

rate of 20.8% (von Doellinger et al., 1974). For fixed investment, the conditions were stricter: buildings were not included and equipment was to be financed at the going rate of the Bank's programme for small and medium enterprises (circa 27% per year in 1972), for the maximum of eight years. However, the rules specified also that, in "exceptional cases", easier conditions could be given for fixed investment (Art. 11 1).

Alternatively, instead of a loan, the Bank could participate as a partner of the enterprise in the project, but, in all cases, its contribution should not go beyond 50% of the total expenditures of the project.

If the payments for license agreements came out of the working capital of the enterprises, as it is presumable, the use of the FUNTEC could have reduced the cost advantage of licensing over self-reliance, as it was considerably cheaper than the commercial credit normally used by the capital goods enterprises to finance their working capital (Suzigan et al., 1972), especially for the expenditures with manpower, the main item of design activities (see Table IV-18).<sup>1/</sup>

TABLE IV-18:- FINANCIAL COSTS: FUNTEC AND INVESTMENT BANKS IN BRAZIL - 1972

<u>Source of Funds</u>	<u>Yearly Rate (percentage)</u>	<u>Duration</u>
FUNTEC:		
Personnel <sup>1/</sup>	1.0	Indetermined, but "long"
Fixed Capital	27.3	8 years
Investment Bank	28.5	Usually 1 year

NOTE: <sup>1/</sup> Buildings excluded. Lower rates could be granted in "exceptional conditions".

SOURCES: FUNTEC: BNDE (1971) and Banco Central, 1974 Report  
Investment Banks - CONCLAP (1972).

<sup>1/</sup> The comparison made in Table IV-18 probably underestimates the advantages of FUNTEC as it compares it with credits given by investment banks, and the latter provided the longest and cheapest credits, among the private sources (see von Doellinger et al., 1974, and CONCAP, 1972).

Nevertheless, in the first ten years of its existence, the Fund was never used by Brazilian enterprises - its sole beneficiaries were universities and other research institutions, mainly for post-graduate courses, and more recently, the military Ministries (FINEP, 1974). In fact, the enterprises interviewed ignored its existence.

The Bank is, certainly, partly responsible for this ignorance and lack of use - the existence of the Fund was never widely publicised and it also suffered from a certain confusion within the Bank, especially at the level of the Board, about its purposes; as shown, for instance, by the several changes introduced in its rules, and the birth and death of similar Funds in the Bank.

Notwithstanding such problems on the part of the Bank, the enterprises remain the main responsible for the lack of use of the Fund. In fact, the Bank and the regional development banks which act as its agents are well-known to the enterprises - our interviews were arranged largely through them - as they are the only source of long-term capital in Brazil. Therefore, they are also the most probable place to go to, if an enterprise is looking for any kind of "development" credit.

In other words, although the Bank could have reduced the costs of search for the enterprises (and has attempted to do so recently - see Chapter V), it is unlikely that such costs would prove an insurmountable barrier to an interested enterprise. Our interviews suggest that the enterprises had never undertaken such search.

(iii) lack of institutional sources of risk-capital:

As pointed out by an enterprise interviewed, loans do not substitute for risk-capital, especially when a highly uncertain venture as developing original designs is involved.

Although the FUNCTEC in its rules envisaged the possibility of providing risk-capital to an enterprise, the Bank would probably prefer a lending operation. Moreover, as we have seen, the participation of the Bank in any project at the time, was restricted to 50% of the value of the investment, either in terms of a loan or as risk-capital, so that the enterprise would have to put up at least the additional 50% from its own resources. Only more recently have the Bank and FINEP given more attention to the provision of risk-capital for technological development (see next Chapter).

On the private side, although the investment banks were originally conceived for the purpose of providing risk-capital, they operated essentially as providers of working capital loans, although for a period longer than the commercial banks (up to one year). The stock exchange, apart from a boom period in 1969/1971, largely fuelled by speculation, has also traditionally played a minor role as a source of capital for the Brazilian enterprises - partly a consequence of the family-type of organisation of the majority, including those interviewed. Among the latter, only six had titles negotiated in the Rio and Sao Paulo Stock Exchanges in 1976.

(iv) joint financing by the enterprises:

An alternative way of reducing the costs and risks of self-reliance could have been the joint funding by two or more enterprises of projects of research and development of common interest (see Chapter II), which could have been used in conjunction or alternatively to the official credit or capital.

This also was not tried. This difficulty of joint action was exemplified when, at the time of our study, at FINEP, an attempt was made to bring together the main producers of electrical equipment to jointly sponsor a laboratory for hydraulic studies, which could be used for the still large

Brazilian hydro-power market. Such agreement was impossible and finally, one enterprise (included in our sample) decided, in 1974, to go along alone, backed up by a loan from FINEP, from the credit line mentioned above.

The difficulty of joint action between the enterprises interviewed is not restricted to technological activities <sup>1/</sup> - i.e. it cannot be attributed exclusively to the risks involved in such activities. It is an important aspect of their general strategy, to which we return in the last Section of the Chapter.

Nonetheless, this difficulty, combined with the absence of external sources of risk-capital implies that a firm that wanted to follow a self-reliance strategy in the Brazilian conditions would have to bear all the risks of such strategy, acting, to use our expression in Chapter II, as its own "insurance company".

Such limitations weighed more heavily upon the smaller enterprises, especially if they wanted to move from a strategy of copying to one of self-reliance, involving greater financial resources. For example, in our

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<sup>1/</sup> During the interviews, we asked the enterprises studied if "they had considered the possibility of joining in with other enterprises in order to increase the opportunities of exporting or to participate more actively in biddings within the country". Seven enterprises said that they had established agreements in order to participate in Brazilian bids, and five for exports. In most cases those agreements were concerned with setting up a "package" of equipment as complete as possible, the goods of one enterprise complementing those of the other (e.g. gates from one enterprise and gantries from another, for electric power generation), but we found also a couple of examples in which the enterprises had, previous to the bidding, agreed on prices and/or in the sharing of the supply. Nevertheless, there was a widespread opinion that it was, in general, difficult to reach an agreement with the other local producers, especially for local competitors; due to mutual suspicion. To quote one entrepreneur interviewed, "the other enterprises still think in terms of a competitive mentality and not in oligopolistic terms of market sharing". Such difficulty of joint action was also in part probably due to the over-capacity of the sector during the 'sixties and early 'seventies.

sample, one of the largest enterprises interviewed took over the control of a small but technically very competent firm producing control instruments based on their own designs after the latter was not able to obtain additional capital from the market.

- (g) learning from licensing and copying-and-adaptation -  
- risks of failure in SR

We have previously argued that the continuous investment in an SR capacity was necessary to, at the same time, reap all the benefits from the licensing relationship while reducing its disadvantages (see Chapter II), especially if the reliance on licensing was to be at least partially superseded in the future. However, the situation found in the interviews, while confirming the partial learning deriving from the licensing relationships, did not show such an investment in SR capacity by the Brazilian enterprises.

Analysing the contents of the licensing agreements with the enterprises, we found that in about half the cases the agreements involved, beyond the provision of the preliminary design, the transfer of detailed design and of manufacturing techniques, and in another 30% of the cases, where the firms had the necessary manufacturing knowledge, the transfer of detailed design. In circa 20% of the cases, the firms did not need any assistance from their licensors in either detailed design or manufacturing techniques, receiving only the preliminary design, mainly for process plant equipment and materials handling equipment (mainly cranes). (See Table IV-19).

TABLE IV-19:- LICENSING CONTRACTS - CONTENT

	<u>Number</u>	<u>Percentage'</u>
Basic Design Only	16	21
Basic and Detailed Design	23	29
Basic and Detailed Design and Technical Assistance for Manufacture	40	50
Total	79	100

The majority of the enterprises licensed pointed out that the licensing agreements brought along a general improvement of the technical level of production. This is probably partly a consequence of the applicability of the same manufacturing techniques when producing goods with higher technical requirements, such as those licensed. In fact, as already pointed out, half of the contracts involved also know-how for manufacturing activities; but the learning opportunities go beyond the knowledge transferred through the contacts.

Through their contacts with the technical staff of the licensors when they go to Brazil and especially during their visits to the licensors in their home countries, the licensees' technical staffs and managements are able to have access, via personal interchange and simply by watching, to information about techniques, procedures, etc., which are applicable not only to the licensed products, but to others as well. Such visits play also an important role in monitoring the latest developments of the licensor in the licensed and non-licensed lines of production.

The enterprises interviewed attach great importance to this spill-over of technical knowledge for non-licensed lines (see Table IV-20), especially whose enterprises which do not depend almost exclusively on licensing (MLD and IE); understandably, as they can use such knowledge for

the lines for which they do not use licensing agreements without having to pay extra for it. Among the enterprises ML we found in some cases a reluctance to admit such "espionnage" (sic), perhaps due to a fear of damaging their relationship with the licensors, on which they depend so much.

Such benefits come largely through the training of the manpower of the licensees (see Table IV-20) but also often the management itself benefits considerably from the contacts with the licensors by having access to more advanced management techniques and contact with more complex organizational structures, an important aspect in the Brazilian case, as most of the capital goods enterprises, even the largest, are still mainly family concerns with a high degree of concentration in decision-making.

TABLE IV-20:- MAIN ADVANTAGES AND DISADVANTAGES OF THE LICENSING RELATIONSHIPS. 1/

<u>Characteristics Most Often Mentioned</u>	<u>MLD</u>	<u>IE</u>	<u>ML</u>	<u>Total</u>
Training of Manpower	5	4	3	12
Improvement in Technical Level of Production	3	2	6	11
Access to Subsequent Innovations <sup>2/</sup>	4	3	7	14
Spill-over to Other Lines of Production	6	4	5	15
Exclusivity as Licensee <sup>3/</sup>	4	3	6	13
Appropriation of Improvements by the Licensor <sup>2/</sup>	1	1	4	6
Limitations to introducing Modifications in Licensed Equipment	2	2	6	10
Export Limitation <sup>3/</sup>	4	2	7	13

NOTES: 1/ Enterprises indicate more than one characteristics, so the sum is greater than the number of enterprises.

2/ Considered to be "symmetrical" conditions.

3/ Considered to be "symmetrical" conditions.

However, as regards the skills of preliminary design, they were not transferred - only their result, the preliminary design itself.

On the other hand, the preliminary design skills developed through copying and adaptation did not seem to be sufficient to design the licensed products, partly because the range of copiable goods is intrinsically limited (see Chapter II, Appendix) but mainly because of the difference in complexity between the copied and licensed goods.

Therefore, in order to be able to supply new, more complex products with their own design and/or to substitute SR for licensing, even partially and in the long run, the enterprises would have had to commit resources - especially manpower but also probably equipment and laboratories - to develop the new preliminary design skills.

For some of those activities they could have used the research institutes and other sources of information available in Brazil. They could also have used the FUNTEC to reduce the amount of their own resources committed to this, as well as their cost. Nonetheless, they would have had to bear part of the costs as well as the main part of the risk.

The analysis above (see 4.2 and 4.3) suggests that, especially for custom-built equipment, the risk of failure was very high - even if the firms produced a design of equivalent technical quality, in the conditions of demand and competition above described the risk of commercial failure was considerable. The evidence from the interviews suggest that the firms were not willing to run such risks if a licensing alternative was available. They were not even willing to attempt a long-term substitution of SR for licensing, using the latter as a basis for learning.

It is indicative of the lack of a prospective of technological self-reliance that only one of the enterprises interviewed had followed a policy of acquiring the knowledge of its licensor in order to withdraw from



licensing - see Case 5 above. All the rest of the enterprises when enquired as to their plans when their present contracts expired reiterated their intention of renewing them. In the absence of a strong parallel effort to master the preliminary design, which in the Brazilian case practically is non-existent, the licensed enterprises have to rely on such agreements to be able to supply products which incorporate new technological developments - in such conditions the licensing agreements become, so to speak, an umbilical cord linking the Brazilian enterprises to the sources of innovation.

It is not surprising, thus, that the enterprises interviewed attach great importance to the fact that those agreements, in theory, provide continuous access to subsequent innovations and that the enterprises which rely almost exclusively on licensing are those which especially emphasise this aspect of the licensing relationship (see Table IV-20).

For the licensor, too, is important to keep its licensee up-to-date technologically, as its revenue depends mainly on the licensee selling the products under license and, given the awareness of the main costumers of the development in the products they purchase and the possibility that competitors of the licensee may use more recent vintages of products, the best way to ensure such sales is to keep the licensee up-to-date. Also, a licensor who does not keep its licensee well informed runs the risk that the latter may change licensors, as, in the Brazilian case, such licensees tend to monitor the market.

Nevertheless, several enterprises interviewed expressed qualifications about this flow of information from their licensors - they believed that in the context of one specific contract, only minor improvements were communicated; major changes being kept in stock for negotiation of a new contract, so that the relationship takes on a "rolling-on" feature, keeping the

licensee firmly tied to its licensor.

#### 4.5) Conditions of Licensing

Some aspects of the relationship between the firms interviewed and their licensors have already been discussed - e.g. the learning from licensing. Table IV-20 summarises the main advantages and disadvantages they see in the licensing relationship. Here we shall discuss, first, the availability of licensors for the Brazilian firms. In the second part we then analyse other elements which determine the payments made to the licensors under the form of sales' percentage and lump-sums, especially the legal constraints, on such payments, and the importance of the licenses for the Brazilian firms interviewed. We discuss then the importance of export restrictions for the firms interviewed, tied-in purchases and adaptation costs. Finally, in the last part, we analyse the risks of entry of the licensor as a competitor or as a partner of the licensee and compare such risks with those of a strategy of SR.

##### (a) Availability of Licensing

For the potential licensors, licensing is but one alternative, as it may either sell the finished product (which in our case corresponds to an export to Brazil, as all licensors are foreign firms <sup>1/</sup>) or it may produce those goods locally, either through a subsidiary or through a joint venture.

Let us discuss this last alternative first. During the 'fifties (especially the second half) and the early 'sixties, there was a considerable

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<sup>1/</sup> As regards the origin of the licensing contracts, confirming the picture previously drawn of the Brazilian situation, there is not example of licensing between Brazilian enterprises. The majority (60%) of the contracts come from the United States and the Federal Republic of Germany (18%).

influx of foreign enterprises in Brazil (see Chapter V), as a result of good market prospectives (often over-estimated - see Leff, 1968), "defensive" investments by multinational companies and generous incentives given by the Brazilian Government.

In the early 'sixties, such investment, coupled to the expansion of capacity of the local enterprises, led to a considerable over-capacity in the sector, compared to the possibilities of absorption by the market (Leff, 1968), which was aggravated by the recession of the period 1963/1967. Only in the period 1972/1974 was this problem largely overcome, according to our interviews with the producers and, subsequently (in 1974) with the State enterprises (see also, Suzigan et al., 1974 and Chapter V).

Such conditions of widespread over-capacity and the intense competition prevailing in the Brazilian market, in which the firms already established (locals and subsidiaries), had the advantages of previous experience (contacts with suppliers, customers, etc.) made the prospective of setting up a subsidiary a less attractive one, especially if compared with exports. Moreover, as suggested in Chapter II and confirmed in some cases by our evidence (see below), licensing may provide a good "beach-head" for later entry in the market, either through a subsidiary or through a joint venture.

Our interviews confirm that exporting is the preferred strategy also in comparison with licensing; that is, potential licensors tend to license only when they cannot export.

This, in fact, was the most often voiced complaint about the supply conditions for licensing agreements coming from the Brazilian enterprises interviewed - 13 enterprises mentioned it (Table IV-21) and it is worth

presenting two examples in more detail, for their intrinsic importance and for the role played by State policies in the two situations.

The first regards equipment for the production of steel. When the National Steel Plan was being prepared, for the expansion of the steel State Enterprises, and it seemed probable that the local industry would have a high participation in the supply of equipment, several Brazilian firms received insistent offers of licensing contracts from abroad ("we were sieged by prospective licensors" commented one entrepreneur; "they were knocking every day at my door", commented another). However, when the financial scheme of the Plan was revealed, with a high participation of international (IDB and IBRD) and bilateral credits, opening up the possibilities of experts, such offers were withdrawn.

The second example is that of equipment for cement production. There was a consensus among the producers of cement equipment that they could not get licenses, especially for the "core" equipment, because the owners of such designs preferred to export their equipment. This was made easier by the small number of producers abroad and by the fact that, as there are no local producers (a consequence of the lack of licenses), the cement entrepreneurs were able to pay very low tariffs on imported plant and often be exempt from them, which acted as a further disincentive to the local production.<sup>1/</sup>

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<sup>1/</sup> Our findings about equipment for cement are not the first reference to the problem: the first (to my knowledge) report on heavy equipment in Brazil (ECLA, 1962) already mentions it; as does Leff (1968), reporting the situation in the mid-sixties, but with an optimism about its prompt solution not validated, it seems, by subsequent events. More recently, the main supplier to the Brazilian market has set up a subsidiary in Brazil.

In this sense, the incentives given to imports of capital goods (see next Chapter) have probably contributed to reduce the bargaining power of the Brazilian enterprises to obtain licenses, especially for more complex goods, which received the most generous incentives (ibidem)

TABLE IV-21:-- MAIN CHARACTERISTICS OF THE SUPPLY OF LICENSING CONTRACTS FOR THE BRAZILIAN ENTERPRISES <sup>1/</sup>

<u>Characteristics Most Often Mentioned</u>	<u>Number of Enterprises</u>
Supply limited by attempts of suppliers to sell directly to the Brazilian market	13
Supply limited because licensors had already granted monopolistic rights to other Brazilian firms	1
Supply limited by screening procedures <sup>2/</sup> in Brazil	12
Supply made easy by the great number of potential suppliers	10

<sup>1/</sup> Enterprises sometimes indicated more than one characteristic, so the sum is greater than the number of enterprises.

<sup>2/</sup> See Section 4.5(b)

However, apart from the cases above-mentioned, the enterprises interviewed do not seem to have had major difficulties in finding licensors abroad and half of them expressly stated that the supply was "made easy by the number of foreign enterprises interested in licensing in satisfactory conditions for the licensee" (Table IV-21). Several enterprises reported also that, often the initiative of a licensing contract had parted from the potential licensor, especially recently before the interviews (Table IV-12).

During the interviews, we found that the enterprises tend to monitor the market through technical literature, visits abroad, etc., in order to keep technically up-to-date and checking also, to some extent, the quality of the designs received against recent developments, by the licensor itself

and its competitors. We found some cases when the licensee had changed or planned to change licensor because they felt such licensors had slipped behind in technological terms.

Nevertheless, there are some limitations in this availability of suppliers, especially for the future. As it is known, for several capital goods, especially the more complex ones, the number of producers - and therefore of potential licensors - is limited, even internationally (e.g. big generators for electric power, gas turbines, big maritime diesel engines, cement equipment). Several of those suppliers have set up subsidiaries in Brazil and are therefore unlikely to license a competitor to those subsidiaries. Moreover, as several Brazilian firms have moved contemporaneously into the same areas, following the markets opened by the investments in heavy industry, in some cases practically all the potential licensors have already established exclusive licensing agreements with Brazilian enterprises. Therefore, newcomers or enterprises which decide to change licensors may find difficulty in finding a licensor available in some areas. This seems to have already happened in the case of travelling cranes for steel plants, where there are nine potential suppliers, according to the ABDIS 1974 catalogue, five of which are Brazilian enterprises operating with licenses and the others foreign subsidiaries and where another enterprise interviewed, complained about the difficulty in finding a licensor abroad, as it had been pre-empted by the other Brazilian enterprises (see Table IV-21). This is a problem likely to increase in the future, especially for heavy, custom-built equipment.

(b) Explicit payments to the licensor - bargaining position of the Brazilian firms

It is worthwhile to begin this part by outlining some of the main Brazilian legal and administrative features as regards payments for

technical assistance from abroad, at the time of the interviews, as they involved constraints upon such payments. Although there was no formal legal prohibition,<sup>1/</sup> there was a strong resistance from the INPI (Instituto Nacional de Propriedade Industrial - National Institute of Industrial Property) and from the Central Bank to accept contracts which involved payments of more than 5% of the value of the sales of the goods produced under contracts of technical assistance and licensing.

At the time of the interviews such pressure had recently increased, following the changes in the structure of the INPI and its greater participation in the screening of contracts prior to their registration with the Central Bank, the administrative procedure required for remitting the payments abroad. Such screening included not only the new contracts, but also those to be prorogated and those of indefinite duration and the INPI was exerting considerable pressure to bring those contracts within the limits of the law and administrative usage, not only as regards payment limits, but also duration of the contracts<sup>2/</sup> and non-acceptance of restrictive clauses, such as export restrictions, tied-in purchases of raw materials and components, etc.

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1/ The legal documents (Law 4390 of 29/8/1964 and Decree 55762 of 17/2/1965) establish only that 5% of sales to be paid abroad for technical assistance is the limit under which such payments can be considered as costs, for income tax purposes. Amounts above such limit could, hypothetically, be paid, but would be considered as distributed profits, for fiscal purposes. However, the Law gives also the Central Bank discretionary powers as regards the acceptance of contracts and the Bank, especially since the INPI began in 1972 to screen the contracts more effectively, was not accepting contracts which went above that limit. A full discussion of the laws which rule the payments for technical knowledge is found in Biato et al. (1974); Figuerredo (1972) and Pinheiro Neto (1973).

E/ The same laws mentioned in 1/ stipulated that a contract should have a maximum duration of five years, renewable for another five, also for fiscal purposes. However, several enterprises had contracts of indefinite duration, to which the INPI and the Central Bank objected.

Prior to the interviews several Brazilian capital goods entrepreneurs, especially the leading ones in custom-built equipment, had expressed their opposition, in public and in discussions with Government officials, to such increased control and especially to the 5% limit, saying that such a limit was too narrow and that they would be prevented by it from getting the licenses they needed.

Our interviews confirmed such complaints. In fact, only three of the twenty enterprises voiced no complaints about the 5% limit or other aspects of the control of the import of technology. Such three enterprises accounted for only seven contracts, together.

The other seventeen enterprises complained, in varying degrees, especially about the 5% limit and the delays imposed by the tightened controls. Twelve enterprises singled this out as one of the main limitations in the supply of contracts (see Table IV-21).

The strongest complaints about the 5% limit came from the producers of custom-built equipment. For such equipment practically always the design will have to be made especially for the Brazilian licensee, to conform with the required specifications of the project. According to the enterprises, such design costs can be substantial: in a case of travelling bridges for steel plants, for instances, the price paid for the designs was the same as the percentage charged on sales - 5% of the value and in others, in the words of a producer of turbines and other heavy mechanical equipment, "sometimes it was up to 20% of the value of the equipment".

Nevertheless, the standard practice we found among the enterprises interviewed, was that when the licensor had to produce special designs for



the Brazilian licensee the costs of such designs were passed on to the latter, as well as travel expenditures of the staff of the licensor to Brazil, beyond the percentage charged on the sales' value. This, of course, tended to increase the cost of licensing considerably.

So far contracts involving such expenditures had been accepted by the authorities. This weakens somewhat the case for complaints about the 5% limit, and it tends to reduce the discussion to the acceptability of a 5% remuneration by the licensor, beyond the costs, i.e. as a monopolistic rent.

There is abundant evidence that there was reluctance from the licensors to accept such limit. One producer of cranes and travelling bridges stated, for example, that its licensors demanded usually 7.5%; another, a producer of cement equipment, went as far as to say that "for 5% I would not license, if I were them", endorsing such reluctance.

However, the evidence from the interviews points out that although in many cases this was an obstacle, it was rarely an irremovable obstacle - there were very few cases of a desired licensing agreement being made impossible by such limit. In fact, several enterprises showed that through hard bargaining, backed up by the fact that it was a Government requirement, they could drive the percentage demanded down to the 5% limit.

Nevertheless, such bargaining can be a protracted process and the time spent on negotiation can be critical, especially when having to meet relatively short deadlines, as often given by the State Enterprises. In most cases, the important thing is to get the license - a few percentage points in the payment to the licensor will not add substantially to the final price of the goods, which, especially in the case of custom-built equipment, tend to be sold more on quality grounds (for which the license is often indispensable in the Brazilian conditions) than on price considerations.

Given this pattern of competition, the capital goods manufacturers have, especially in custom-built equipment, a strong possibility of passing on to their customers the costs of licensing. During our interviews we did not discuss the pricing policies of the enterprises, but Leff, interviewing largely the same universe, found, a few years earlier (1964), that the usual practice in the heavy-engineering firms was full-cost pricing (Leff, 1969).

Moreover, this pattern of competition offers the opportunity of monopolistic profits and licenses are normally provided as a monopoly - in most cases the licensor grants an exclusivity of the use of its designs and trademarks to one licensee. Exceptions to this pattern were found only in some cases of equipment for the petrochemical sector (heat exchangers, evaporators, boilers) where we found the licensors, which are also normally the suppliers of the engineering of the process, providing licenses for different licensees, but for different projects (i.e. for different biddings). This was one of the main points stressed as advantages of the licensing agreements by the enterprises interviewed (see Table IV-20), which is understandable, in markets where the interviews suggest are characterised by intense competition and product differentiation.<sup>1/</sup>

Where the restrictive conditions above-mentioned (see 4.2 and 4.3) apply rigidly, licensing becomes the conditio sine qua non for entry in such markets, but even in less stringent conditions the knowledge received through the licensing agreements (designs and, when necessary, manufacturing technology) tends to overcome the most important barriers to entry in those areas: product differentiation and, to a less extent, absolute cost advantages

<sup>1/</sup> The evidence coming from interviews with State enterprises and financial institutions corroborate that there is a fierce competition in this area.

stemming from the knowledge that older firms may have of more economic techniques of production (Bain, 1956). Given the pattern of competition, and the similarity of manufacturing techniques for different methods, the design barrier is probably the most important.<sup>1/</sup>

Entering such lines of production had an additional advantage for the firms interviewed, especially during the 'sixties decade and early 'seventies: as we have already mentioned, most of those firms invested heavily in capacity expansion during the late 'fifties and early 'sixties, a capacity which could be more easily and more economically occupied by the large and bulky orders for custom-built equipment than trying to compete with the smaller firms for several small orders, where the latter had the advantage of lower fixed capital and lower overhead costs and there the competition was largely based on price.

Furthermore, under the pressures from demand and competition (see 4.2 and 4.3), and in the absence of a parallel investment in SR (see 4.4), licensing became not only a condition for entry, but for survival as well, especially in custom-built equipment markets, so that its opportunity cost for the Brazilian enterprises was very high and their bargaining position as regards the conditions of the licensing agreements relatively weak, even if for most of them such bargaining position was relatively strengthened by the relative abundance of licensing, above-mentioned.

<sup>1/</sup> The other types of barriers to entry, using still Bain's well-known classification, are probably of little importance for those goods: scale economies are of small importance in the case of custom-built equipment, which tend to be produced one-off or in very small quantities. It is also unlikely that there would be significant differences in the prices of factors of production for the different firms which would give advantage to the "older" firms. In fact, as mentioned earlier, the firms tended to enter those markets closely in time, following the opportunities opened up by the investment programmes, especially of the State. Moreover, as pointed out in Section 2, most of them were already traditional producers, with well-established relationships in the markets of factors and most of them rely on internal programmes for training their manpower. Although the equipment stock is different from enterprise to enterprise (Tecnometal, 1971) there is no indication that this gave advantages to early entrants. Finally, the possibilities of "limit pricing" are limited in the case of custom-built, bidded equipment, unless some form of collusion is found by the existing producers, for which there is no indication of widespread existence.

It is important to note that the enterprises which follow a deliberate strategy of partial SR, especially Enterprise 3, pointed out that their technical capacity strengthened their bargaining power ("it is a relationship between equals" said the latter), providing better conditions for licensing.

Under the pressure to obtain licensing, some enterprises got themselves into trouble by establishing verbal agreements with licensors which would not be afterwards accepted by the controlling authorities, so that payments abroad would not be authorised by the Central Bank. Given the importance of maintaining an image of reliability among the community of licensors ("fighting with one licensor hurts our reputation with the others", said one entrepreneur interviewed), the enterprises were quite worried when such cases happened.

More generally, the concern with the delays in getting the licenses because of the need for long negotiations with the licensors and, then, with the INPI and the Central Bank <sup>1/</sup> seemed to be even greater than with the limitation of supply because of the 5% limit. There were inclusive some hints about their willingness to make some agreements "under the table", in order to circumvent the limitations and obtain the licenses in due time.

We have more detailed information about 43 of the 79 contracts (54.4%). It is not surprising, in the light of what has been discussed above, that almost 80% of the contracts were at 5% and at least one explicitly above

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<sup>1/</sup> The enterprises normally took their contracts to the INPI after they concluded the negotiation with their licensors. If the INPI objected strongly enough to some of the terms of the contracts to refuse its approval, this meant that the enterprise had to go back to its prospective licensor and try to obtain its consent to the changed terms.

that limit (see Table IV-22). It is probable that the others were at least at 5% too, especially for custom-built equipment.

TABLE IV-22:- PERCENTAGE OF SALES CHARGED IN SOME CONTRACTS<sup>y</sup>

<u>Percentage of Sales</u>	<u>Number of Contracts</u>	<u>Percentage</u>
1	1	2.5
3	2	5.0
3.5	1	2.5
4	4	10.0
5	31	77.5
7	<u>1</u>	2.5
	40	

NOTE:- <sup>y</sup> Contracts corresponding to 50.6% of total number. Three others, for which there is data available, involve complex schemes of payment, including purchases of parts and complementary equipment and, with the information at hand, it is not possible to reduce such payments to a precise percentage of sales. Nevertheless, it seems that they would fit in the upper range.

As regards lump-sum payments, they were also frequent. One enterprise suggested that there was a tendency for a trade-off between lump-sum payments and the percentage charged on sales: for simpler produces, where the transfer of technology would be relatively easy and there would not be a great need for further assistance from the licensor, there would be a tendency for a relatively high initial lump-sum payment and for subsequent relatively low percentage charges; the inverse occurring for complex products. Although most of the lump-sum payments were in the range of twenty to forty thousand dollars, there were at least three exceptions - two payments of US \$100,000.00 and one of US \$300,000.00 - all of them for complex machinery (high-pressure boilers and diesel engines), which were combined to high payments in terms of sales' percentage and, in two cases, with purchases of components.

The enterprises interviewed showed a marked preference for payments as a percentage of sales in comparison with lump-sum payments, as the former is contingent upon the realisation of the sales, while the latter has a nature of a risk-investment. For the same reason, as well as for the need to receive assistance from the original producer of the designs at the stage of manufacturing (see 4.4), they tended to discard the possibility of an outright purchase of the designs, preferring the continuous relationship involved in the licensing agreement, which, moreover, allows them to share, to some extent, the innovations introduced by the licensor.

(c) Export restrictions - the importance of the internal market

In most cases the licensing agreements involved partial or total prohibitions of exports (see Table IV-20). In two cases, where exports were allowed (for restricted areas), the percentage of sales' payments were subject to a surcharge.

Although the INPI and the Central Bank were at the time refusing to register such contracts the enterprises tended to view such restriction with equanimity - they saw it as the "symmetric" of the monopoly they received in the Brazilian market (not illogically, one may add).

Such acceptance of export restrictions is also explained by the fact that most of the sales of the enterprises interviewed are oriented towards the Brazilian market, which, at the time was going through a period of remarkable growth.<sup>1/</sup> Combining data from the interviews with information from the ABDIB catalogue we find that at least 13 of our enterprises had exported in 1971/1972, but for most of them exports accounted, at the

<sup>1/</sup> In the period 1968/1972 the internal production of capital goods in Brazil grew at circa 14% per year. See Chapter V.

maximum, for 20% of their sales. In spite of such relatively small importance of exports their restriction involves a high opportunity cost for the enterprises because of the high incentives given by the Brazilian Government to exports (tax rebates, special credit, etc. - see von Doellinger et al., 1974). It is estimated that such incentives, if one includes the tax rebates, amounted, in 1970, to an addition of over 40% to the exchange rate (*ibidem*).

Although they also depend mainly on their sales in the Brazilian market, the technological capacity developed by two of the self-reliant enterprises (Cases 3 and 5 - see Section 3) has enabled them to compete successfully in the international market; Enterprise 3 having already entered the export of technology per se through licensing. Such international sales are especially important for the latter enterprise given the high value of the machine it produces.

It is highly improbable that licensing would have allowed for a similar penetration of the international markets. It is in fact significant that the exports of Enterprise 5 date largely from the end of its licensing agreement.

Given that an export operation depends essentially on the initiative of the exporting firm and given the importance for the licensees of keeping a good relationship with their licensors, a certain scepticism is probably warranted about the effectiveness of the action of the INPI and Central Bank in terms of export promotion, even if the licensors agree to drop such clause from the contracts (see Chapter V). Given the traditional shortage of foreign exchange from which the Brazilian economy suffers, indicated also by the incentives mentioned above, the social costs of such restrictions are probably even greater.

(d) Tied-in purchase

During our interviews only three enterprises reported purchases of equipment or parts tied-in to their licensing agreements, although it is possible that this is an underestimate. In the cases we were able to identify such payments seemed, to a considerable degree, designed for increasing the revenue of the licensor, circumventing the 5% limit previously mentioned. They tended to be applied to more complex equipment (e.g. diesel engines) and were generally costly - in one case, of compact boilers, the purchases of components reached 30 to 40% of the value of the equipment and another enterprise explicitly mentioned that they tended to be over-priced in order to increase the revenue from licensing to the licensor.

(e) Costs of adaptation

We stressed in Chapter II that when designs are used in a different economy they will often need adaptation. This is what we found in the Brazilian case, the adaptation costs being borne out by the licenses. Only two of those enterprises did not need to adapt the designs received from their licensors.

In most cases such adaptations were needed in order to use the materials (mainly steel) and components (e.g. bearings) available in Brazil. Nevertheless, several enterprises introduced modifications in the licensed equipments because when they were manufacturing it they found room for improvement and because of their knowledge of later developments in such products, abroad and in Brazil (see Table IV-23).

The two last causes of modifications above-mentioned seem to confirm both the relative capacity of the enterprises interviewed in terms of detailed design and manufacturing technology and their close monitoring of the market, previously mentioned.



Nevertheless, it is also important to note that only four of the enterprises introduced significant modifications in the design of the equipment licensed (one of them the enterprise discussed in Case 3), the others restricting their modifications to the process of production of the licensed equipments (see Table IV-24).

TABLE IV-23:- ADAPTATIONS INTRODUCED BY THE LICENSEES - CAUSES

<u>Main Causes of Adaptation</u>	<u>Number of Enterprises</u>
Different new materials and components	12
Possibility of improvements found during manufacturing process	7
Knowledge of technical developments abroad	3
Technological development of competitors	3
Requests from purchaser	2

NOTE: // Enterprises indicated more than one reason, so sum exceeds number of enterprises.

TABLE IV-24:- ADAPTATIONS INTRODUCED - TYPE

<u>Adaptations in:</u>	<u>Number of Enterprises</u>
Manufacturing Process	16
Design of Product	4
No Adaptation Made	2

NOTE: // Two enterprises made both types of adaptation.

This may be due to the intrinsic quality of the designs received, but it is also probably influenced by the limitations of the Brazilian enterprises in terms of basic design, already commented upon. In fact, when inquired upon what limited the introduction of further improvements and modifications, the limitation of the capacity for design was the motive most often quoted, on equal terms with the uncertainty as regards the demand (see Table IV-25).

TABLE IV-25:- WHAT LIMITS THE INTRODUCTION OF FURTHER ADAPTATIONS OR INNOVATIONS IN THE LICENSED PRODUCTS

<u>Main Causes Mentioned</u>	<u>Number of Enterprises</u> ↓
Nothing	4
Restricted design capacity of the licensee	6
Uncertainty about demand	5
Lack of working capital	4
Availability of new materials, components, and equipment for quality control and performance tests	4

NOTE: ↓ Two enterprises confirmed that they had not needed so far, to introduce modifications (see Table IV-24). Some enterprises indicated more than one cause, so sum exceeds total number of enterprises.

The costs of adaptation add not insignificantly to the costs of licensing previously mentioned. Taking the case of the enterprises which rely almost exclusively on licensing, as reported during the interviews, their technical staffs are practically wholly devoted to adaptation tasks. Such staffs account, on average, for 5.7% of their work-force (see Table IV-16). Accepting (from MPCG, 1967 and Leff, 1968), that labour costs are circa 30% of the value of production and that the cost of the design staff is <sup>similar to the</sup> ~~above~~ the average cost of labour, we would have a (very rough) estimate of the costs of adaptation, for such enterprises, of about 2% of the value of production.

Nevertheless, the licensees transfer such improvements free to their licensors. In this way the latter benefit doubly: by shifting those costs to the licensees and by being able to incorporate such improvements in designs licensed to Brazil (to the same firm or to others) and elsewhere, strengthening thus their bargaining power.

In fact, in most cases, the licensors exert a tight control over such modifications, partly on grounds of maintaining performance requirements but also probably as a means of ensuring their transfer and keeping control over the licensee.

However, it should be noted that the majority of the Brazilian enterprises interviewed do not resent such control. In part they consider it the "symmetric" (sic) condition for the transfer of recent developments by the licensor, although the position is far from symmetric in terms of control, as the licensees have much less possibility of controlling the technical development of the licensor and ensuring the transfer of the latter (as shown in their assessment of the transfer of innovations previously discussed) than vice-versa. In part, they also welcome it as a form of "validation" by the licensor of the improvements they introduce - an implicit recognition of their technical weaknesses.

Finally, it is worth mentioning the strategy used by one of the enterprises interviewed in order to reduce adaptation costs: at the time of the start of the design process by its licensors it sends some of its technical staff there with all the necessary information about the Brazilian characteristics of raw materials and components, so that, from the outset, the design is adapted to these conditions. This procedure has the advantage of partially cutting down the adaptation costs (minus, of course, the travel expenditures), reducing to some extent delivery time and, as emphasised by the enterprise, an educational benefit for its technical staff through the discussion of the design problems with the licensor's staff, as well as "learning-by-watching" (see 4.4 above).

(f) Risk of entry of licensor as a competitor or partner  
- comparison with the risks of SR

As already discussed, in Brazilian conditions licensing is a necessary condition for entry and permanence in the market of a wide range of

products, although of course, licensing is not a "passport to success" - in a competitive situation where most of the competitors have licensing agreements, some stand to lose and, in fact, we found some instances of contracts which had never been used, most of which were in the process of being dropped.

However, this strategy of survival and growth based on a licensing agreement, exposes the Brazilian licensees to another source of uncertainty - it can be thwarted by a decision of the licensor to supplying the market directly.

As previously suggested, a licensing relationship can be a convenient stepping stone for an international company contemplating investment abroad in the form of a subsidiary: it provides an efficient mean to test the market abroad and to establish the trademark among customers while earnings profits from the licensed know-how and sales of components and other services.

Although the Brazilian policies grant considerable incentives to foreign investment (see Chapter V), the licensors of the Brazilian enterprises interviewed seemed to prefer an alternative strategy, that of becoming partners of their licensees. This is probably due partly to the conditions of supply in the Brazilian market (see above) and, partly, to the other advantages of such partnership in the Brazilian case: they are able to use the investment of the licensees not only in physical installations but also in terms of the experience of the Brazilian firms of contacts with suppliers, customers and the financial system (especially the public agencies, which cannot lend money to foreign enterprises except under special circumstances,<sup>1/</sup> while committing very little capital of their own

<sup>1/</sup> Public credit agencies, such as the BNDE, are not supposed to grant loans to foreign enterprises unless authorized to do so by the President of the Republic. As an enterprise is considered to be Brazilian if the foreign partners hold less than 50% of its capital, a partnership such as those mentioned in the text would circumvent this limitation (see Chapter V).

as their contribution to the partnership is essentially the capitalised value of their know-how. Moreover, their role of suppliers of a technology which may be the necessary condition for the survival of the licensee and their technical supremacy tend to give them a decision power over the strategy of the licensee in disproportion to their capital contribution, applying to all lines of production and not only to the licensed lines.

In fact, we found only one example of a former licensor having set up a subsidiary (in Brazil (for the production of process plant equipment)<sup>1/</sup> without having first attempted to enter a partnership with its licensee. In three other cases reported (heavy electrical equipment, sugar cane equipment and paper machinery), the entry was subsequent to failure to establish partnerships with old or desired licensors.

The Brazilian firms interviewed reported also that there was a marked tendency, recently, on the part of the licensors, to switch over from straightforward payments to partnership agreements and, especially, to begin new agreements under a partnership arrangement. Half of the enterprises which at the time of the interviews had licensing agreements and two of the WL, had already been formally approached to do so.

However, the Brazilian firms much prefer the traditional alternative of payments to the partnerships. As one leading producer of machine tools put it, "It is difficult: they are not interested to be a minority partner. We are not interested in having them as a majority partner. Half and half doesn't work". Another enterprise which said that, "in some cases a partnership way be advantageous", at the same time expressed its fear, telling the

<sup>1/</sup> The market for such products was undergoing a fast expansion based on the investments in oil refining and petrochemicals, mainly under the responsibility of the State (Petrobras).

story of one of its competitors which had entered such a partnership and ended up taken over by its licensor/partner. In fact, the partnerships which were refused and which led to subsequent entry of subsidiaries, involved either a majority or a 50:50 holding by the licensor and were refused largely because of the fear of losing control of the enterprise. <sup>1/</sup>

The case of the one enterprise which at the time of the interviews had already accepted the proposed partnership is illustrative of the influence the licensor can muster, even with a very small participation: although the licensor held only 10% of the capital, it had the right to appoint one of the directors, who was in charge of "helping the define the lines of production of the firm". The same enterprise (Enterprise 12) had previously refused a 50% proposal because of the fear of control by the partner.

Nevertheless, if the alternative of a partnership is less desirable for the Brazilian firms than the alternative of payments, the alternative of facing its former or prospective licensor as a direct competitor in the Brazilian market is much worse, as it means at best, changing to a new and untried licensor, while the new competitor enjoys the advantages of being well-known in the market - through the efforts of its erstwhile licensee. In some cases, the change of licensor may not be possible, as other licensors may not exist or they may be prompted to enter the Brazilian market too, in a "defensive" move.

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<sup>1/</sup> There is the possibility that by entering a partnership with a foreign enterprise, even on a minority basis, the Brazilian firms may face restrictions on the supply of licenses from other international firms, although this worries the firms interviewed much less than the problem of control.

In fact, for the four Brazilian enterprises involved in the sectors where old or prospective licensors entered, for three the consequences were highly damaging: they were either obliged to abandon such lines of production (or were planning to do so) or they were relegated to secondary positions where they had an important role. In only one case, the Brazilian companies have weathered well the competition - in the case of sugar cane equipment, where they have a long tradition of supplying the market and where the foreign firm which entered their market was not a former licensor (i.e. they did not have to change) and probably made a wrong decision in terms of location.

In this sense, the diversification of lines of production of the Brazilian enterprises acts as a defense against such risk, and, in fact, of the firms ousted from the market by entry of licensors the only one which seemed threatened in terms of survival was a firm specialising in sale for one industry. The others, although suffering a considerable setback by such entry, did not seem threatened in their survival.

In a fourth case, where a Brazilian firm refused a partnership, nothing seems to have happened. It is significant that this refers to Enterprise 3. Its technical capacity probably contributed considerably to give it a stronger defensive edge against threats of entry.

Therefore, if faced with the only two alternatives of either accepting a partnership or having to meet the competition of their former licensors (or prospective ones), for most of the enterprises the least evil seems to be the partnership. For example, the same international firm which had a 50:50 agreement refused by Enterprise 12 (see above) approached another Brazilian firm with, this time, a minority holding proposal. The first

reaction of the latter was to refuse but, when threatened with the entry of the former, they changed their mind, and were in the process of finishing negotiations.

As we have mentioned, at the time of the interviews only one of the firms had actually formalised a partnership agreement. Two others followed an alternative course: they set up new enterprises with their former licensors, preserving thus the control of their original enterprise, a strategy which is, of course, limited to products where the market justifies such investment, mainly standard products (e.g. conveyor belts). Nevertheless, such enterprises did not preclude accepting partners in the original enterprises.

More generally, of the twelve enterprises which had been approached with partnership proposals, four refused (with the consequences above described) and eight had either accepted and were negotiating the final terms or were planning to do so. Moreover, four of the enterprises which had not been recently approached expressed their propensity to accept such proposals if put forward.

The two risks above-mentioned - of expulsion or loss of control - are important risks, but they present some crucial differences with the risks of strategy of self-reliance, especially in terms of their timing and of the consequences for the Brazilian firms if such possibilities actually materialised.

Historically, the risk of the licensor stepping in as a competitor was, for the Brazilian enterprises, a prospect which they had no way of estimating the probability of occurrence, and which laid, anyway, in the (probably far) future. Optimistically, it could never happen at all. Meanwhile, they would, presumably, be earning profits from the licence. In



fact, our interviews showed that the requests from the licensor for partnerships, backed up by a threat of entry, was, at the time of the interviews, a recent phenomenon; indeed, a change in the "rules of the game", which happened after most of them had had licenses for several years.

In contrast, a self-reliant strategy faced a much nearer uncertainty, that of the costs of such strategy, costs which the lack of experience of the firms made difficult to estimate too, but which the interviews suggest the enterprises generally expected to be high, perhaps even higher than they actually would be. This was compounded by the uncertainty about the acceptance of demand of Brazilian-designed products and by the uncertainty about the competition, problems likely to occur before the risk of the entry of the licensor, at least in the past conditions of licensing in Brazil. In other words, firms with a high present-time preference, as seems the case with most of the enterprises interviewed, would be stimulated to use licensing.

However, it can be argued that if a self-reliant strategy was successful, the net rewards could possibly be greater than those deriving from a licensing strategy, as the Brazilian enterprise would be able to exploit wider markets, not being restricted in exports; would not have to share its profits with the licensor, nor would it be so threatened as the licensed firms by the entry of a foreign competitor or obliged to accept it as a partner, as shown by the enterprises which followed a strategy of partial self-reliance, especially Enterprise 3.

Nevertheless, the Brazilian conditions experienced by the enterprises interviewed, were such that it is reasonable to argue that the Brazilian enterprises when considering the prospect of a strategy of self-reliance, viewed the probability of failure greater than that of success,

especially for custom-built equipment, in contrast with their experience and that of their Brazilian competitors with licensing agreements, which had been, until recently, a relatively easy and safe path to growth.

It is important to stress that the conditions previously described in were not recent. As we shall see in more detail in the next Chapter, at the time of the interviews they had been in operation for over two decades, so that they probably had been incorporated into the interpretative filter and in the expectations of the enterprises (see Chapter II). However, our interviews suggested that the request for partnerships is tending to become part of the licensing negotiation, which implies that the risk of entry of the licensor, either as a partner, or, in case of refusal, as a competitor, has now to be faced much earlier in time.

Nevertheless, although this new feature reduces the attractiveness of a licensing strategy (the Brazilian firms, as already mentioned, expressed their concern about the loss of power such partnerships would entail), it does not seem powerful enough to offset its advantages as compared to a strategy of self-reliance. Indeed, no enterprise interviewed put forward such a strategy as an alternative to conceding a partnership to their licensors, which the majority, as we have seen, indicated they would end up by conceding, albeit unwillingly. Moreover, when enquired about their policies when the licensing contracts expired, all of the enterprises which had such contracts expressed their willingness to continue the licensing relationships and three of the seven WL enterprises were considering entering into licensing agreements.

This is probably the most crucial dilemma faced by the Brazilian enterprises - to exchange relatively safe and fast growth for dependence and,

ultimately, loss of control of their decisions. It is indeed the political and economic dilemma of the national bourgeoisies in the less developed countries, and we return to this point in Chapter VI.

IV-6: Conclusions - The Role of the State and of the Enterprises.

The interviews suggest that, given the conditions under which they operated, the strategy adopted by the majority of the enterprises - copying-and-adaptation for the simpler and better known products, and licensing for the more complex products and for those different from their traditional lines of production - was satisfactory for such enterprises. With the exceptions noted (Section 3), the majority of the enterprises did not seem to contemplate a strategy involving major investments for developing an independent design capacity, especially for the more complex goods; even if this entailed the risk of eventually losing control of their decisions to their licensors or having to face the latter as competitors.

Most of the conditions under which the enterprises interviewed chose their technological strategy reflected policy measures taken by the Brazilian State, following a path of fast import-substituting industrialisation with strong reliance on easy imports of capital goods and on foreign investment finance and technology - policies examined in detail in the next Chapter.

Under the political and economic conditions which have ruled such a process in Brazil, the Brazilian capital goods enterprises have not been the hegemonic group. Nevertheless, it is important to stress that the enterprises interviewed, among which are the leaders of the Brazilian industry, do not seem to have tried, either through their individual action or collectively, to change the policies of the State in order to be more able to develop their own technological capacity, so that the reliance on licensing could be, even in the long run, reduced, or, at least complemented by a strong

internal capacity. The initiatives in such direction had come mainly from segments of the State apparatus, partly for political reasons - to reduce the degree of foreign control over the Brazilian economy.

Such initiatives were either not taken up by the enterprises, as in the case of the FUNTEC, or when they interfered with the licensing process, as in the case of the INPI, deeply resented. Against the latter measures, as well as against the facilities for imports, policies which were also opposed by the subsidiaries of foreign companies, were mobilised the efforts of the Brazilian enterprises, individually and through their lobbies, such as the ABDIB and SIMESP,<sup>1/</sup> but not for demanding greater protection to local efforts of technological development.

That is, the strategy adopted by the Brazilian enterprise suggests also a lack of a long-term prospect in terms of autonomy on the part of the Brazilian entrepreneurs, individually and as a group, qua national bourgeoisie in the sense defined in Chapter III.

In the Brazilian conditions, a policy of total SR in capital goods design would, of course, be unfeasible as well as unjustifiable, but nevertheless, there seems to be, as suggested by some of the data previously presented, scope for increasing the degree of SR in the capital goods enterprises, in standard equipment as well as in some custom-built equipment.

However, considering that one of the prime purposes of a policy of greater technological self-reliance is achieving a greater degree of economic and political autonomy, this lack of a "national project" by exactly those who would supposedly benefit most from it - the national bourgeoisie -

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<sup>1/</sup> The organisation of the producers of capital goods of the State of Sao Paulo.

raises some important questions about the feasibility of such policy in Brazil, enhancing the role of the State - points to which we return in Chapter VI.

CHAPTER V:

ECONOMIC POLICIES AFFECTING THE TECHNOLOGICAL DEVELOPMENT OF THE BRAZILIAN  
CAPITAL GOOD INDUSTRY

V.1: Introduction

We argued in the last Chapter that the State policies designed to promote industrial development were in good measure responsible for the strategies adopted by the Brazilian capital goods enterprises. In this Chapter, we analyse the main industrial policies which affect the choice of design strategy in the capital goods industry in more detail, examining also the changes introduced since the time of the interviews (end of 1972), up to approximately 1976. Some of these changes have as their explicit objective increasing the degree of self-reliance of the Brazilian capital goods enterprises.

The policies examined here were selected based on the analysis of Chapters II and III confirmed by the indications provided by the interviews.

Before analysing specific policies it is important to examine whether there was a long-term strategy for the industry and to place such policies in the general framework of policy-making of the country. This is briefly done in Section 2.

Section 3 examines the three main policies which affect imports of capital goods: the exchange rate policy, tariffs and other fiscal incentives and the supply of credit for internal purchases of capital goods.

Section 4 discusses the control of entry of new enterprises and expansion of those already in the industry, focussing especially on the entry of foreign enterprises.

Given the importance of the demand of the State Enterprises for the industry we analyse, in Section 5, the main characteristics of the purchasing policies of some of the main State Enterprises and their linkage to other State policies.

Finally, in Section 6, we analyse the main aspects of the present explicit policy of science and technology: first the policy of control and absorption of imported technology and then the policies of support of local technological development of the capital goods industry.

We present in an Appendix to this Chapter (Appendix B) a more detailed analysis of two programmes of the Plan for Science and Technology for the development of new capital goods industries - aircraft engines and mini-computers - as they have a special interest in terms of the technological complexity of the products, the technological strategy adopted (combining licensing with local development) and in terms of their pattern of institutional support.

#### V.2: Policy-Making for the Sector: Coordination and Long-Term Strategy

The capital goods industry in Brazil, with the exception of two enterprises <sup>1/</sup> is privately owned. However, the State, through the control of imports, the foreign capital policy, the monopoly it has on long-term credit and, more directly, through its purchasing power (about 60% of the

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<sup>1/</sup> The State controls, through the BNDE, an enterprise which produces railway equipment, as a result of it being unable to repay loans received from the Bank and, more recently, one of the State steel companies has set up a subsidiary to produce mainly steel equipment. The setting up of such subsidiary, financed by the BNDE, has provoked angry reactions from the private entrepreneurs, which regard it as an undue interference of the State.

TABLE V-1: GROSS CAPITAL FORMATION IN THE INDUSTRIES PRODUCING CAPITAL GOODS<sup>1/</sup> - 1955/69 AND 1962/69 - IN CRUZEIROS - MILLIONS OF 1969.

<u>Year</u>	<u>Mech.</u> (1)	<u>Electrical</u> (2)	<u>Transport</u> (3)	<u>Total Ind.</u> (4)	<u>(1+2+3)/4</u> (%)
1955	33	36	53	1007	12.1
1956	45	86	57	1049	17.9
1957	36	58	179	1200	27.7
1958	61	77	285	1534	27.6
1959	137	131	556	2170	38.0
1962	156	118	311	3111	18.8
1963	118	97	199	2644	15.7
1964	89	110	187	2411	16.0
1965	93	83	190	2463	14.9
1966	98	158	297	2893	19.1
1967	97	144	358	2773	21.6
1968	135	153	447	3317	22.2
1969	193	183	458	3851	21.7

NOTES: Electrical and electronics industry and Transport equipment produce also consumer goods. In 1966 it was estimated (MPCG, 1969), that 18.3% of the production of the former and 55% of the latter were for capital goods.

SOURCE: Suzigan et. al. (1974).



Industria Mecanica Pesada) to administer the incentives given to private entrepreneurs of the sector. "The basic idea behind the creation of the Executive Groups," says Lafer, "was to make possible a binding centralised decision which coordinated in one nucleus, all agencies concerned with the manipulation of incentives for a given sector" (Lafer, 1970, p. 136).<sup>1/</sup>

The GEIMAPE was legally empowered to grant the following incentives:

- (a) classification of the project as essential to the process of development, which meant that imports for the project could be made under a subsidised exchange rate (see Section 3);
- (b) concession of loans and share subscription by official institutions;
- (c) exemption of tariff duties and transfer tax to equipment needed for the project;
- (d) concession of favoured tariff treatment for the import of materials and components needed for local production.

The GEIMAPE was composed of representatives of the Government institutions which provided incentives - BNDF (local loans and guarantee to foreign loans), CPA (tariff exceptions), CACEF (similarity control), Exchange Department of the Bank of Brazil (foreign exchange control), SUMOC (control

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<sup>1/</sup> The Decree which created the GEIMAPE (Decree 46.753/59) established that its functions were to be: "to elaborate and submit to the approval of the President of the Republic the plans, schemes and programmes for the several lines of production linked to the heavy mechanical industry, acting executively in the examination, negotiation and approval of specific projects and recommending, when applicable, to the specific (Government) institutions, the measure needed to the full facilitation of the investments" (quoted in Bastos, 1976, p. 36).

of foreign investment), of a representative of the Army Ministry and of representatives of the capital goods entrepreneurs (ABDIR). Moreover, it had a Consultative Council, composed of representatives of technical, academic and manufacturers' institutions.<sup>3/</sup>

Therefore, by the strength of its legal powers and by its composition, the GEIMAPE was in a privileged position to orient the development of the sector during that critical period, even if it was set up rather late.

In practice, the incentives given by the GEIMAPE, which benefitted mainly the foreign enterprises entering the sector (see Section 3), were distributed with an overriding concern for expanding the capacity of the sector quickly. Possibly, as Leff suggests, they were guided by a misconception of the real size of the Brazilian market: "apparently it [the GEIMAPE] made the mistake of confounding the volume of imports with the effective demand for the domestically produced goods." (Leff, 1968, p. 37). In the light of the strategy of the foreign firms, the incentives were often redundant (see Section 4), contributing strongly to the overcapacity which characterised the sector from the early 'sixties for over a decade.

Several reasons can be suggested to explain the strategy followed by the GEIMAPE. At a general level, such strategy was consistent with the general strategy of the Targets Plan, which privileged, above all, short-term accumulation, via import substitution with a strong reliance on foreign

<sup>1/</sup> Such institutions were the IPT (Technological Research Institute of Sao Paulo), the National School of Engineering of the University of Brazil, the National Confederation of Industries, the National Association (of Producers) of Machines, Vehicles, Accessories and Parts and the ABNT (the Standards Association). (Bastos, 1976.)

capital (Lessa et al., 1964; Lafer, 1970).<sup>1/</sup>

Such strategy was also undoubtedly influenced by previous experiences of the preceding Brazilian Governments, when an important public investment programme, proposed by the Joint Brazil/United States Commission, had been curtailed because of lack of foreign exchange to import the necessary capital goods, which impressed on policy-makers the importance of a wide basis of local supply of equipment to fulfill their plans, especially under conditions of scarcity of foreign exchange, as those prevailing in the mid-'fifties (Leff, 1968; Lessa et al., 1964).

In 1964 the GEIMAPE was subordinated to Ministry of Industry and Trade, under the Commission of Industrial Development, together with the other Executive Groups. This new Commission, had as its main purposes, to elaborate the general criteria which should preside the concession of Government incentives to industrial investments and to promote the application of such incentives (Decree 53.975/64); similarly to the Executive Groups.

However, differently from the Executive Groups, the Commission's decisions had no binding power over the different State institutions directly involved with the granting of incentives, which appraised the projects submitted to them according to their own criteria. This lack of power was maintained even after the Commission was transformed in 1969 into

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<sup>1/</sup> In fact, the strategy of the GEIMAPE mirrors that of its predecessor in time and model, in policies and organisation: the Executive Group for the Automobile Industry (GEIA), created in 1956, whose action (the same as described above for the GEIMAPE) led twelve companies to undertake the manufacturing of vehicles in Brazil, of which ten were foreign subsidiaries. As in capital goods, this led to a massive over-capacity in the industry and only in 1969 were the production targets planned for 1961 achieved (Almeida, 1972). Lafer (1970) states that the use of the GEIA as a model for the other executive groups was a deliberate policy. The same time-horizon is shown in the lack of provisions for the financing of the Plan, which fuelled the inflationary process (Lessa et al., 1964) and is synthesised by the slogan of the Government of the period, "50 years in 5".

the Council of Industrial Development (CDI) and "became, explicitly, the organ in charge of the execution of the policy of industrial development" (Suzigan et al., 1974, p.12)- although it recommends to the other State institutions (e.g. BNDE) "priority" to the projects it approves. Such recommendations, however, do not have binding power over the other institutions, which operate according to their own criteria.

However, considering its operational criteria, even if the CDI had enjoyed a greater degree of effective power over the other Government institutions, it is doubtful if such power would have been used for introducing some degree of long-term coherent policy for the sector.

In fact, up to 1976, the Council, when analysing the projects presented by industrialists, followed the criteria that the problems of cost, competitiveness and market of the products were of the exclusive responsibility of the entrepreneurs and were not to be analysed by its technical staff. Indeed, as remarked by Suzigan et al. (1974), the function of its technical staff was "more to summarise than to really analyse the projects", so that the CDI was "an organ that grants incentives whenever it is asked to do so" (op. cit., pp. 20 and 21).

The lack of selective criteria, which characterised also the other activities of the CDI, such as the selection of "priority industries",<sup>1/</sup> reflected the more general policy-making which prevailed in the period 1964/1973, concerned above all, with short-term results, especially in terms of quantitative growth.

<sup>1/</sup> The CDI declared as "priority sectors" "practically all the most important sectors of the transformation industry. It would have been easier to declare the sectors which were not considered priority." (Suzigan et al., 1974, p. 20).