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Multinational enterprises, technology and
employment in Brazil: Three case studies

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Other studies dealing with the subject of appropriate technology and employment creation are Working Papers Nos. 14, 16, 17 and 19 which are listed in the Appendix.

MULTINATIONAL ENTERPRISES, TECHNOLOGY AND
EMPLOYMENT IN BRAZIL: THREE CASE STUDIES

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Introduction

The relationship between technology choice by MNEs and employment is a controversial matter in the existing literature. We do not intend to work out the concept theoretically, nor even retrace the points established by already published studies and investigations, but we think it is convenient to make a brief digression on the questions raised by the cases analysed in Brazil.

Indeed it may be said that, even before we carried out the research, there were elements available that pointed to the irrelevance of labour costs for technological choice by MNEs already operating in Brazil. Thus, Morley and Smith,¹ using a sample of 35 MNEs, showed that these firms did not alter their production methods in order to employ more local labour, which is very cheap. In another study,² with a sample of MNEs from various home countries and representative of a large number of industrial branches, the same authors concluded that labour cost was not among the decisive factors for determining the technology adopted. In their view market size and the product's quality were the elements that have influenced entrepreneurial decisions the most.

Taking these findings as a background for our study, we have extended the scope of our analysis beyond the relation between labour costs and technology, and consequently employment and technology. Our approach is to discuss the relationship between MNEs and employment in general, irrespective of the technology used. Simultaneously, we have tried to clarify the main factors inducing technological choice, knowing in advance that labour cost is not among them.

In order to explain the context of the case studies and the reasons determining our choice of enterprises, it is useful to briefly present: (i) some features of the Brazilian economy which seem important in order to understand the relationship between MNEs and employment; and (ii) basic elements conditioning technology and employment in MNEs.

MNEs, economic development and employment in Brazil

Several elements contribute to making the Brazilian economy particularly interesting among the developing countries. First of all the Brazilian economy is undoubtedly industrialised. The manufacturing industry accounts for 27 per cent of the National Domestic Product (NDP), agriculture for 13 per cent and services for 53 per cent. There is a fairly large capital goods sector which accounts for approximately 17 per cent

of industrial production. Although the national income distribution is very concentrated, the population of some 120 million with a per capita income of approximately US\$ 1,800, constitutes a domestic market of a considerable extent. (The reference year is 1978.)

Since its beginning in the nineteenth century the manufacturing industry in Brazil has been directed towards the domestic market. The emerging industry has profited from a certain amount of protection against foreign competition as a result of three obstacles to imports: tariffs and exchange and administrative restrictions, which have made imports more expensive, if not virtually prohibitive.

Since the 1930s, when the international crisis created serious difficulties for the export of primary goods - which were the main support of the economy at that time - the situation has been such that exchange difficulties and the growth of domestic industry co-existed and stimulated one another. The industrial growth has been marked by the fall of the share of imports in the aggregate supply of manufactured goods. The demand for these goods has grown with the sole rise of the internal income level and domestic industry has been led to attend an ever-increasing share of this demand.

Especially since the 1950s, the State has increased its participation in economic activities, not only as policy maker, but also as direct investor, completing the economic infrastructure (transport, energy) and producing basic inputs for industry (iron-smelting, petroleum). As could be expected under such conditions of protectionism, the developing industries were not able, as a rule, to compete on the international market for manufactured goods. This factor, together with the high internal growth rates of the last decades, has made the domestic market the main destination for industrial output. It is this market which has attracted foreign enterprises since the beginning of this century. Once these firms had settled in Brazil, they could take advantage of the existing degree of protection against competition from imported goods.

The presence of foreign firms in Brazil can be traced back to the emergence of the manufacturing industry. Until the Second World War their main (although not exclusive) area of operation was that of public utilities (railways and trams, gas, telephones, electricity, navigation, and so on).³ Since the fifties, the installation of durable consumer goods and producers' goods industries, together with the distinct new trend in international capital expansion which has been underway since the Second World War, has brought about a

considerable influx of American, Japanese and particularly European MNEs. Since then the MNEs have led in the most dynamic industrial markets, especially in the sector of durable consumer goods. In the capital goods sector they share their leadership with some national enterprises.⁴ In addition, MNEs presence in some branches of non-durable consumer goods is also impressive, though not predominant. A good example is the textile industry.⁵

It would seem that there has never been any major concern about the choice of technology, taking into account local labour costs which are much lower than in the MNEs home countries. It cannot be said, either, that such concern has existed among Brazilian firms. On the contrary, when market leadership is shared by national and foreign firms there is often a uniformity of production methods to a large extent. The equipment adopted by MNEs corresponds in many cases to that used by the international technological vanguard. In other cases a technological gap exists, when technologies are employed which are obsolete in the home countries. It should be pointed out that, due to protectionism which ensures market positions and the almost exclusive orientation towards the domestic market, production costs - the typical guidepost for technological choice and capital/labour ratios - cease to be fundamental parameters to firms, both national and multinational. Their concern with costs is usually within the limits of competition with other firms in the domestic market which on the whole does not threaten survival.

Alternative technology finds a narrow field for dissemination in an economy with the characteristics of the Brazilian one. First, there is no clear orientation of the government for its implantation. Second, the importance of industrial output, and the predominant location of MNEs in the manufacturing industry place the rural economy in a secondary position. However, it is precisely the rural economy which would be the most important field for experiments with alternative technologies.⁶ Finally, agriculture's technological modernisation takes place in the most capitalised branches, which have a high degree of chemical output and utilisation of mechanised implements.

Brazil's market size imposes a large production output for a great number of industries. Under these conditions, the situation is more favourable for the utilisation of technologies which are characterised by large-scale production, as is the case with those used in the MNEs home countries. In Brazil there are less opportunities for technological adaptation as a result of the scaling down of production which is more frequently found in some other Latin American or African countries.

Employment and government policies

As far as government policy is concerned, there seems to be concern only occasionally about the level of employment absorption. As a consequence, economic policies have never induced nor led to the realisation of specific employment goals. There is no policy for settling rural workers in the countryside in order to avoid or mitigate against the high degree of migration from the country to the towns which results in the anarchic growth of the metropolises. Neither is there any definite orientation with respect to technology in the manufacturing industry or in the service sector; and there are no public programmes for labour employment, except for occasional needs created by disasters.

The housing sector is an important user of labour. Though it is one of the most important urban labour market segments and is ruled by BNH's (National Habitation Bank - a government agency) loans policy, it does not involve any significant concern with employment. The government, aware of this sector's importance for employment creation, does not stimulate the modernisation of either the construction industry nor its supplier industries. It also does not exert any pressure on the technology choice.

The highly labour-using heavy construction sector - dams, roads, urban service industries - is under the direct control of public investment. The government contracts construction activities with private enterprises but has no direct control over technological options or the employment level.

Since the 1940s there has been a wages policy in Brazil. In the beginning, it consisted of fixing a minimum wage, thought to be appropriate to ensure the survival of a worker's family. Today the wages policy is based on two elements: (a) a policy of minimum wage fixation; and (b) a policy defining yearly (presently half-yearly) monetary wage corrections to combat the erosion of its real value by inflation.

In the last 18 years there has been a strongly marked fall in the real minimum wage, which was a fundamental piece of the economic policy of the regime established in 1964. Today it does not correspond to the minimum pattern of consumption by a typical family. Despite this, a considerable part of the workforce earns less than the minimum wage and even in the manufacturing industry the number of workers in this situation is not negligible.⁷

The role played by the wages policy in the determination of the employment level is less controversial. Only a few authors hold that the minimum wage level has a

decisive influence on the number of workers absorbed; in fact it is generally held that the employment level is relatively indifferent to the fixation of the minimum wage.

The minimum wage policy could only affect employment, on the one hand, under the assumption that it would be capable of reducing labour costs, and that these lower costs would have a positive influence on employment. Both assumptions are controversial. Several authors⁸ have concluded, after some empirical investigation, that the wage level and consequently its cost are independent of the minimum wage set by the government. Others,⁹ also basing themselves on empirical evidence, hold the opposite view. They think that the minimum wage serves as a reference for the remuneration of unskilled labour.¹⁰ We find it unnecessary to engage in this particular discussion here, since even if we admit that a lower minimum wage would be effective in reducing labour costs, we cannot accept the second assumption - that lower wages could induce an expansion of employment. Firstly (as we will try to show later), since labour costs hardly have any influence on technological choice, a lower wage would not lead automatically to the choice of more labour-intensive technology. Secondly, we think, as do Keynes and Kalecki, that the aggregate income level (and therefore the employment level) is determined by decisions concerning expenditure, especially investment expenditure. The main determinant of investment is its expected profitability and not the costs incurred - especially labour costs, which are relatively low in a great number of branches.

Therefore, neglecting the effects of global changes in the wages share of income and the consequent alterations in the global demand composition on labour force absorption, we are prompted to conclude that, besides the absence of an employment policy, the wages policy does not directly affect the level of employment either.

Many attempts to stimulate industrial growth have been made by government policies. As we have stated above, protection against international competition, in the form of a market reserved for enterprises which are settled in Brazil, has been a constant factor in the country's industrial development. From the mid-1950s, when the establishment of a durable consumer goods industry became an explicit goal of economic policy, incentives to industrial investment have been multiplied. Broadly speaking, we can say that these incentives, besides ensuring market protection, involve mechanisms - such as subsidised credit, favoured exchange, fiscal exemptions etc. - that result in the lowering of capital costs, so that equipment amortisation and fixed costs of production are reduced.

Multinational firms take advantage of several incentives provided for their installation and investment. They benefit from the same guarantees offered to Brazilian firms, except for the possibility of access to some government-subsidised credit lines (from which MNEs are excluded) and for the existence of an upper limit on the amount of repatriated profits.

As there is no explicit employment policy, it is not exaggerated to assert that the policy of stimulating industrial growth is the only one which effectively influences the level of employment in industry. Since the fifties, but especially in the last 15 years, economic policy in Brazil has been based upon a vigorous belief in accelerated industrial growth as an efficient means for the solution of many existing social problems. In spite of the aggravation of urban tensions, increased urban concentration and growing rural poverty, no significant changes can be expected in the philosophy on which this economic policy is based.

Another policy which should be mentioned is the one regarding export programmes. Since 1964 there has been a permanent emphasis on the goal of manufactured goods export promotion. At first the manufactured goods exported were mainly textiles, footwear and some favoured primary products. Afterwards export diversification evolved so that nowadays automobiles, machine equipment, electrical goods, office machinery and similar products account for a significant share of Brazilian exports. However, the balance of trade, which up until the beginning of the oil crisis had usually been positive, has now become negative or only slightly favourable. On the other hand, the internationalisation of financial flows and the growth of external debt led the Brazilian government to undertake a great effort towards expanding exports. Since then, a broad range of policy measures have been taken with a view to increasing exports. The main one is an indirect subsidy in the form of fiscal exemption to export producers. There are also incentives to the settlement or expansion of firms engaged in export programmes, such as facilities for the import of equipment and raw materials.

Exchange policy is directed to assure the relative stability of the exchange rate in a situation of high inflation through the so-called "mini devaluations". This means that the government periodically (monthly or even at shorter intervals) devalues the local money (cruzeiro) so as to prevent a fall in the competitiveness of Brazilian products on the international market. At the same time, under the pressure of foreign debt and domestic inflation, the government has pursued a policy to keep the cruzeiro somewhat overvalued as compared to the dollar; but this is counterbalanced by the above-mentioned fiscal incentives, from the exporters' standpoint.

MNEs have occupied an outstanding position among the firms which export manufactured goods. In our view, this fact has and will continue to have an increasing influence on technological alternatives, to the extent that external markets and international patterns of costs of production become a basic reference for the firms established in Brazil. It should be stressed that the export drive has little to do with goods where the productive process is highly labour-intensive. It is thus not expected to have a positive effect on employment as a hypothetical result of a greater weight of labour-intensive products in the aggregate export product mix.

The policies stimulating industrialisation and import substitution are elaborated by various government agencies. There are research agencies and universities contracted by all kinds of firms to develop specific technologies. This form of co-operation can provide large external economies, since only a few enterprises possess their own research laboratories.

Government agencies in charge of sectoral policy execution play an important role in industrial and technological development. Many sector-oriented policies such as on oil, energy, telecommunications, housing, and so forth are implemented by public institutions and holding companies. They not only establish what goals should be attained, but they also outline the policy measures for the sector and even define what to purchase from the private sector. A curious aspect in Brazilian economic policy tradition is that some of these institutions are public enterprises which conceive, manage and carry out these plans. The most significant example is perhaps Petrobrás, which owns the monopoly for petroleum exploration, and also refines and distributes it. Its purchasing policy stimulated and even turned economically viable a fair part of the equipment sector, of which it is the largest customer. Telebrás holds a similar place in telecommunications policy, as does Eletrobrás and its subsidiaries as regards electricity production and distribution. These enterprises determine the technology to be adopted, assure market protection and stimulate the private sector (including MNEs) to develop certain import-substituting products. Some of the sectoral policy-making agencies are not directly involved in the production of industrial goods or public services and are not enterprises; even so they may direct and elaborate policies and decisions which affect production and technology. This is the case, for instance, of SEC - the Special Informatics Office - which co-ordinates the policy regarding the information sector and, as a consequence, also the electronic computers' industry.

Employment and technology: A brief
theoretical appraisal

Before entering into a more specific discussion of the factors affecting the employment generation by MNEs in Brazil in respect to their technology choice, it may be useful to draw attention to some basic theoretical questions involved.

Following a comprehensive survey of employment studies which are concerned with industrialisation,¹¹ two main approaches to this problem can be distinguished: one regarding the output composition in the whole economy, and the other regarding the employment impact of the so-called choice of techniques.

As to the first, most research efforts focus on the macro-economic components of aggregate demand: domestic consumption, exports, government expenditure and private investment. The possible effects of economic policy on employment through those items are most often examined with some general issues in mind, viz., income distribution, demand price elasticity and propensity to consume; export specialisation and import substitution; government demand directed towards more labour-intensive goods; and shifting investment demand towards production sectors with higher direct and indirect over-all employment impact.

Leaving aside the various statistical problems posed by the scarcity and low reliability of data for such studies (especially concerning the inadequacy of the high level of aggregation it usually involves), perhaps the main shortcoming of this approach is a deeper one. They seem to rely to a great extent on a tacit belief that the aggregate product mix is sufficiently flexible and subject to shaping by economic policy, but at the same time they do not sufficiently regard the basic economic forces underlying a given output composition. This cannot be done simply by formally splitting the total income into its aggregate components and adding up its effects. What is required is a more complex treatment which should take into account both the dynamic interaction between the demand items and their structural contents, i.e. their linkages as well as their market competition patterns affecting investment, which rest to a large extent upon micro-economic features.

The second approach, focussing on technology choice determinants, is more directly related to our present study. It aims basically at the identification of the factors responsible for the adoption of methods of production with a given degree of labour utilisation and at the evaluation of its employment effect as compared to alternative technologies. It involves

such issues as the estimation of elasticities of substitution between factors of production; the investigation of causal links between wage costs level and/or change and different capital-labour ratios; the discussion of the availability and social advantages of the adoption of more "appropriate" technologies; and the alternative possibilities for the transfer of technical knowledge and its generation and adaptation in connection with the presence of MNEs and their relationship to the economic policy of the host country.

This is not, however, the place to carry out a systematic assessment of these widely studied subjects. A few words will suffice though as a general introduction to an alternative framework.

First of all, it should be stressed that most of this discussion rests upon the common ground of conventional neoclassical assumptions, the bulk of them of a highly static and thus unrealistic character. Mention could be made, for instance, of the usual two-factor model which considers both capital and labour as homogeneous quantities; the conception of a real world which is price "distorted" compared to an imaginary world of perfect competition; the question of factor substitution and information; and the notion of rational entrepreneurs whose technological choice decisions are thought to fall within profit-maximising behaviour and are hence strictly circumscribed to costs account and comparison.

The acceptance of such a theoretical background, even though most of its more drastical assumptions can be relaxed, may lead to serious shortcomings both on econometric and theoretical grounds. On the other hand, its replacement by singularised empirical hypotheses and findings can be misleading if they remain unassisted by some general frame of reference which could put them together. We posit that an alternative approach to cope with these problems should satisfy two major conditions. Firstly, the unit of analysis should be the relevant industry or market, and not simply the firm or, conversely, the whole branch (at the 2-digit level of statistical classification, for example) or a demand component aggregate. Secondly, a dynamic approach should be used, in the sense of putting a strong emphasis on the expansion process of firms and markets as well as on their inter-action in the course of time.

In other words, the alternative approach should bring to the foreground both the locus and the dynamic patterns of the competition process which is taking place. As a result, a prominent position would be given to the market structure approach, with special reference to the distinct oligopolistic practices and competitive instruments in the hands of the market-leading enterprises - including here the MNEs.

At the same time, the technological issues would not be examined under the restricted label of "choice" but rather under the wider heading "policy". This latter one would include both the constraints created by the enterprise's insertion (as well as the market's) in the production structure (as regards the kind of product and its demand, the scale of operation, the nature of inputs employed, and so on¹²) and the strategy of competition which expresses itself in price, sales and technological policies of the firm. As a consequence, such an important though controversial subject as that of appropriate technology development could be shifted from the formally abstract level of "rationality" and social welfare assessment to the more realistic and relevant context of oligopolistic competition and entrepreneurial strategy. It is likely that, in this case, the concept of "appropriateness" as regards MNEs would be more closely linked with technological transfer and adaptation rather than generation.¹³ Likewise, the possibility of significantly influencing employment absorption through government policies would be viewed in a more realistic and less ambitious way. Specific technological policies would then probably be considered only as a small and less effective part of the necessarily broader scope of public policy within which employment-generating technology would be seen.

Employment, technology and MNEs in Brazil

Thus far we have presented some of the features of the evolution of the manufacturing industry in Brazil which, in our view, affect the relationship between MNEs and employment: the market size, its degree of integration, the importance of the domestic market, protectionism, absence of employment policies, existence of several policy measures which stimulate industrial growth and, more recently, industrialisation. It is worth noting that this picture does not concern only MNEs, but the manufacturing industry as a whole. We should also call attention to the fact that national capital is often in a position to compete with foreign capital, even when the former imports equipment and technology, or associates with the latter in joint-ventures.

This puts forward additional analytical difficulties - those of distinguishing among the characteristics of MNEs behaviour: i.e. what part of this is exclusively due to the foreign origin of capital and what part is due to other factors, such as size and technical and marketing features of the branch. This difficulty is not noticeable, for instance, in the automobile industry, where all of the large assembly enterprises are multinational, but it is apparent in some segments of the electrical materials and appliances branch, for example, where Brazilian firms compete with MNEs through similar production processes. This is the reason why many of the following considerations about employment and technology can also be extended to national firms.

The problem of assessing the effects of investment on employment is complex. First of all, it is difficult to measure indirect employment.¹⁴ In addition, we have to neglect, for research purposes, all the probable employment expansion connected with the increase in public revenue and expenditure, with the balance of payments and with changes on aggregate consumption and investment which result from that investment.¹⁵

In spite of these analytical constraints and of the impossibility of adequately measuring the indirect employment effect, we can make some observations which will help to understand the cases to be presented. There is no doubt that in a fairly integrated industrial economy such as Brazil the domestic manufacturing industry has a greater capability of taking advantage of the linkage effects, preventing to some extent an income evasion to foreign countries. For the same reason, the employment multiplier operates to a great extent inside the national economy.

Besides, as the economy runs most of the time under the pressure of difficulties in trade balance and under the influence of protectionism, given an initial investment there will always be incentives to the supply of raw materials, components and equipment by the domestic industry, thus positively affecting the employment level.

Market size also appears as a fundamental issue in the determination of the employment impact of a given investment. It is well known that several productive processes are incompatible with small scales of production. It follows that a large market may make the local manufacturing of certain inputs viable which could never be produced in countries with small market size.

All these aspects seem to have a more substantial effect on the employment level than eventual adaptations of production techniques to the low labour cost. Hence, the fact that a great number of MNEs use the technology developed in the industrialised countries (that is, the non-existence of a wide technology range which can be adapted to the factor endowment of each host country) does not imply that total employment creation is the same in every country. Thus Brazil, for all the reasons mentioned, is a country where MNEs investment can generate significant linkage effects.

Although the capital-intensive character of MNEs technical processes seems to have slight relevance for aggregate employment creation, the same is not true of the over-all linkages within the Brazilian economy which evidently involve all enterprises, and not only MNEs. For the economic system as a whole, low cost of labour appears as a factor inhibiting technical progress diffusion, which often means capital-intensive techniques. Techniques with lower productivity are made economically viable through low wages, which result in a highly heterogeneous economy.

If the less productive firms had to endure an intense pressure from higher wages, they would suffer from smaller markets and/or profit margins, or else they would be forced to undergo a modernisation process which would reduce the employment directly connected with the production to be modernised. Evidently the ultimate effect on aggregate employment would again be hard to evaluate, since not only the technical conditions would change but also the respective share of profits and of wages, and with them income distribution and the composition of aggregate demand.

The above-mentioned aspects clarify the framework in which we carried out the interviews for the following case studies and determined the final choice of the enterprises. Being aware of the lesser importance of strictly technical aspects in the determination of the amount of employment resulting from MNEs investment, we emphasised criteria such as the final destination (domestic or external market) of goods produced, the relationship with subcontractors and the scales of operation. Nevertheless, we did not neglect the factors conditioning the choice of technology and the possible relevance of labour costs. Each of the enterprises studied typifies a specific pattern under which the various elements of our framework (production scales, market size and behaviour, output destination, relationship with subcontractors, and so on) interact.

Three case studies

Case I

Enterprise X, the first of the three enterprises selected, is of European origin and was established in Brazil more than 50 years ago. Today it is one of the largest private firms in Brazil with activities in the electrical equipment branch. One of the particularities of the Brazilian subsidiary is that it occupies an outstanding position both at the international and local levels and its size is similar to that of the parent enterprise.¹⁶ This evidently influences the local subsidiary's strategy.¹⁷

Its main products are various kinds of cables: telephone, electrical, some special cables, and wires for building construction, etc. Most of the production is manufactured according to the specifications of clients. As a result, they also define the characteristics of the suppliers' output. The subsidiary is one of the market leaders and has as main competitors both national and multinational enterprises, some of which are very large.

The subsidiaries' decisions concerning the adoption of technology do not take labour costs nor employment opportunities into account. Each product must be manufactured according to one definite technology, i.e. the most advanced one which is economically viable. The technology chosen is therefore the one used internally by the group. Hence, there is in fact no technology "choice".

Furthermore, labour cost is relatively small, about 5 to 10 per cent of total costs for most of the output. But there are exceptions which are more labour-intensive, namely some special cables produced by one of the enterprises of the Brazilian group.

With regard to the development of its own technology, the Brazilian subsidiary, until 1975, simply imported the one it used as far as product engineering was concerned. After that, a technological centre was created in Brazil. There were various factors leading to this decision. One of them was the difficulty faced by the parent company in attending the needs of the Brazilian market which were not equal to its home markets. The constant need of having recourse to the parent firm to develop products which were appropriate for the Brazilian market endangered the subsidiaries' technological leadership in the sector. Besides, the Brazilian subsidiary was large enough not only to afford, but even to impose, the creation of its own research and development centre.

In addition, the pertinent government agency INPI (Industrial Patents National Institute) established a number of restrictions with respect to the payment of royalties for imported technology, especially for multinational firms which imported technology from their parent enterprises.

This was Enterprise X's case. INPI decided that Enterprise X should pay for the technology on the basis of its dividends. But Enterprise X's problem is that its parent in technological terms only holds a minority of its shares, so the dividend payment could not be a way of "purchasing" technology, because most of the dividends are received by shareholders that have nothing to do with the development of technology.

Now its Brazilian technological centre consists of 116 highly-skilled workers, 56 of whom are university graduates. The centre is in contact with some Brazilian universities concerning research, laboratory utilisation, and so forth. Nevertheless, it cannot be said that the local subsidiary is autonomous from the parent as regards technology (and this is not to be expected) since 70 per cent of its technology is still imported.

One of the enterprise's policies is the attempt to localise its input production in order to reduce imports, which are both expensive - because of high tariffs and freight charges - and difficult - because of CACEX (a government agency which oversees foreign trade regulations). For this purpose, the firm gets in touch with suppliers in Brazil, with a view to their developing the input needed (as for instance some special kinds of paper, plastic, rubber, etc.). These contacts are not limited to listing the products' specifications, but also include technical assistance for these subcontractors. Some of these inputs are, however, manufactured by Enterprise X itself because of the local suppliers small scale of production.

The policy of localising the input production is in part possible because of the greater technological autonomy attained by the Brazilian subsidiary when it began to create a portion of its own technology. When technology is imported, the subsidiary's purchases are usually obtained from some predetermined suppliers, generally foreign ones. However, when the technology is developed in the host country, it is possible to adapt it to the inputs supplied by the domestic market.

This localisation of the input implies an expansion of the employment in the host economy. These effects can hardly be evaluated exactly since they are greater and more complex than the employment created by the enterprise's suppliers. The provisions of inputs by local suppliers create a network of backward and forward linkages which involve a great variety of sectors within the economy.

In this connection it is necessary to say something about exports too. Although Enterprise X's output has always been directed to the domestic market, the economic recessions now affecting Brazil and the government's incentives to export, have led it to consider the alternative of exporting. In this connection there were many obstacles to overcome. The first one was foreign competitiveness. Imported raw materials are very expensive in Brazil, approximately twice their price in the USA and Europe. But there is a chance of exporting the special cables, the production of which is particularly labour-intensive. In this respect low labour cost in Brazil, as compared to the USA, provides the Brazilian subsidiary of the enterprise group with a competitive advantage on the North-American market.

Another difficulty to be overcome in this export effort is the specification problem. A great share of the enterprise's output - as for instance telephone cables - must adhere to specifications of the domestic market which in Brazil are different from other countries. When its main customer - Telebrás, a public holding which monopolises the telecommunication services in Brazil - was growing steadily, Enterprise X could also expand its

production without major difficulties and there was no reason to think about exporting. But with the present government policy of cutting off public expenditure during the recession, the domestic market is not sufficient any more. Thus, Enterprise X is forced to adapt its products to other markets' specifications.

Enterprise X does not intend to become mainly an exporter, but it has some interest in holding a share of the international market in order to keep in close contact with international technology and prices.

Another possibility open to the local subsidiary is to export some of the inputs it produces. The destination of those exports would be other affiliates of the group, particularly the Argentinian one, because it can sell these goods at prices which are lower than the North American equivalents.

In the face of all these features of technology utilisation, it appears clearly that the problem of employment creation cannot be reduced to the question of technology choice alone. The latter is conditioned by technical progress at the world level and by the goods which are produced. Each product, as a rule, embodies only one basic technology, determined by scientific advancement and available technologies, as well as by economic viability.

Therefore, if the technology in the production of these electrical cables is capital-intensive, there is no sense in trying to force the enterprises in this industry to employ more labour-intensive techniques at the cost of building up an obsolete industry with lower competitiveness. But this does not tell us everything about the impact of this MNE's activities on generating and inducing direct and indirect employment. It is also necessary to consider the enterprise's capability to increase the country's production capacity, its influence on import substitution, and its ability to expand exports, etc.

As regards the labour force, there are other aspects to be taken into account: the technicians' home country and the policies related to labour training.

The first item is closely connected with the internal creation of technology. Until 1962 the latter was fully imported, i.e. foreign technicians were sent to the subsidiary with responsibility for implanting the technology used in the home country. From 1962 to 1975, technology continued to be imported, but only by means of written descriptions.

Since 1975, when the local centre for technology creation came into existence, it has become necessary to train Brazilian technicians in certain particular subjects, so that the local personnel would be able to carry on the

research and development (R and D) tasks. For this purpose three European technicians (not from the enterprise's home country) came to train the Brazilian staff. One of them has already gone back to Europe and the others are to return soon.

The firm usually contracts technicians with no experience and undertakes their complete training in the local facilities. Furthermore, it often sends them to Europe so that they can improve their training in the parent company's laboratories. Presently, people are also being training at the Massachusetts Institute of Technology (M.I.T., USA) on superconductors, a subject not developed by the parent firm.

The direct production workers are also generally trained by the enterprise itself. For this purpose internal courses exist. In this case the rule of recruiting people without experience to learn inside the plant also applies. But Enterprise X has also signed agreements with SENAI (a Brazilian institution specialised in training industrial workers) so that some types of workers can be trained more easily and less expensively.

Case II

Enterprise Y is a North American MNE in the electrical and electronics sectors. It came to Brazil during the First World War (when it had another name and different activities). In 1931 it founded its first industrial plant, which was also its first factory outside the United States. Now the enterprise has two plants in Brazil and its main products are computers and related goods and electric typewriters.

In order to understand this enterprise's technology choice and the impact it has on employment, it is necessary to say something about the way it is organised at the international level, because this affects the strategy of all its subsidiaries.

The only joint-stock company in the group is the parent enterprise, which holds 100 per cent of all its affiliates' capital. The latter act as parts of the same group and as competitors to each other.

At the world level the group is split into three major "operating areas". The first one, accounting for more than 50 per cent of the corporation's sales, includes the USA and its military bases in foreign countries; the second includes Europe, the Middle East and Africa; and the third includes the Americas (except the USA), the Far East and Oceania. The Brazilian affiliate is the third largest in its area and the eighth in the world. It

accounts for 2 per cent of the group's world sales. Presently Brazil is a country in which the group is growing at one of the highest rates in the world (until 1980 its growth rate in Brazil was about 25 per cent a year, while in 1981 the rate fell slightly).

In each of these "operating areas" production is divided among the various affiliates. There is no more than one factory producing the same product in the same "operation area".¹⁸ Management of these affiliates, together with some experienced advisers, define the products to be manufactured in each subsidiary. This decision is based upon three criteria: cost, quality and length of the production period. Once it has been defined which product will be manufactured in a given factory, this subsidiary is then in charge of the whole production in that "operation area" and it must keep and improve its performance with respect to the "production goals" of the group or else it can lose the right to manufacture this product. This could be claimed by any other subsidiary in the "operation area" which attains a better score on established criteria. Therefore the Brazilian affiliate's market is not restricted to Brazil or Latin America, but it includes Canada, Japan, Australia and the Far Eastern countries.

Presently, the main products of Enterprise Y are computers, video terminals and electric typewriters. It exports 80 per cent of its output and 80 per cent of these exports are earmarked for Japan. In 1981 it is expected that the value of its exports will reach 220 million dollars.

In 1980 the value of its exports was 174 million dollars. In the same year Brazil exported \$458,843 worth of electrical machines and appliances and \$265,557 worth of office machines and appliances (according to CACEX statistics).

A number of policy measures in Japan and Brazil favour the enterprise's export strategy. The former exempts from import tariff those goods for which inputs have been partly imported from Japan.¹⁹ Brazil exempts from tariffs those enterprises which export a large share of their output.

As for the question of technology choice, there are several elements that must be considered. Enterprise Y's policy is to keep complete homogeneity among its products all over the world. The Brazilian product must be absolutely identical to that manufactured in the USA and in the European, Middle East and African area. This also implies a certain technological standardisation, independent of whether the labour cost in a particular host country is low or high.

Another aspect of the influence technology may have on employment is that of technology creation. Enterprise Y does not have an R and D centre in Brazil, but the Brazilian subsidiary can influence the technologies developed in order to adapt the product's specifications to the conditions of the Brazilian market, so that the latter can supply the necessary inputs. Every affiliate keeps in contact with all the existing R and D centres and laboratories of the group all over the world. This is done not only for the purpose of information about the products developed, but also for influencing technological projects.

There is another feature typical of this enterprise, which is fundamental for understanding its employment impact. This is subcontracting. Its policy is to subcontract as much as possible since the business or output of the enterprise, as indicated by a manager, is informatics. It is thus not a mechanical enterprise, nor is it interested in electrical material production (in the sense of parts and components). Its "end" product is electronic computers and they prefer to buy the "means" from other firms.

There is a whole strategy to prevent the enterprise from becoming dependent on its suppliers and vice-versa. Hence, they try to diversify their suppliers as much as possible, even geographically, in such a way that the pieces they purchase never account for more than 17 per cent of the supplier's sales.

There are two motives for this diversification of the input sources. The first is to prevent unforeseen events: if, for any reason, one of its suppliers ceases producing for a certain period, the enterprise can have recourse to others and its own production will not be curtailed (this is the reason for the geographical diversification, since often such stoppages affect a whole region). From the Brazilian subsidiary's standpoint it would be a tragedy to delay its output delivery, for this could mean losing the right to manufacture its products (without thinking about competitors other than the affiliates of its own group).

The other motive for diversifying input sources is to prevent its suppliers from losing confidence in case Enterprise Y ceases to make some products and therefore ceases to purchase the components from certain suppliers. If these purchases account for no more than 17 per cent of the supplier's sales, the problems it has to face will not be so great as to affect the confidence of the other suppliers.

This sort of consideration should not be underrated. The firm's policy towards the subcontractors is affected by the need to always adopt in this sector the most advanced technology, which makes it frequently necessary to discontinue some production lines every few years. (Not to mention the possibility, which is not remote, of losing its claim to manufacture a certain product.)

It seems to us that this accelerated obsolescence of the output is one of the factors that leads Enterprise Y to adopt a strategy of avoiding verticalisation downwards and buying everything that can be purchased from other firms. This gives Enterprise Y a greater ability to innovate constantly.

The search for suppliers is not confined to monitoring what exists in the market. It is necessary to see which firms would have the conditions to manufacture the components or pieces required and to "develop" these subcontractors. For this purpose, it tries to help them to absorb technology: it facilitates their acquisition of machines, it grants them needed credit and it helps suppliers' employees in obtaining training - even sending them abroad, if necessary.

The technology so developed belongs entirely to the suppliers, who can use it freely, even selling parts to Enterprise Y's competitors. The enterprise's interests are not endangered in this way, but just the opposite seems to be true. A larger scale of production for the components reduces the price of each part. Besides, the competitiveness of the enterprise is based on the features and quality of the final product - not of its individual parts or components.

In spite of having a great number of suppliers the enterprise is not willing to lose any one of them suddenly. Hence, it tries to find out whether the latter pay their debts, their taxes, whether they are honest, what their relationship to other entrepreneurs is, and so on. It also tests the quality of their parts and imposes a limit on them of 5 per cent for defective parts. This is very important, because the suppliers usually also sell their products to other industries, where quality requirements are not so tight, such as the motor vehicles' industry or other branches of durable consumer goods. Here it is not a great problem if a little screw breaks or one transistor of a radio set is defective. The opposite holds true when a computer ceases to work because one of its parts, even a small one, is out of order. Because it is a very complex and expensive machine, it is difficult to discover what the cause of the failure is, and its repair is very costly, since each hour lost is valuable. All these factors make quality the most important factor for competition in this branch.

Therefore it is not correct to think that Enterprise Y's main activity is to assemble its parts. The most important and the most difficult of its activities is the permanent testing of its products, in each of its several parts and as a whole. These tests must be done while the pieces are being assembled, so that it is easier to find where defects may occur.

It should be noted that the enterprise contracts not only suppliers of goods, but also service suppliers. Among the latter are several universities and technical schools which render services in the field of technology development and application.

Enterprise Y's strategy, dictated by the difficulties of importing, is to purchase its input as much as possible from the domestic market, if necessary by "developing" new suppliers. But in spite of this, a significant share of its input is still imported. On average, 53 per cent of the final price of its products correspond to components, wages and salaries. The remaining 47 per cent of the price is accounted for by imports. In 1981 imports amounted to 152 million dollars.

These imports are due to problems of economic viability. The production scale for these goods would be too small in Brazil to justify their local production (which is directed to a market ten times smaller than that of the USA or Europe, the Middle East and Africa). These imports are regulated not only by CACEX, but also by the SEC.

From all that has been said above, it is clear that the volume of employment generated directly by the enterprise does not reflect its true employment impact. In November 1981 its main plant had 1,229 employees and in the same year it had 362 suppliers.²⁰ In 1980, when it had 338 subcontractors, 1,650 out of their total 7,500 employees were directly working to supply Enterprise Y with components. Thus, the number of jobs created by the suppliers for the production of Enterprise Y's components is greater than the number of the latter's employees.

Another indicator for the indirect employment generation of Enterprise Y is its purchases on the domestic market, which are shown in Table 1.

Its character as a subcontracting enterprise is reflected in Y's employment profile. As its main activity is management, the number of people working directly on production-line activities is relatively small. For each production worker there are three employees in the administrative staff. As a policy, every employee in the Brazilian affiliate is a native of the country.

Table 1: Purchases in local market (million of US dollars)

Year	Main Plant		
	Parts & Components	General Items	Total
1971	2.9	1.6	4.5
1972	3.5	1.5	5.0
1973	4.3	2.8	7.1
1974	7.9	5.0	12.9
1975	8.7	3.2	11.9
1976	8.3	3.2	11.5
1977	17.4	4.3	21.7
1978	15.1	7.5	22.6
1979	24.3	6.3	30.6
1980	32.5	5.8	38.3
1981	37.9	14.3	52.2

Source: Company dated provided during the interview.

As for the training of this staff, during the period of installation of the most important plant of the enterprise (1971-73) there was a need for bringing technicians from foreign countries, and also for sending abroad a large part of the Brazilian staff. In 1981 the last foreign technician left Brazil, but the number of Brazilian people sent abroad remains high at about 40 to 50 employees each year (with a minimum of four months abroad).

Nevertheless, not all of these Brazilian people who are presently abroad are being trained. There is a need to permanently keep some Brazilians in the various R and D laboratories in order to influence the research and the products being developed. But these people never remain more than two years abroad so as to avoid losing their connections with Brazil.

Finally, we would like to note that, notwithstanding the particular characteristics of Enterprise Y, its study is illustrative of the different main ways in which MNEs generally affect indirect employment, namely through subcontracting, import substitution and exports.

Case III

Enterprise Z belongs to the textile industry which is very important in Brazil. It is still one of the largest employment sources in the manufacturing industry, though its share in total employment has been falling in the last two decades. On the other hand, employment growth in the industry has been very modest in spite of the steady growth of production in the last decades, which was lower, however, than the manufacturing industry average.

Historically linked with the beginning of the manufacturing industry in Brazil, the cotton spinning and weaving industry was installed here at the end of the last century, taking advantage of the availability of raw materials as well as of a firmly expanding market. At that time textiles was a modern industry and its production technique was similar to that used in the industrialised countries. Another feature was the early integration of spinning, weaving and finishing stages in the same productive unit. Here the trend towards specialisation, already prominent in Europe, did not develop in Brazil.

Technological modernisation did not fully progress in cotton textiles in the course of this century. There were some modernisation efforts, but they did not bring about a uniformity of production techniques. Now the sector is still immensely heterogeneous both as to productivity and technical features. Three factors made this possible: (a) the characteristics of the textile production process allow the juxtaposition of different generations of equipment; (b) production has always been directed towards the domestic market, with the help of strong tariff protection; and (c) the sector reflects a great diversity in firm sizes and administrative structures, allowing for the coexistence of large spinning and weaving enterprises, small knitwear producers - generally operating members of the owner's family - and home workers who use old looms. Of course, it is not possible to compare the costs of modern capitalist enterprise and those of an individual weaver. This latter is a small unit run by a family and does not remunerate any amount of capital. These producers draw an income from their labour which is just enough for their survival. This explains their resilience in face of strong competition and the possibility of coexistence with modern plants of much higher productivity.

National rather than multinational enterprises still predominate in the cotton textiles industry. The focus of MNEs in this industry has been the production of chemical (artificial and synthetic) fibre thread. It is well-known that chemical fibre production has contributed an enormous technological advance to the textile industry, since it has made possible at low cost a very large expansion of thread production, far above the existing supply of vegetal fibres, like cotton. On the other hand, synthetic fibre production may be more appropriately classified as a part of the chemical or cellulose industries, with which it shares some production characteristics: high level of initial investment, processes generated and patented in industrialised countries, high capital-output ratio, and considerable cost reduction through economies of scale.

Data from the Brazilian Association of Artificial and Synthetic Fibres Producers, an entity which groups almost all producers of rayon, acrylic, polyester and nylon, show that the sector has grown since 1973 at approximately 5 to 7 per cent a year. In 1981 a production decline of 13 per cent was expected, but this figure is not incompatible with the forecasts for the manufacturing industry as a whole, since 1981 has been a recessionary year for the domestic economy as a whole.

Only a few of the 14 firms belonging to the Association are not MNEs, and they account for a small share in the aggregate production. As can be seen from Table 2, almost the entire production is sold in the domestic market (less than 5 per cent of the production was exported in 1980). It could be thought at first that exports are not greater because the installed productive capacity is almost fully utilised in producing for the domestic market. As a matter of fact, the industry does not try to compete on the international market because its production costs are much higher than those of its competitors from other countries.

There are two main factors pushing up the production cost. First, the scale of production, which is often below that of the plants in the USA, Europe and Japan, increases unit costs. Second, the higher cost of raw material in Brazil than in the above-mentioned countries, especially the higher price paid by the synthetic fibre producers for processed substances, the chief component in the total production costs.

Chemical fibre-producing MNEs which have settled in Brazil have filled a gap in production structure. They have substituted imports and have increased the domestic supply of fibres to local weaving firms. In spite of the fact that they create few jobs directly, it would be difficult to measure exactly the net employment resulting from their installation. For this purpose, the following aspects have to be considered.

- Import substitution, which includes substituting local for external employment.
- Incentives for the localisation of the raw materials and equipment production. Almost the whole supply of the processed inputs for fibre production is now locally manufactured, in contrast to 15 years ago. A part of the equipment is supplied by the domestic market too.
- Substitution of natural fibres. Artificial and synthetic fibres replaced vegetal and animal fibres in the entire world. These fibres have replaced in part cotton spinning, and this certainly has a negative effect on employment.

Table 2: Chemical fibres: Comparative data 1979/80 (in tons per year)

	Installed Capacity			Output			Sales Domestic Market			Exports			Imports			Apparent Consumption		
	1979	1980	% change	1979	1980	% change	1979	1980	% change	1979	1980	% change	1979	1980	% change	1979	1980	% change
ARTIFICIAL	64 840	61 040	- 5.86	60 197	61 868	2.78	55 354	56 627	2.32	4 700	4 675	- 0.53	3 404	4 535	33.23	58 758	61 172	4.11
Rayon Viscosis	48 040	45 440	- 5.41	46 908	47 568	1.41	41 916	42 637	1.72	4 700	4 675	- 0.53	2 211	1 586	-28.27	44 127	44 223	0.22
Textile thread	15 840	15 840	-	14 342	15 743	9.77	10 640	11 877	11.63	3 550	3 788	6.70	50	143	186.00	10 690	12 020	12.44
Industrial thread	7 200	4 600	-36.11	7 111	6 500	-8.59	7 173	6 500	-9.38	-	2	-	117	578	394.02	7 078	7 078	-2.91
Discontinuous fibre	25 000	25 000	-	25 455	25 325	-0.51	24 103	24 260	0.65	1 150	885	-23.04	2 044	865	-57.68	26 147	25 125	-3.91
Rayon Acetate	16 800	15 600	-7.14	13 289	14 300	7.61	13 438	14 000	4.18	-	-	-	1 193	2 949	147.19	14 631	16 949	15.54
Textile thread	6 000	4 800	-20.00	2 993	3 800	26.96	3 108	3 500	12.61	-	-	-	293	745	154.27	3 401	4 425	24.82
Other	10 800	10 800	-	10 296	10 500	1.98	10 330	10 500	1.65	-	-	-	900	2 204	144.89	11 230	12 704	13.13
SYNTHETIC	228 908	239 633	4.69	213 423	230 946	8.21	206 324	221 267	7.24	7 797	5 339	-31.52	11 278	15 062	33.55	217 602	236 329	8.61
Nylon	84 788	93 473	10.24	78 654	87 006	10.62	76 862	85 587	11.35	238	77	-67.65	6 169	6 010	-2.58	83 031	91 597	10.32
Textile thread	45 648	46 960	2.87	42 410	43 082	1.58	41 484	42 011	1.27	194	45	-76.80	665	748	12.48	42 149	42 759	1.45
Industrial thread	17 160	21 153	23.27	16 078	19 673	22.36	15 986	19 263	20.50	44	32	-27.27	1 443	2 421	67.78	17 429	21 684	24.41
Canvas for tyres	11 300	14 000	23.89	10 892	14 000	28.53	10 302	14 186	37.30	-	-	-	3 428	2 248	-34.42	13 730	16 434	19.69
Threads for rugs/carpets	2 220	2 300	3.60	1 061	1 651	55.61	1 046	1 593	52.29	-	-	-	-	-	-	1 046	1 593	52.29
Discontinuous fibre	8 460	9 060	7.09	8 213	8 600	4.71	8 044	8 534	6.09	-	-	-	633	593	-6.32	8 677	9 127	5.19
Polyester	120 120	122 160	1.70	113 966	121 410	6.53	109 585	113 272	3.36	6 561	5 136	-21.72	1 232	2 511	103.81	110 817	115 783	4.45
Textile thread	50 280	51 000	1.43	48 117	52 827	9.79	49 426	50 661	2.50	684	473	-30.85	124	1 235	895.97	49 550	51 896	4.73
Industrial thread	2 160	3 360	55.56	1 482	2 840	91.63	1 374	2 631	91.48	-	-	-	144	2 212	47.22	1 518	2 843	87.29
Discontinuous fibre	64 800	64 800	-	62 380	63 892	2.42	57 338	58 409	1.87	5 331	4 419	-17.11	964	1 064	10.37	58 302	59 472	2.01
Other	2 880	3 000	4.17	1 987	1 851	-6.84	1 447	1 572	8.64	546	244	-55.31	-	-	-	1 447	1 572	8.64
Acrylic fibre	24 000	24 000	-	20 803	22 530	8.30	19 877	22 408	12.73	998	126	-87.37	3 877	6 202	59.97	23 754	28 610	20.44
T O T A L	293 748	300 673	2.36	273 620	292 814	7.01	261 678	277 904	6.20	12 497	10 014	-19.87	14 682	19 597	33.48	276 360	297 501	7.65

Source: Brazilian Association of Artificial and Synthetic Fibres Producers.

However, in Brazil, the factors responsible for the rise of production costs have prevented the replacement of cotton by chemical fibres from advancing as much as in the industrialised countries, although a further reduction of the cotton textile market seems likely. While synthetic and artificial fibres still have a higher price than cotton, the situation may eventually be inverted if the existing pattern in the industrialised countries is followed. The cotton textiles industry ought to modernise and direct itself more aggressively to the foreign market, given the favourable conditions to the production of vegetal fibres in the country. Presently, the exports both of cotton and chemical fabrics and threads are supported only by government incentives, in the form of fiscal exemptions and "draw-back" procedures to raw materials imports. It is estimated that government subsidies represent almost 50 per cent of the export price of a product like polyester. It is only through these incentives that exports can become viable, for the price of thread on the international market is approximately half the domestic price.

Enterprise Z is a textile firm of European origin specialising in the production of artificial and synthetic fibres such as polyester, nylon and rayon (continuous and discontinuous thread). The group has two plants in Brazil now. One of them produces polyester, the other rayon and nylon.

In 1949, a number of Brazilian entrepreneurs took the initiative of founding an enterprise with the purpose of supplying rayon to the national textile industry. Then such material was hardly available on the domestic market and had to be imported. Soon afterwards they associated themselves with an important European textile producing group, which supplied equipment and technological assistance and which subsequently took over the firm. More recently, another European financial group has acquired Enterprise Z although the technological affiliation has remained the same thus far.

Since the year it began to operate, in 1954, and up to the present moment, the firm has expanded and diversified its output. At the beginning it produced only rayon (continuous thread) and later on also discontinuous thread. Through a verticalisation process the enterprise incorporated the production of raw material for the manufacture of discontinuous rayon fibre cellulose from cotton linter. In 1971 the unit producing nylon (polyamid-continuous fibre) was installed and in 1979 it acquired a second plant from another MNE which was already producing polyester.

Table 3 presents the evolution of Enterprise Z's fibre production and some of its chemical products.

Table 3: Annual Output (tons)

	1973	1975	1977	1979	1980	1981
Rayon Unit						
Continuous fibre	3 088	3 155	3 668	3 689	3 803	3 840
Discontinuous fibre	9 445	7 807	10 917	13 748	13 527	16 560
Sodium sulphate	1 948	5 568	5 585	9 918	9 743	11 760
Cellulose	7 326	7 469	9 053	11 773	10 892	11 160
Carbon sulphuret	2 251	2 081	2 402	2 408	2 643	2 880
Sodium sulphuret	221	25	28	80	219	900
Polyamid Unit						
Nylon	1 304	4 515	5 975	11 759	11 411	8 400
Polymeres	2 406	5 000	6 179	12 741	13 513	10 200
Polyester Unit						
Polyester				3 909	5 456	5 400
Nylon				863	850	600
Polymeres				268		

Source: Company data provided in the interview.

As we can see, the firm's market share is particularly large in the case of discontinuous rayon fibres; for the other products, though significant, they do not exceed 20 per cent of aggregate production.

As for the essential raw materials, the enterprise produces most of the cellulose (cotton linter) used in the discontinuous fibre of rayon manufacture. Caprolactama, the raw material for nylon, is bought from other firms. Imported until some years ago, it is now supplied by the Brazilian "Camaçari Petrochemical Pole", a complex of petrochemical units established for the purpose of import substitution, through several incentives from the federal government.

The firm's main goal is to produce for the domestic market, providing inputs for the local weaving companies. Occasionally the firm also exports, but the foreign market is regarded as only a complement to the domestic one and as an occasional outlet. Export efforts are made whenever the domestic demand loses strength so as to ensure an appropriate degree of capacity utilisation and to reduce the fixed unit cost. The firm benefits on such occasions from the usual government export incentive. It should be recalled that the local raw material cost (especially for caprolactama) turns the final product into an extremely expensive one compared to the prevailing international prices.

The technology used by the enterprise comes from Europe. The first foreign controlling group (besides being a thread producer), was a generator of process technology and even an equipment producer. At present the technical staff in Brazil is able to specify and control the new equipment and processes. When it is possible to produce the equipment in Brazil, the firm orders it locally. Only such equipment and control devices are imported which cannot be supplied by the domestic market.

In spite of the present market's contraction, the enterprise continues investing. This investment now being undertaken is to expand the office facilities and to improve the administration, on the one hand, and to expand the equipment which produces cotton cellulose, on the other. The purpose is the completion of the verticalisation of discontinuous rayon thread, so that the raw materials can be fully supplied by the firm itself. The equipment used for this purpose was entirely purchased from Brazilian suppliers.

The evolution of the employment generated by the enterprise during the last decade is as follows:

Table 4: Number of workers

	Production	Other	Total
November 1971	499	394	893
November 1976	807	527	1 334
November 1981	1 216	755	1 971

Source: Company data provided during the interview.

The difference between the 1981 and 1976 figures is due to a great extent to the establishment of the polyester producing unit. As can be seen, the workers not directly involved with production account for more than one-third of the total employees. They include the administrative staff, and persons engaged in maintenance, security, cleaning and other ancillary functions. According to the information received, the labour cost is lower than in the group's home country, but this has never influenced the choice of technique. Nevertheless, the number of employees other than production workers is proportionately larger in Brazil than the international average of the group.

We could actually establish that total labour cost does not exert significant pressure on total production costs. As a result, managers pay more attention to other factors which weigh more heavily on unit costs. However, the price of the raw material used in nylon production, which is exceedingly high, is the one prevailing in the domestic market, and therefore cannot be changed. This determines the final price of the output. By the same token, all the competitive firms are likewise affected by this situation which determines and equalises cost structures. This prevents price competition through cost reduction. The same uniformity prevails in the cost structure of the rayon producers.

Finally, as regards the managerial staff and the highly-skilled workers, there is an almost complete degree of localisation. Only one of the five directors is a foreigner and the technicians are all Brazilian. Although it is possible that occasionally a few foreign foreigners are employed, they are not connected with the technological parent firm.

The workers are trained on the production site. As for some occupations of a more general character - eg. mechanics and electricians - the firm engages already trained workers but may provide them with additional training courses in the respective areas.

Concluding remarks

These observations cannot be taken as a definite conclusion concerning the relationship between employment generation and technology adoption by MNEs in Brazil, for the obvious reason that they are based on an analysis of only three enterprises. However, there are enough common features in the cases studied (including those not reported) as well as interesting particularities to allow some general remarks.

Two kinds of concluding remarks will be made. The first deals with those characteristics of the MNEs sampled that seem to be most relevant and striking as regards the two chief components of the subject - employment and technology - which by the way are not always fully connected to each other. Several conclusions are drawn for all firms in the sample and where this is not the case the company or companies referred to shall be identified as in the report. The second kind of conclusion is based on a broader view of the subject (while still owing a lot to the experience gained through the cases studied).

It should be remembered that our sample is composed of MNEs X, Y and Z, respectively, producers of electrical cables, computer hard and software, peripherals and like equipment, and artificial and synthetic fibre thread. While X and Z are subsidiaries of European groups, Y is a US affiliate. The sample choice took into account both the complexity of the existing industrial structure and the considerably high level of integration achieved by industrial development in Brazil. This meant that the MNEs under study were chosen not only to cover highly diversified employment-creating and technological patterns in terms of the insertion of the enterprise in the local industry and of its competitive situation, but also to illustrate very different generations of industry and the corresponding origin, size and degree of integration or adaptation to the local market by the MNEs.

The main specific conclusions which can be drawn from the sample enterprises are presented below as five separate points.

1. Relationship between technology choice and employment

One of the most remarkable findings concerning the entire sample is that technology choice has scarcely any connection with labour costs. As a result, it can be said that it also has almost no influence on employment absorption, at least so far as technology adaptation or change is concerned.

In the first place, a common point to be stressed is the essentially rigid character of the technology employed. It implies that differences in cost structure or specific cost differentials - labour costs, for example - do not play an important role in decisions regarding the basic technology to be used or in technological changes, except for relatively minor adjustments or improvements. As a matter of fact, there seems to be no technology choice at all, in the usual sense of the word, since the main technological differences that can be found between firms (MNEs or national-owned) in the domestic industry sector, and between affiliates (and parent firm) spread all over the world, are mostly those relating to different technological vintages and generations of equipment.

A second common factor which was observed is the low share of labour cost in total production costs. Even when technical improvements are made with a view to reducing costs, they usually aim at lowering the cost of items other than labour, i.e. those which have the greatest weight in total costs. Which of these are given the most attention depends of course on the particular cost structure which is determined chiefly by the characteristics of the product and of the industry. Nevertheless, it can be said that the reduction of administrative and organisational costs constitute an important goal for technical improvements (this could be found in cases where a laboratory or an R and D centre is already operative or, in a planning stage, as in Enterprises X and Y respectively).

2. Employment composition

The employment structure of the MNE affiliates under study is broadly the same as in other countries (including the home country). Labour cost differentials also seem to have a negligible effect as far as the labour force composition is concerned, both according to production and administrative staff and according to subdivisions of employees based on their skill levels. The main reason is the same as above, viz.: a considerable rigidity in the technology employed and also as regards the utilisation of different groups of the labour force.

It is noteworthy, however, that two other important sources of employment composition particularities of the Brazilian affiliates as compared to other countries could be found. The first and perhaps most important one is due to differences in the scale of operations: indirect (mostly administrative) jobs tend to be higher as a percentage of the total labour force where the scale of operation is smaller. This is a common feature of all three MNE affiliates operating in Brazil. This does not necessarily mean that labour costs as a whole are higher in absolute terms, since unskilled workers

earn a much lower wage in Brazil as compared to other countries, although the same is not true of salaries of higher managerial staff. Another important source of differences in the labour force composition is the presence of R and D activities, which evidently involves a greater absorption of highly skilled workers, technicians, engineers and applied scientists (as in the case of Enterprise X).

3. Nature and quality of the product

Another striking general impression that emerges from all three of the enterprises examined is the considerable importance attached to the quality of their products. Quality control is very tight everywhere and the product specifications are rigidly followed, no matter how this may be determined: by the needs of the customers (all cases), by Brazilian technical production norms (Enterprise X) or by the international norms and specifications fixed by the multinational group itself within the context of a world strategy for market control (Enterprise Y). But we cannot depict this as the general situation, since at least in one of the interviews, the opposite was described. It would appear that in times of sales stagnation or decrease, an MNE often relaxes its quality control on parts or components in order to reduce costs at the expense of subcontracted suppliers. It is possible, therefore, that our findings may be somewhat biased because of the type of industries and products included in the sample.

On the other hand, the precise definition of the nature of the product seems to be generally of decisive importance. In the case of Enterprise Y this impression is exceedingly strong. The enterprise considers its output as a service, not as industrial goods, and its factory as "an office". Service quality is so crucial that product assembly and testing are done simultaneously. Also, the enterprise's profit margin is calculated on its services, not on the goods produced.

4. Suppliers, verticalisation and indirect employment generation

The policy adopted towards suppliers of inputs depends generally on the final market requirements or competitive conditions. Especially in the case of Enterprise Y, a very careful survey of the suppliers' market and cost conditions is made. With a view to ensuring low input prices with good quality, the suppliers' profit margin is often fixed together with specialists from Enterprise Y on the basis of a detailed account settlement. Another important factor is the frequent changes in the product mix according to rapid technological changes. The impact and frequency of these modifications are so high in Enterprise Y that even its factory layout is deliberately flexible. As a consequence, its suppliers cannot be permanent either.

The decision to fully verticalise the production is usually not taken, except for some specific components or material inputs, the price of which is high enough and is not expected to fall. The most important reason for this seems to be that input production is often subject to significant economies of scale, while the local market not yet large enough to allow operation on an optimum scale.

On the other hand, the decision to buy inputs from domestic producers instead of importing them is strongly influenced, in all cases, by government tariff policy. Clearly high import tariffs are the most responsible for import substitution and corresponding employment generation and maintenance as far as basic inputs are concerned.

To sum up, it can be said that the factors preventing MNEs' backward verticalisation (which would almost certainly imply much more capital-intensive technology), as well as government policy towards import restrictions, are both of great importance as a means for indirect employment expansion through the preservation of local labour-intensive suppliers.

5. Relationship between affiliates and parent firms

Both in absolute as in relative terms, the size of the subsidiary firm is most relevant as regards technological development capability, i.e. through R and D activities. This is true above all for Enterprise X, which is almost as large as its parent and which has reached a sufficient level of sales and of personnel (including their training) so as to be able to meet the expense of and efficiently operate an R and D laboratory. In this case, the very long presence in Brazil and ensuing intimate knowledge of local market conditions were also of great help.

With regard to the subordination of affiliate firms to the parent enterprises, it should be noted that, at least in these three sample cases, there is a fairly high degree of independence for the affiliates. Decisions are to a great extent decentralised, to the point that even international competition with the parent enterprise itself may take place (as in the case of Enterprise Y). An MNEs' subsidiary usually loses its strongest dependency links a few years after its establishment. This is illustrated, for instance, by the increasing degree of local personnel in production and administration (in Enterprise Y there seems to be a global policy of the group to promote this).

Finally, there is no way of directly comparing these affiliates with domestically-owned competitors, which are almost absent in the cases of Enterprises X and Y. But as a general appraisal we might say that there are no signs of significant differences with respect to national competitors either in technology or in employment characteristics.

A few more words might be added on the over-all picture that emerges from the MNEs we have examined with regard to the area of technology and employment generation.

There seems to be no evidence that enterprises, whether national or multinational, base their technology choice upon labour cost. Besides, in Brazil there are no direct government employment policies, and the few economic policies which indirectly affect employment are not sector specific. The low cost of labour by itself does not stimulate the adoption of less capital-intensive technology. In some cases, however, there is a tendency to employ a greater number of workers in ancillary activities, as compared with similar situations in most of the industrialised countries. But this phenomenon is secondary when compared to the employment generation induced by the reliance on raw materials, component parts, commercialisation and service suppliers. In many cases, multinational enterprises contract the supplying of component parts both from national and multinational enterprises which operate with more capital-intensive technology as a result of their smaller production scales.

Finally, it would appear that any effort to promote employment-absorbing policies in developing countries in connection with MNEs should pay special attention to the dynamic performance of these firms in their own individual branches as well as to their long-term impact on the growth of the entire economy. In this sense, a choice-of-techniques approach, such as the question of the technological appropriateness of one production method over another, may be misleading as its static analytical frame of reference may blur reality instead of bringing it into focus. It should be remembered that the recent years of extremely rapid economic and employment growth in Brazil, especially up to 1974, were to a great extent due to a dynamic industrial pattern of production and distribution on which MNEs had a strong influence and which could not possibly have taken place in their absence.

Footnotes

¹ S.A. Morley and G.W. Smith: Managerial discretion and the choice of technology by multinational firms in Brazil, Rice University Program of Development Studies, (mimeo) Fall 1974.

² S.A. Morley and G.W. Smith: The choice of technology: multinational firms in Brazil, Rice University Programme of Development Studies - Discussion paper (mimeo), 1974.

³ For the presence of foreign enterprises before World War I, see A.C. Castro: As empresas estrangeiras no Brasil, 1860-1913, Zahar ed. R. Janeiro, 1979.

⁴ For a detailed description of the national origin of the leaders, see M.L. Possas: Employment effects of multinational enterprises in Brazil, Multinational Enterprises Programme Working Paper No. 7 (Geneva, ILO, 1979).

⁵ As a matter of fact, there is a distinction between natural and chemical fibres. In the former's production, the national enterprises are more relevant than in the latter's, where the MNEs are strongly predominant. On the presence of MNEs in the textile industry, see Peter Evans: Dependent development: the alliance of multinational, state and local capital in Brazil (New Jersey, Princeton University Press, 1979), Chapter 3.

⁶ See, for example, Marilyn Carr: Economically appropriate technologies for developing countries (London, Intermediate Technology Publications Ltd., 1976).

⁷ In 1977, among people 10 or more years old, 8.4 per cent earned less than half of a minimum wage; 13.8 per cent earned up to a full minimum wage, and 14 per cent up to double the minimum wage. If we take only people employed in industry (manufacturing and construction), the same segments corresponded to 11.4, 20.2 and 36.8 per cent, respectively. The minimum wage in Brazil fluctuates between US\$ 90 and US\$ 110. Source: PNAD, IBGE, 1977.

⁸ R. Mecedo and M.E. Garcia: Observações sobre a política brasileira de salário mínimo, FIPE, USP (mimeo) São Paulo, 1978. Quoted by P.R. Souza: Emprego, salários e pobreza, ed. Hucitec/Funcamp, São Paulo, 1980.

⁹ P.R. Souza and P.E.A. Baltar: "Salário mínimo e taxa de salários no Brasil", in Souza: op. cit.

¹⁰ Their argument applies only to unskilled labourers and their remuneration, not to the average wage.

¹¹ David Morawetz: "Employment implications of industrialisation in developing countries: A survey" in Economic Journal, Sept. 1974.

¹² Some of these aspects are developed in ILO: Employment effects of multinational enterprises in developing countries (Geneva, 1981), pp. 95-101.

¹³ See D. Morawetz, op. cit., p. 522.

¹⁴ On this, see the interesting article by J. Krishnamurty: "Indirect employment effects of investment" in A.S. Bhalla (ed.): Technology and employment in industry (Geneva, ILO, 1981, 2nd edition).

¹⁵ See S. Watanabe: Multinational enterprises and employment-oriented "appropriate" technologies in developing countries, Multinational Enterprises Programme Working Paper No. 14 (Geneva, ILO, 1980).

¹⁶ This size comparison is in terms of production. As regards share capital the enterprise in which the subsidiary depends in technological terms controls less than one-quarter of the subsidiary's shares. The Brazilian subsidiary is owned by an international holding company whose shareholders are not exactly the same as those of the parent company (in technological terms).

¹⁷ When we say Brazilian subsidiary, we refer to a group of enterprises, one of which completely controls all the others. They have a common strategy and act as one firm.

¹⁸ That is to say it is possible that all the subsidiaries in the same "operation area" produce computers. But each of them will produce a different type of computer.

¹⁹ This leads the Brazilian subsidiary to try to purchase from Japan the inputs it has to import.

²⁰ We could only gather data for one of the plants, but this plant is the most important one. The other produces only paper cards and renders services like repairing. So the data presented are the most relevant ones.

ANNEX

Enterprise X

- Origin - Italy
- Product lines - telephone cables, electrical cables, special cables, wires for building construction, etc.
- Employment - 15,000 (1981)
- Capital - approximately US\$ 200 million (12/1977)

Enterprise Y

- Origin - USA
- Product lines - computers, video terminals and electric typewriters
- Employment - 1,229 (1981)

Enterprise Z

- Origin - Switzerland (technological affiliation: Italy)
- Product lines - artificial and synthetic fibres: polyester, nylon, rayon
- Employment - 1,971 (1981)
- Capital - approximately US\$ 22 million (3/1978)

APPENDIX

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