Workshop: R.T. Biscoe-trained, expert mechanic", or (2) "XYZ Servicing Yard: Volkswagen-trained mechanic", (R.T. Biscoe and Volkswagen are two established names in vehicle servicing business in Nigeria).

The opportunities afforded the technical employees of motor assembling and servicing companies in Nigeria, by roadside workshops, may be interpreted in two lights. First, they are avenues for a wider transfer of technology to other Nigerians. There is a need to establish the multiplier effect of the technological
employment created by an MNE that trained one technician in a formal factory centre. The technician also goes ahead to train perhaps about four or five other technicians up to or near his own technical competence level, in a period of years. After training, the apprentice technicians either seek partnership associations with their old bosses, or set up their own roadside workshops. And as the technologies being used in the established motor servicing companies are improved, no informal workshops also alter their own technologies. Examples of such changes have been observed: progress: (1) from car painting manually with a brush, to spray-painting, (2) from manual setting and adjustment of carburetors to the utilisation of simple electronic setting, (3) from heated metal form of vulcanising punctured tyres to the use of electrically operated devices for heating and repairing tyres, (4) from manual engine repairs to the use of sophisticated tool sets and electronic gauges for complete engine works, and (5) from vehicle part replacements to increasing degrees of part engineering involving rethreading, minor machining and size modifications to meet specific needs.

A second view of these roadside workshops is the motivational problems they create for production managers. The fact that employees are able to make more money working outside their companies makes the employees less responsive to the wage incentives of many companies. The training manager of the car manufacturing company actually mentioned this point as a major force militating against industrial work motivation in Nigeria. In fact, many full-time employees of motor servicing companies engage in subtle tactics aimed at attracting formal company customers to their own roadside workshops. The other manufacturing company in our study also mentioned the tendency for many of their employees to engage in training and other business activities in their own spare time. But due to the difficulty of setting up informal factories for producing some of the metallic products of this second company, the employees do not have the opportunity to open informal workshops for practising the trades they learned from the company.

The choice of appropriate technologies by MNEs in developing countries may create more direct and indirect employment under two conditions. The first condition is that the operations entailed by specific production processes be amenable to ready learning by employees exposed to rudimentary training opportunities. Some factory operations requiring precision and very narrow tolerance limits may take up to 10 or 20 years to master competently. Some others may be learned in shorter time spans ranging from several months to about a year or two. The more complex operations do require that trainees possess a minimum level of technical awareness represented by either the City and Guild I or II or the Nigerian Trade Test Certificate I or II. The simpler operations do not often warrant any prerequisite technical training. The two companies in this study require a School Certificate or a Primary School Leaving Certificate as a minimum educational qualification for varieties of technical training programmes within their factories. Many of the employees taken for such training courses complete them in between nine months and three years. The trainees stand a good chance of being promoted to foreman or supervisory level if they stay with their companies and continue to perform satisfactorily.

The second condition of creating substantial employment through appropriate technology choice is that the technologies concerned be really "appropriate". The test of appropriateness in this context is the extent to which a particular technology is of optimum use considering the factors of output size, ease of manipulation, the limited technical skill availability factor, ability to service or maintain the machines or tools involved, and the problems of power supply, water, and other related infrastructural deficiencies that may exist in an environment. In broader perspectives, appropriate technologies have tended to be defined in terms of those elementary or intermediate core production processes that are easily adaptable to the raw material processing or simple manufacturing activities that are peculiar to the economic environment of a given country. In that sense, a technology is appropriate because it is the easiest to acquire and use in a specified industrialisation stage of a country's economy.

In Nigeria in particular, appropriate technologies may be viewed as those that can be readily learned by Nigerian employees in formal factory settings for immediate productivity. The skills involved should be capable of being further developed, without the frequently wasteful routines of many factory employees who tend to jump from one specialised operational training to another in different factories. The need to foster the much talked-about supply of intermediate technical manpower in Nigeria underscores the importance of encouraging Nigerian employees to specialise in the performance of general operations that may cut across many factory and industrial production processes.
For example, welders, machinists, chemical analysts, forgers and technical drawers may be able to apply their skills in different factories needing persons for these operations. But rather narrow specialists, such as those trained to service a given machine that is unique to a factory, may not be able to readily build upon the skills they have acquired whenever they move outside the factory providing the training. In the final analysis, all skills acquired within the confines of modern technology are beneficial to a developing nation. The point being emphasised here however is that some skills are more general and potentially more durable than others, for purposes of spreading technological know-how and thereby creating more employment in the economy.

As an industrialisation strategy, the first step needed to improve the activities of technicians in informal workshops is to provide them with stable locations. Persons trying to use the skills they have acquired from formal factory courses in Nigeria have generally been neglected in national development planning processes. Bello (1968) documented the importance of such technicians in the industrialisation policies of the Nigerian Government that could foster the growth of Nigerians in indigenous manufacturing enterprises. The fact that roadside workshops operate at the mercy of landowners who frequently toss their tenants around for purposes of optimising the rent from their landed properties, represents instability for such workshops. Customers are never too sure of where to locate their technicians' workshops. The workshops are never too readily accessible to both old and new customers, as the technicians keep seeking locations further and further away from premium landed properties they had to vacate for better development by owners. Of all the States in Nigeria, only the Lagos State Government has identified and implemented a policy of allocating plots of land to roadside workshops. The workshops are to be constructed by the technicians in specified areas where many of them can operate their businesses in accessible locations to many potential customers.

The employment being created through the informal and formal activities of employees trained by MNE companies in Nigeria is considerable. The case of motor workshops in the cities is clearer to identify than those of other technicians operating in lesser numbers. For instance, there are refrigerators, typewriters, fans, television and radio repairers in many cities. Their skills and training would have largely derived from the MNE companies they work for, where such operators are part-timers outside. In respect of the second company of our study, we have also observed many workshops in which the metallic skills obtainable from the company were being used. Among such workshops are those in which fast moving products such as water tanks for preserving water in Nigerian towns, metal buckets for domestic use, metal cooking gadgets (for firewood use), flower pots, cake and bread pans, metallic furniture for homes and parties and the fabrication and mending of cans and drums for kerosene, engine oil and vegetable oil transportation and sales at the local market levels. These products reflect the major characteristic of functional consumer requirement rather than sheer finishing beauty or sophistication. This same product characteristic was the type engineered by the metal products company into the production processes that made the company profitable when it was acquired in 1970.

This analysis will appear to have pinpointed the distinction between the imperatives of MNE employee training and the national industrial development perspectives on broad training. The MNEs ideally select given technologies they are able to implement productively subject to the constraints of required training for local employees. The technical training extended to such employees is usually viewed in terms of employment creation. Some technologies demand more functional employee training than others. An average MNE would probably seek to optimise the time, costs and returns obtainable from particular training schemes that attend upon specific choices of technologies. A consciousness of the benefits derivable from the extent of the employment created through the choice of a technology may influence the decisions made by given MNEs. Direct employment creation through

the instrumentality of particular MNE choices of technologies may be limited by considerations of market size, output capacity of plant and the ease of finding trainable local employees. However, the significance of such resultant employment creation, through the technical training of employees, can far outweigh the numerical magnitude of those trained. For instance, an employee trained in a factory to perform either welding, machining, quality testing or engine maintenance operations will represent a technological resource.

The benefits of such a trainee to national economic development through the possibilities of establishing a career based on such training, of practising or teaching the skills concerned in the informal sector of the economy and of increasing the local value-added of the products or services involved, can be considerable. Technical manufacturing skills are still so relatively scarce in the Nigerian business system at present, as to make such skills more valuable and productive than administrative and clerical skills. Hence, the few skilled technical employees developed by a manufacturing company may be readily considered more immediately relevant to the propagation of manufacturing core technologies than the more prevalent clerical skills available in Nigeria. Without denigrating the importance of clerical or administrative skills, it must be noted that the judgment being pronounced on categories of skills in this context is only intended to emphasise the notion of relevance of given skills to particular technological activities. Technical factory skills simply happen to be more critical and valuable in the manufacturing processes of MNEs in this regard than are other skills.

The perspectives of a developing country on the importance of employment creation through the MNE choice of technology may differ from those of the MNE itself. The number of employees newly trained by an MNE, rather than their quality or level of technological skills, may too often appeal to a government. The need to find jobs for school-leavers, to reduce unemployment, and to integrate local personnel into the activities of MNEs are clear factors influencing the aspirations of many host governments. In Nigeria in particular, a policy of gradual appeal to MNEs to Nigerianise their managerial positions did bring about such Nigerianisation, but in terms of numbers rather than substance. Many companies elevated local personnel to dummy managerial positions without explicit managerial responsibilities. It took a set of policy review exercises by the Government before a more satisfactory level of compliance could be secured from the MNEs. Such exercises included strict analysis of position descriptions of companies, their expatriate incumbents, potential Nigerian replacements, time schedules of planned training programmes for Nigerian managers and proof of inability to find Nigerian managers before the mandatory permit for expatriate quotas could be obtained by MNEs.

The experiences gained from the Nigerianisation policies of the Government are definitely relevant to those of technical employment creation by MNEs through the choice of technologies. A technician trained in a factory probably stands a better chance of being effectively deployed by an MNE trainer, than a manager does. The discretion to allocate tangible decision-making functions to a manager may be varied by an MNE according to the level of ability perceived in given local managers. But because an employee is needed to perform specific operations after training, the incentive for an MNE trainer to fully utilise such trained employees is usually present. The Government should be specific as to the categories of local technical skills that should accompany the manipulation of the broad technologies chosen by MNEs for their manufacturing processes in Nigeria.

A Nigerian employee of one of the two companies we studied indicated that an expatriate technician was actually performing tasks that Nigerians with trade test certificates could handle. This illustration is cited to support the need for government efforts to be more specific as to their expectations of MNEs. To assess the truth of such decision situations, it would be necessary to establish that the functions being performed by the expatriate personnel involved can actually be performed by Nigerians who are qualified and willing to "get their hands dirty" in the work situation concerned. The managing director of the metal products company hinted that a basic advantage of using generalist managers by their group lies in the versatility of such managers. Any of their three top expatriate managers who have backgrounds in production activities are said to be capable of doing anything within their line of business. As qualified Nigerians are found, or as they respond to internal training processes, so are such Nigerians given tangible work responsibilities. The management orientation of this particular company may be functional to the technical employment creation goals of the Nigerian Government in this case. However, one can imagine the extent of frustration of public policy that could result from the unwillingness of an MNE in
such a situation to participate meaningfully in the realisation of the employment goals of the host country.

There exists two mechanisms for reconciling the obligations and privileges of MNEs with the expectations of host countries. These could be through morally binding written agreements (not enforceable in a law court) or through legislations by host countries. The agreements signed by the Nigerian Government with car assemblers in Nigeria have been of limited use in securing the goals set out in them. The local content of many cars and vehicles assembled in Nigeria today by most companies only range between 10 and 20 per cent. The Government expected to reach about 80 per cent local content or more by now. The enactment of laws stating the constraints under which MNEs may make certain technology-related decisions may provide MNEs with more meaningful guides for effective planning. It may also highlight the problems of infrastructural and market size limitations which many MNE managers readily call attention to in the process of explaining their levels of performance which the Government is not happy with. A clear confrontation of the issues involved in what technologies are desired by host nations (because of their employment implications) and those technologies felt feasible by MNEs, is needed. The impression we got from most of the managers we interviewed was that frequently, the Government and MNEs do not devote enough time and effort to a frank exploration of the employment and technological expectations or possibilities of their relationships.
X. Possibilities of and limitations to the application of the enterprises' experience elsewhere

Both of the MNEs controlling the companies studied in Nigeria do have experience of manufacturing the same products in other developed and Third World countries. In fact, both parent MNEs came to the Nigerian market on the strength of their manufacturing activities in respect of products that were previously being imported into Nigeria. The experiences of the two MNEs will be examined first individually, and then jointly in order to demonstrate their prospects for use in other countries.

The Third World MNE brought a tradition of generalist management perspective to the company acquired in Nigeria in 1970. This company had eight expatriate specialist managers when it belonged earlier to a European group. Many of the managers were not even performing the specialist functions attributed to them. The company never really made any profits in Nigeria from 1959 to 1969. The Third World MNE that took over the company already had a number of experienced managers with a general rather than a narrow specialist understanding of business management. The original team of eight specialists was replaced by the MNE with three generalist managers. The company was made profitable in the first year of the take-over by the Third World MNE. This was achieved by the introduction of three simple innovations.

1. The quality demanded by Nigerian consumers, as against the existing practice of producing a line of household products to European quality and taste standards, was taken into consideration. This led to a slight reduction in the quality standard of the products, but not in the functionality of the products for consumers. Production costs went down. And the volume of business easily went up as a result of lower selling prices. Even though 1970 coincided with the end of the Nigerian Civil War, the profitability of the company was accounted for by that ingenious attempt to relate the products to their environmental requirements.

2. A set of efficiency measures was introduced by the three new generalist managers who replaced the old eight specialist managers. Production cost was generally streamlined. The three generalists cost less money than the old eight specialists. The new managers were more sensitive to Nigerian local circumstances. Instead of only one shift operated by the former owners of the company, the new owners introduced two shifts. The production backgrounds of the generalist managers facilitated effective management on the shop floor. The operational problems of the company were naturally perceived by the generalist managers as their individual and collective problems. All these led to a doubling of the production volume and a tripling of profits in 1976, the year the managing director, responding to our interviews, came to the company.

3. Administrative changes in running the operations of the company were made. The functions of charge-men, supervisors and operatives were analysed. Systematic job evaluations were carried out and tied to available promotion prospects at lower levels. The administrative manager (a Nigerian) and two expatriate managers (personnel manager and production manager) interviewed every operative, and independently rated them for given positions. The personnel manager, since 1978, has been a Nigerian. The consensus of the three managers on who are promoted as charge-hands or supervisors was popularly accepted by the workers because everyone had a chance to be considered in the selection process.

These management innovations served three purposes: (1) they improved productivity and helped to make the company profitable; (2) they involved Nigerian employees in the running of the affairs of the company by extending training and promotional opportunities based upon objective job evaluation criteria to them; and (3) they therefore secured the loyalty and devotion of Nigerians to the service of the company. In this connection, one should note the absolute absence of industrial relations conflicts in the company between 1976 and 1981. Most of the employees trained by the company generally tend to stay with the company. Labour turnover in the company was practically nil. This particular company's experience in Nigeria seems patently applicable to the problems of MNEs in other developing areas. For one thing, the company is a Third World MNE subsidiary, and the innovations tried successfully by their managers in this case are more or less known to most managers. They have worked in India, other Par
Eastern countries and in African countries in which the MNE is implanted. In
general, the concept of trying to solve the management problems originating a
company by attempting to alter the environment of the company on
productivity and employee motivation is a basic business construction. Where
many MNEs fail in Nigeria, allegedly because the Nigerian cultural and economic
setting is unmanageable, this particular MNE has succeeded. This success is
certainly replicable in other nations of the Third World.

Such replications may be pursued in terms of the training orientations of
employees and managers. Broad-based technological training programmes, which will
provide employees with possibilities of future career development along the lines
of such programmes, should be encouraged. Managers and professionals should be
schooled in generalist perspectives that are needed to deal with the short-run
difficulties of shortages or total lack of industrial manpower supply. The
technologies selected by way of machines and equipment should be those easily
serviced by technicians who are given only a limited training within the context of
a factory. The selection of simple technologies that are easily adaptable to
many purposes in a factory should be accorded priority. As the level of market
and infrastructural development of a country rises, the requirements of specialist
training operations can be met through on-the-job courses. The essence of the
link between technology choice and employment creation is the need for MNEs to
secure local personnel for use in operating such technologies. Naturally, the
impact of local manpower preparedness for the levels of training warranted by
given technologies was considerable in the case of the sample enterprise. The
managers chose equipment which was easily serviced by staff of minimal technical
training rather than equipment calling for advanced personnel skills. Availability
of spare parts, ease of repair and sensitivity to power and water supply disruptions
were all factors carefully weighted in the MNE decision processes. The technol-
gegies selected were invariably those found to be consistent with the
environmental peculiarities of the factories being operated by the managers.

A basic limitation of these experiences for use in other developing countries
is the amount of pressure for output creation which given companies are subject to.
Any company selecting a given technology at a point in time must also have the
possibility of scheduling the necessary in-house training programmes to presage
the manipulation of the technologies. The time lag required for making the choice
of technology and subsequently preparing the local personnel to be capable of
operating the technology must be affordable to the company. Where a company must
produce today to justify its existence or perhaps to ensure the profitability or
competitiveness of its operations, the luxury of selecting some technologies
only by attempting to analyse the impact as pre-conditions of implementation may
be considered too expensive. This is why all host governments should try to
encourage MNE forward planning and implementation of technological choice activities
in a way to benefit all concerned. The expectations of host governments should
be clarified and communicated to the MNEs in this regard. The MNEs should also
have the indulgence of discussing their operational constraints with the host
country’s government. Both MNEs and host developing countries are bound to
benefit from mutual co-operation and open communication on matters related to
choice of appropriate technologies and employment creation. To a developing
country employment creation implies a propagation of modern technological skills
badly needed for transforming traditional economies into modern industrial ones.
To MNEs, appropriate technology choice denotes the realisation of economies of
operations derivable from efficient combinations of relatively scarce manpower
resources with adaptable methods of production. Joan Woodward’s1 idea of

technology as the methods chosen by companies to produce their goods and services
could not find any more fitting operationalisation than this policy of MNE and
host country co-operation can provide.

The experience of the car manufacturing company is also replicable in other
developing countries, given the following conditions: (1) the output capacity of
the company to be the optimum for effective realisation of technical
economies of scale; the number of cars produced daily, as reflected in the
market size for cars, should be large enough; about 250 to 300 cars per day will
meet the production requirement, according to our respondents; the parts and

1 Joan Woodward, Industrial Organisation, London, Oxford University Press,
1965.
other car component business which can be usefully developed as suppliers to the plant, will be feasible under such daily production range; (2) from the experience of the MNE in Brazil and the USA, the level of technological development present in an economy should be advanced enough to be able to provide most of the technical skills needed for the production activities of the plant.

The car assembled in Brazil was said to have about 95 per cent local content with only about 5 per cent imported content consisting basically of oil and petroleum products. The 95 per cent local content achieved by the company in Brazil was largely due to the existence of facilities, skills and parts manufacturing ventures that were able to meet the quality standards of the cars assembled. The USA plant, on the other hand, reached only about 50 per cent local content. The USA plant of this company exposed the serious limitation of any strict adherence to production criteria set in terms of the proportion of local content present in manufactured products. The theoretical maximum in technology transfer parlance is obviously a situation in which a product meets a standard of 100 per cent local content realization. Proportions of local content below such an upper limit are assumed to represent lower degrees of desirable value-added components of the output concerned.

However, the location of a car manufacturing plant in the USA presented the other side of the thinking related to the optimization of economies of productive operations traceable to the use of parts and materials emanating from the cheapest sources conceivable. An advanced economy, any company operating in the USA can readily (with ease) seek the limits of union tolerances to seek parts and materials from the most economical sources. This car manufacturing MNE intimated for example, that the gear boxes used in the US vehicles were being imported from the Federal Republic of Germany. The objective of 100 per cent local content of products manufactured is only logical and attractive within the framework of developing economies seeking to transform their economies from basically traditional to industrial ones. Subject to this limitation, any MNE may join hands with a developing country in selecting appropriate technologies that may increase employment through the route of staff training and utilization of increasing local contents of manufactured products.

The activities of these two companies in Nigeria were evaluated in terms of the core, peripheral and training or development of staff technologies that are open to them. The core production technologies available to both companies were largely constrained by the problems of limited supply of intermediate technical manpower and market size. The use of sophisticated technologies could only be justified at production capacities very much larger than the two plants of these MNEs were set up for. The fact that the basic infrastructures such as water, electricity, drainage and good roads were still in limited supply affected the range and quality of technologies that could be easily chosen by MNEs. Each selected technology had to be complemented with internal employee training programmes aimed at efficient manipulation of such technologies by cheaper local staff for production purposes. Such training efforts, which the Nigerian IIE programme encouraged, tended to create pools of needed factory expertise out of Nigerian employees invariably hired with little or no technical background for the training courses intended.

The peripheral technologies chosen by the MNEs involved plant layout adjustments, the handling of goods-in-process, reduction of waste due to scrap minimisation in production processes, the introduction of conveyor belts to facilitate the efficiency or operatives in the car company; and the introduction of charts, record-keeping and data analysis for old practices of periodic output examination by managers at very long intervals. The interview with managers in both companies revealed the introduction of the science and art of making production decisions as events and operations were occurring, rather than waiting until the outputs have been produced to worry about their importance to profitability and consumer satisfaction. The development of the expertise of dealers who market and service cars or who distribute metal products to final consumers, also received attention. The car company, however, was obliged to look after the welfare of the dealers through whom all the cars produced had to be sold. The dealers received training benefits that were designed by the MNE to enhance the satisfaction of consumers besides maintaining the general quality image of the cars and buses. The metal products company also operates basically through a set of dealers all over the federation. The decision of both MNEs to have dealers as intermediaries between their companies and Nigerian consumers is also partly reflective of the developing state of Nigerian business environment.
We can conclude, therefore, that the experiences of the two MNEs in Nigeria are largely replicable in other Third World countries. The phenomenon of lack of qualified professional and managerial manpower in developing nations can be dealt with through the planned utilisation of available resources. The metal products company was able to turn an unprofitable venture into a money-maker by using few generalist managers as against many narrow specialists that were being unproductively deployed by the original owners of the business. Productivity can be improved in any company by paying attention to the requirements of production personnel training and motivation, and by being sensitive to consumer needs and circumstances. The car manufacturing company trained many Nigerians who also had the opportunity of extending their acquired training to other Nigerians in the informal production activities of roadside workshops. Any MNE that is committed to the norm of technology transfer through the mechanism of selective training courses for local indigenes can easily make a useful contribution to the host nation seeking such training.

Some limitations of these experiences of MNEs in Nigeria should be viewed in terms of the infrastructural and general economic policy constraints existing in other developing countries. Some nations are more facilitative of the operations of informal manufacturing workshops than others. The take to land in a given country may be more restrictive of the tendency of technicians to set up shops in points close to their potential consumers. The tradition of confidence reposed in technicians operating in locations other than the appointed manufacturing company premises of the MNEs they serve may vary with countries. The propensity of consumers to seek a trade-off between the quality assurance of manufacturing companies that charge higher rates for their products or services, and the cheaper alternatives found in the informal sector may vary. If school-leavers are not as responsive to training opportunities, per se, as Nigerian youngsters tend to be, the success of these experiences may be constrained. Moreover, where intermediate and high-level technicians and managers are hard to come by, MNEs utilising generalist managers may easily short-change their host countries by refusing to share operational control (or job responsibilities) with indigenes.
These two MNEs in Nigeria provided opportunities for testing three hypotheses concerning technology transfer and employment creation in developing countries. The hypotheses and the fragmentary data available in their support are as follows:

1. That MNEs do as a matter of principle consider the employment impact of their choice of appropriate technologies before actually adopting specific production technologies. This first hypothesis seems intuitively rational and appealing from the standpoint of the existing technical and professional manpower supply constraints in Nigeria as well as in other Third World nations. Moreover, the creation of employment opportunities for the intermediate and professional products of Nigerian institutions of higher learning is an official Nigerian government policy. One may ordinarily expect MNEs aware of such an official policy to be inclined to mainly focus their attention on the employment effects of the technologies they choose in Nigeria. A basic requirement of all feasibility reports of MNE projects planned for Nigeria is a statement of the sources and training of the technical and managerial personnel to engage in such projects.

The data from our two case studies did not support, however, this hypothesis. The most prominent factor that surfaced in the choice of technologies by the MNEs was their own economic considerations. Thus, the level of demand for a particular product line, as observable in the size of the market that can be catered to, was found to be a major constraint on plant production capacity. The relatively small size of such plants was also a restriction on the range of technologies that could be used by both MNEs. Furthermore, the search for productivity, through the utilisation of specific technologies by the two MNEs, appeared to have been guided more by managerial concern for organisational results rather than by the sheer desire to create employment.

2. That technology transfer is relatively independent of the state of general technological development of the MNE host country.

Once an MNE agrees to manufacture certain products in a country, the hope of the host nation is often expressed in terms of a maximum incorporation of local materials into the products of the MNE. Indeed, the official agreements between typical MNEs and the Nigerian Government require that the local content proportions of manufactured products be specified and increased over time. What such agreements do often overlook is the difficulty of promoting the development of the institutions and technical skills needed for implementing the agreements.

A case in point here was the agreement signed in 1977 between the Nigerian Government and the car manufacturing company included in this study. The data we gathered indicated that effective agreements between MNEs and host governments need to meet two criteria: (a) they should be monitored seriously by both parties for specific implementation schedules and perhaps, with expressed details of sanctions that could be invoked if either party were to renege on the terms or spirit of such agreements, and (b) the agreements should be realistic and attainable within the regular system of business operations of the MNEs concerned. An agreement may be considered realistic and profitable to a country and an MNE when the institutional and infrastructural factors needed for meeting its terms are fully recognised and provided for.

An objective of local parts' incorporation into manufactured outputs of MNEs in Nigeria is the realisation of higher local value-added in manufacturing activities. Besides the usual foreign exchange savings this will entail on reduced imported parts and components, it is also often an effective means of spreading the impact of technology transfer to other sectors of the economy. Our findings in the two cases we studied showed that the second hypothesis mentioned above is also not supported. Agreements between MNEs and governments can be useful pointers to the mutual expectations of the parties involved in the processes of transferring technology. To make use of local parts and materials by an MNE, there must exist some evidence of capable local suppliers or producers of such components. Also, there should be available indicators of the fact that the parts locally available are of reasonable quality standards that are deemed consistent with the quality requirements of the MNE products concerned. The issue of who should bear the extra cost of higher-priced local parts used by MNEs in their production processes must also be faced. The parts and materials these two MNEs obtained locally were said to be two to three times more expensive than imported ones. But there exists
a price control mechanism that curtails the freedom of the car manufacturing company in particular from raising its product prices to reflect such input costs as they are encountered.

To operate a press shop in Nigeria at present, according to the MNE managers interviewed, is conditioned by the ability to find a ready pool of experienced technicians needed for the operations concerned. Such staff are in short supply, if not totally non-existent in Nigeria. The alternative route of bringing such technicians into the country through the expatriate quota route was described as being not only tedious, but rather expensive. What the Nigerian Government has been able to realise from these two MNEs by way of technology transfer and employment creation have been constrained by (a) the state of development of local parts and materials suppliers, and (b) the limit of technological sophistication that can be successfully introduced by MNEs, considering the existing lack of needed technical skills in Nigeria.

3. The third and final hypothesis is that technology, as envisaged within the context of MNE manufacturing activities, is necessarily consistent with employment creation that can be expected from such manufacturing ventures.

Every MNE choice of technology may create some form of quantitative or qualitative employment in a developing country. The rare instances in which the choice of technologies may imply automation leading to a net loss of employment through MNE activity may be left out of consideration in this context. From our study, we found that each time a more advanced technology was introduced by either of the two companies, no employees were dispensed with. The metal products company pointed out that all employees affected by any of their technological changes were retrained and absorbed into other production roles.

The car manufacturing company also made mention of how a contemplated change in their paint-shop technology which could eliminate about eight spray painters, was dropped due to a number of factors. The introduction of a dipping system of vehicle painting will ensure better quality consistency in the paint work. But the fewer hands needed to monitor the painting operations will have to be better skilled than the existing crop of painters. Moreover, this paint shop was recognised as a major bottleneck in the production processes of the company. The range of options open to the company by way of reducing the impact of this bottleneck comprised the expansion of the paint shop in terms of more drying oven facilities, more painters, as well as a complete change of painting system from manual spraying to an automatic system. The eventual decision of the company was said to be weighted in favour of the employment creation option of expanding the current work station.

From the information obtained from these two MNEs in Nigeria, we are constrained to also reject the third hypothesis above. The number of new or improved jobs created by each of the MNEs reflect clearly the types of technologies they introduced. However, the fact that the changes they made in existing types and levels of technologies were also varying over time, also suggested that qualitative differences in staff skill levels were being fostered in the processes. Hence, the number of employees present in either of the companies in 1979, for instance, should be deemed rather different qualitatively from the set we found in them in 1981. This assertion should be true especially of the car manufacturing company that reported a 33 per cent yearly staff turnover rate.

The rejection of this third hypothesis however needs to be qualified. There are situations in which MNEs may create more employment in a developing country through the conscious selection of suitable technologies for that purpose. But even when such technology selection is not apparent, the continuous training activities of the MNEs involved will tend to be creating qualitative changes in the levels of skills of their staff.

The question then will arise as to what yardstick to apply in evaluating the quantity and quality of the employment (as defined by technological skill levels) that are being created by given MNEs. When policy makers demand employment creation by MNEs, they probably should also indicate the types and levels of skills that are expected in the local staff to be privileged with such employment. At the managerial and professional levels, the Nigerian Government is currently trying to be very specific and definitive about the conditions under which MNEs may employ expatriates when Nigerians are not available for given top positions.
The MNEs are asked to justify their applications for expatriate quotas to fill vacant positions with explicit statements of the time and conditions under which Nigerian replacements for the expatriates will be identified and trained. However, the issue of what levels of intermediate and lower-level technical skills are being generated by the technological choices of MNEs are not the subject of any official government policies. The MNEs are left to decide what types of skills will be nurtured in their operatives. This approach gives the MNEs the latitude they often cherish in developing countries to make their own operational decisions with little or no governmental interference. It, however, tends to place their host nations in a slight disadvantage in the sense of not being able to influence what patterns of skills are developed in the local staff hired by the MNEs. It is important for governments in developing countries to be aware of the extent to which they can influence the technology choice decisions of MNEs through the use of clear employment goals they set for them.

Implications

The manufacturing processes of the two MNEs have been simple or at best intermediate in terms of complexity. The operations entailed by fabricating the household utensils, roofing sheets, collapsible tubes and extruded sections by the metal products company were relatively simple, for instance. Major parts and materials are imported, processed and assembled in the plants. The number of persons employed for each operation tended to remain constant over time. Output was increased often by increasing the production lines or by adding more work shifts to existing ones. Changes in management practices also created more output as well as more employment in different skill areas of the MNEs' operations. The car manufacturing company also operates in Nigeria the same basic simple technology that is used in its plant in the Federal Republic of Germany, USA and Brazil. The noticeable difference between the Nigerian plant and the other assemblies is the small capacity of the Nigerian plant, as well as the absence of parts manufacturing in the country. This car manufacturer nevertheless managed to create considerable employment through its peculiar policy of training and not constraining the freedom of its employees to leave the company after such training and its renewing its staff intake 100 per cent every three years.

A central policy implication of our findings relates to what a government may do to maximise the employment levels which MNEs can generate through their selection of appropriate technologies. It is rather conventional at present for host nations and MNEs to discuss technology choice mainly at the inception of specific manufacturing operations of given MNEs. From our Nigerian cases, it was clear that no systematic examination of the qualities and patterns of skilled employment being created by MNEs was being undertaken by government officials. Such an examination, which will entail mutual discussions between government officials and MNEs, will tend to enlighten the parties concerned as to the employment opportunities and problems that exist. Technology transfer from MNEs to host developing nations should be approached as a process that can benefit from continuous reviews after business operations have started.
APPENDIX

Materials used


2. Data gathered in 1979 on "Management Practices in Expatriate, Nigerian and Public Organisations" research project by J.A. Bello and other University of Lagos colleagues, which included interviews with workers and managers of Tower Aluminiun (Nig) Limited.

3. The Comcraft Group - a brochure of information on the business activities of the central NIE management group that controls Tower Aluminiun. Copy provided by Mr. Rao, the Managing Director.

4. The Tower Power House, a final year B.Sc. (Hons) engineering student report of September 1979, on his practical training in Tower Aluminiun. Copy was read in the personnel manager's office.