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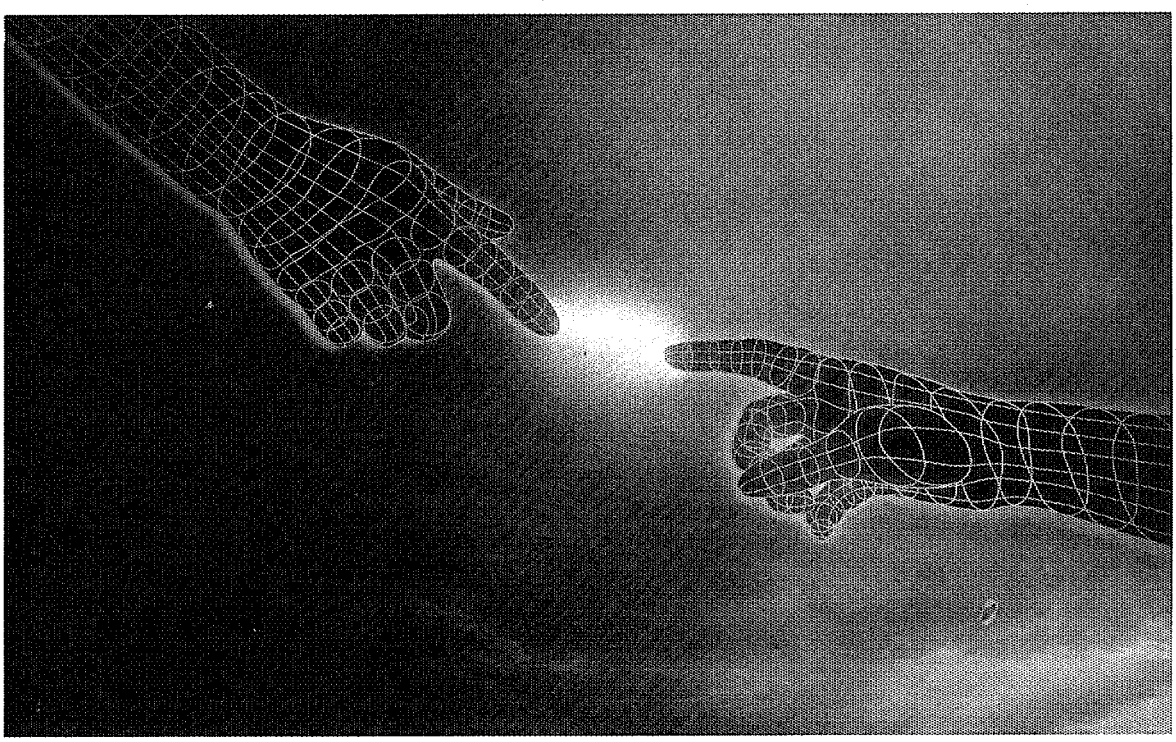
OPPORTUNITY STUDY, MARKET ANALYSIS AND CONCEPTUAL PLAN FOR THE ESTABLISHMENT OF AN AUTOMOBILE PRODUCTION PLANT IN THE STATE OF BAHIA



FINAL REPORT

UNIDO

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Presented by	**P-E International**

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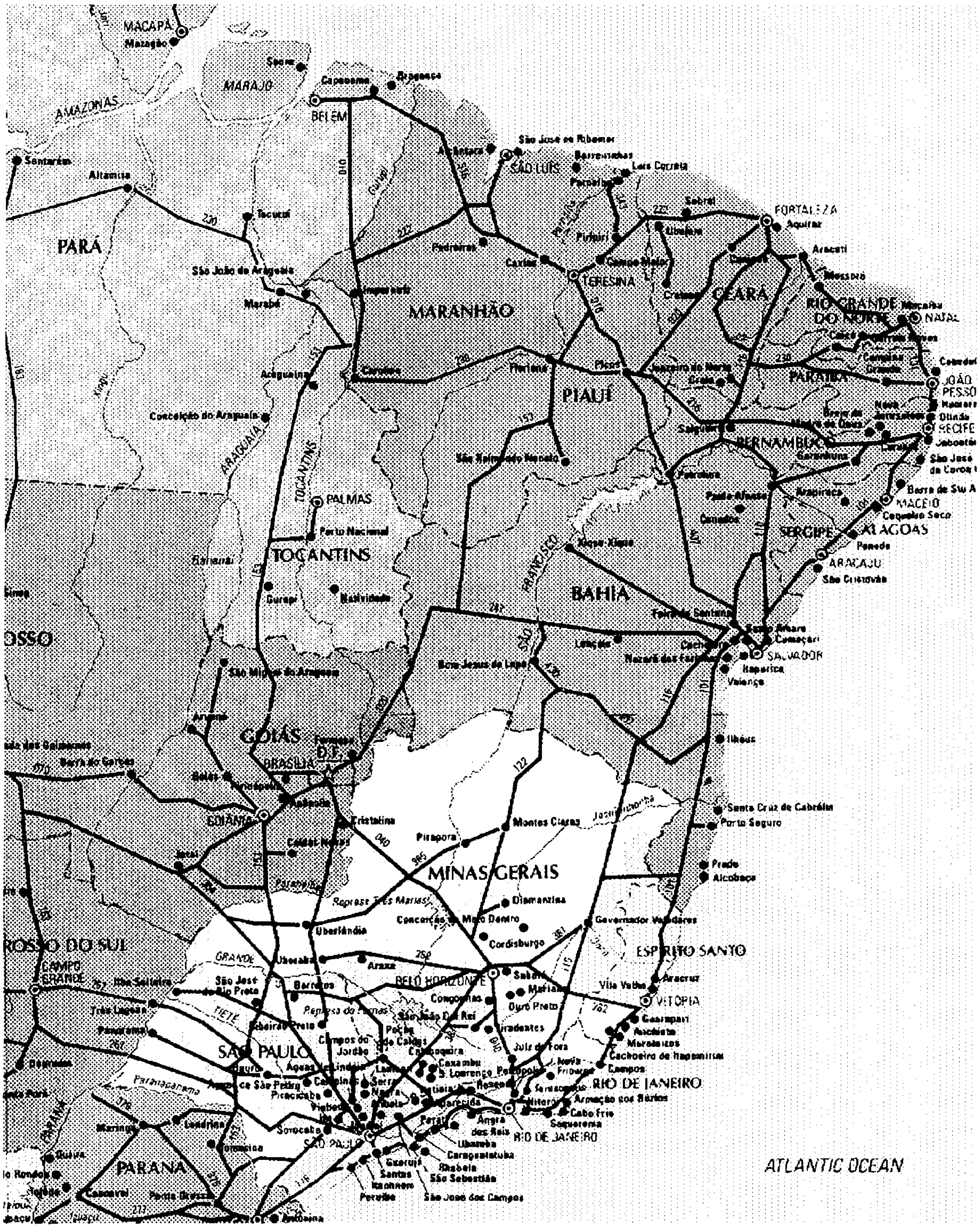
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1.1 Project Background

The automotive industry is one of the main factors contributing to the economy in this century. Its contribution to society is not limited simply to the production of vehicles and to employment of a large number of people as it is directly or indirectly involved in all sectors of the economy.

The automotive sector represents a complex sequence of activities which begin well upstream with the suppliers of raw material (iron and steel, mechanical parts) then moves on the major manufacturers (glass, tyres), the makers of equipment (parts or component kits) while also involving related sectors which are also very important and diversified (machines, oil industry). This sequence continues on down stream as far as the customer through marketing networks of which the objective is not simply that of making sales (including their financing) but also takes in assisting customers in the maintenance and upkeep of, as well as repairs to, their vehicles.

The automotive industry is of utmost importance:

- for other industrial and tertiary sectors
- because of its investment requirements
- because of the size of its work force
- because of the international trade-flows which it generates.

For any country an indigenous automotive industry is a means of having a solid industrial base and a strong economy. With a range of goods sought after by consumers, a country with an ability to produce its own vehicles has a definitive advantage in world trade.

Until recent years, western countries were used to fairly regular growth in the automotive industry together with purchases from newly motorised consumers. This trend is coming to an end, as has already been seen in the United States and Sweden, and is being transformed into that of a replacement market. Constructors are adapting to these types of constraints by offering vehicles with improved characteristics. In Brazil these two types of demand coexist, but the potential is enormous concerning non-motorised consumers who will one day become purchasers.

Delays in adaptation due to the human, industrial and technical constraints are in effect necessary in order to allow the automotive industry to change to suit new conditions resulting from the natural evolution of society and the economy, or from a desire for political change.

Encouraged by the success of industries already present, particularly in petrochemicals, and by good prospects for the development of the automotive industry, the government of Brazil and the State of Bahia has requested to UNIDO to undertake an opportunity study on the setting up of an automobile factory in the State of Bahia. At the same time the government is aware of the complexity of many factors which have to be considered in this context.

1.2 Objectives

The underlying purpose of this opportunity study - including market analysis and alternative market concepts - is to assess whether any realistic potential exists for the State of Bahia to enter automobile production in an economically viable way. This is to enable an informed decision regarding the development of the automotive industry in Bahia.

Thus the purpose of the study is to provide a market analysis, and draw up a conceptual plan for the establishment of an automobile plan in the State of Bahia.

This study will provide the basic elements for the decision maker concerning the Brazilian automobile market and the Bahian State as a possible automotive production location. Based on desk research, and information collected during the study mission we will try to answer one of the basic points of the project: - Which segments or branches of the automobile industry have the greatest chances of installing a production plant in the State of Bahia with success?

The objective of this exercise is to get a view of the past, present and future trends of the industry by main groups of products, and to give some political, financial, geographical and social considerations in order to help the Secretariat of Industry, Trade and Tourism of the State of Bahia and relevant Federal Ministries to make a decision regarding the development of the automobile industry in that State. Finally our research is orientated towards finding potential investors by providing a financial evaluation setting out the current and short-term requirements in the context of the overall development potential of the country.

1.3 Outline Summary of Key Issues

On the basis of the above approach, this report begins by presenting various conditions put forward for the establishment of an automobile production plant, with the aim of assessing whether any realistic potential exists for the State of Bahia to enter vehicle manufacturing in an economically viable way.

The points and conclusions raised in the study are set out in the following pages.

The Market for a New Automotive Plant

The Brazilian market

- The Brazilian market is substantial, vehicle sales are expected to approach $15,000 million in 1995, a rise of almost 50% on the levels of the early 1990s. This represents 1.3 million vehicles of which just over one million are passenger cars.

- A middle interpretation of the current growth trend, if sustained, would result in vehicle sales in the region of $20 billion or more by the year 2000. This corresponds to just over two million vehicles, a figure based on both a recent independent forecast and on the local manufacturers' current opinions; the two are in close agreement.

- The main sales increase in recent years has been in passenger cars and light pick-up trucks. However the forecasts suggest that unit sales in the next five years will grow in the region of 7% annually for all three vehicle categories.

- Brazilian production capacity is now fully utilised, with exports still comfortably exceeding imports. However the latter have increased substantially in the past year.

- The situation is now such that new Brazilian manufacturing capacity is essential if the market demand is to be met by indigenous production.

- The outlook for South America as a whole is buoyant - overall growth rates averaging between 9% and 10% annually are forecast to the year 2000. Since Brazil is by far the largest vehicle market in the region, it is also the key location for future manufacturing investment.

- A large number of substantial investments are already planned by the major western multi-national producers; and Far Eastern investment is also imminent.

- Thus both market demand and potential investors are present in abundance. The question remains: Which are the best locations for investment? (Discussed later in the report).

The North Eastern Market of Brazil

- The most likely choice for a manufacturing plant in Bahia is to produce small to medium size cars in sufficient volume to serve both the north-east area, significant exports and a part of the remaining Brazilian market. This is discussed further under 'Choice of Production'.

- The market in Bahia itself is comparatively small - approximately 35,000 vehicles in 1995. This market alone could not justify a local vehicle production plant, but would obviously support sales in the context of a wider North Eastern market.

- The North East Region, including its closely neighbouring areas, comprise about 12½% of the national market - some 112,500 small to medium cars in 1997/98. A new plant could reasonably expect to sell about 17,000 vehicles - 15% of this 'local' market - a significant contribution to sales turnover.

- Most of the north-east quarter of Brazil is nearer to Bahia than to São Paolo and will account for sales of 270,000 small to medium cars by 1997/98. A 12½% share of this larger market would provide sales of 34,000 vehicles.

- Thus a car plant producing, for example, 100-150,000 vehicles a year, could sell a significant proportion of its output in the North East. If it exports say 30%, then it would have to achieve a share of only around 6% of the remaining Brazilian market, overwhelmingly in the South East.

- Opinions on the desirability of Bahia as a manufacturing location are divided. Some manufacturers prefer to remain in the southern part of Brazil which (SE + S) comprises over 80% of the car market. The proximity of local suppliers and customers, together with the presence of existing facilities, are obvious incentives.

- Others, however, take a longer term strategic view. They wish to diversify away from the congested south east which is becoming increasingly expensive and prone to delays in the local sea port. Such manufacturers see substantial advantages in diversifying to a location such as Bahia which can offer a combination of:

    - lower labour costs
    - a smoother working environment
    - fast export/import shipping through less crowded port facilities
    - long term stability for a national and international operation.

These are major strategic incentives in considering a new manufacturing location.

Automotive Component and Raw Material Suppliers

- There are at present only two major component suppliers in Bahia. They are there for historic reasons which are not really relevant to-day. In general, component suppliers prefer to be located in the South East for two definitive reasons:

  - It is highly beneficial for the independent component supplier to be close to his customer;
  - The increasingly important Argentinian market is very much closer to the South East.

- The first point is crucial. Close proximity to the customer benefits the component supplier much more than the customer because, in to-day's increasingly competitive environment, it is the supplier who pays the transport costs and who enjoys greater flexibility in providing 'just-in-time' service to a wide range of industrial customers. A vehicle manufacturer just needs to serve his wholesale/retail distribution network which can be done from almost anywhere.

- Until such time as there is substantial local vehicle production to provide business, there seems little to motivate component suppliers to locate in Bahia. The only possible exception could be an international producer seeking a low cost manufacturing base, who wished to export the majority of his output.

- The absence of raw material and component supplies was quoted as a disadvantage for potential investors in vehicle manufacture. However some multinational car producers take the view that components can be delivered effectively to Bahia from the south (this is born out by local manufacturers); and that component manufacturers will set up there if it is to their advantage. Either way they have the buying power to command the necessary service.

Production Choice and Plant Capacity

Alternative Products

- In general it is not attractive at this time for a component supplier to locate in the North East at present; but the establishment of a large local customer would make it more so as the market place develops over the next few years. This is discussed under this heading above.

- Discussions with the major vehicle manufacturers show that there is a low probability of commercial vehicle production being located in Bahia. This is because the relatively smaller volumes (compared to passenger cars and their derivatives) would necessitate the distribution emphasis to focus primarily on south-eastern markets in Brazil. The same low volumes make component supply at a distance more unattractive, and there is a greater variety of product, especially in the medium to large trucks.

- The passenger car market is by far the largest under consideration and its predicted growth rate is high - over 7% annually for Brazil.

- It has substantially greater scope (than other automotive products) for implementing international manufacturing strategies based on low cost production for both the Brazilian market and a flexible mix of export sales to suit varying market conditions world-wide.

- The major manufacturers - notably Ford, General Motors, Volkswagen and Mercedes - are already planning substantial expansion in Brazil over the next two years. Fiat, who along with GM and Peugeot are planning major investments in Argentina, is expanding its production operations by manufacturing the world model "Palio". Several Far Eastern producers are also considering manufacturing facilities.

- Some of the passenger car manufacturers have expressed potential interest in locating a plant in Bahia. It follows that it is the needs of the car manufacturer that need to be considered as the first priority.

- The key issues for investment consideration reported by the manufacturers were:

  - good local road and rail connections
  - good connections with the outside world, especially sea and air (port expansion is needed)
  - excellent telecommunications
  - sufficient services (water electricity etc.)
  - industry specific training designed to produce, quickly, the right industrial culture
  - the right mix of incentives - this implies flexibility in tailoring the offering individually

- Overall, the key to success will be the State of Bahia's ability and willingness to adopt an imaginative, flexible approach to potential investors that meets their requirements; rather than merely saying, as is more common: "This is what we have to offer" and, by implication, take it or leave it. It is not suggested here that this is, or is likely to be, the State of Bahia's approach. Nevertheless there is always the temptation, having worked out a broad incentive package, to assume that this is what the potential customer wants.

- We recommend that substantial efforts be made to ascertain what each of the major multi-national companies is looking for - in fine detail. This needs a separate, highly focused study by a small team with the necessary international connections in the world's automotive industry.

Plant Capacity

- Alternative market scenarios for a small to medium passenger car plant producing 100,000 and 200,000 vehicles a year are outlined in Section 4.3. The choice will depend entirely on the individual product/market situation, both national and international, of the potential investor.

- If a 'local' market strategy is envisaged to be aimed in part at either the North East, or the north-eastern quarter of Brazil, then it is likely, from a market standpoint, that a plant in the region of 100-150,000 units p.a. would be the most suitable. This assumes a relatively higher 'local' market share in the region.

- A larger plant, 200,000 units and upwards, would need a dedicated nation-wide market strategy. However the planned level of exports is a critical factor.

Alternative Plant Capacity

For this review we are taking a combination of 2 strategies described in chapter 5.1 in that within certain areas facilities will be installed for producing a level of 200,000 units per annum with a 2 shift working pattern. In other locations space will be allocated and set aside to accommodate additional facilities. Services where applicable will be installed to provide for the increased demand of the second Scenario. Also, drains and sewers etc. together with the Water Treatment Plant will be installed to meet long term demands. All these will be reviewed to minimise the effect of monetary changes on the long term programme, avoid disruption to production whilst maintaining a high level of quality.

Equipment

The detailed equipment required for the weld shop, paint shop, assembly lines, auxiliaries and services are identified in chapter 5.5 and refer only to the main items of expenditure required to set up an automobile production plant.

Location and Site

Site

The state of Bahia has selected five potential sites for the development of an automobile manufacturing complex which present the best conditions to host the proposed complex. These areas are located in three planned different industrial centre, as follow:

1. **Aratu Industrial Centre - CIA** - 4 sites of approximately 100, 300, 250 and 100ha. (shown in Appendix IV - A, B, C and D) and one complete industrial installation rapidly adaptable to the automotive industry necessities.

2. **Subae Industrial Centre - CIS** - one site of 450ha.

3. **Camacari Petrochemical Complex - COPEC** - availability of 100 and 200ha.

The list of possible sites with their size and geographical location appears in (section 5.4 and Appendix IV). The surface area necessary for such an activity is about 1,183,000 sq. metres for the production of 100,000 vehicles and about 1,418,000 sq. metres for an eventual production of 200,000 vehicles per year, should it be required

In view of the strategy adopted it appears advisable to select a site corresponding to the second case. The precise choice cannot be made until a geological and structural examination of the sites have been carried out. We believe that the choice should be that of site B due to the fact that it is near the port of Aratu; the largest site; and is situated between two other possible sites allowing for the possibility of future extensions

Building

The building required for the proposal cover an area of 329,880 sq. metres and its composition is:

Buildings

Weld Shop	66,560	
Paint Shop	79,040	
Assembly	62,400	
Warehouse and Distribution	43,008	
Administration	38,592	
Water Treatment Plant	11,500	
Boiler House	6,800	
Canteen	11,500	
Hospital	5,760	
Service Areas	4,720	
		329,880 square metres
		(81.52 acres)

Project Engineering

The production processing stages proposed are summarised on the chart in chapter 5.2.

The estimation of construction costs made on the basis of price levels in this current year 1996 are as follows:

Buildings	(US$ million)	
Weld Shop	29.8	
Paint Shop	35.6	
Assembly	28.1	
Auxiliaries	37.5	
Administration	40.5	
		$171.5 million
Other		
Roads	20.3	
Hard standings and car parks	14.4	
Drains and sewers	8.0	
		$42.7 million
Equipment		
Weld Shop	87.8	
Paint Shop	130.5	
Assembly	78	
Auxiliaries	192	
Administration	156	
		$644.3 million
TOTAL CAPITAL INVESTMENT		**$858.5 million**

The additional financial expenditure in terms of capital investment required, to reach a production level of 200,000 vehicles in a relatively short period - should it be desired - is estimated at US$ 165.9 million. This is detailed in section 8.6.

Prior to the project reaching the stage of approval a considerable number of investigations and analyses is required. To cover the pre investment cost involved with this project a sum of US$ 9 million should be allocated. These investigations are summarised in section 8.3.

Plant Organisation

Personnel distribution at the different workplaces is shown in section 6.1.

Manpower

Labour requirements are as shown below :

	(100K)
General Manager	1
Manager	24
Other staff	227
Direct Labour	1096
Indirect Labour	658
	2006

Implementation Schedule

The following implementation schedule is assumed for the present project but could be changed if an investor had set his own decision on project set up.

Implementation aspect implementation		Period	Scheduled
a.	Opportunity Study	4 months	December 1995
b.	Decision on Feasibility Study	2 months	February 1996
c.	Feasibility Study	7 months	September 1996
d.	Project Approval	5 months	February 1997
e.	Site and Building Development	33 months	November 1999
f.	Plant and Equipment Installation	32 months	October 1999
g.	Trial Run, Test and Verification	2 months	November 1999
h.	Pre-Production	2 months	December 1999
i.	Commercial Operations	From January 2000	

The Cost disbursement schedule is not taken account as it is difficult to estimate when payments will be made as these depending of individual contracts. Certain contract are paid after the work is completed. While others provide for advances and intermediate payments.

Financial Analysis

The financial analysis is carried out on the basis of the results of the market study and other previous chapters. The evaluation of the financial viability was conducted using the COMFAR III Expert, UNIDO's specialist software, that presents profitability calculations.

For the purposes of this report we have carried out a financial analysis for an automobile production plant manufacturing 100,000 vehicles pa. with an economic life span of the project is taken to be 10 years and commercial operations are assumed to start on January 2000.

The total capital requirement is as follows:

Land acquisition is considered as free
in millions of US$

	100,000	
- Land acquisition	0.0	
- Pre Investment	9.0	
- Building and site preparation	214.2	
- Equipment	644.3	
Sub Total	***867.5***	***(607.3)***
- Interest during construction	72.9	(72.9)
Total	***940.4***	***(680.2)***

The financing plan for the total capital plan is funded under the following conditions.

- A debt equity ratio of 70-30 is assumed in the funding of capital and it is also assumed that the 70% borrowed capital will be obtained from financial institutions in the form of long term deferred payment basis financing.

- The financial institution to provide this loan could be an international institution or a Brazilian. For the purpose it was assumed that the Banco de Desenvolvimiento Economico e Social (BNDES) will provide the credit.

- The annual interest is calculated to be 12% in real terms, but it is recommended to take it on the International financial market where the interest rates are about 7%.

  The annual disbursement, capital plus interest, is estimated to be US$ 122.0 millions.

- The operating expenses are estimated to be US$ 71.6 million p.a., but these operating plant expenses are stated on an estimated production of a one litre family size car and our marketing plan takes only 40 % of one litre cars. We will just increase by 100% all the costs of sales US$ 71.6 m x 2.= US$ 143.2 millions p.a.

- Production capacity is divided as follows:

  75 % of production capacity is assumed to be required first year and 100% thereafter. As a result production would be 75,000 in 2000 and 100,000 per year afterwards. Should a plant manufacturing 200,000 vehicles pa be required, production would be 75,000 in 2000 then 175,000 in 2001 and 200,000 per year thereafter. This is the manufacturers' usual production increase in order to meet a 200,000 pa production schedule.

- For the two possibilities (100,000 and 200,000 vehicles) products manufactured are stated as an approximate reflect of actual Brazilian market for passenger cars or derived, 40% Popular and 60 % of vehicles with motor power between 1600 and 2000 cc.

- The sales revenues and production volume, for a plant producing 100,000 vehicles p.a. are shown below:

	Product. Volume	Sales revenue	% of own Product.	Own sales Revenues	After 35% Dealers Margin
2000	75000.0	1155.2	40 %	462.1	300.3
2001	100000.0	1540.2	40 %	616.1	400.4
2002	100000.0	1540.2	40 %	616.1	400.4
2003	100000.0	1540.2	40 %	616.1	400.4
2004	100000.0	1540.2	40 %	616.1	400.4
2005	100000.0	1540.2	40 %	616.1	400.4
2006	100000.0	1540.2	40 %	616.1	400.4
2007	100000.0	1540.2	40 %	616.1	400.4
2008	100000.0	1540.2	40 %	616.1	400.4
2009	100000.0	1540.2	40 %	616.1	400.4

The sales revenues were calculated on the base of medium price for complete vehicles and had been decreased in order to take in account the purchase of 60% of the value in motors and other components. A dealer margin of 35 % also has been taken away from the sales prices revenues which results in an estimated real revenue. This 35% is based upon conversations with dealers in Europe. No information could be obtained from sources in Brazil.

- The financial projection shows :

  An annual net profit after tax of (in millions of US$):

  - 36.1 the first year, 104.6 the second, 109.8 in 2002 and an increase to 184.7 in 2009.

  - An ending cash balance in year 2009 of 1592.7 million US$

- The Financial Internal Rate of Return for this project has been calculated as 24.7%

- A short financial comparative evaluation comparing costs between Brazilian states shows that the tax incentives offered by Bahia are one of the most attractive and that the differential between lower wages and higher transport prices is positive for the Bahian State.

- The impacts of the project economical evaluation show that it is highly beneficial for the region in terms labour, trade balance and balance of payments.

Conclusions and Recommendations

The strategy for evaluating whether Bahia is a good choice for the location of an automobile plant, could be based on demonstrating that:

- the infrastructure is quite good;
- the market and demand exist;
- the work force is available, open to new technologies, cheaper and less demanding;
- the training programs will be launched by the State of Bahia;
- the transport costs are not a real barrier;
- the proximity of natural resources;
- the component suppliers exist, and will be attracted to Bahia in the medium term;
- the regional tax incentives are really attractive and among the best in Brazil;
- the land acquisition is possible with potential sites at nominal prices;
- the basic services and utilities will be provided by the State. Other infrastructure subsidies will be negotiated on a case by case;
- the financial projection and comparisons seem to be sufficiently positive to warrant the start up of this type of production.

All these topics are covered in the report to a greater or lesser degree depending on information which could be obtained. Nevertheless, the Study Team is convinced that the State of Bahia is an ideal location for automobile industry investment.

We consider that we have replied to the main questions posed at the beginning of this project, namely:

Type of product: The range of potential products is very large and the potential growth rates sufficiently promising in so many cases that we have been obliged to make our choices on the bases of interviews which we have held with management in the automotive sector and on our own experience in this field. This choice has fallen on passenger cars of between 1000 cc and 2000 cc engine capacity, since this sector, by its size, can lead to the creation of a major industrial mechanical engineering sector. The automotive component sector which has existed in Bahia for a number of years, has not succeeded in creating this phenomenon. The commercial vehicle sector, on the other hand is disadvantaged by the low volumes and also consumes larger quantities of steel per unit than passenger cars, thus leading to higher transport costs.

As far as quality is concerned, we have been influenced by the figures often quoted by automobile manufacturers, the growth prospects of the market and the recommendations of our industrial expert. As a result, we have opted for a production level of 100,000 vehicles per year for our profitability analysis.

Concerning, manufacturing process, we have concluded on the advice of our industrial specialist that it is not possible to consider manufacture of complete vehicles in a zone which has very little experience in this field. It is therefore recommended that the factory operates on a CKD basis, with 60% of components being brought in from outside. A list of equipment has been drawn up along with requirements in terms of materials, building, personnel and machinery necessary for the establishment of a factory and its operation.

As to the possible manufacturing sites, it has been possible to list these with the help of the Secretariat of Industry, Commerce and Mining of Bahia. This list has been drawn up taking into account available land of sufficient size to accommodate a plant of the size envisaged and having the most favourable infrastructure. Nevertheless, the financial means were not available to carry out more fundamental research into this question, particularly in relation to damages which might be caused by the climate or to carry out geological analyses. These questions can be examined in the context of a future feasibility study.

Given the production quantities envisaged despite high forecast in the market for vehicles locally, it is not possible to consider production only for neighbouring regions, the context must be production for the whole Brazilian market and for export. Alternative scenarios for sales have been developed in view of defining market shares according to destination.

The most basic question posed is that of the reason for developing automotive production in Bahia. This question was the first to be raised and appeared to be the easiest to answer, the most evident reason being:

- the State of Bahia will benefit in economic, financial and social terms from the establishment of automobile production, the consequences of which are evident.

- the investor will benefit in terms of maximising profit.

Nevertheless it is still necessary to prove this in quantitative and qualitative terms, weighing up favourable and unfavourable factors, and depending on whether the question is viewed from the governments aspect or that of the investor. At this level, our conclusions are as follows:

- The financial aspects of the project are positive, with financial simulations giving a high profitability with a production of 100,000 vehicles per year.

- The strong points of the State of Bahia are its subsidies and assistance to investors, its port access compared with congested ports in the south-eastern states.

2.1 Project History

The "Brazilian Economic Miracle" of the 1960's and 1970's is usually closely connected with the economic development of the automobile industry. In particular, this industry is considered to have significantly contributed to the growth in manufactured exports of Brazil. According to the World Bank, "to a large extent the rapid development of the Brazilian auto industry over the past 20 years is a success story of infant industry development. Through its backward linkages it played a key role in the development of Brazilian industry. In addition, it is the largest exporter of manufactured products in Brazil". Actually, automotive exports increased remarkably in the late 1970's, when growth in total transport-equipment exports figured more than 3.5 times as high as in overall manufacturing. The highest growth rates were achieved in overseas sales of buses, electrical auto parts and engines.

However, such impressive figures may precipitate an ill-considered judgement. Let alone that the causes of booming automotive exports are open to question, the above-mentioned figures are of only limited relevance. This is due to the rather low export levels from which the favourable development started. It is thus not surprising that export-growth rates levelled-off considerably in the late 1970 and 1980's, notwithstanding that the slackening demand for Brazilian exports, especially in neighbouring Latin American countries, contributed to this reduction as well. Moreover Brazil's position in worldwide automobile production and trade has to be assessed in relative terms, i.e., compared to other producing countries. Finally, due consideration must be given to the completed different export conditions prevailing in various overseas markets and for the various automotive products as well.

If Brazil was considered a promising and internationally competitive location within the "strategic positioning" of the major automobile companies operating at a worldwide scale, the consequences would go beyond higher shares in world production of automobiles, at the expense of the traditional suppliers. Brazil would also become increasingly integrated into world trade of automotive items. The emphasis on standardisation and scale economies within the so-called world-car strategy causes production to take place where cost-minimising operations are guaranteed. This would result in a pattern of cross supply between plants of scale-efficient size. Thus, the engagement of multinationals in Brazil is to be expected to serve as an export platform, apart from producing automobiles for the domestic market. At least initially, neighbouring markets are likely to absorb the bulk of built-up and completely knock-down (CKD) vehicles. However, trade back to the industrialised countries and especially inter-firm trade is expected to gain momentum when learning effects materialise. Probably, the product structure of exports then shifts to auto parts and components, where sourcing from lower-cost suppliers seems most profitable.

Undoubtedly, the future prospects of automobile production in Brazil depend to a large degree on overseas demand developments, imports policies of major trading partners, and technological trends, which are beyond the control of the Brazilian Government.

However, the strategic positioning of automobile multinationals is not determined exclusively by factors that cannot be influenced by Brazil. Internal policies had an important impact on the automobile industry's performance. Economic policies can thus be supposed to have an impact on the future prospects of Brazil's automobile industry as well.

The Brazilian Government decided at an early stage of its industrial development to establish an automobile industry based on foreign multinationals. The future of automobile production in Brazil thus depends on the companies' perceptions of the long-term outlook as regards to the attitudes of the public and the Brazilian authorities towards them. Especially for capital-intensive industries such as automobile production, whose productive facilities must be amortised over long periods, the threat of politically induced changes in profit expectations can seriously impede further investments.

In order to sustain the country's attractiveness for foreign capital, the Government must aim at reducing political and economic risks for automotive producers. This requires efforts to guarantee political stability as far as possible and economic conditions that create a favourable investment climate in the long run. Uncertainties arising from ad-hoc policy interventions should be kept to the minimum; binding rules, rather than discretionary measures, are required. Economic policies must be devised in a way that predictability is assured, so that production and investment decisions can be made on a sound and stable basis. furthermore, incentive schemes must be simplified, since the currently prevailing administrative complexity renders discriminatory actions by the bureaucracy very likely.

The domestic market for automobiles in Brazil is booming and aims at becoming the third largest in the world by the year 2,000. The industry should begin a new cycle of investments to introduce new models and raise capacity in line with "optimistic expectations". In this respect, the Brazilian Government has been contemplating to establish a new automotive plant in the most appropriate site.

2.2 Objectives

The underlying purpose of this Opportunity Study - including market analysis and alternative market concepts - is to assess whether any realistic potential exists for the State of Bahia to enter automobile production in an economically viable way. This is to enable an informed decision regarding the development of the automotive industry in Bahia.

Thus the purpose of the study is to provide a market analysis, and draw up a conceptual plan for the establishment of an automobile plan in the State of Bahia.

This study will provide the basic elements for the decision maker concerning the Brazilian automobile market and the Bahian State as a possible automotive production location. Based on desk research, and information collected during the study mission we will try to answer one of the basic points of the project: - Which segments or branches of the automobile industry have the greatest chances of installing a production plant in the State of Bahia with success?

The objective of this exercise is to get a view of the past, present and future trends of the industry by main groups of products, and to give some political, financial, geographical and social considerations in order to help the Secretariat of Industry, Trade and Tourism of the State of Bahia and relevant Federal Ministries to make a decision regarding the development of the automobile industry in that State. Finally our research is orientated towards finding potential investors by providing a financial evaluation and economic analysis setting out the current and short-term requirements in the context of the overall development potential of the country.

2.3 Project Promoters

Encouraged by the success of industries already present, particularly in petrochemicals, and by good prospects for the development of the automotive industry, the government of Brazil and the State of Bahia has requested to UNIDO to undertake an opportunity study on the setting up of an automobile factory in the State of Bahia.

This project has been undertaken with extensive co-operation from the Government of Bahia's Secretariat of Industry, Commerce and Tourism.

3.1 Introduction

This chapter examines the automobile industry by major products and producers in the areas of production, market demand and external trade. The automobile market analysis focuses on the Brazilian market, preceded by a brief review of global trends in the World and Latin America. A regional analysis within Brazil illustrates possible market options for the State of Bahia.

The historic perspective and future growth potential in Brazilian, South American and World markets provide a broad strategic background; and there are relevant economic issues which are addressed in this report. However any major automotive expansion strategy in Bahia, or elsewhere in Brazil, depends on the perceptions and investment intentions of the multinational producers. This is the stated policy of the Brazilian Government, and there is no evidence to suggest that there is any serious alternative.

Thus the viability of an automobile production plant in Bahia will depend to a large extent on the particular circumstances of the individual multinational investor. These depend on the economic and practical factors associated with such a multinational's strategic manufacturing and marketing plans world-wide.

While it is clearly not possible to analyse in detail the multinationals' confidential plans, discussions with some of the major companies potentially interested have provided valuable information on:

- Key investment parameters
- Specific issues which motivate them in considering or rejecting possible investment in Bahia
- Hence - strengths and weaknesses to be addressed by the Bahia Government.

This chapter illustrates the supply and production situation of the Brazilian motor industry and its markets mainly in graphic form in the text. The numeric data is available in the briefing document prepared for the Study Mission Team and in **Appendix I** of this report, detailing the world production of motor vehicles and in **Appendix II** the production of vehicles in Brazil by model.

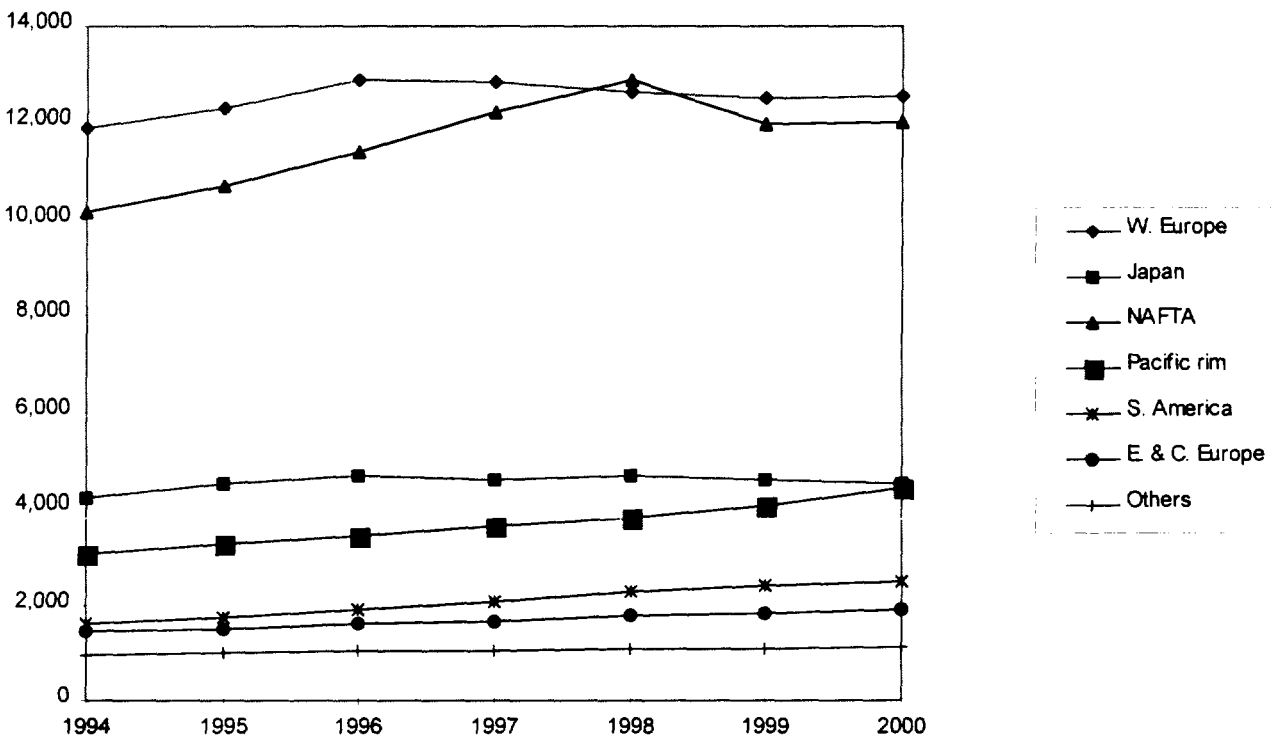
3.2 Global Trends in the Automotive Industry

The following forecasts are based on a balanced scenario which assumes that political stability will be maintained in the major continents and that South American economies will continue to develop over the period.

World Overview

Passenger car sales are expected to exhibit modest growth, rising from a world total of 33.3 million vehicles in 1994 to almost 39 million units by 2000 - an average growth rate of nearly 2.7% annually. However individual forecasts vary substantially from one major region to another:

Forecast of New Car Registrations - '000 units



Source: Economist Intelligence Unit

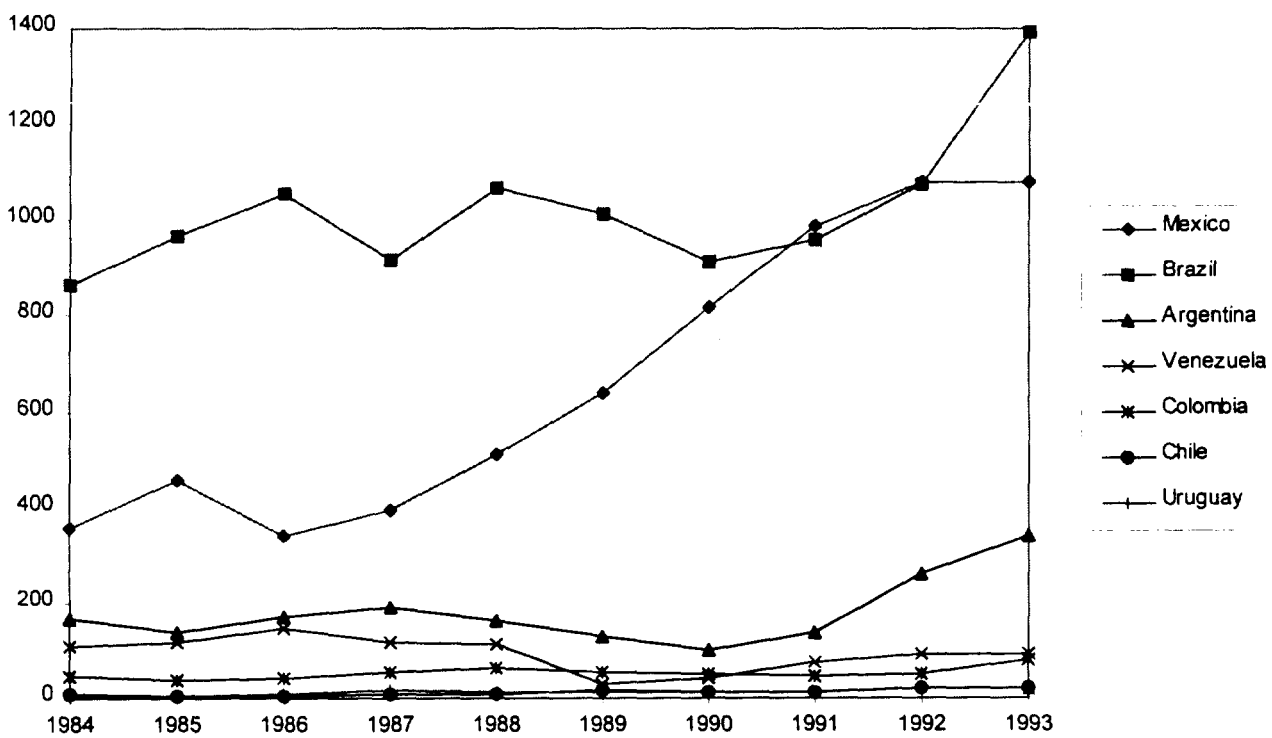
South America enjoys the highest growth forecast, with the large NAFTA market growth much higher than Europe or Japan. South America alone is forecast to buy an average of 2.2 million vehicles a year over the next five years; this is 500,000 vehicles each year higher than the 1995 level of 1.7 million units.

This underlying growth picture, particularly in the Americas, provides a positive, and therefore stable, background scenario. However there is always the possibility of a recession or of a significant political change within or outside South America. Any such alternative scenario would inevitably have a negative effect on the forecasts

3.3 The Automotive Industry in Latin American Countries

Following the difficulties of the early to mid-1980s, total output of the Latin American Industry has nevertheless grown by an average of around 7½% annually since 1984:

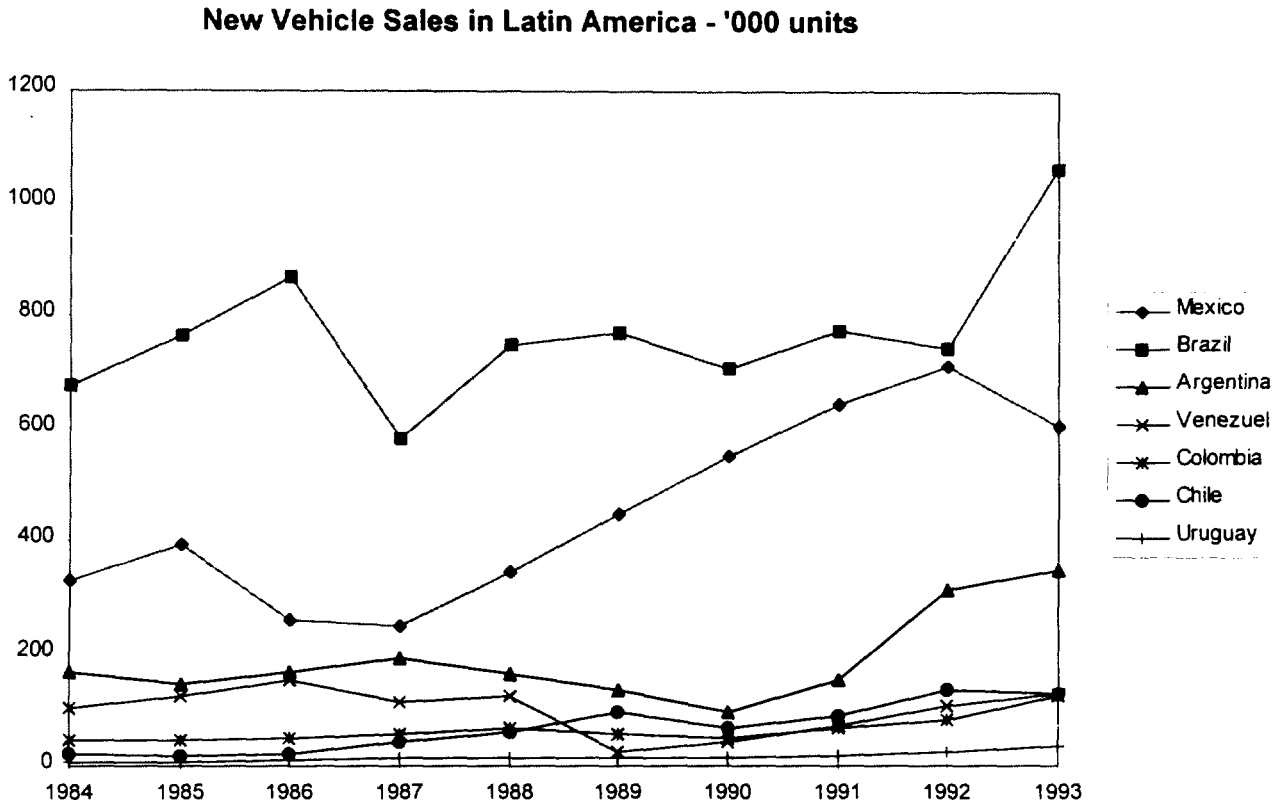
Production of all Vehicles in Latin America - '000 units



Sources: National Motor Industry Associations

Thus, despite economic problems, there has been substantial expansion of production facilities over the past two decades. These caused over-capacity problems a few years ago. However, in 1995, producers are struggling with a capacity shortage.

New sales of motor vehicles in Latin America fell dramatically from 2.15 million units in 1980; and this figure was exceeded again only in 1993:



Source: Motor industry associations; manufacturers

Although the overall growth averages around 6½% annually, in fact more of the growth has taken place since 1990 with a spectacular rise of nearly 60% by 1993. In Mexico, sales almost trebled between 1987 and 1992 - a spectacular average growth of over 23% annually. In Brazil, sales started expanding rapidly only in 1993 following the changes Government taxation policy (see Appendix III).

The size of the increase (+ 43% in one year) shows how sensitive the market is to Government policies and also indicates the strength of the latent demand potential.

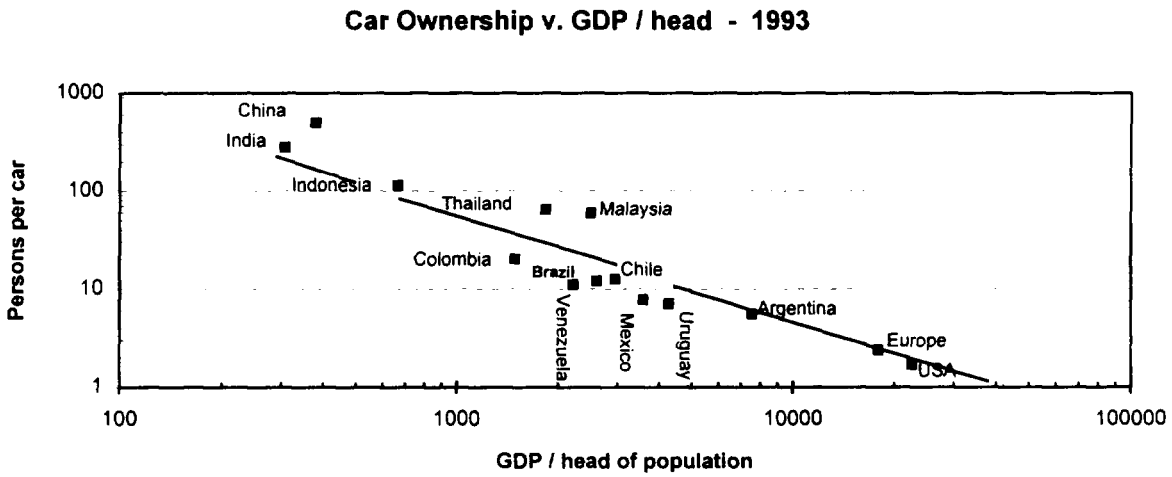
Sales by vehicle type and the compound annual growth rate (CAGR) were as follows:

'000 units	1989	1990	1991	1992	1993	CAGR
Passenger cars	1082	1090	1247	1480	1772	13%
Light commercial	330	306	379	433	452	8%
Heavy	126	128	177	194	152	5%

Source: Economist Intelligence Unit

Car sales have risen by 63% over this period; light commercial sales by 48%; and heavy commercial by 56% in the three years 1991 to 1993. As a result, the share of heavy commercial sales has fallen from nearly 10% (numerically) in 1991 to 6.4% in 1993.

Vehicle ownership in Latin American countries varies considerably - from an estimated 20 persons per car in Colombia up to 5.6 persons per car in Argentina. Brazil, with 12 persons per car is on a par with Chile and Venezuela:



Source: Economist Intelligence Unit

This chart must be interpreted with care. The line shown is a world wide 'average' relationship between vehicle density (or persons per car) and GDP per head. Thus countries above the line have a below 'average' vehicle density, those below an above 'average' vehicle density. The more developed Far Eastern countries (Thailand and Malaysia) have large populations without cars in relation to their GDP per head.

It may seem surprising that South American countries (except Argentina) display a higher than 'average' vehicle density. This is mainly because sales in earlier decades have built up a relatively high vehicle parc i.e. total number of vehicles in use - by going mainly to new owners rather than replacement sales. As a result, car ownership is also high in relation to GDP per head. However the chart is consistent because the value of the Brazilian car population is low - over half is more than ten years old. Argentina, being further up the scale in economic development, and with more evenly spread wealth, is close to the 'average' relationship for the developed countries.

3.4 Structure and Characteristics of the Brazilian Market

Introduction

After 1993, 1994 sales and production soared to new records with 1.59 millions units in output, 13.7% above 1993 and 47.3% above 1992 levels. Domestic sales also went up by 13.7% to 1.21 millions confirming Brazil as Latin America's largest vehicle producer and biggest car market, and ranking Brazil in seventh place in the world.

Before these two record years, the best Brazilian production performance was in 1980 with 1.17m vehicles, and domestic sales in 1979 with 1.10m vehicles. Between these two record periods, the world economics crisis added to several inadequate economic plans, external debt and inflation plunged the Brazilian economy and automobile industry into a complete slump.

The spectacular recovery was in part due to the 1992 'Sectorial Agreement' renewed in 1993, which has reduced car prices and created a new lower tax category, the "popular car". Since 1990 Brazil has been opened up to foreign competition, breaking away from a period of 18 years of protection for the local car industry. The imported cars underline the relative fragility of the Brazilian automobile industry in terms of quality, technology and prices.

Due to the fear of imports, which already command 3.5 per cent of the market, local manufacturers have accelerated their investments. Some $5 bn in investment spending has been announced for the 1991-95 period and $6 bn for 1995-2000 are announced. Several new models have been introduced since 1990 and a lot are planned. Component manufacturers are also boosting their investments ($1 bn in 1994).

The integration with Mercosur countries is increasing. Argentinian and Brazilian producers are localising investments to avoid duplications. Acquisitions and mergers involving Brazilian and Argentinean components manufacturers are also growing.

When Brazil launched its new Real currency more than a year ago, the instability of the Brazilian economy was a great problem. Today the Real has contributed to bringing inflation down (monthly rate 2% to 4% instead of 40%). Its success contributed to the election as president of Mr Fernando Henrique Cardoso, who planned its launch when finance minister. And it has helped boost economic growth in the region.

The Real worked in stopping inflation, partly because the government balanced its budget through spending cuts rather than simply printing more money. The government also reduced external tariffs forcing Brazilian companies to cut prices.

Economic growth was 5.7% in 1994 and was the highest since 1986. Business confidence and political stability have lifted foreign investments. International companies are finding a new interest in Brazil, and not only in the automobile industry.

Actually the fears have changed, and people worry about the same kinds of problems as in other big developing countries. One such problem is the trade deficit that has followed the opening of the economy to foreign competition. Since November 1994 the trade account has been in deficit, and in June 1995 the estimate for the complete year was US$ 20 bn or nearly 4% of GDP. In response, the central bank changed the Real's trading bands to allow a gradual devaluation of up to 6.5 per cent. The government has also imposed quotas on imported cars and raised tariffs on consumer durables. These provisional or occasional measures are taken because Brazil is in transition towards a phase of stabilisation, and "Stop and Go" policies are likely to continue until the government passes a range of structural reforms needed to modernise the economy.

The start-up of the industry

The Brazilian automotive industry goes back to the 1950s'. In 1953, Brazil prohibited the import of complete vehicles and obliged local manufacturers to assemble their vehicles on the spot. The first few years saw only the creation of a few jeep and truck assembly lines.

The real start-up dates from 1957, with the creation of a co-ordinating agency, the GEIA (Executive Group for the Automotive Industry) which laid down targets for local content while leaving the manufacturers free to decide on horizontal or vertical integration. Most companies decided on the latter system, especially as regards mechanical parts and sub-assemblies, notably engines, with the result that only a few models were available on the market, and this seems to have had a very favourable effect on future development.

In the space of only five years, Brazil was able to build up a real automotive industry, since already in 1962, the level of local content exceeded 95%, rising to over 98% in the middle of the 1960s', for nearly all models.

Between 1968 and 1973, the motor industry benefited greatly from Brazil's "economic miracle", when GDP growth rates were above 10% per year. Until 1980 the industry sustained moderate expansion, peaking at 1,165,174 units in 1980. Fiat in 1976 and Volvo in 1978 were the last to Brazil come as recession took over during the 1980s.

The 1980s recession drove many manufacturers out of the market (Chrysler, Alfa Romeo and Iveco) and in 1987 VW and Ford merged their operations in Brazil and Argentina. Several economic plans were attempted during this period but all failed to control inflation.

This economic chaos affected the industry severely. Domestic vehicle sales reached a peak of 1.01m units in 1979, dropped slightly in 1980 and then fell by 40% to 580,000 units. The insufficient volume of sales during these black years explain the high average age of the parc of around 11 years for a total parc estimated at 15,340m in 1994.

Brazil : vehicle production, domestic sales and exports, 1980-1994

	Production	Domestic Sales	Exports
1980	1,165,174	980,261	157,085
1981	780,883	580,725	212,686
1982	859,304	691,294	173,351
1983	896,462	727,732	168,674
1984	864,653	677,082	196,515
1985	966,625	763,180	207,640
1986	1,056,322	866,728	183,279
1987	920,071	580,085	345,555
1988	1,068756	747,716	320,476
1989	1,013252	761,625	253,720
1990	914,466	712,626	187,311
1991	980,004	770,754	193,148
1992	1,073,761	740,228	341,900
1993	1,391,376	1,061,397	331,522
1994	1,581,389	1,206,823	377,627

sources : ANFAVEA

Exports represent a high proportion of production (more than one third for some years) and was a way of escape for the industry due to the big variations in demand and fluctuations in exchange rate of the Brazilian currency. After a record year in 1987 with 345,555 units, the amount exported fell by almost 50% in the four next years, recovering only in 1992 and establishing a new record in 1994.

Low investment characterised this period, averaging 4.4% of net sales between 1984 and 1989. Only after 1990 did investments grow faster due to the opening of doors to imported vehicles .

By 1990, a study (Secretary of Science and Technology of São Paolo) indicated that Brazil had the lowest level of automation within the world's main motor industries (3.9% on average in welding, painting and final assembly).

A strong and diversified component production base existed, but extreme protectionism policies damaged the overall competitiveness of the motor industry. Apart from high internal costs, manufacturers could not obtain the latest technology, such as fuel injection and anti-lock brakes, for many years. The only sector able to compare favourably on technical grounds with products from western countries was that of heavy trucks due to substantial co-operation between the Brazilian constructors and their parents, principally European companies.

The "Pro-alcohol" plan was launched in 1975 to counter the energy crisis. It seemed destined for a great future with nearly 620,000 vehicles of this type in 1986, representing 96% of passenger cars, together with production of about 17 billion litres of alcohol based fuel per year.

This plan is now in abeyance, and the government has reduced its assistance for the production of alcohol based fuel. The price difference between the two types of fuel is not important enough to justify the technical aspects of engine life, and consequently demand fell to 70,000 vehicles in 1990 (13% of sales).

Latest trends

The Brazilian automotive industry reached a stage of maturity some time ago. Despite the fall in the level of local content down to 90% since 1990 it is a powerful factor contributing to economic growth. Total annual output exceeds 1.5 million vehicles of which 1.25 million are passenger cars or derived. In 1993 the automotive industry contributed to 10.8% of industrial GNP.

Economic recovery and political stability are part the explanation behind the jump in domestic demand, but the real trigger mechanism was the launch of the "popular car" concept

Automotive policy

Brazil cannot really claim to have a policy for the automotive industry. The authorities intervene as various problems arise. The sector agreements and the launching of the " popular car " led to the unexpected success of the arrival on the market of the Fiat Uno 1000 in 1990.

With the help of government aid for vehicles of under 1000 cc, the Uno 1000 benefited from being the only model in this category, selling for 20% cheaper than its nearest competitors. Its success led to other models being introduced.

The Brazilian Automotive Sector Agreements are described in Appendix V.

Reductions in the prices of vehicles and the liberalisation of tariff barriers by 20% until mid - 1995 led to an overnight change in the automobile industry. The closed environment of the Brazilian automotive industry was obliged to adapt rapidly to face up to imported vehicles which were often of superior quality.

This response took place in a number of ways :

- increased investments in order to :
  - . improve existing vehicles
  - . launch new models
  - . increase and modernise production capacity
  - . use new techniques (just in time, global sourcing,...)

- opening up to the outside world :
  - . increasing use of imports (reduction of vertical integration)
  - . imports of parts and components (particularly electronic equipment)
  - . sales of fully imported vehicles
  - . building-up of relations with Mercosur countries

This proliferation of imported parts and even whole vehicles has upset the balance of trade which led to an immediate increase in customs taxes and duties to 70 % (except for Mercosur countries for which the rate remained at 20%), the establishment of quotas and the enactment of laws or related measures regulating the automobile industry.

A definitive agreement is scheduled to be made towards the end of 1995 by means of legislation which will possibly take into account objections made by the WTO which is seeking to abolish new customs barriers.

This law is currently being discussed by representatives of the federal authorities and manufacturers' associations for industries involved in vehicle construction. The objective is to draw-up a coherent body of legislation, similar to that established in Argentina, which will encourage local industries.

The MP 1.132

The interim legislation (MP N° 1.132), of September 26, 1995, which is currently in force covers the following points :

Taxes on imports are reduced to 2% for these groups of products :

- Machines and equipment, including those for testing, moulds, new instruments and industrial apparatus for quality control, as well as their respective spare parts and accessories and models for moulds

- Raw materials, parts and components, assemblies and sub-assemblies, finished and semi-finished items, pneumatic equipment.

These items include purchases destined for the manufacture or assembly of :

- Passenger cars, jeeps and mixed use vehicles
- Small trucks, delivery vans, pick-ups, vehicles for transporting goods with a capacity below 4 tonnes
- Vehicles for transporting goods with a capacity equal or superior to 4 tonnes, vehicles for transporting 20 or more people and road truck tractors
- Agricultural tractors and agricultural machinery
- Traction engines, railway equipment and excavating equipment
- Coach work for vehicles in general
- Trailer and semi-trailers for the transport of goods
- Parts, Components, assemblies and sub-assemblies, finished and semi-finished, and pneumatic equipment, items destined for use in the products mentioned above.

Products which are to be resold, such as in the second-hand market, do not benefit from these reduced rates of tax.

In order to benefit from these tax incentives, the FOB value of imports of raw materials, components etc. added to total FOB value of imported complete vehicles must be below or equal to the cash value of exports all within a set period determined by the company.

The value of acquisitions on the domestic market of plant and tooling equipment should be at least equal to 50% of total purchases until 31/12/97 and at least equal to 60% after this date, all within a period to be determined by the company.

In order to avoid a concentration of imports which could be prejudicial to national manufacturers, the Ministries of Industry, Trade and Tourism can establish additional limits on imports so that the minimum level of domestic purchases will be 50% of each product, except for tyres for which the minimum domestic level is 20%.

Cash export values are defined as: the FOB value of exports denominated in convertible currencies less imports made under the "drawback"(see note) system, amounts paid or credited to an overseas agent or representative, amounts transferred by the company to its parent (dividends or royalties).

The non respect of these conditions is sanctioned by a fine of 30% on the resulting difference in taxes, increased by 1% in interest charges per month.

The value cash of exports can be increased by 20% for direct investments or for investments made through machines and equipment.

Manufacturers of parts and tyres who export their products by means of assembly plants are allowed to count these items as exports, provided that proof can be given.

The index of national production content should be at least 70% for tax exemption. This figure represents the ratio of the cash value of total manufactured items in FOB terms / total FOB value of imports. A minimum of 60% for raw materials, parts and Brazilian components should be included. These two ratios do not apply to products which are destined only for export such as the Fiorino Diesel (diesel passenger cars are prohibited in Brazil).

Mercosur products are considered as being national when these countries apply the same criteria.

Imports of vehicles by independent entities or by constructors of agricultural tractors or coach builders are limited to a quota of 12% of local production, and are subject to public offers. For the period from 13th of June 1995 to the end of December 1995 imports of vehicles cannot exceed 50% of the number of vehicles imported before in 1995.

For " new comers" such as new factories, the national content ratio is lowered to a minimum of 50% for a period of 36 months beginning from the products' entry onto the market.

In conclusion this measure (MP 1.132) favours local or future manufactures over importers who face restrictions in selling their vehicles and who are taxed more heavily. It also limits excess local producers imports although this is mitigated through Mercosur outlets and imports outside Mercosur. These measures are designed to encourage the adoption of new technologies which was not the case before 1990.

Note : Drawback system advantages

The system operates basically in two ways: import tax exemption or payment suspension.

For example, let us suppose that a company has imported in July raw materials worth r$1.000,00 and has paid all taxes accordingly. In December it exported the finished product worth r$2.000,00. To be entitled to the drawback system, the company submits to the Foreign Trade Department at Banco do Brazil a document faithfully stating the transaction which has been made together with all import and export documentation. For the next import transaction for further exportation, the company will be exempt from taxes for the new importation .

As to the payment suspension process, the company has to submit a document where it undertakes to import the raw material and export the finished product according to a true sales plan, by informing about the whole operation and fulfilling all deadlines established both for importing the raw materials and components as well as for exporting the products.

The ultimate purposes of this system are to encourage exports, to establish a quality standard in accordance with buyers' requirements, to reduce production costs, to speed up the process and to create a two-way system in foreign trade.

The benefits are: exemptions of Import Tax, I.I., (% over cost, Insurance and Freight, CIF), industrialised products tax, I.P.I. (% over CIF plus I.I.), Sales tax, ICMS, and the surplus tax on freight, AFRMM. Furthermore, the freedom of transportation by ship or plane under any flag and exemption of minimum deadlines for payment.

The interim legislation (M.P. 1.132) of September 1995 was replaced by a new M.P. in October (M.P. 1.165). The main change was that the tax payable on imported products changed from 2 of the value of the product to a 90% reduction in the amount of tax payable. The rate of this tax varies according to the products and their origin. As already indicated, the tax on complete vehicles is 70%. The tax payable by companies fulfilling the required conditions would therefore be 10% of 70% or 7%. This implies a lowering of preferential tariffs granted to local manufacturers.

At the time of finalising this report the Brazilian Government brought out the new automotive regulations. The Brazilian Automotive regulations (M.P. 1.131 of February 9, 1996) set out the following changes to M.P. 1.165:

- Reduction of up to 50% of import taxes for the products listed below, if the import is undertaken by Brazilian manufacturers themselves or by a trading company contracted by them. The resulting tax cannot be less than the TEC (External Common Tariff) accord with the MERCOSUR countries:

    - passenger cars, jeeps and mixed vehicles;

- small trucks, delivery vans, pick-ups, vehicles for transporting goods with a capacity below 4 tonnes;
- vehicles for transporting goods with a capacity equal or superior to 4 tonnes, vehicles for transporting 10 or more people and road trucks.

- Reduction of up to 90% of import taxes on raw materials, parts and components, assemblies and sub-assemblies, finished items, pneumatic equipment, taking into consideration that the import tax cannot be less than 2% according to the following reductions:
  - 85% in 1996
  - 70% in 1997
  - 55% in 1998
  - 40% in 1999.

- The ratio between the acquisition of Brazilian capital goods and those ones imported with import taxes reduction should be at least one to one (1:1) until December 31, 1997 and from January 1, 1998 onwards it should be equal to one to one and a half (1:1.5).

- The ratio between acquisitions of Brazilian and imported raw materials should be at least one to one (1:1) per year.

- The value of imports of raw materials and products listed below, from the MERCOSUR countries, added to the imports and transport vehicles with import taxes reduction should not exceed the value of the net export each year. (A variation of plus or minus 10% will be allowed until the end of 1998).

  - passenger cars, jeeps and mixed-use vehicles;
  - small trucks, delivery vans, pick-ups, vehicles for transporting goods with a capacity below 4 tonnes;
  - vehicles for transporting goods with a capacity equal or superior to 4 tonnes, vehicles for transporting 10 or more people and road trucks;
  - agricultural tractors and agricultural machinery;
  - traction engines, railway equipment and excavating equipment;
  - coachwork for vehicles in general;
  - trailer and semi-trailers for the transport of goods;
  - parts, components, assemblies and sub-assemblies, finished and semi-finished and pneumatic equipment and any items destined for use in the products mentioned above.

- The auto parts imports with taxes reduction cannot exceed two thirds of the net exports per year;

- for any "newcomers" the above ratios will be reached after a three year period;

- the average national content ratio should be at least 60% per year. For "newcomers" this ratio will be required from the third production year.

Investments

The following table shows the extent to which Brazil is a promising market. With average annual investment of US$ 900 million between 1990 and 1993 and a billion US$ in 1994, multinational companies do not take such risks without there being good prospects for future earnings.

Brazilian motor industry investment programme - 1995 - 2000 officially announced

COMPANY	INVESTMENT US$	VEHICLES /PERIOD	DEVELOPMENTS
FIAT BR/ARG	1.0 bn	150,000 from 1997	Capacity expansion at Betim. New car 178
VW	250m	40,000 from 1997	CV'S LT 35
VW	250m	1,200/day from 1996 1,800/day from 1997	PC'S motors (1.4 L)
FORD	1.1 bn	225,000 from 1996 from 1997	Fiesta CV'S HN-80 (50 ton)
G.M.	2.0bn 200m	from 1995-2000 250,000 from 1996	PC'S, LCV'S & CV'S PC'S CORSA
MERCEDES BENZ	400m	80,000 from 1997	PC'S A-CLASS
RENAULT	1.0 bn	100,000 from 1999	PC'S MEGANE
SCANIA	200m	from 1995 -1997	CV'S and BUS
VOLVO	300m	from 1995-2000	CV'S and BUS
HYUNDAI	N.A.	30,000 from 1997	PC'S & LCV'S H-100
KIA MOTORS	100.m	15,000 from 1997	LCV'S TOWNER /HI-TOPIC
ASIA MOTORS	200m	30,000 from 1997	LCV's HI-LUX

Source: Automobile Manufacturers

As well as these officially announced investments, others are in the planning stage and could concern :

ROVER series 200 about 30,000 vehicles by 1998
PEUGEOT (Brazil or Argentina) series 106 about 100.000 vehicles by 1998/99 for an investment of US$ 500m.
TOYOTA Corolla model about 200,000 vehicles by 1998/99
NISSAN LCV'S L-200
HONDA PC'S CIVIC
IVECO CV'S

The major difference between the investments which have already taken place and those to come is that the first group objectives have been to renovate the means of production and management (reduced delivery cycles, increased automation, computerisation) as well as to improve productivity (see table 13 in the statistical Appendix VI). In contrast the second group of investments are mostly aimed at increasing new production lines and facilities.

In this respect, estimates of production capacity of 1.5 million vehicles for 1993 have already been reached in 1994, and capacity in Argentina has grown similarly. During the interim period before the new production units become operational, the previous investment have contributed to improving productivity and also to increasing the production capacity of older plants.

Employment, Salaries and Productivity

In 1993 the automobile industry created direct employment for 106,738 people plus 13,897 in the agricultural machinery sector. Jobs created indirectly by this industry numbered 5.2 million overall (refer to table 12 in Appendix VI).

After a long period of stagnation, salary costs have increased significantly in real terms after the first sector agreements in 1992 (by 17%), by 10% in 1993 after the second round of agreements, and by 19% in 1994 after a short lived strike. In 1994, the daily salary of a blue collar worker was about US$ 40 compared to US$ 28 in 1992.

We can see in table 13 (see Appendix VI) that in 1993 productivity, measured in vehicles per employee, increased by 27% above 1992 levels, and nearly 48% above those in 1991. The figure of 13 vehicles per employee is a record for Brazilian industry but as mentioned previously, the productivity per employee depends upon the complexity of the model. The simpler type of car (Popular) is playing a larger role in Brazilian production (see table 6 in Appendix VI).

In any event, according to studies carried out by the Massachusetts Institute of Technology (MIT) and Booz-Allen & Hamilton, Brazil is producing more rapidly and the average hourly input to construct a vehicle passed from 48 hours in 1990 to 39 hours in 1993.

3.5 Motor Vehicle Production in Brazil

Overview of Main Producers (December 1993)

The major producers in Brazil comprise:

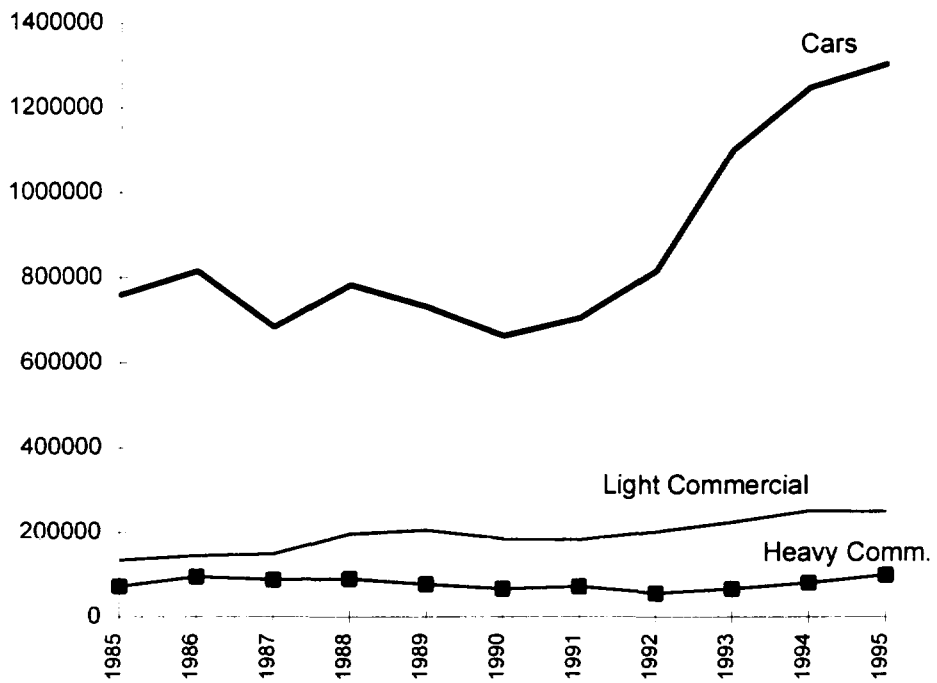
	Plants	Employees
Agrale S.A.	5	1,095
Fiat Automoveis	1	16,632
General Motors do Brazil	2	19,197
Mercedes-Benz do Brazil	2	17,056
Scania do Brazil	1	3,100
Toyota do Brazil	1	639
Volvo do Brazil	1	1,511
Volkswagen (Autolatina)	4	47,997
Ford (Autolatina)	5	

Geographically the industry is centred in the South East, mainly in and around the São Paolo region.

Expansion plans are under consideration by a number of these producers, and new contenders have announced their intention to enter the market. These future plans are described in Section 4.2.

Chart (i) shows the substantial increases in production output of cars and commercial vehicles over the past ten years, but mainly since 1990/91:

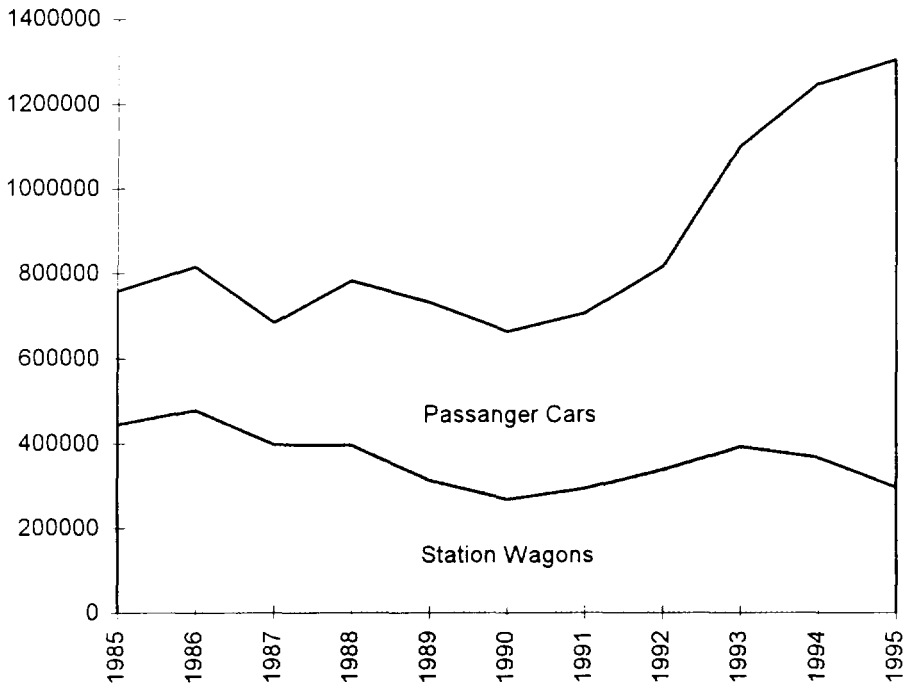
(i) Production Trend by Main Vehicle



Heavy commercial vehicles (i.e. trucks and buses) have recovered only in the past three years, lagging behind the upturn in private cars which started slightly earlier in 1991/92.

The major increase in output of cars, however, incorporates a substantially increasing preference for Estate cars (Station Wagons) in recent years, as shown in Chart (ii):

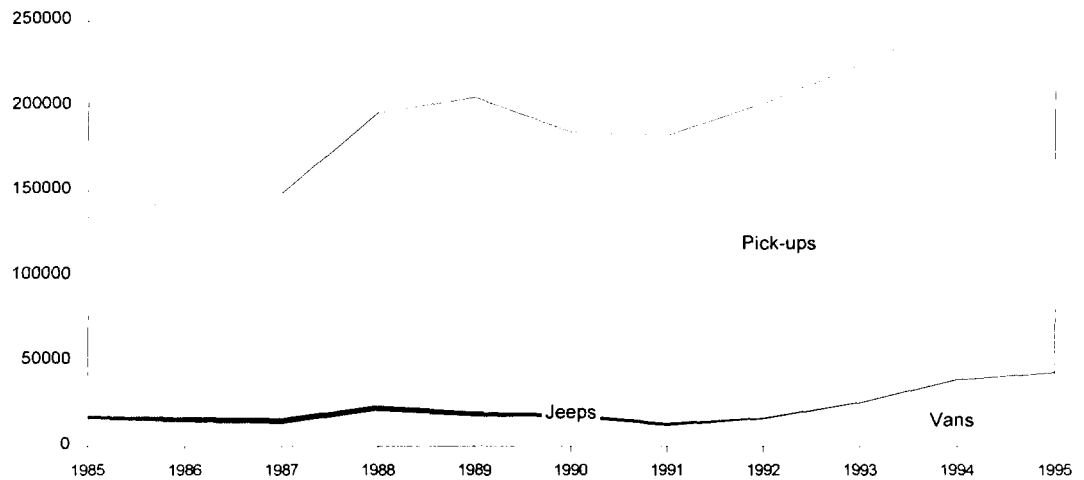
(ii) Production Trend by Vehicle Type - Cars



The total output of cars has increased by over 60% from the steady level of around 800,000 vehicles which obtained from 1985 until 1991.

Light commercial vehicles also show a major preference - for pick-ups as compared to light vans:

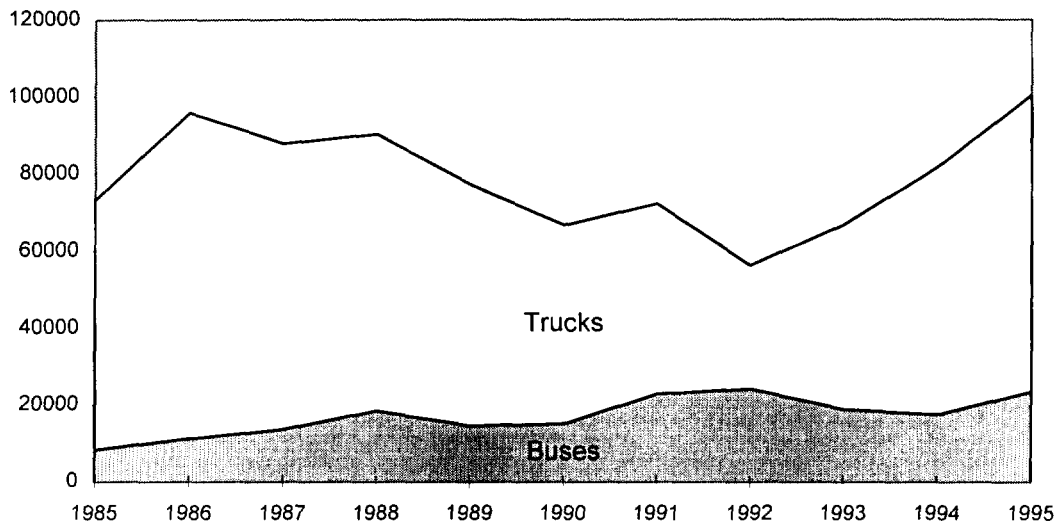
(iii) Production Trends by Vehicle Type - Light Commercial



The rise in total demand for light commercial vehicles has risen much more consistently over the ten year period, with reasonably steady growth in the 1980's when output of cars was static. Possibly for this reason, the growth since 1991 has been lower, in the order of 40%.

Production of trucks declined substantially from 1986 to 1992, but has recovered since then:

(iv) Production by Vehicle Type - Heavy Commercial

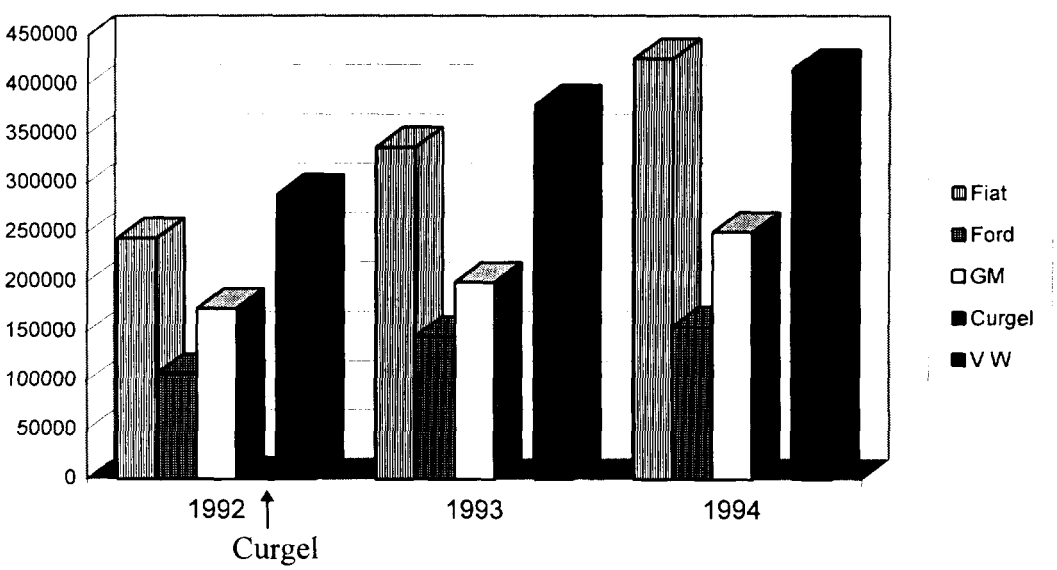


Despite indications that current production capacity is approaching its maximum, plans to increase output seem to focus on the existing facilities.

Production Levels by Major Producers

The level of output by each major car producer is shown in Chart (v):

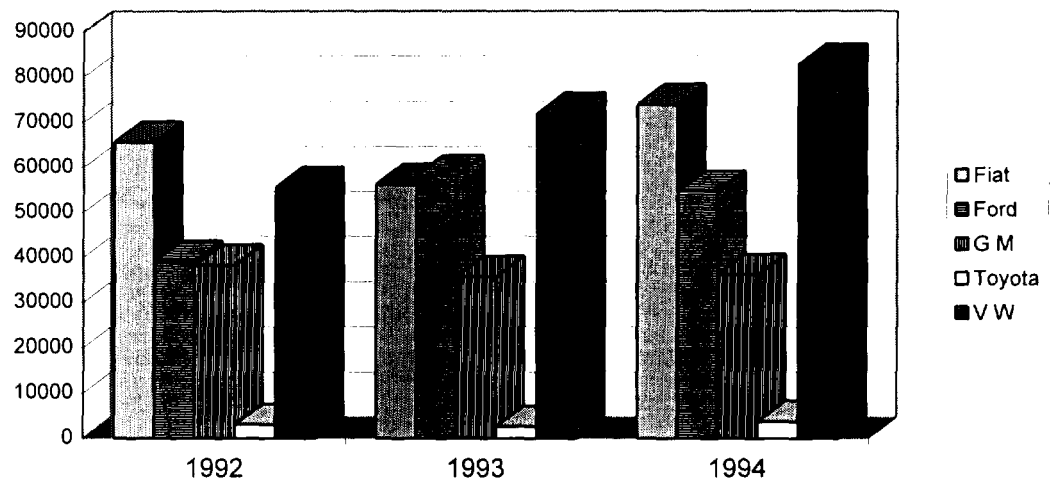
(v) Production by Manufacturers - Cars and Estates



Both Fiat and VW have grown steadily over the period, Fiat overtaking VW only in 1994. Ford has been rather static in the past two to three years; while G M has increased its share of production. (Curgel is shown, but since 1992 the production figures are too small to be shown on the chart for comparison).

Light commercial vehicle production was:

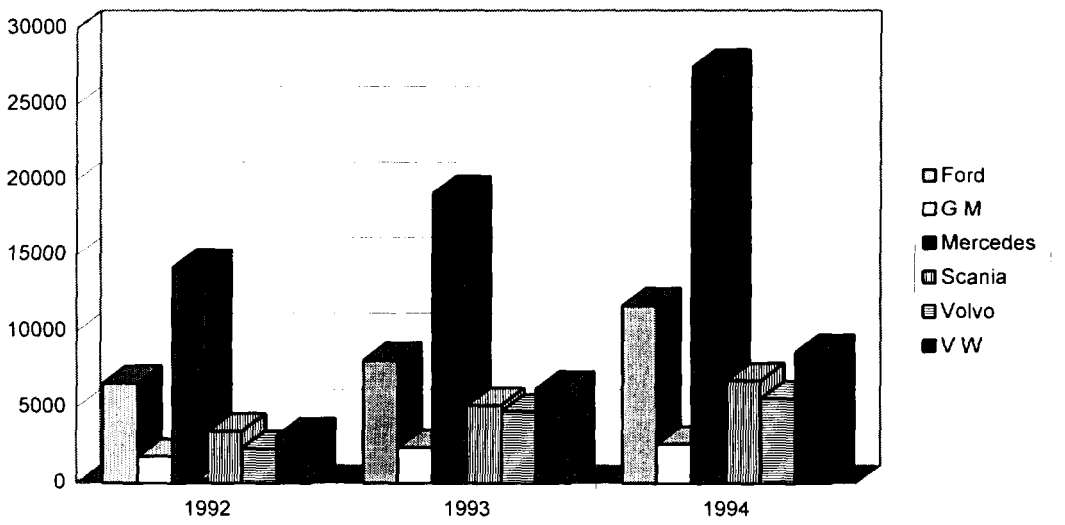
(vi) Production Shares by Manufacturer - Light Commercial



Despite growing significantly in 1994, Fiat has lost production share with VW substantially increasing its share and Ford gaining ground. GM's has remained steady while Toyota's has started to grow.

Truck production output has grown strongly in the past three years;

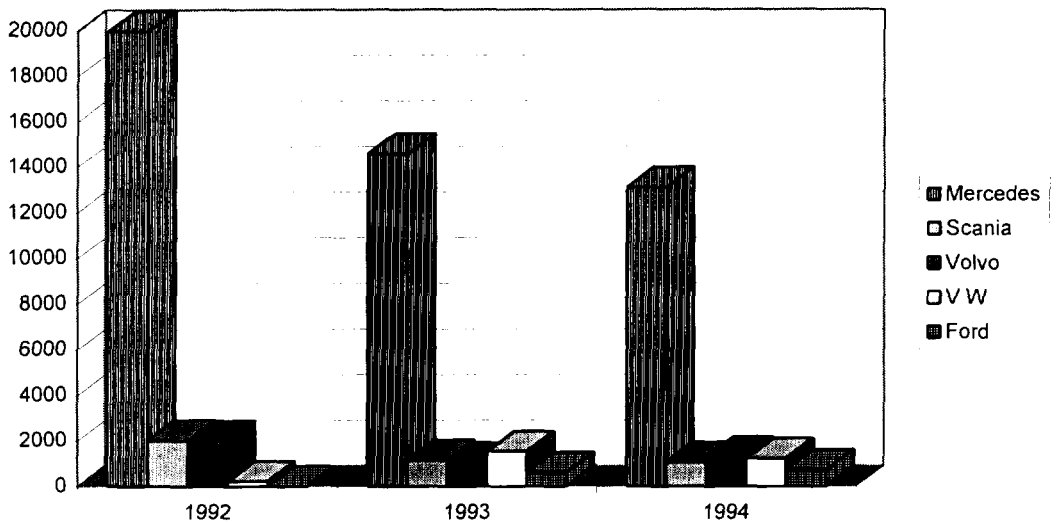
(vii) Production Shares by Vehicle Manufacturer - Trucks



Mercedes has achieved spectacular growth, virtually doubling its output over this period. Similarly, at lower volumes, Ford and VW have done the same. Scania and Volvo have also grown, albeit slightly less quickly.

Production of buses is dominated by Mercedes-Benz. Scania and Volvo shared the remaining small output share in 1992; but VW's production has grown significantly in the past two years, albeit from a low level:

(viii) Production by Vehicle Manufacturer - Buses



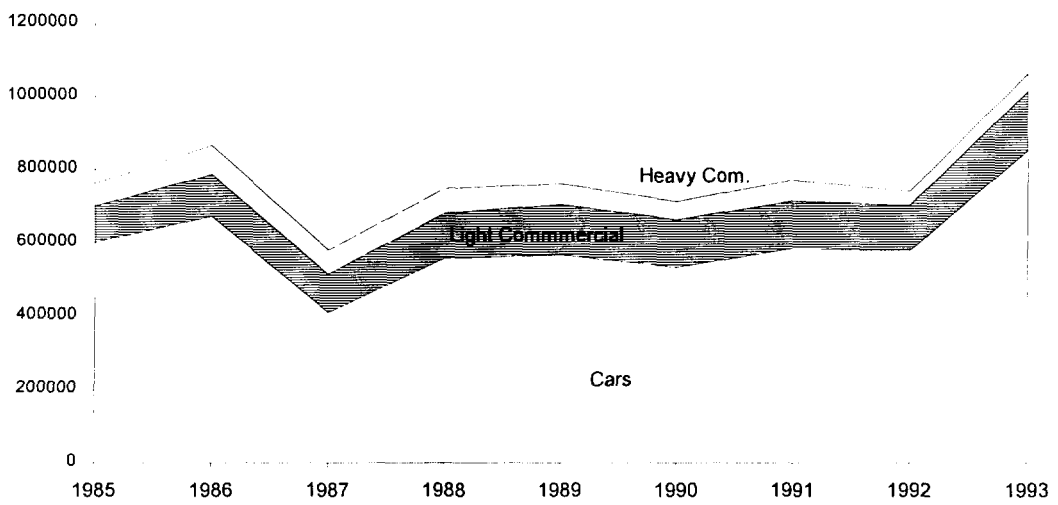
The years 1993/94 represent a low-point in production of buses; however estimates for 1995 suggest that the output this year will approach the high 1992 level. This means that production capacity is approaching its present maximum. However there have been no suggestions of any of the producers considering the opening of an new manufacturing site.

3.6 Domestic Sales of Vehicles by Brazil Manufacturers

The domestic sales of vehicles into the Brazilian market reflect, to a fair extent, the pattern of output. Nevertheless there are a number of important differences caused by the substantial increase in trade during the past two to three years.

Chart (ix) shows that sales of cars started to rise substantially only in 1993, having been virtually flat previously:

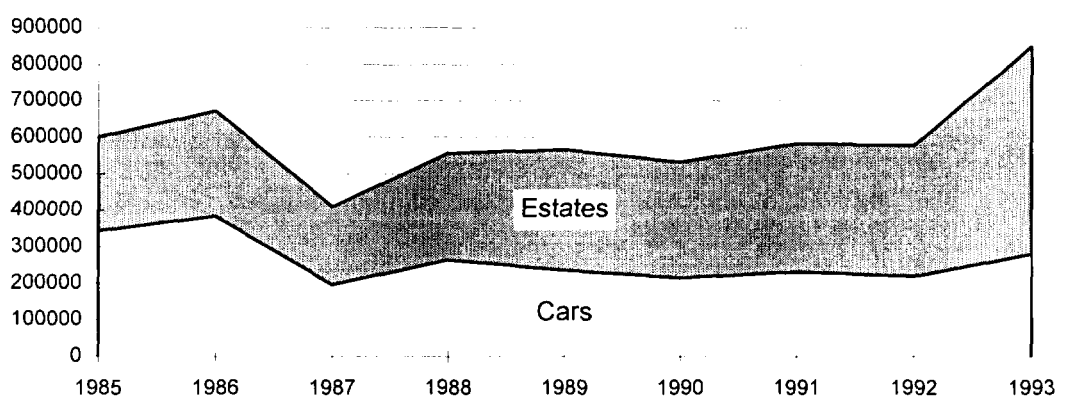
(ix) Domestic Motor Vehicle Sales



Home sales of cars have been boosted further by the recent tax reductions in the popular class.

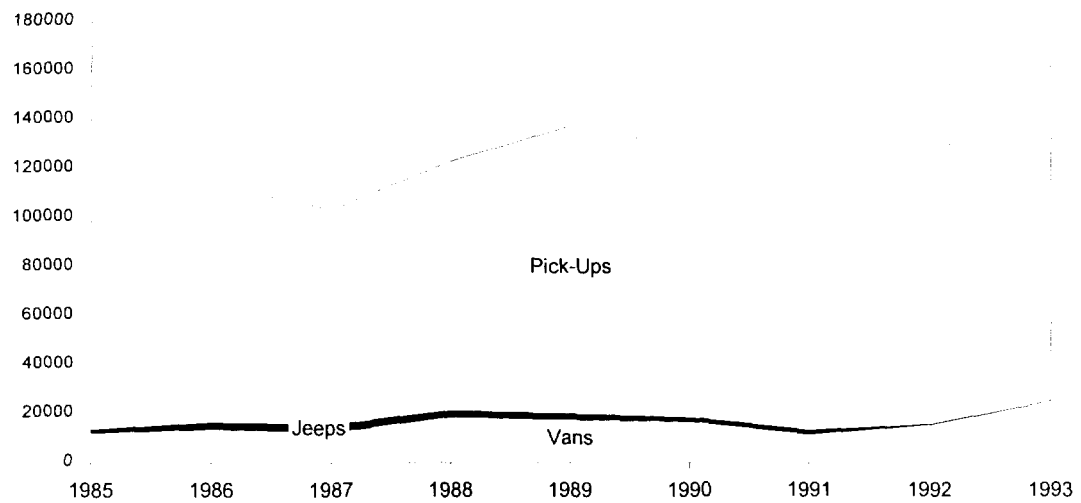
Sales of cars by vehicle type are illustrated in Chart (x):

(x) Domestic Sales Trends by Vehicle Type - Cars



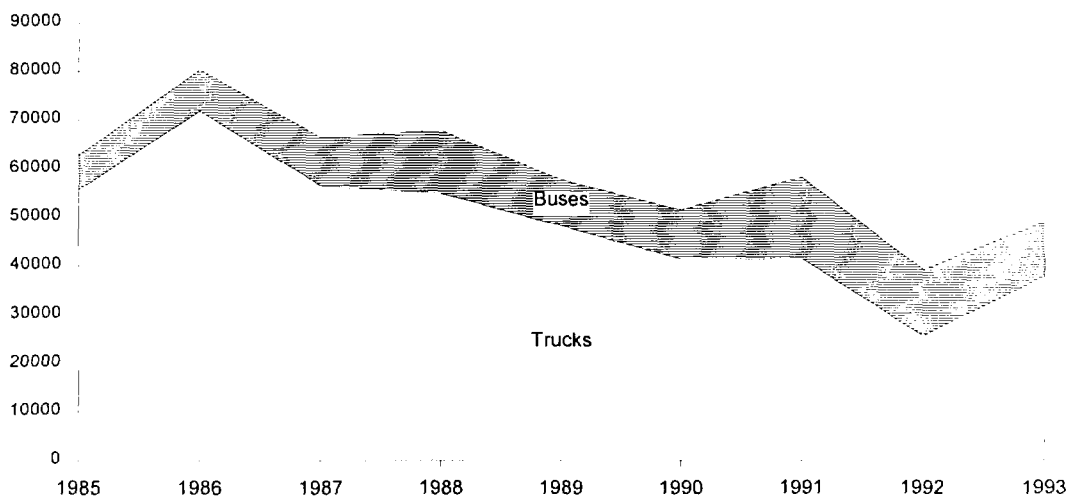
Home sales of Light commercial vehicles show a similar pattern:

(xi) Domestic Sales Trends by Vehicle Type - Light Commercial



The sales trend for Heavy commercial vehicles - trucks and buses were:

(xii) Domestic Sales Trends by Vehicle Type - Trucks and Buses

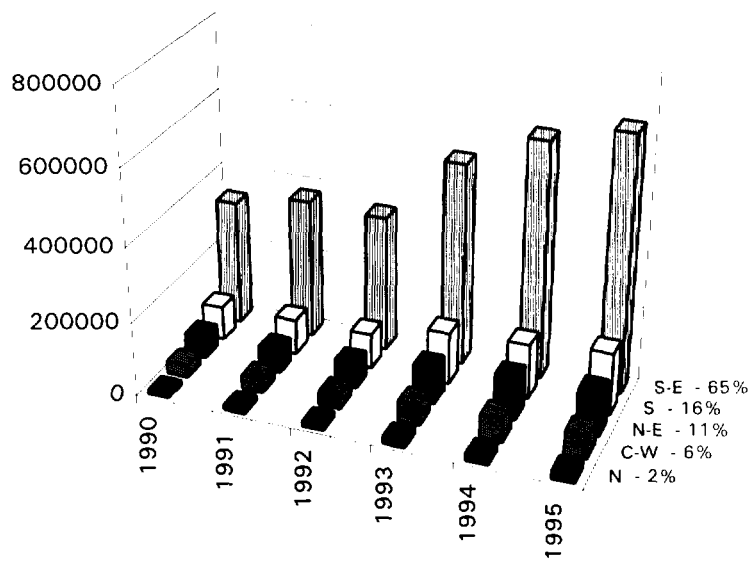


The downward trend is for heavy trucks; bus sales have in fact expanded somewhat since the mid-1980s.

Vehicles Sales by Geographic Region

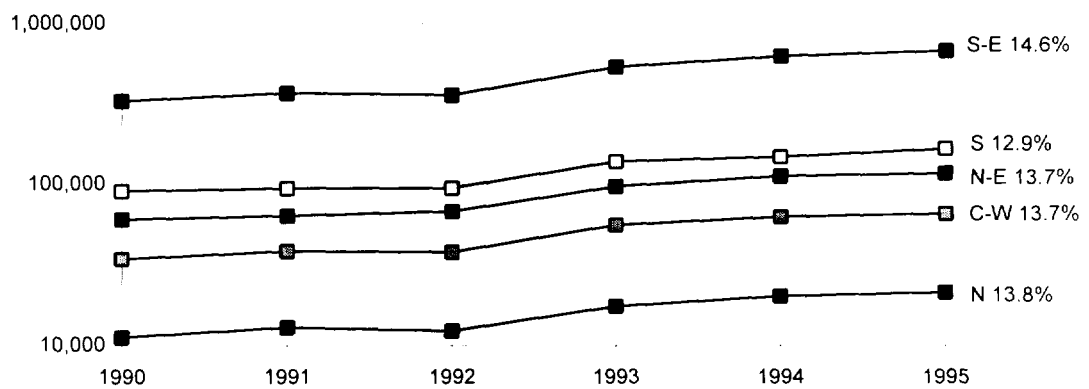
Domestic car sales have grown from nearly 533,000 units in 1990 to an estimate of over 1 million cars in 1995 - regional sales and market shares are shown in Chart (xiii):

(xiii) Domestic Car Sales by Region



The relative growth patterns for each region were surprisingly similar:

(xiv) Domestic Car Sales - Regional Growth Trends



Only the South East and the South differ from the rest to give an overall national average of 13.74%.

Thus, despite the large share of the South East, the other regions have also grown at a similar rate to the South East. The South and South East together comprise the majority of the market - over 80% of the total.

As a result of their similar growth rates, the relative shares of each state have remained virtually constant over the five year period.

A new (or existing) vehicle producer considering setting up a manufacturing site in Bahia must consider the implications of this heavy geographic weighting. A market strategy that is primarily oriented towards the domestic market must obviously target the SE and S with its distribution arrangements. It is clear why so many domestic manufacturers have located in the South East and neighbouring areas, given the proximity of both market demand and also industrial and component supplies in this area.

However, there are other considerations. If a new Bahia plant is set up with exports as a primary or even a partial strategic objective, then the S-E & S market area may be relatively less important. This is particularly true if the new plant is able to capture a larger than average share of the local North Eastern market.

And the equally high growth rate of the North East region means that this market offers similar potential (in relation to its size) to that of the South East. If general economic and industrial activity are stimulated by investment, the outlook is even more favourable.

These market shares reflect the varying nature of economic and employment conditions more than the population density:

Car Sales per '000 Inhabitants

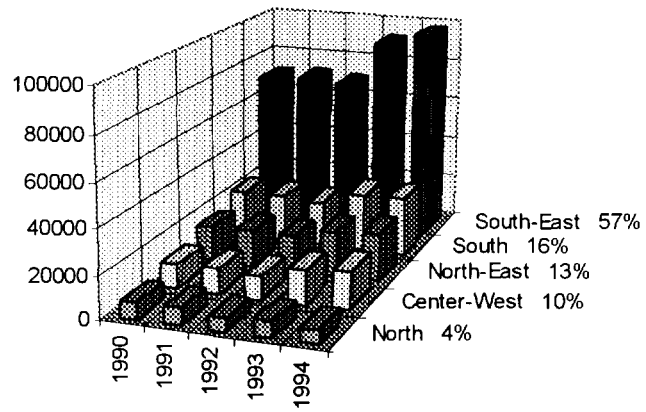
North	2.0
Centre West	6.7
North East	2.7
South	6.7
South East	10.0

Bahia's car sales are 3.0 per thousand inhabitants, slightly above the average for the North East. Clearly there is scope for increasing penetration as industrial activity increases and incomes rise.

In the year 2000 it is estimated that there will be over 15 million vehicles in Brazil, of which 12 million will be passenger cars or derivatives. There are no precise figures available for age profiles so it is difficult to draw any quantitative conclusions. However it is clear that there is already a potentially large replacement market.

For light commercial vehicles, the situation is similar, except that the Centre West is relatively more important than for cars, and the proportion of sales in the South East is significantly lower:

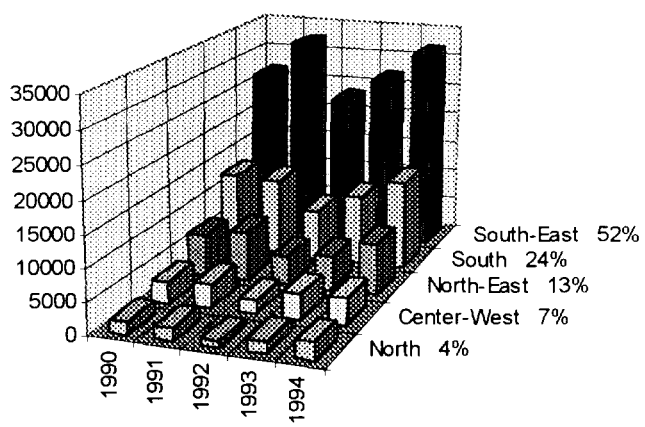
(xv) Light Commercial Sales by Region



The South East has only a 57% share of sales (compared to 65% for cars); whereas the North East, North and Centre West enjoy 27% (as against 19% for cars).

Heavy commercial vehicle sales are shown an even lower proportion of 52% in the South East, but correspondingly higher in the South. Sales to the other markets (N-E, C-W & N) are 24% of the total:

(xvi) Truck and Bus Sales by Region



Thus for all commercial vehicles, sales to the three central and northern territories comprise a significantly higher proportion of the total.

The Market Potential in Bahia and the North Eastern Sector

Domestic vehicle sales to Bahia rose from 18,500 vehicles in 1990 to over 35,000 vehicles in 1994; historic growth and penetration have been similar to the North East as a whole. Clearly the Bahia market alone cannot provide more than a few percent sales for a local vehicle plant.

The North East Region and its immediately neighbouring areas account for some 12½% of the national car market - estimated at 170,000 units in 1997/98. A good share of this market - say 15%, over 25,000 vehicles - could offer substantial potential to a Bahia production plant of 100,000 unit output.

Much of an even wider area, roughly the north east quarter of Brazil, taking the centre as Brazilia, is closer to Bahia than São Paolo or, at worst, is no further. This 'north east quarter' will account for domestic sales of approximately 300,000 units in 1995 i.e. nearly 30% of the Brazilian market.

If a local car producer situated in Bahia can obtain, say, an overall 15% share of the whole 'north east quarter' through effective marketing, this would represent sales of 45,000 units for such a new venture. This could provide a producer in Bahia with part of a market strategy that might include exporting as its other major plank.

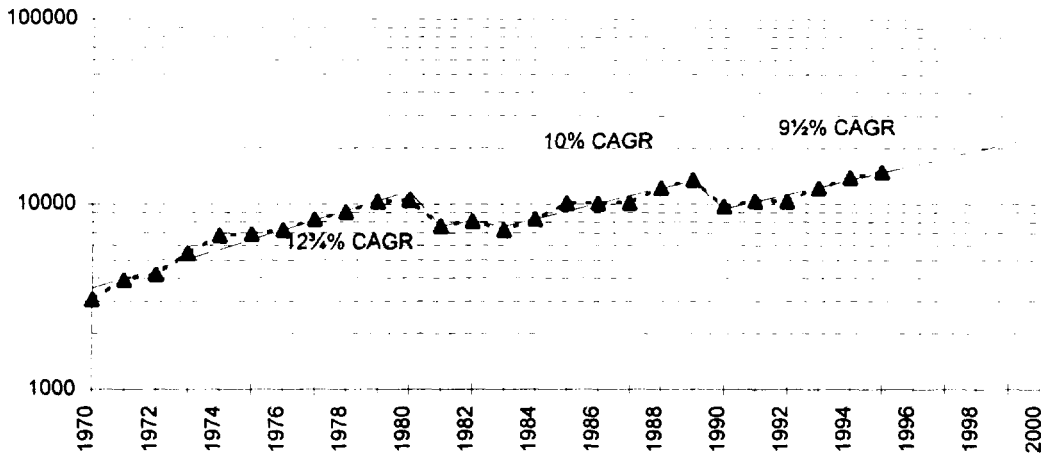
The same argument applied to commercial vehicles suggests that the 'north east quarter' will account for sales of about 50,000 light commercial vehicles in 1995, and some 18,000 trucks and buses. Although this represents significant market potential for a prospective new supplier, the absolute numbers involved are obviously quite low and, in themselves, are hardly likely to justify the siting of a plant to produce commercial vehicles in the North East.

3.7 Total Vehicle Sales to the Brazilian Market

Total vehicle sales (i.e. purchases) in the Brazilian market show a growth pattern since 1970 that is fairly typical for a rapidly developing country:

US$ million @ constant 1993 prices

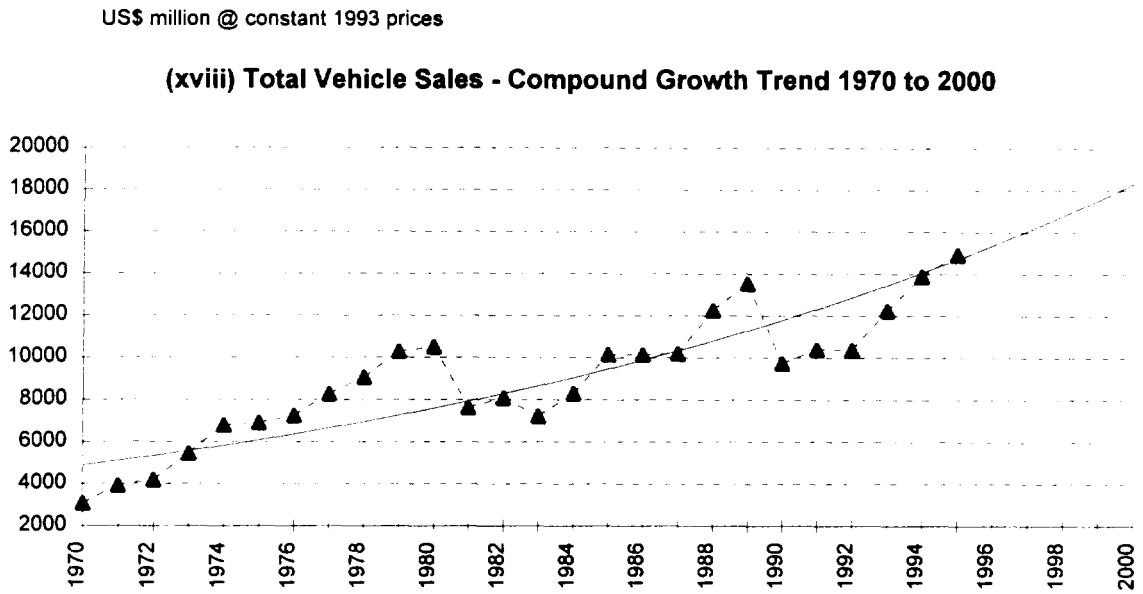
(xvii) Total Vehicle Sales : Trends in 1970-80; 83-89; 90-2000



In the 1970s, early growth was rapid - nearly 13% compound average growth rate (CAGR) over this decade. Following the setback in 1981/83, sales took off again but this time growth was lower at 10% average between 1983 and 1989.

In the 1990s so far, growth has been 9½% CAGR and, for the time being, seems set to continue. If this average rate of growth were sustained for the rest of the decade, without any recession, sales by the year 2000 would be well in excess of $20 billion at constant 1993 prices.

However, if we examine the long term trend, including the two major setbacks, this shows an overall average compound growth of just 4½% annually over the past twenty five years. This is shown in the following graph which comprises the same data as those above, but plotted on a linear scale:



This long term growth trend, if it continues, implies that sales will exceed $18 billion at 1993 prices by 2000, a somewhat more modest target which could well be achieved if there are no really major setbacks.

However, the actual outcome will be dependent largely on Government policies such as the recent tax reduction, the successful implementation of an automotive strategy, and the general economic climate in Brazil

The main destinations for exports are other South American countries, principally Argentina:

Exports of Vehicles from Brazil	**$ million**	
	1993	**1994**
Argentina	735	752
Chile	227	184
Uruguay	127	100
Ecuador	32	61
Paraguay	36	51
Other S. American	107	97
Total South American	1264	1245
Europe	174	262
Mexico	174	157
USA & Canada	38	-
Central America	34	29
Asia	40	27
Africa	28	31
Oceana	5	9
TOTAL	1757	1760

Over 60% of exports go to the two largest South American destinations.

The principle vehicle exporters in 1994 were:

	'000 units
Fiat	28.1
Fiat CKD	123.1
Ford	8.8
Ford CKD	29.0
GMB	9.1
GMB	7.6
VW	5.4
VW CKD	63.8
	274.8

Of the 275,000 vehicles exported, over 80% (223,000) were in CKD form. Fiat's main destination for complete vehicles is Italy; most of their CKD units go to Argentina. VW's principal export market for both types is also Argentina.

There is a large volume of exports in engines and components, mainly the latter, with the USA and Mexico as the principal destinations:

Exports of Engines and Components from Brazil	**$ million**	
	1993	1994
USA & Canada	461	53
Mexico	101	448
South America	160	227
Europe	136	123
Asia	19	51
Africa	19	22
Oceana	1	1
TOTAL	897	925

Source: ANFAVEA

Thus the exports of components account for over one third of all automotive exports. It must be remembered that a substantial part of this trade is accounted for by the major multinationals trading 'internally' within their groups.

3.9 Market Forecast

This section provides forecast scenarios to the year 2000 for Brazil and other Latin American markets. The latter are included because of their immediate relevance to present and future automobile production in Brazil - due to increasingly close integration in the region, especially with Argentina.

Important background assumptions are:

- The absence of major political world problems - essential to stable world markets which, in turn, affect the Latin American markets and investment
- Domestic political stability in Brazil and its major neighbours
- Brazilian Government policies providing a stable economic framework for controlled growth
- Hence, economic growth based on a forecast 7½% average annual growth to the year 2000.

The assumption that the recent developments in Brazil - South America's largest market - will be built on positively is critical to the future growth scenarios, not only for Brazil but for the whole of the South American region.

Broad Economic Scenario

The overall ratio of car ownership and GDP per capita was introduced in Section 3.3.

This provides a broad basis for medium to long term growth prediction. GDP in Brazil is forecast to grow to around US $6400 per head by 2000. This would suggest a vehicle density of in the region of 8 persons per car, equivalent to a vehicle parc of 25 million cars - roughly double the present figure.

This might imply sales of 12½ million cars to new owners over the next five years, an average of 2½ million a year. In practice, car sales next year are likely to approach only 1.2 million units, so it is probably safe to assume that such a scenario is excessively optimistic. Nevertheless, it is useful in highlighting the long term potential in a country which has the necessary development potential if only it can realise it.

The forecast discussed in the next section implies that Brazil will reach a total population just under 15 million cars by 2000, which implies a vehicle density of only 11.5 persons per car, down from the current figure 14 persons per car.

Passenger Cars

The Mexican market is forecast to virtually double over the next five years. The NAFTA agreement will have a major effect both on Mexican production - as it gears up to meet demand from the USA - as well as on vehicle sales.

Forecast of New Passenger Car Sales in Latin America

'000 units

	1994	1995	1996	1997	2000	CAGR
Mexico	380	460	520	600	860	14.6%
Brazil	**975**	**1050**	**1100**	**1230**	**1470**	**7.1%**
Argentina	405	440	500	550	630	7.6%
Venezuela	70	70	85	90	105	7.0%
Colombia	55	60	65	70	82	6.9%
Chile	75	81	89	97	110	6.6%
Uruguay	23	24	25	30	37	8.3%
Ecuador	12	12	13	13	15	3.8%
Peru	8	8	10	11	15	11.1%
Total	**2003**	**2205**	**2407**	**2691**	**3324**	**8.8%**

Source: Economist Intelligence Unit

The impact of NAFTA in 1993 is that Mexico will become the most important Latin American supplier to the US market. As a result, several Brazilian component manufacturers are planning to set up Mexican subsidiaries to try and remain in this market. The implication for Brazil is that such companies are less likely to diversify their manufacturing operations within the country unless there is a major shift in actual vehicle production outside the Sao Paolo area.

There is already substantial trade with Mexico amounting to some 10% of all Brazilian exports in 1992. For example, all VW Beetles produced in Mexico are supplied with Brazilian engines, gearboxes and other components. A substantial number of commercial vehicles were also exported in that year.

In South America, the largest markets - Brazil and Argentina - should both grow at near the average growth of 7.5% annually. As some of the smaller markets grow, Brazil's percentage share of total sales is expected to increase slightly from 57.6% in 1994 to 60% in 2000.

The car population in South America is expected to grow from 20 million in 1994 to over 25 million units by 2000, again on the assumption of continuing economic growth in Brazil.

Forecast of Passenger Car Parc in South America

'000 units

	1994	1995	1996	1997	2000
Argentina	4550	4750	4938	5052	5385
Brazil	**11600**	**12000**	**12700**	**13400**	**15200**
Chile	990	1075	1150	1225	1450
Colombia	678	685	695	704	724
Ecuador	78	82	88	91	102
Peru	415	420	425	431	452
Uruguay	325	340	355	370	430
Venezuela	1520	1525	1535	1550	1600
Total	**20156**	**20877**	**21886**	**22823**	**25343**

Source: Economist Intelligence Unit

Thus Brazil and Argentina will continue to dominate the region, both from a demand and from a supply point of view. While this appears obvious, it is vital to appreciate the implications in terms of regional and multinational co-operation. This is discussed further in Chapter IV.

Light Commercial Vehicles

The outlook for light commercial vehicles is for higher growth than that for cars in South America (excluding Mexico where it is still high) - an average growth of nearly 9% annually from 1994 to 2000:

Forecast of Light Commercial Vehicle Sales in Latin America

'000 units

	1994	1995	1996	1997	2000	CAGR
Mexico	150	165	195	220	280	11.0%
Brazil	**185**	**195**	**238**	**250**	**275**	**6.8%**
Argentina	50	56	70	85	90	10.3%
Venezuela	35	40	55	65	78	14.3%
Colombia	35	42	45	52	65	10.9%
Chile	45	49	55	61	75	8.9%
Total	**500**	**547**	**658**	**733**	**863**	**9.5%**

Source: Economist Intelligence Unit

In Brazil, however, much more modest growth is expected, slightly less than that for cars.

Heavy Commercial Vehicles

Mexico again exhibits the highest growth potential excepting Venezuela where a substantial increase is expected from the present low base:

Forecast of Heavy Commercial Vehicle Sales in Latin America

'000 units

	1994	1995	1996	1997	2000	CAGR
Mexico	65	80	95	103	130	12.3%
Brazil	**55**	**60**	**60**	**75**	**85**	**7.5%**
Argentina	13	14	15	15	20	7.4%
Venezuela	5	5	10	15	18	24%
Colombia	10	13	14	14	17	9.3%
Chile	10	12	14	15	18	10.3%
Uruguay	1	1	1	1	2	
Total	**159**	**185**	**209**	**238**	**290**	**10.5%**

Source: Economist Intelligence Unit

Overall these forecasts predict that Latin American markets will experience substantial growth in the remaining years of this decade. Given the stated assumption of general economic stability and growth, especially in Brazil, the South American market may reach well over 3 million vehicles, that in Mexico in the region of 1¼ million units and in Brazil over 1.8 million vehicles.

The Brazilian Market

As stated earlier, the Brazilian market has seen a spectacular recovery over the past three years which looks set to continue into 1996 and beyond. Imports have also risen, accounting for 8% of the market in 1993 - nearly 36,000 vehicles. Imports are estimated to have doubled in 1994.

The EIU forecasts are essentially a positive scenario dependent on a combination of continuing economic recovery, the implementation of a clear automotive policy, and a reduction in the still large gap between car prices and average incomes. The latter are still too low for really rapid growth to be sustained for many years. Nevertheless, despite potential pitfalls, there is a widespread optimism among vehicle producers that the growth being predicted will really happen.

Summarising the outlook for the Brazilian car market:

Forecast of Domestic Sales, Parc, Vehicle density and Production for Cars

		1994	1995	1996	1997	1998	1999	2000	cagr
Domestic sales	'000	975.2	1,050	1,100	1,230	1,350	1,425	1,470	7.08%
Car Parc	millions	11.6	12.0	12.7	13.4	14.1	14.7	15.2	4.61%
Cars per person		13.7	13.5	12.9	12.5	12.0	11.7	11.5	
Production	'000	1,190	1,270	1,338	1,460	1,590	1,680	1,750	6.64%

Source: Economist Intelligence Unit

Although domestic sales are increasing at a slightly average higher rate than production output, the excess of production over domestic sales rises from just under 215,000 units in 1994 to 280,000 units in 2000.

The production forecasts are based on current information about the plans of the main vehicle suppliers. Obviously, these could change if one or other major company decided to switch its production plans to another Mercosur country, Argentina in particular being the most obvious candidate. This underlines once again the importance of a stable economic plans for the automotive industry.

The outlook for all vehicle sales in Brazil is as follows:

'000 units

	1994	1995	1996	1997	2000
Cars	975	1050	1100	1230	1470
Light Commercial	185	195	238	250	275
Heavy Commercial	55	60	60	75	85
Total Sales	1215	1305	1398	1555	1830

Source: Economist Intelligence Unit

This independent forecast compares well with current local opinion in Brazil which generally assumes sales of 2 million units by 2000; although some optimistic predictions are as high as 2.5 million vehicles.

Interestingly, the forward projections indicates by the two historic trend curves discussed in Section 3.7 vary between 1.8 million for the 25 year long term trend to 2.2 million for the current 1990s average growth rate. The 2 million forecast fell neatly between the two.

3.10 The Components Sector

There are nearly five hundred vehicle components suppliers in Brazil of which 170 are listed as OEM (Original Equipment Manufacturing) suppliers to the vehicle producers. Most suppliers are medium sized - with 132 firms employing 125 or less; 222 companies have between 125 and 500 employees, a further 111 between 500 and 2000, and only 18 over 2000 people.

The vast majority of establishments - around 80% - are located either in São Paolo or in states relatively close e.g. Minas Gerais or Parana. 53% of companies are located in the greater or central São Paolo itself. Thus the main component suppliers are located close to the production facilities of their major customers; and to a large proportion of the after market as well.

Ford has its own electronics components company, based in Guarulhos, employing 3500 people. This is part of Ford's auto components division and, as such, exports the majority of its output. However Ford intends to increase the supply of its local requirements to 50% of the total by 2000. The company will diversify its component production into plastics and air conditioning equipment.

VW has launched a major drive to boost investment in components manufacturers - both new technology and increased productivity.

Total sales of the Brazilian components industry is estimated at over US $12,000 million; of this large figure, 60% was sold direct to the car manufacturers, 17½% for replacement, and 17% for export.

Trade in components enjoy a healthy surplus as might be expected, given the surplus in vehicle exports which account for over half of sales. Exports have risen from 2 billion US$ in 1989 to an estimated $3 billion in 1994. However, imports have risen proportionately faster and are expected to reach $2 billion in 1994:

Trade in Automotive Components **US$ million**

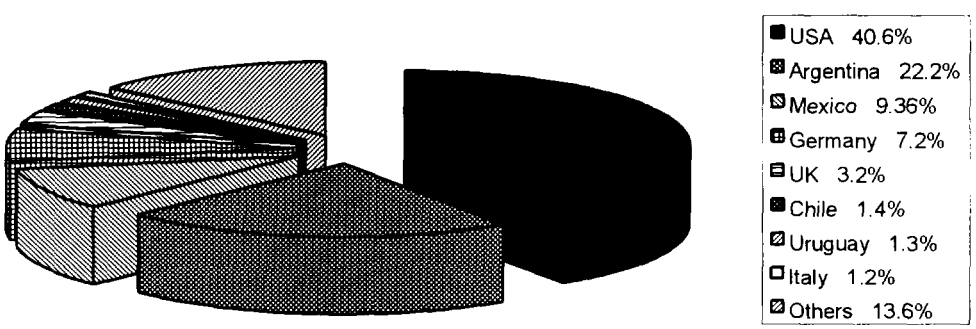
	1989	1990	1991	1992	1993	1994
Exports	2120	2127	2048	2312	2665	*3000
Imports	708	837	844	1060	*1700	*2000
Trade Surplus	1412	1290	1204	1252	965	1000

Source: Sindipeças * estimates

The largest export destinations are the USA followed by Argentina and Mexico. The main imports come from Germany, followed by Argentina, the USA and Italy. Obviously this reflects the dealings of the major multinational producers.

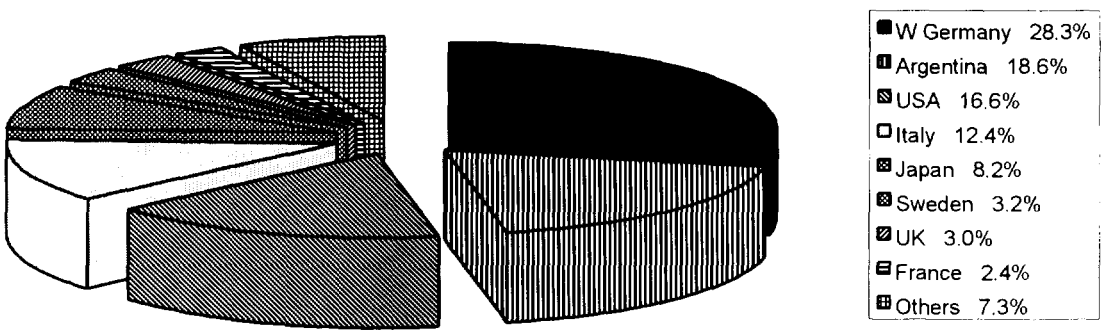
Principal Export Destinations for Components - 1993

Principal Export Destinations for Components - 1993



Source: Sindipeças

Principal Sources of Imports of Components - 1992



Source: Sindipeças

There is a rapid increase in intertrading within Latin America, primarily with Argentina. It is common to find that cars produced in one country using components made in the other. Since Brazil and Argentina are rapidly moving towards a common vehicle production zone, it is clear that this 'interchangeability' of sources of supply is an increasing trend. Interestingly this runs contrary to the hitherto opposite tendency of component producers locating very close to their OEM customers. This is discussed further in Chapter IV.

The main export products are internal combustion engines and major parts (e.g. cylinder heads, blocks pistons etc. which account for over 25%, followed by car radios which account for 12½% of the total.

Principal Products Exported in 1993

Item	%
Radio	13%
Engines	12%
Other parts & accessor.	10%
Cylinder Blocks	7%
Brakes	5%
Gear Boxes	4%
Injection pumps	3%
Wheels	3%
Other engine parts	3%
Pistons	3%
Camshafts	3%
Others	28%

The principal imports are gearboxes, engines and then a wide range of miscellaneous parts:

Principal Imports in 1992

Item	%
Gear Boxes	19%
Other car accessories	11%
Other engine parts	5%
Diesel engines	4%
Parts for pumps	4%
Other parts for positioning engine	3%
Brakes	3%
Others	17%

The component industry's main problem at present is lack of capacity, hence the activity by the major OEMs mentioned above; a number of major foreign component manufacturers are taking a close interest in Brazilian companies.

It is widely accepted that many of the local component suppliers are insufficiently developed technologically to serve OEM markets on a world wide basis. However, the increased trend towards global purchasing has generated considerable interest in what the Brazilian industry has to offer, either currently, or potentially given some investment in increased and/or improved facilities.

For example a recent mission of the UK's Society of Motor Manufacturers and Traders Ltd (SMMT) included at least one vehicle producer whose buyers have been instructed to investigate and assess the significant Brazilian component suppliers.

It was outside the scope of this preliminary study to investigate the very large number of possible investment partners. However, from the discussions we held in Brazil, the first impression is that the main interest focuses on forming possible partnerships rather than on green field investments.

4.1 Introduction

The demand for motor vehicles described in the previous chapter makes it clear that, given the favourable circumstances already mentioned, there is ample scope for expansion of automotive production of every kind in Brazil. The product groups considered are passenger cars and their derivatives, light and heavy commercial vehicles, and automotive components.

This chapter, which is based mainly on the findings obtained during the field visit to Brazil, sets out the investment criteria, possible market concepts relevant to the alternative product groups, and draws tentative conclusions on the most likely options. It goes on to outline two alternative sales scenarios for an automobile production plant.

4.2 Investment Criteria and Market Concepts

The decision to invest in an automotive plant in Bahia depends not only on the conventional business and economic criteria affecting any production plant serving the Brazilian market; but also, to a considerable extent, on the particular circumstances that apply to each individual producer. The broad criteria affecting such an investment decision, which have emerged from our discussions with Brazilian producers, are as follows:

- Strategic product and market planning, sourcing and distribution, especially within Mercosur, but also to and from elsewhere
- Logistics and communication - accessibility by land and sea
- Internal market concepts and strategies
- Local conditions - e.g. infrastructure, labour characteristics, financial incentives.

Strategic Product and Market Planning

The potential investors in a new automotive plant are large multinational companies who have an increasingly international approach to both manufacturing and marketing their products. For example, Ford has just reorganised into product areas (including components) on an international rather than geographic basis.

For these groups, the choice of manufacturing location is a highly complex strategy decision that depends as much on international trading conditions, including intertrading within the group, and on local country politics, as it does on the ability to supply the local market.

The Mercosur common market area, comprising Brazil, Argentina, Uruguay and Paraguay, has resulted in substantive integration of manufacturing facilities and marketing arrangements, in particular between the two largest members - Brazil and Argentina. The following table illustrates the close interrelationship in the projected plans of the multinational producers:

New Investments officially registered with Governments

Investors	Country	Potential Investment US$ Million	Type of vehicle	Annual Output units p.a.	Start date
Fiat	Argentina	1,000	PC Project-178	150,000	1997 onwards
VW	Brazil	250	Truck (Inc. LT-35)	40,000	1997 onwards
VW	Brazil	250	PC Motors EA.-111	270,000	1996 onwards
			(1.4l)	400,000	1997 onwards
Ford	Brazil	1,100	PC Fiesta	225,000	1996 onwards
Ford	Brazil		Truck HEN-80 (50 ton)		1997 onwards
Ford	Argentina		LC NKW Ranger	15,000	1997 onwards
General Motors	Brazil	2,000	PC/LC/Truck (foedern)		1995/2000
General Motors	Argentina	500	PC Corsa	80,000	1997 onwards
General Motors	Brazil	200	PC Transmission (Corsa)	250,000	1996 onwards
Mercedes-Benz	Brazil	400	A-Class	80,000	1997 onwards
Peugeot	Argentina	100	PC 306	20,000	1996 onwards
Renault	Brazil	1,000	PC Megane	100,000	1999 onwards
Renault	Argentina	500	PC Clio	50,000	1996 onwards
Scania	Brazil	200	Truck/Bus (foedern)		1995/1997
Volvo	Brazil	300	Truck/Bus (foedern)		1995/2000
Hyundai	Brazil		PC/LC H-100	30,000	1997 onwards
Kia Motors	Brazil	100	LC (Besta)	15,000	1997 onwards
Asia Motors	Brazil	200	LC (Towner/Hi-Topic)	30,000	1997 onwards
Toyota	Argentina	150	LC Hi-Lux	20,000	1997 onwards
Chrysler	Argentina	83	LC	5,000	1996 onwards

Investments under serious consideration

Investors	Country	Potential Investment US$ Million	Type of vehicle	Annual Output Vehicles p.a.	Start date
Rover	Brazil		PC (200)	30,000	1998 onwards
Rover	Argentina		Landrover	5,000	1998 onwards
Peugeot	Arg/Brazil	500	PC 106	100,000	1998/99
Iveco	Brazil		Truck		
Toyota	Brazil		PC (Corolla)	200,000	1998/99
Nissan	Brazil		LC (L-200)		
Honda	Brazil		PC (Civic)		

Source: Automobile Manufacturers.

In recent years the industries in the two countries have been working very closely together. Already, some models are being produced in one location to serve the whole Mercosur market and overseas exports as well. Several manufacturers - e.g. Fiat, Mercedes and Scania - produce components, including major items such as engines and gearboxes, in one country for supply to a main assembly plant in the other. As a result, Argentina has become the major automotive export market for Brazil and vice-versa. In 1993 the total cross-border trade of all automotive products already approached $600 million in each direction.

New entrants to the South American markets such as Toyota are planning new production in one location. This makes particular sense where the volumes are not excessive, for commercial vehicles and buses or niche model cars.

In the case of high volume, small cars there may well be an argument for putting down a local final assembly plant, but sourcing the components from one location. Economies of scale are often best achieved through large scale component manufacture, rather than through large scale vehicle assembly. The local assembly philosophy obviously reduces local distribution costs but may have a sourcing cost penalty in large concentrated conurbation's such as São Paolo.

Thus the 'internationalist' argument for producing in Bahia will depend on:

- the location of the main target markets, within Brazil, Mercosur, and worldwide
- the main sources of component supply, within and outside the producing group
- transport and communication
- the group company strategic philosophy towards South America, and Brazil in particular.

There are obvious advantages on the grounds of communication and proximity, of locating in the South East and South of Brazil, particularly with respect to Mercosur. A plant in the South region, e.g. Santa Catarina or Paraná, has close access to and from component suppliers and can serve over 80% of Brazil's car market. What may be equally important, such a location is actually closer to Buenos Aires than Bahia is to São Paolo.

For components suppliers, there seems no advantage in locating in Bahia at the present time. This was confirmed, albeit tentatively, in our discussions which did not indicate any great enthusiasm for locating such a long way from the main customer base in the South East. The local Bahia component producers had specific reasons for locating there originally - in one case major financial investment incentives many years ago, and in the other, the purchase of a local Brazilian producer. One firm stated it would not locate in Bahia if making the decision today to serve mainly the Brazil market; the other company was non-committal.

It should be emphasised that there are dozens of major components suppliers producing hundreds of different types of products sold to a wide variety of customers. The circumstances for each are individual and different from each other. Clearly it was not possible to obtain a 'representative' opinion in the time available.

It is quite possible that two circumstances in the future could make the North East, and Bahia, attractive to a components supplier. These are:

- the presence of a large, preferably tied, local customer
- a substantial proportion of output being exported overseas i.e. to the USA or Europe.

For example, if a major vehicle producer established an assembly plant in Bahia, it might very well make economic and logistical sense to set up production for a major component requirement 'next door' in Bahia, while shipping most of the remaining output to other group factories in Europe or elsewhere. For example, Bosch exports 50% of its output to Europe, North America and Latin America.

The main conclusion is that, in general, a component manufacture is unlikely to locate in the North East 'in isolation' from a strong local market pull. The trend towards 'just-in-time' supply requirements by manufacturers makes proximity to the customer base advantageous, particularly to the component supplier, especially if major outlets are located in Argentina as is increasingly the case.

For car manufacturers, a substantive case can be made for producing vehicles in the North East, particularly in Bahia. The volumes involved are sufficient to justify serving the north eastern region, especially if the whole 'north east quarter' of Brazil is considered. The viability of such an investment will depend particularly on:

- the location of component supplies
- whether significant international trade is involved
- a strategy to supply the North East and neighbouring internal Brazilian Markets.

This combination would almost certainly create a potentially attractive situation for a potential investor.

It is significant that the opinions of major vehicle producers vary substantially. A key strategic issue is undoubtedly the international trade question. One world-wide multinational has broad strategic approach covering a range of interconnected criteria which include:

- Locating outside the São Paolo region as a matter of medium to long term strategy
- Reducing import/export port transit times
- Reducing labour costs and increasing working flexibility

Their outlook rests on their intention to import up to 50% of vehicle components (at least initially), and to export 30 % of the new plant's output. Regarding component supply, the intention is to consolidate the sourcing of Brazilian components in São Paolo initially; and then to encourage the build-up of component production local to the new plant. Obviously this may take several years. This is a good example of practical economics combined with longer term strategic thinking regarding the increasing problems of manufacturing in the South East in years to come.

Another major company, Volkswagen - which agreed to be quoted, pointed out that a key factor in its recent decision to locate a new plant in the South East region was the ease of logistics, in this case the availability of rail transport for their engine plant. The other vital issue was availability of qualified manpower. However, the company made the point that, for the future, old criteria are changing and that, increasingly, there is a gradual move towards decentralisation.

Inevitably, no universally applicable conclusions can be drawn. However it is clear that, for an investor in the right circumstances, there may be substantial advantages in locating a car manufacturing plant in Bahia; and that such a decision is likely to have increasing advantages in the future as the economy grows, South East gets ever more congested, and international trade increases.

The scenario for producing cars in Bahia is discussed further in Section 4.3.

For commercial vehicles, it is less easy to make a strategic case for producing in the north eastern region, in Bahia or anywhere else. The volumes are relatively low, and the 'local' market, even in the whole 'north east quarter' may not be sufficiently large to attract a plant that would be distant from both component suppliers and its key markets outside the region.

A major international truck supplier confirms these points. This manufacturer feels that:

- Bahia's lack of component suppliers is a major disadvantage
- It is a long way from Brazil's industrial market and the key Mercosur markets
- There is no suitable local steel supply.

These arguments apply particularly to the heavier commercial vehicles. For light commercial vehicles, especially vans made in significant volumes, the same arguments which favour car production may well apply, especially as the economy grows and the 'north eastern quarter' market demand expands.

Logistics and Communication

The strategic issue of accessibility and speed of transfer through the local port is absolutely critical. It would be a condition of investment in Bahia for the State Government to invest heavily in really modern, purpose built port facilities, together with the necessary local road and rail connections. The important point in Bahia's favour is that the basic port location exists.

If the logistics by sea can be enhanced to the required standard relatively easily, transport to the rest of the Brazilian market is less satisfactory with many poor roads and no satisfactory rail system. Addressing these deficiencies would greatly enhance Bahia's attractiveness; obviously this will take time and money and central Government support.

Nevertheless, current road transport can do the job perfectly well, as evidenced by a local vehicle component manufacturer who has substantially reduced his stock levels from 10 down to 1½ days by introducing a 'just-in-time' system three years ago. This illustrates that it can be done!

The major vehicle manufacturer prepared to actively consider Bahia as an investment location points out that the transport cost of shipping a car from Bahia is no more than $30-50 extra per vehicle. They take the view that this can probably be made up quite easily through savings in labour and other costs.

Internal Market Concepts

These have been touched on in the strategic discussion above. The majority of respondents in our enquiries feel that Bahia is a long way from the key South East region which accounts for more than 80% of market demand - described in Section 3.6 which also discusses the market potential in Bahia and the North Eastern sector. The inferences which can be drawn are that:

- The Bahian market alone (35,000 cars) is not large enough to justify local manufacture
- The North East region plus neighbouring areas (130,000 units) offer significant potential and could provide a base load of, say, 25% sales for a car plant with major export objectives
- The whole 'north-east quarter' of Brazil, accounting for 30% of the Brazilian market, is within easier distribution distance than São Paolo, and could offer a major sales share to a local plant.

The relevance of these Brazilian market concepts is largely interdependent with both overall manufacturing and external market strategies. If a vehicle plant for a low to medium volume model is designed to serve mainly the Brazilian market and Mercosur, then the 'north east quarter' approach may well be outweighed by the poor logistics and higher costs that may obtain in this case. It will depend on the precise product mix. Even then, two different producers of seemingly similar products and market strategies may come to different conclusions about the best manufacturing location that are perfectly rational because their cost bases and supply patterns vary significantly.

Once a producer decides to invest in more than one assembly plant on a local market basis, then Bahia becomes a viable proposition for a vehicle manufacturer. This becomes increasingly attractive as the total automotive market grows.

Local Conditions

The key issues pertaining to local conditions are concerned with:

- Availability and characteristics of the work force
- The industrial infrastructure
- Financial incentives

A high volume model, on the other hand, could be produced in a North Eastern plan serving the 'north-east quarter' market - 300,000 cars in 1995 rising to between 400,000 and 450,000 units by 2000 and exporting the rest of its output. If exports were primarily overseas ie. to North America or Europe, Bahia would be a very attractive manufacturing location.

The Work Force

This is probably seen as the most important issue, given the reasonable overall infrastructure in Bahia ensured by the presence of the oil industry.

The widely held and well known perception of Bahia's labour force is that "life is one long fiesta". Many expatriate managers and Brazilians outside Bahia speak of the "holiday mentality" and opine that Bahia should concentrate on tourism and agriculture.

This contrasts sharply with the evidence from discussions with the management's of Bahian production plants. The Bosch plant near Salvador has achieved a world record within the Bosch Group for maximising its number of working days in the year. The Pirelli factory achieves the best product quality, again within the Pirelli Group on a world basis.

It is true that highly skilled workers trained specifically in automotive production are virtually non-existent. Certainly one Bahian manager felt that the labour generally available does not have the same industrial culture as in the South East. Nevertheless, in his own plant, he has no problem because many of his work force are now second generation people who have been educated both in the family and by the employer.

Another local manager pointed out that, interestingly, the time taken to train workers from a similar starting point is the same in all regions within their group, but that both training and labour costs are substantially lower in Bahia.

There seems to be substantive evidence that a well managed work force in Bahia is both reliable and loyal, significantly more so than in the highly industrialised part of the country. "People in Bahia are less well educated but more highly motivated" was one manager's comment. A meeting with a local Trades Union leader highlighted a survey carried out amongst its members in which 90% of those replying (in a 60% response) felt that disputes should be resolved by discussion. It is widely agreed that there is good co-operation between management and their work forces.

The key issue is the perception of the 'outside world', in this case the work force's image in the rest of Brazil. There is a danger that this adverse image, probably largely unfair, is not taken sufficiently seriously by the authorities in Bahia itself because they have become accustomed to dismissing these allegations, knowing them to be largely incorrect. Nonetheless they remain prevalent.

They need to be taken very seriously indeed. A vigorous campaign is needed, focusing specifically on this point, to emphasise to potential investors the advantages of the local work force, especially in the medium and longer term. This should be a joint effort with the Trades Unions who must be prepared to co-operate in long term agreements in order to make such efforts effective.

Substantial steps have been taken by the Bahia State to encourage and enhance the level of technical training available. Further efforts may be needed; an extension of the Senai training scheme, so successful elsewhere in Brazil should be considered.

Industrial Infrastructure

Local transport, logistics and international communications have already been mentioned. There seems little else of concern to the companies with whom we held discussions. It is generally accepted that the basic services necessary are available; water and electricity are in plentiful supply.

The main issue is the supply of sub-contracted goods and materials for the supply of an automotive plant. There are virtually no such sub-contractors available at present in Bahia and it is seen as a disadvantage by some. That this may not be greatly significant to a well organised operation has been established.

Financial Incentives

These are generally considered to be the least important of the individual decision criteria; at least that is what the companies interviewed have said. The total package overall will undoubtedly be the key with the initial investment being one important factor. The level of incentives offered by Bahia is said to be good, but not the highest available. Espírito Santo was quoted by one senior executive as having the best incentive strategy.

4.3 Alternative Sales Scenarios

As explained earlier, in the Brazilian situation it is not meaningful to attempt a general 'sales forecast' for a new production plant because the basis for any such forecast can be defined only in terms of the broader market strategy.

We have, therefore, taken the situation at present considered most likely to attract an automotive investor to Bahia and postulated two alternative manufacturing plant and the pursuant sales scenarios. These are based on discussions with major multinational car manufacturers who consider them to be realistic possibilities.

The two scenarios assume the establishment of a production plant with an annual output of 100,000 and 200,000 cars respectively. Such a plant could be for a single model; but it is more likely to be able to produce two models in order to give the manufacturer flexibility to meet changing conditions in international as well as Brazilian markets. It is assumed that, in both cases, 30% of production will be exported. This assumption is based on two points:

- it is a declared policy of a major multinational operating in the country;
- in the context of the size of the market in Argentina and North America, 30% is a relatively small share.

However, it must be noted that the percentage for export varies on the strategy of the manufacturer, for example the Corsa is built in Spain for the worldwide market.

We have assumed that the whole Brazilian market will expand approximately evenly, in line with forecasts shown in Section 3.9.

Scenario 1 : Plant producing 100,000 small to medium cars p.a. in 1997/98

In this investment scenario, the supplier would have to achieve an overall share of 7.8% of the Brazilian market for small to medium size cars in order to achieve the necessary total sales. This assumes a 30% export ratio. It is assumed that the new plant would be able to supply a range of two different models.

Version A - North East market only	**Cars - units**
Total demand in Brazil	1,350,000
of which: Small to Medium Cars market segment (estimated 67%)	900,000
- North East Region and immediate neighbours (12½% share)	112,500
15% 'local' North East market share	17,000
Exports @ 30%	30,000
Sales to rest of Brazil (6.7% of remaining 787,500 market segment)	53,000
Total Sales	100,000

This assumes an idealised situation of sales being equal to production. It does illustrate one key point: by achieving a high 15% 'local' share, combined with exports, only a relatively low market share is required in the highly industrialised part of Brazil, where the competition may be greater.

Of course the market shares can be varied so that the 'local' share is smaller and the remaining Brazil share is greater. For example, a 12½% 'local' market share and the same exports would still require only just over 7% share of the remaining national market.

Version B - 'North East Quarter' market (This refers to virtually the whole NE quarter of Brazil)	**Cars - units**
Total demand in Brazil	1,350,000
of which: Small to Medium Cars market segment (estimated 67%)	900,000
- 'North East Quarter' market (30% share)	270,000
12½% share of the 'North East Quarter'	34,000
Exports @ 30%	30,000
Sales to rest of Brazil (5.7% market share of remaining 630,000)	36,000
Total	100,000

A market share of 10% in the 'North East Quarter' still requires only 6.8% of the remaining market.

These illustrative examples show what might reasonably be achieved on the basis of an internal marketing strategy focusing on the North East.

Scenario 2 : Plant producing 200,000 small to medium cars p.a. in 1997/98

In this scenario, given the same 30% export ratio, the larger plant would have to achieve 15.5% overall of the Brazilian market in order to sell its entire output. This makes the 'local' market concept largely irrelevant:

Version A - North East market only	**Cars - units**
Total demand in Brazil	1,350,000
of which: Small to Medium Cars market segment (estimated 67%)	900,000
- North East Region and immediate neighbours (12½% share)	112,500
25% 'local' North East market share	28,000
Exports @ 30%	60,000
Sales to rest of Brazil (14.2% of remaining 787,500 market segment)	112,000
Total Sales	200,000

The figures illustrate that, even if the very high 'local' 25% market share were achieved, the total volume of sales required would necessitate a high share (14.2%) of the remaining national market.

Version B - 'North East quarter' market (This refers to virtually the whole NE quarter of Brazil)	**Cars - units**
Total demand in Brazil	1,350,000
of which: Small to Medium Cars market segment (estimated 67%)	900,000
- 'North East Quarter' market (30% share)	270,000
20% share of the 'North East Quarter'	54,000
Exports @ 30%	60,000
Sales to rest of Brazil (13.6% market share of remaining 630,000)	86,000
Total	200,000

Even in this case, for the 200,000 unit plant to achieve the necessary sales, it would have to gain an overall share of 13.6% of the national market, only 2% less than the overall average of 15.5% needed.

Clearly, this size plant is not attractive primarily for this type of local market strategy; a 150,000 unit plant could probably still show worthwhile economies. A 200,000 unit plant would have to be based on a national market strategy or, alternatively, on a much higher export ratio.

V PROJECT ENGINEERING

5.1 Introduction

The information as defined in the previous sections provides the basis for this study in which consideration will be given to the Scenarios as shown below. The type of vehicle to be assembled is based on the largest market which is for the 1 titre popular and vehicles with engine sizes from 1.6 to 2 litres.

Scenario 1 100,000 units per annum
CKD. operational concept, 40/60%
2 shift working, 40 hour week, 230 effective working days p.a.

Scenario 2 200,000 units per annum
CKD. operational concept, 40/60%
2 shift working, 40 hour week, 230 effective working days p.a.

Alternative strategies to be reviewed:

Strategy A

To install a single system of 30 u.p.h. (units per hours), working a double shift pattern to meet the volume requirements of Scenario 1 and actioning the next phase of the expansion programme when the volumes demand.

Advantages
- Minimum initial investment
- Minimum risk

Disadvantages
- Disruptive to production
- Effect on quality during expansion programme
- Costs could escalate with financial variations

Strategy B

Initially installing two 30 u.p.h. systems, working only one shift and introducing the second shift only when justified by sales demands.

Advantages
- Minimum disruption
- Improved sales response time
- Improved operator training. 'On line' training on System 1 before introducing the second system. Also prior to introducing the second shift.

Disadvantages

- High initial investment costs

Strategy C

For Scenario 2, build a mirror plant adjacent to the existing but using the services, auxiliaries, drains, roads etc. provisions in Scenario 1

Advantages

- Little or no disruption to production
- Would allow any new or improved technology to be introduced

Disadvantages

- With the effects of monetary variation the costs associated with this second phase will increase considerably

For this review we are taking a combination of strategies A and B in that within certain areas facilities will be installed for producing a level of 200,000 units per annum with 2 shift working. In other location space will be allocated and set aside to accommodate additional facilities. Services where applicable will be installed to provide for the increased demand of Scenario 2. Also, drains and sewers etc. together with the Water Treatment Plant will be installed to meet long term demands. All these will be reviewed to minimise the effect of monetary change on the long term programme, avoid disruption to production whilst maintaining a high level of quality.

5.2 Overview of Proposed Facility

Warehouse

Factory will operate as a 'Knock Down' (K.D.) manufacturing unit with 60% of components being supplied or purchased from either the parent group or other manufacturers. These parts such as engines, transmissions, steering mechanisms, metal panels, plastics etc. will be transported into the factory via sea, road and rail in either standard crates or special dunnage in order to prevent damage. A building designed for receiving supplies in the manner stated will have rail sidings within the building and special facilities for handling containers. A quarantine and storage area will be provided for all purchased out parts the size of which would depend on the 'Just In Time' concept adopted e.g. in order to maximise the pay load components would be received in containers or multiples of. From the main warehouse building the various components are distributed to the related sub store areas e.g. metal panels are transported to an area adjacent to the Weld Shop.

Weld Shop

Both small and large panels are brought together to form larger sub assemblies e.g. doors, wheel-arches, etc. ultimately resulting in a complete body shell. Ninety percent of the welding will be carried out by robots. All the sub assemblies (underbody, roof, sides etc.) are brought together into an Auto Body Framing (A.B.F.) area and are robotically stitched together. Then transferred onto a moving line for additional welding and to have more sub assemblies fitted to the body shell, e.g. doors, boot lid, bonnet. Throughout the process, a number of intelligent systems are installed to control the quality of the car building process. The body shell transfers onto the metal finish line prior to entering the Paint Shop.

Paint Shop

First the car body is prepared by dip and spray cleaning, then fully immersed in an anti corrosive dip, then baked in an oven. Next all welded joints and those areas which are more susceptible to the effects of severe weather are sealed. For added protection the underbody is given an anti-chip coating. From here the body is conveyed to the primer spraying line, this protects the paint from ultra-violet light and provides an essential surface for keying the top colour coat, metallic finishes have a waterborne base coat which is followed by a clear coat. Throughout the process, emissions will be strictly controlled by various systems to ensure protection of the environment.

Assembly Hall

On entering this area the car is suspended from a 'power and free' conveyor system which transports it along the various assembly lines.

Trim lines: these are the first lines where such items as the main electrical looms, lights, door mechanisms and glass etc. before moving onto the next stage of assembly.

Chassis line: it is envisaged that there will be sub assembly areas as the engine and mechanicals are to be delivered in a K.D. form e.g. engine dress and steering mechanism. On this line the underbody assemblies are fitted, also the engine, bumpers, wheels and tyres are fitted. As many components are larger or heavy, machines take the strain e.g. robots to lift the spare wheel into the boot of the car. The conveyor at this point rises to lift the car above the operators head providing for ease of access. From the chassis line the car is conveyed to the final assembly line.

Final assembly: with all the mechanicals now fitted, the car is almost complete, so that items such as instrument panels, carpets, seats and windscreens are now fitted, this is followed by a series of stringent inspection checks before being driven off the line. Off-line testing continues with a water test, wheel and headlight alignment checks and road and roll testing before being shipped to the customer.

General

In addition to the main production areas, there is a requirement for other buildings to accommodate operating functions which support the main manufacturing process. These are identified as follows:

Administration

Power Station and Sub Stations

Boiler House

Water Treatment Plant

Compressor Houses

Railway Station and Control Room

Other considerations to be included in the establishment of a factory of this size would be:

Hospital

Canteen

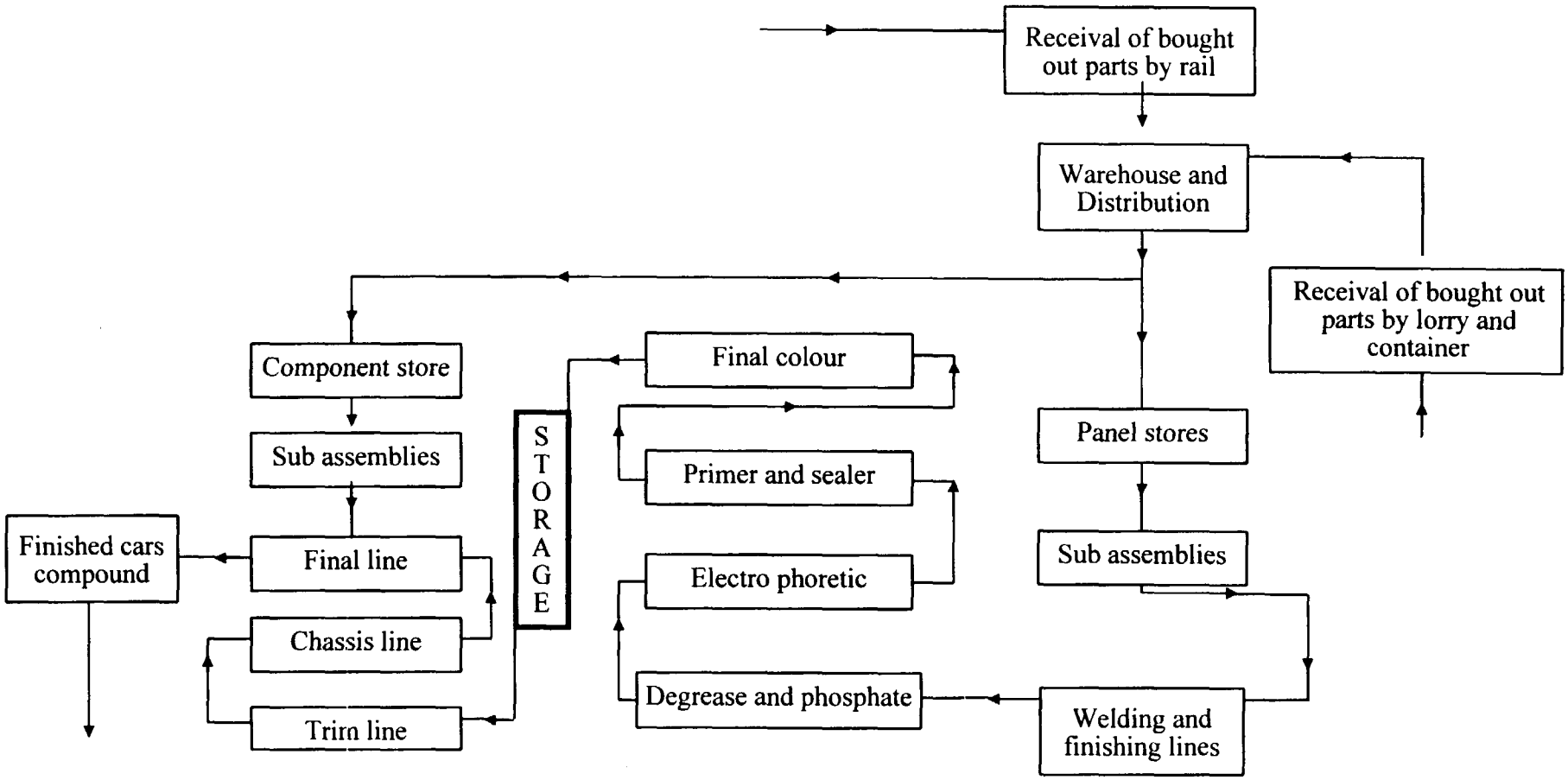
Sports and social facilities

The factory would require security fences, gate houses with weigh-bridge facilities, floodlights and surveillance cameras, also a network of internal factory roads. Hardstanding areas for lorries and containers, a secure compound for finished cars awaiting delivery and car and bus parks for the employees transportation. The whole design concept of the buildings and surrounding areas of the factory should embrace the local environmental requirements.

Environmental considerations have also been allocated for within the paint manufacturing process:

- An electrostatic paint atomisation and application system that maximises paint transfer and minimises waste.
- Venturi scrubbers in booths remove the majority of particle emissions
- Optical analysers along the boundaries to keep track of hydrocarbons, sulphur dioxide, nitrogen oxides etc.
- Installation of a water treatment plant that pre-treats all water from the manufacturing processes prior to it being delivered back to the process or directed to the local sewerage plants

Automotive Plant Schematic of Manufacturing Process



5.3 Land & Buildings

When evaluating the land required, long term expectations should be considered such as:

a) Sales increase from 100,000 to 200,000 units per annum

b) A possible reduction in imported and bought out components which would then be manufactured 'in house'. This would involve further investment in buildings and equipment to facilitate a new Press Shop, Engine and Transmissions Plant etc. The bringing of high value items within the plant control systems would reduce the levels of inventory and promote a more meaningful JIT concept.

It is believed that a number of sites are being offered for consideration by the governing body of the State of Bahia and it is assumed that due consideration has been given to the following factors:

1) Manpower resource

2) Good roads and railway network.

3) Services - electrical power, gas supplies and water supply with an appropriate volume and pressure etc.

4) An adequate sewerage and drainage system to feed into.

5) Planned factory interfaces with the environmental policies within the area.

It is envisaged that the availability of these items has been considered when selecting the various sites and that these meet the requirements. Therefore, they have not been included within the terms of this review.

The estimated land required to accommodate the proposed manufacturing plant (as shown in diagram 1) which will contain facilities to produce at an output rate of 100,000 cars per annum would be in the order of 1.18 million square metres.

This area provides for expansion to the volume level of 200,000 cars per annum, providing the same manufacturing concept continues, however, should a new Press Shop be considered the land requirement would increase to 1.42 million metres squared.

No provisions have been made for landscaping the area, other than the grass verges bordering the internal roads.

Buildings

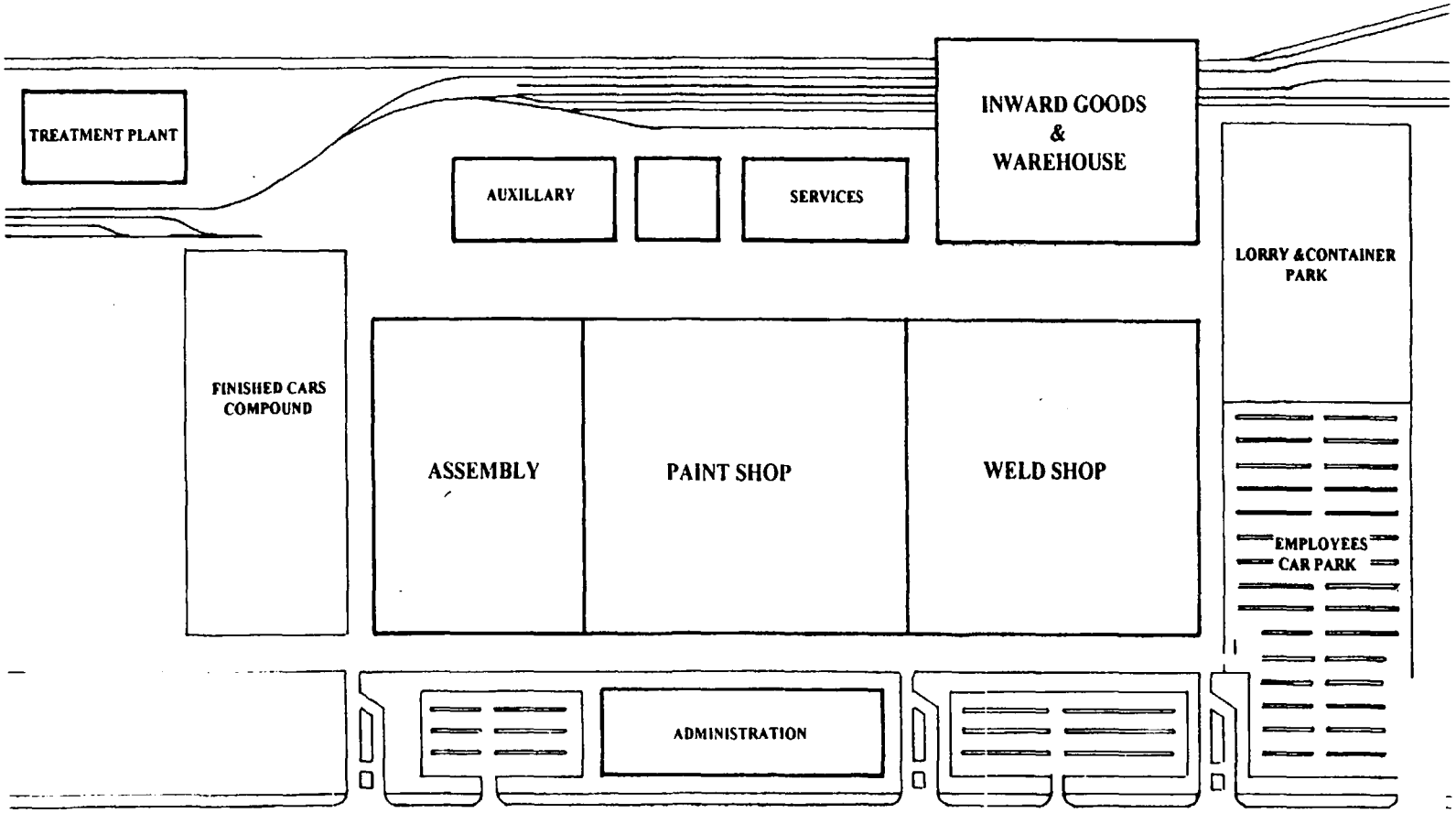
It is proposed that factory buildings should be single storey, high bay structure with external walls in an environmentally acceptable brick and provision made within the building for a minimum of fifteen percent natural light. The high bay structure will facilitate a complex system of overhead conveyors whilst remaining unobtrusive to the eye. The administration building will be a two storey structure but will in fact be approximately the same height as the factory buildings.

The buildings required for the proposal cover an area of 330,000 metres squared.

Inwards Goods Received Area
Warehouse
Welding Shop
Paint Shop
Assembly Hall
Administration Building
Boiler House
Water Treatment Plant
Hospital

The siting of an Automotive Plant will substantially effect the infrastructure of the area. Some long term plans for roads that may already exist, will have to be speeded up and others changed. Good roads are essential to the effective operation of this plant for deliveries of materials and components, the despatch of finished cars and for the employees and their various modes of transport.

Diagram 1 Schematic Layout
Proposed Automotive Plant (Not to scale)



Buildings

Weld Shop	66,560	
Paint Shop	79,040	
Assembly	62,400	
Warehouse and Distribution	43,008	
Administration	38,592	
Water Treatment Plant	11,500	
Boiler House	6,800	
Canteen	11,500	
Hospital	5,760	
Service Areas	4,720	
		329,880 square metres
		(81.52 acres)

Other

	(square metres)	
Roads (internal)	292,491	
Hardstandings and car parks	269,860	
Land for future development	290,400	
		852,751 square metres
		(210.71 acres)

Total requirement of land for site	**1,182,631 square metres**
	(292.23 acres)

5.4 Location and Sites

The State of Bahia has selected five potential sites for the development of an automobile manufacturing complex which present the best conditions to host the proposed complex. These areas are located in three planned different industrial centres, as follows:

1. **Aratu Industrial Centre - CIA** - 4 sites of approximately 100, 260, 300ha (A, B, C, D) and one complete industrial installation rapidly adaptable to the automotive industry necessities

2. **Subea Industrial Centre - CIS** - one site of 450ha.

3. **Camacari Petrochemical Complex - COPEC** - availability of 100 and 200ha.

1. **CIA** - Located in the municipalities of Simoes Filho and Candelas, in the Metropolitan Regions of Salvador (approximately 30 km outside the city).

   - **Energy**: COELBA 70 MVS CHESF 400 MVA.
   - **Water**: 1,800 m^3/hour.
   - **Telecommunications**: TELEBAHIA supplies trunk-lines according to demands.
   - **Natural Gas**: 1,500,000 m^3/day through BAHIAGAS.
   - **Road System**: Located near BR-324. 150km of internal paved roads.
   - **Environment**: Control of air and water pollution (though humidity, salinity, gas and particles proportions). Effluent treatment through a central system that executes solid residual incineration and covering
   - **Aratu Harbour**: Located at 10km (average) from the suggested areas. Allows ships of 8 to 12m of keel. Operates with containers and several granaries. The installation of roll-on/off system is planned.
   - **Salvador Harbour**: Located 20km from the suggested areas. Allows ships of 8 to 12m of keel. Operates with containers and general loads.
   - **Highways**: The industrial centre is served by BR-324, double hands till Feira de Santana (at 100km of distance), where the greatest road truck of North and Northeast Brazil is located.
   - **Railways**: Internal line linking the suggested areas to the Aratu Harbour and to the federal railways that serve the Northeast region.
   - **International Airport**: At 15km of distance from CIA.

2. **CIS** - Located in the municipality of Feira de Santana, 100km from Salvador.

   - **Energy**: 32.3 MVA.
   - **Water**: 900 m^3/hour.
   - **Telecommunications**: TELEBAHIA supplies trunk-lines according to demands.
   - **Natural Gas**: A pipeline linking Alagoin has to Feira de Santana is planned (58km).
   - **Road System**: Located near BR-324. 70km of internal paved roads.
   - **Environment**: Control of air and water pollution. Treatment of solid and liquid effluents.
   - **Harbours**: 85km from Aratu Harbour and 110km from Salvador Harbour.
   - **Highways**: Feira de Santana is the greatest highway truck of the North and Northeast regions of the country. The two principal Brazilian highways meet in Feira - BR116 and BR324. In addition, there are another three BR's and five BA's (state highways). BR324 is the principal access to Salvador, with capacity to support heavy and intense traffic to Salvador.
   - **Railways**: Served through Salvador by the federal system.
   - **International Airport**: 85km from CIS

3. **COPEC** - Located in the municipality of Camacari (Metropolitan Region of Salvador). 35km from the capital.

   - **Energy**: COELBA 410 MVA/COELBA 269 MVA/CHESF 1,800 MVA.
   - **Water**: 2,129 m^3/hour.
   - **Telecommunications**: There are trunk-lines available.
   - **Natural Gas**: 1,500,000 m^3 BAHIAGAS and PETROBRAS.
   - **Road System**: Served by 130km of internal paved roads.
   - **Environment**: CETREL - private company that controls of the air, water, soil and subsoil pollution, operates with solid and liquid effluents residuals incineration (10,000 tons/year), capacity of land cover 70,000 tons/year. Operates a 3 m^3/sec effluent treatment station.
   - **Harbours**: Served by Salvador Harbour and Aratu Harbour (see above).

- **Highways**: See above.
- **Railways**: See above.
- **International Airport**: 18km from COPEC.

Camacari Petrochemical plant is the largest complex in the Southern Hemisphere. It permits the installation of plastic, thermoplastic, paint, rubber and varnish transformation units.

Aratu Industrial Centre consists of metal-mechanic units for components, parts, pieces, and steel work, in addition to wire, cables and forgery.

Subae Industrial Centre consists of metal mechanic units, a large tire industry, wire and cables. These industries will serve as peripheric units of the Automotive complex.

The surface area necessary for such an automobile manufacturing plant is about 1,183,000 sq. metres for the production of 100,000 vehicles and about 1,418,000 sq. metres for an eventual production of 200,000 vehicles per year, should it be required

In view of the strategy adopted it appears advisable to select a site corresponding to the second case. The precise choice cannot be made until a geological and structural examination of the sites have been carried out. We believe that the choice should be that of site B (at the Aratu Industrial Centre) due to the fact that it is near the port of Aratu; the largest site; and is situated between two other possible sites allowing for the possibility of future extensions

5.5 Equipment

The equipment needed to set up an automobile plant will necessitate the following, which will be supplied by the "parent group":

Weld Shop

- Transfer Conveyors
- Overhead Conveyors
- Material Handling Aids
- Skid Conveyors
- Auto Body Framing
- Welding Fixtures - Sub Assemblies
- Guarding
- Robot Welders - Projection
  - Seam
  - Spot
- Assembly Fixtures
- Tooling
- Extraction

Paint

- Power and Free Conveyors
- Skid System
- Degreasing Tank
- Phosphate System
- Demin Rinse and Blow Off
- Electrophoretic System
- Ovens
- Spray Booths
- Electrostatic Booth
- Spray Booth - Spinning Bell
- Flash Off Tunnel

Assembly

- Power and Free Conveyor System
- Material Handling Equipment
- Transfer Systems
- Sub Assembly Fixtures
- Slat Conveyors
- Road and Roll Facility
- Underseal System
- Rectification Spray and oven

N.B. The above identified facilities indicate only the main items of expenditure.

Auxiliaries

- Boiler
- Sub Stations
- Power House
- Water Treatment Plant
- Water Tower (Pressure)
- Rail Head and Station
- Cranes (internal and external)
- Canteen
- Hospital
- Garage Servicing Facility

Services

- Transporters
- Forklift Trucks - various
- Tow Train - Guided
- Shunting Engine
- Tool room
- Maintenance
- Pallet Racking
- Dunnage - CSP's

N.B. The above identified facilities indicate only the main areas of expenditure

5.6 Raw and Process Materials Resource

With the basic concept of the manufacturing plant being that of the assembly of the body panels into the body shell, then painted and assembled into the finished product, the resource required in the initial period for raw materials is minimal.

The majority of component parts for the painting and assembling will be supplied from the Parent Group or via its component suppliers during the initial start-up of the plant operations. This will ensure continuity of supply, competitive costing and an assured level of quality. As the operation becomes established it will be in the interests of the Group to source from the local suppliers who should be able to supply at more competitive prices. In addition, the suppliers will be evaluated by Quality Assurance representatives as to their capability to produce the quantity at the required level of quality.

With other automotive manufacturers currently operating within the country, it would be reasonable to assume that there would be a paint manufacturer therefore, this could be an area to explore for local sourcing.

VI PLANT ORGANISATION

6.1 Organisation

In establishing a completely new manufacturing facility, on a green field site with a major training programme at all levels of the workforce, it is essential that the organisation structure is clearly defined early in the programme. The organisation as shown on the following page depicts a proven management structure which is not only lean by workable. It embraces all the operational functions of the manufacturing plant down to the level of shift manager.

Below this level a hierarchy of foreman, senior foreman and superintendent has been initially opted for rather than the team leaders concept, mainly because it is felt that it would further complicate an already formidable education and training programme.

Various organisational concepts exist, some with a fairly flat structure which allows for ease of communications and flexibility, these are usually linked with the philosophy of 'continuous improvement or change' which are normally associated with the 'Team' concept.

Once the manufacturing operation has established itself in both volume and quality achievement, then, in keeping with the 'parent company policies' the operation should be reviewed to improving costs.

The proposed management structure shown on the following page, indicates the key positions within the new factory. Initially the majority of these key personnel will be people from the 'parent group' who will probably be replaced by a local management team on completion of their contracts.

Key Personnel

Manufacturing Director

Directly accountable to the main board of the parent group responsible for the promotion of the company's policies and products. Also the direction, control and co-ordination of all functions within the organisation to maximise profitability.

Quality Manager

To promote the parent group 'Quality Policies' throughout the whole manufacturing process, from monitoring and implementing the necessary SQA concepts at all suppliers, initiating 'Quality Circles' to promote the "Build in" quality concept. Monitor in house quality - promote 'Zero Defect Policy' and to liaise and follow up warranty claims and evaluate and provide feedback into the system for corrective action.

Personnel Manager

Responsible for the welfare of all employees, the overall recruitment and integrated training programme for all levels within the company. The placement and monitoring of all sub contract work and all 'Health and Safety' aspects within the manufacturing facility.

Manufacturing Manager

Is accountable for the achievement of production schedules to the correct quality criteria and at the right cost. Controls and co-ordinates all manufacturing and support functions within the plan. Reports directly to the Manufacturing Director.

Financial Controller

Provides support to the Manufacturing Director on all aspects of manufacture effecting profits. Responsible for the maintenance of accounts and implementation of budgetary control systems throughout the various manufacturing processes for manpower and materials. Also the analysis of costs and performance monitoring.

Industrial Engineering Manager

Responsible for the efficient and effective utilisation of both direct and indirect labour and materials. The allocation or work for various production output rates and model mix, also the continuous review of all operations and methods to improve performance and reduce costs.

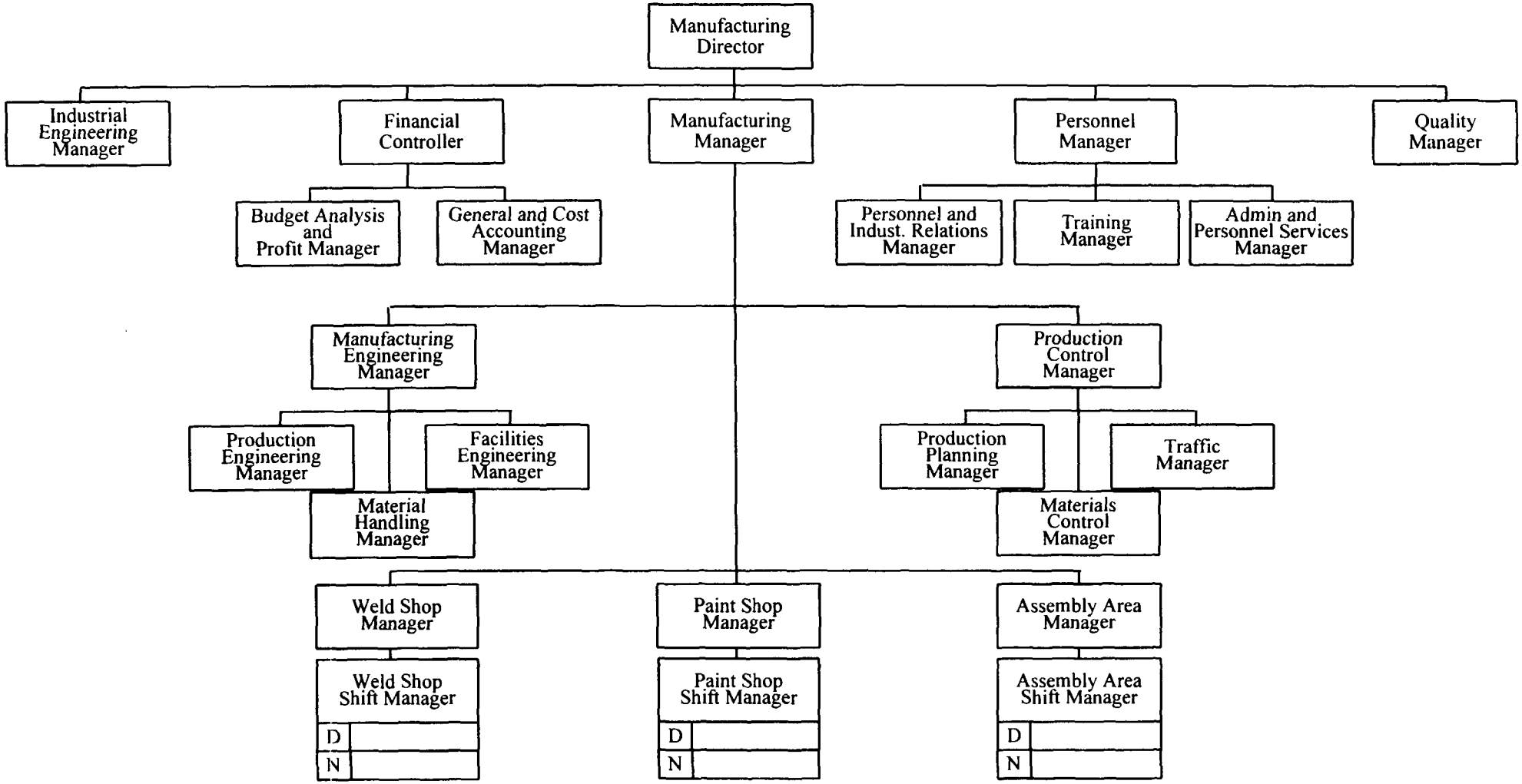
Manufacturing Engineering Manager

Responsible for the installation, operation and maintenance of all factory systems. Development of manufacturing process with associated tooling, fixtures and equipment. Introduce integrated methods of materials handling for components from suppliers and throughout the manufacturing process. Also the despatch of completed vehicles, maintenance of drawings and documentation and the close liaison with the engineering and design functions of the parent group.

Production Control Manager

Planning of production schedules to meet sales demands, procurement of materials both direct and consumable to meet with the manufacturing requirements whilst maintaining minimum economic inventory levels. Control and co-ordination of all transportation, including legislation requirements, for the delivery of materials and the despatch and distribution of finished vehicles.

Organisation Chart



6.2 Manufacturing Support

As stated in the previous section the Automotive Industry will be new to the area and the associated skills required for the manufacture of cars will be limited. The need for support at all levels is paramount to the success of this venture. Careful consideration should be given to the needs, the timing and the quality of the resource available to maintain the impetus of the programme.

Key Management Team from the 'Parent Group' should be contracted to the project as early in the programme as possible. This team will be responsible for the establishment of the plant, not all its associated factors:

Civils

Buildings

Factory Layout

Installation of plant and equipment

Training

Methods of Transportation and Supply

Pre-production and Volume Launch

As highlighted before there will be a need to train the technical staff relative to their particular functions. Such personnel would be progressively brought in at the start of the installation of equipment so that they could either be trained at the suppliers or work with them as the facility is being installed.

All engineering designs, modifications, process sheets, etc. will initially be controlled by the parent group together with quality procedures to ensure that an acceptable standard of manufacture is maintained.

7.1 Workforce Selection and Training

Assuming that there is adequate labour force within the chosen area for the factory and recognising that the Automotive Industry will be new to that area. Then the associated skills required for the manufacture of cars will be limited and as such and will entail a major training programme.

Training of key personnel will need to commence early in the programme with people being taken to the 'Parent Company' for product familiarisation and training in company procedures and practices.

Different types of training will be required for different categories of labour e.g. supervisory, technical, skilled and semi-skilled. The requirement for multi-skilled operators in order to provide greater flexibility will almost certainly increase the length of the training programme.

Technical people will need to be knowledgeable of the new technology of machines and equipment that is to be installed within the factory. Most manufacturers of plant, machines and equipment provide a facility for training in both the maintenance and operation of their particular product at their own factories.

There is no substitute for 'on the job' training and it would be practical to lease or buy a building in which a training facility could be established whilst the new factory is being built. This would promote such skills as welding, spraying and the assembly and strip-down of cars to provide product knowledge for the shop floor worker. This facility would also allow for maintenance of the equipment and act as a method of evaluating the suitability of potential employees.

In determining the number of people who would be employed on the site one should be knowledgeable about the product to be manufactured however, at this stage of the proceedings this is not possible. Therefore, in an assessment of the information given e.g. 'a one litre engine family size car' and knowing the manufacturing process proposed, a comparative estimate can be made. This is as shown below:

Anticipated work content

Model: One litre engine, three door family saloon

Weld Shop	3.90	hours
Paint Shop	2.70	hours
Assembly etc.	11.50	hours
	18.10	

7.2 Manpower requirements (cars per annum)

	(100k)	(200k)
Staff	252	477
Direct	1096	2092
Indirect	658	1255
	2006	3824

The additional manpower requirements for a plant manufacturing 200,000 vehicles pa will be met as and when required.

Workforce selection and training

This labour force would not include for personnel in the following areas:

Hospital

Security

Canteen

Office Cleaners

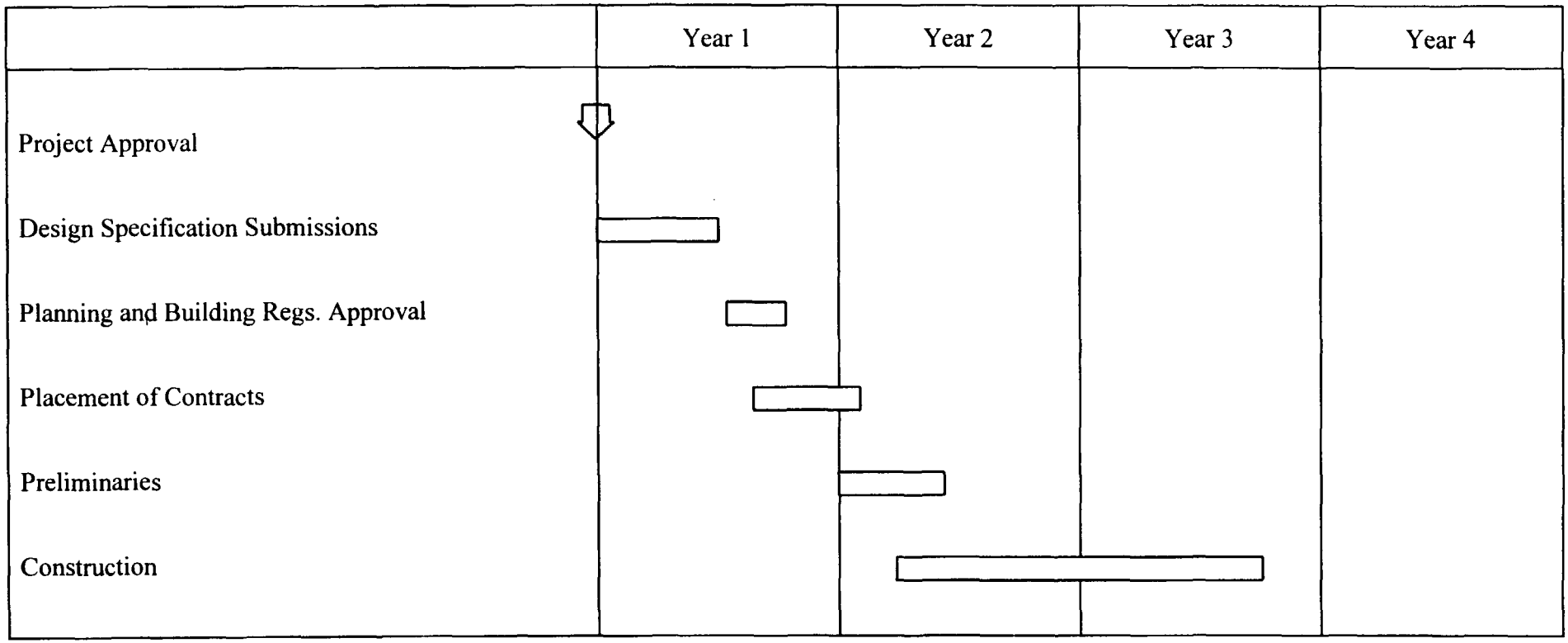
Railway station and control room

Although these facilities have been provisioned for within the general concept, the labour required to operate in these areas will be brought in on contract and therefore will be included in the overall operating costs.

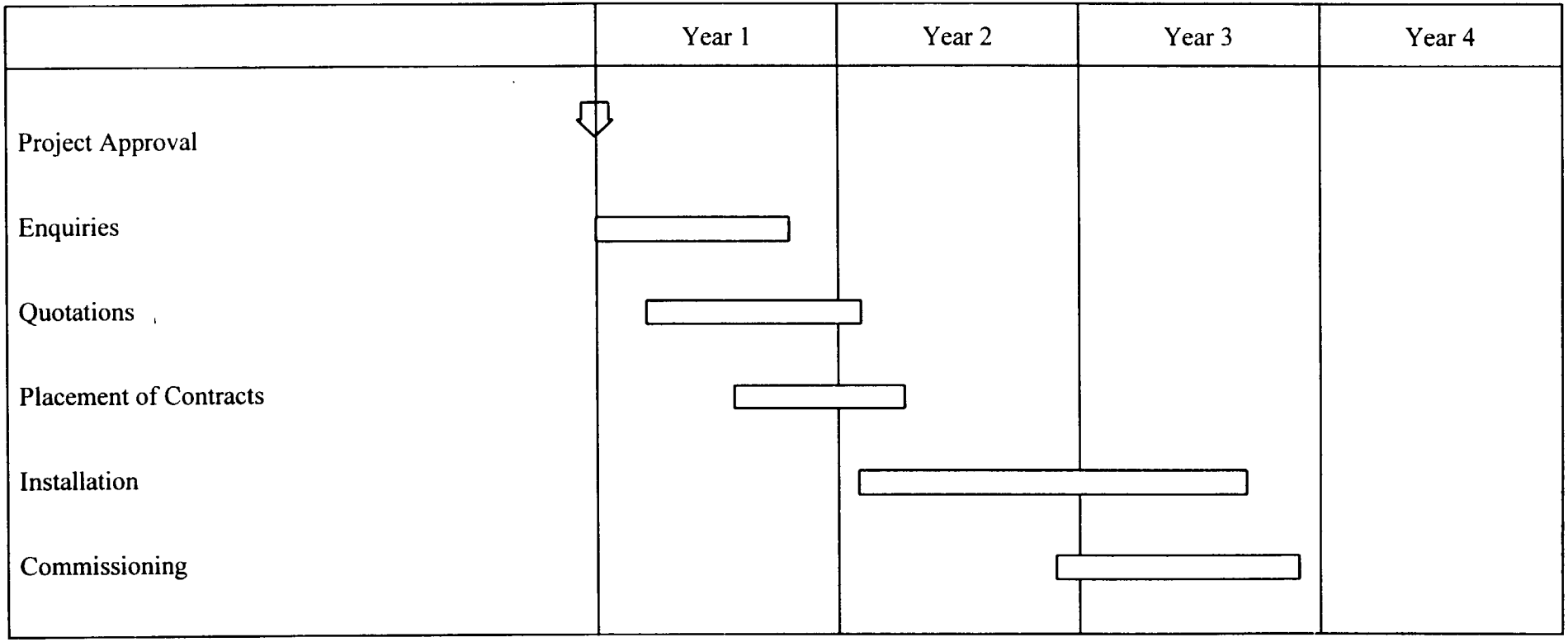
8.1 Site & Building Development and Commissioning Programme

The following pages provide an outline of the schedules and costs involved in the setting up of an automobile production plant manufacturing 100,000 units per annum. We have also included the associated costs for increasing the size of the plant to that of producing 200,000 units per annum.

Site and Building Development Programme



Plant and Equipment Development Programme



8.2 Estimate of Capital Costs

Buildings	(US$'million')	
Weld Shop	29.8	
Paint Shop	35.6	
Assembly	28.1	
Auxiliaries	37.5	
Administration	40.5	
		$171.5 million
Other		
Roads	20.3	
Hardstandings and car parks	14.4	
Drains and sewers	8.0	
		$42.7 million
Equipment		
Weld Shop	87.8	
Paint Shop	130.5	
Assembly	78	
Auxiliaries	192	
Administration	156	
		$644.3 million
TOTAL CAPITAL INVESTMENT		**$858.5 million**

8.3 Pre Investment Costs

The process of developing a company from the beginning is a long and involved one. Although the challenges of developing a 'green field' site are substantial, the efforts of those involved must be directed at all levels of planning.

Prior to the project reaching the stage of 'approval' a considerable amount of investigation and analysis is required to evaluate the merit of this proposal. Such areas of consideration would be as listed below:

Proposed Marketing Strategy

Government Assurances on the Investment

Guarantees

Import Licences

Environmental Studies

Site Surveys

Report on the Effect on the Infrastructure

Detail Costing of the Project

The majority of these investigative studies would be undertaken by independent parties who would specialise in their own particular field. It would seem feasible for the 'Parent Group' to define the detailed specification of the process and be involved with the negotiations with supplies of facilities and equipment. To cover the pre investment costs involved with this project a sum of $9.0 million should be allocated.

8.4 Plant Operating Costs

This is an area of expense that covers a wide variety of essential services which are fundamental to the smooth operation of a manufacturing plant. However, it will be difficult to make a direct comparison of these items of expense with those covered within a typical UK operation, when considering the different practices and policies that may be applied outside the control of the manufacturing plant.

The items of expense that would be incurred by an operation the size and complexity as previously defined for the proposed automotive manufacturing plant are as estimated below:

Operating expenses	(US $ million')
Rates*	3.2
Wages	41.6
Electricity	12.0
Process Gas	1.5
Heating Gas	3.6
Fuel Oil	0.6
Water Rates	0.9
Telephone Bill	0.9
Refuge Collection	0.8
Freight Transport	5.0
Contract Services	0.9
Other	0.6
	$71.6 million p.a.

In addition to the above annual expenditure, reserves should be made for maintenance materials used in the day to day operation of the plant and also major items e.g. drive units, gearboxes and other essential equipment to minimise downtime in the event of a breakdown or used in keeping with a preventative maintenance programme (say US$ 0.75 million).

* Rates is defined as the taxable value of a property.

8.5 Inventory Levels

The levels of inventory for an operation of this nature will be greater than that of a conventional plant. This is because the supply of high value components during the initial start-up period will be imported into country from the 'Parent Group' or their current suppliers. Containers with specially designed dunnage to maximise the payload would provide the main mode of transportation. This method of supply combined with the length of the 'supply line' e.g. sea, road and rail is fraught with problems.

Therefore, the obvious choice in minimising the possibility of disruption to production would be hold buffer stock levels. This concept would 'tie-up' a considerable amount of monies and would not be in line with current operating practices.

At this stage in the 'Opportunity Study' it is difficult to assess the level at which the plant should operate, however, a form of 'Just in Time' could be implemented but it would not become fully effective until a greater percentage of the component supply is sourced from within the country. This should be a priority item in the 'continuing improvement programme'. For the purposes of this financial assessment an operating level for inventory costs should be made in the region of US$ 30 million.

8.6 Alternative Scenario

This review is to provide some indication of the monies required to increase the capacity of the manufacturing plant to 200,000 units per annum, also the additional manpower to be recruited and the timing.

This assumes that the same method of operation, in that the same percentage of bought out components continues and therefore no additional processes e.g. press shop, plastics or trim manufacture etc.

Within the costs for Scenario 1 certain facilities would be installed for producing a level of 200,000 units per annum. In other areas space was set aside to accommodate the additional facilities required to meet this capacity level. Further to this, services such as drains and sewers etc. will be installed to meet the new demands. All these expenditures in Scenario 1 were to avoid disruption to production whilst maintaining a high level of quality, achieve the 200,000 up in a relatively short period and minimise the effects of financial fluctuations on the overall project.

Financial expenditure

Building	40.5		
Equipment	71.4		
Auxiliaries	18.0		
Service	36.0		
		$166.9	million

Headcount (additional)

Staff	225
Technical	45
Supervisory	245
Skilled	950
Semi Skilled	353
	1818

Timing

A fast response to meet sales demand, in that the facilities installation could be run in parallel with the recruitment and training programme. The second shift could be easily established by splitting the labour on the first shift and introducing the new operators to work on both shifts with the more experienced men. With a six month installation programme and commissioning the additional labour could be introduced in line with the output required, this minimising any off standard.

9.1 Introduction

In the present chapter a financial analysis will be carried out on the basis of the results of the market study and other previous chapters. An evaluation of the financial viability will be conducted in 2 ways:

- One will compare the difference between the costs in the actual producer states and the eventual automobile production of Bahia
- The other will be more 'classic' but will consider only the main elements of the financial analysis.

9.2. Basic conditions of the financial analysis

It is assumed that the product to be manufactured has already been prepared technically by the company which intends to invest in Bahia. Therefore, Research and Development costs will not be taken into account as they are integrated in the total vehicle price.

All the base costs and price estimations are based on exchange rates as of October/November 1995

- The currency used is the US$ at constant prices.
- The exchange rate is calculated at 0.9623 R$ per US$ (16/11/1995).

The result of using such fixed indicators is to delete all the fluctuations in inflation and exchange rates which will obviously occur but at an unknown factor.

The economic life span of the project is taken to be 10 years for purposes of the present evaluation.

The following implementation schedule is assumed for the present project but could be changed if an investor had already made yet his own decision on project set up.

Implementation aspect	Period	Scheduled implementation
a. Opportunity study	4 months	December 1995
b. Decision on Feasibility study	2 months	February 1996
c. Feasibility study	7 months	September 1996
d. Project Approval	5 months	February 1997
e. Site and Building Development	33 months	November 1999
f. Plant and Equipment Installation	32 months	October 1999
g. Trial run, test and verification	2 months	November 1999
h. Pre-Production	2 months	December 1999
i. Commercial operations	From January 2000	

9.3 Case Study

We have assumed that the following hypothese would be the most likely

100,000 Passenger Cars Popular cars 40% 1.6-2.0 litres 60%

The exact location of the factory does not have a great influence at this point of the study given that the site will be provided virtually free of charge. Nevertheless, the surface required by this project suggest that the most appropriate site would be within the Aratu Industrial Centre - CIA which has land available in parcels of from 100 to 300 Hectares., thus meeting the industrial requirements for an automible production plant (details in Appendix IV).

9.4 Capital Requirement

a) Land acquisition cost

The cost of land acquisition is at a nominal rate, as stipulated by the Government of Bahia, so we will consider it as free.

b) Site preparation and plant construction cost and equipment acquisition

The basic services such as access roads and utility lines, will be provided by the State of Bahia but the preparation costs inside the site and the building costs are estimated as follows.

Buildings	(US$'million')	
Weld Shop	29.8	
Paint Shop	35.6	
Assembly	28.1	
Auxiliaries	37.5	
Administration	40.5	
		$171.5 million

Other		
Roads	20.3	
Hardstandings and car parks	14.4	
Drains and sewers	8.0	
		$42.7 million

Equipment

Weld Shop	87.8	
Paint Shop	130.5	
Assembly	78	
Auxiliaries	192	
Administration	156	
		$644.3 million

TOTAL CAPITAL INVESTMENT **$855.5 million**

c) Pre-Investment Expenses

These expenses represent the costs of the project during the stages of project implementation and include the following items.

Proposed Marketing Strategy

Government Assurances on the Investment

Guarantees

Import Licences

Environmental Studies

Site Surveys

Report on the Effect on the Infrastructure

Detail Costing of the Project

To cover the pre investment costs involved in this project a sum of US$ 9 million should be allocated.

d) Interest During Construction

Interest payable during construction is not taken into account except for the year preceding the start of production i.e. 1999. It is assumed that payments for works and machinery will be made after the end of construction and installation and in cases where certain advances may be necessary they will take the form of capital advances by the investors estimated at (30%).

e) Total Investment Costs

The table below summarises the total capital requirement and borrowing needs in 1999

	million US$
Total investment cost s	858.50
Total pre-production exprenditures	81.88
Increase in net working capital	30.00
Total Investment Costs	**970.38**

The financing plan for the total capital plan is funded under the following conditions.

- A debt equity ratio of 70-30 is assumed in the funding of capital and it is also assumed that borrowed capital will be obtained from financial institutions in the form of long term deferred payment financing. The maximum ratio of debt allowable is 75-25. This ratio could be lower if other local or foreign financial or industrial partners participate in the investment. As an example Renault's importer stated in 1994 readiness to " put several hundred million Cruzeiros on the table".

- The financial institution providing a long term capital loan could be an international institution or Brazilian. For the purpose we assume that the Banco de Desenvolvimiento Economico e Social (BNDES) will provide the credit. The principal of the loan is to be repaid in 10 equal annual instalments with the first repayment being made at the end of first year of commercial operations.

- The annual interest is calculated to be 12% in real terms (current terms are actually 40 %). It would be preferable to obtain financing outside Brazil where the risk of variations in inflation or the exchange rate could place at risk the entire financial and commercial structure of the project. This is especially so as the rates of interest payable on the international capital market are certainly, more attractive (interest rates are about 7%).

The following table provide details of the loan

Loan	680.20 US$ million
Interest Rate	12.00%
Duration	10 years
Annual Repayment	120.40 US$ million

US $ Million

Year	Capital to be repaid	Interest	Amortisation	Annual Repayment
2000	680.2	81.6	38.8	120.4
2001	641.4	77.0	43.4	120.4
2002	598.0	71.8	48.6	120.4
2003	549.4	65.9	54.5	120.4
2004	495.0	59.4	61.0	120.4
2005	434.0	52.1	68.3	120.4
2006	365.7	43.9	76.5	120.4
2007	289.1	34.7	85.7	120.4
2008	203.5	24.4	96.0	120.4
2009	107.5	12.9	107.5	120.4

9.5 Operating plan

The organisation required for operation of present project has already been outlined in chapter VI. The following represents breakdown of the personnel details:

	(100K)
General Manager	1
Manager	24
Other staff	227
Direct Labour	1096
Indirect Labour	658
	2006

The operating shift envisaged is two and the annual operating days is 230 days of 40 hours.

The operating costs are divided as follows:

	US$ millions
Rates	3.2
Wages	41.6
Electricity	12.0
Process Gas	1.5
Heating Gas	3.6
Fuel Oil	0.6
Water Rates	0.9
Telephone Bills	0.9
Refuse Collection	0.8
Contract Services	0.9
Freight & transport	5.0
Other	0.6

	71.6 million p.a.

Note : Total salaries charges are approximately 65% over the gross value of payroll (see Appendix III)

As these operating plant expenses are based on an estimated production of a one litre family size car and our marketing plan contains only 40 % of one litre cars. We will just increase by 100% all the costs of sales 71.6 m x 2.= US$ 143.2 millions p.a.

In addition to the annual expenditure, US$ 1.6 million in reserves should be set aside for maintenance materials used in the day to day operation of the plant and also major items e.g. drive units, gear boxes and other essential equipment to minimise downtime in the event of a break down or used in keeping with a preventive maintenance programme.

The stocks on hand or levels of inventory for the main raw materials, auxiliary materials, utilities, expendables and manufactured products are difficult to assess at this stage. However, a form of just in time could be implemented but it would not become fully effective until a great percentage of component supply is sourced from within the country. For the purpose of this financial assessment an operating level for inventory costs should be made of US$ 30 million.

9.6 Sales Plan

Production capacity is divided as follows:

40 % are of the so called "Popular" class and the 60% others have engine capacity in the range of 1600 - 2000 cc.

75 % of production capacity is assumed to be needed in the first year and 100% thereafter. As a result production would be 75,000 in 2000 and 100,000 per year afterwards.

Average prices of the largest volume selling cars in Brazil

(Reals at Ocotber 1995)

POPULAR				1.6L to 2.0L		
	P. mini	P. maxi	P. average	P. mini	P. maxi	P.average
FORD						
ESCORT	8935	8935	8935	17027	31340	24184
FIAT						
UNO	7911	8805	8358	15249	22814	19032
G.M						
CORSA	9325	14133	11729	24410	24410	24410
KADETT				15369	16353	15861
MONZA				19154	33221	26188
VW						
GOL	8763	10399	9581	14010	25775	19893
Average price	**8733**	**10568**	**9651**	**17537**	**25652**	**21594**

Source: O GLOBO + own estimates

These prices have been supplied by the manufacturers. Transport costs and the cost of options are not included. Prices are in Reals (R$) and alcohol fuelled models are 2-3% cheaper.

The following example is a very approximate estimate of the sales figures which an automotive manufacturer could achieve each year. It is based on the average prices cited above with in each case a division of engine size which corresponds approximately to the Brazilian market.

100.000 vehicles (40% POPULAR; 40% others lower price; 20% others higher price)

POPULAR				1.6L to 2.0L		
	P. mini	P. maxi	P. average	P. mini	P. maxi	P.average
Nbr vehicles	0	0	40000	40000	20000	0
Average price R$	8733	10568	9651	17537	25652	21594
Millions R$	0.00	0.00	386.04	701.48	513.04	0.00
Millions US$	0.00	0.00	371.49	675.02	493.70	0.00

TOTAL US$ 1540.21 million

Given that the vehicles are assembled from CKD kits for 60% and that the price of purchase of these pieces and components are difficult to estimate, we will assume that 40% of sale revenues are from own production.

1540.21 x 40% = 616.1 millions US$ p.a.

Also, if we consider that price of the vehicles indicated above include the margin allowed to the distribution network, which we estimated at 35 %. The real income from sales, or added value are given below.

	Product. Volume	Sales revenue million US$	% of own Product. C	Own sales Revenues US$	After 35% Dealers Margin
2000	75000.0	1155.2	40 %	462.1	300,3
2001	100000.0	1540.2	40 %	616.1	400.4
2002	100000.0	1540.2	40 %	616.1	400.4
2003	100000.0	1540.2	40 %	616.1	400.4
2004	100000.0	1540.2	40 %	616.1	400.4
2005	100000.0	1540.2	40 %	616.1	400.4
2006	100000.0	1540.2	40 %	616.1	400.4
2007	100000.0	1540.2	40 %	616.1	400.4
2008	100000.0	1540.2	40 %	616.1	400.4
2009	100000.0	1540.2	40 %	616.1	400.4

9.7 Financial Projections

Projections were carried out for the main financial indicators or parameters.

The long term debt repayment schedule and production and sales plan have been presented in previous sections

The schematic financial projections computed on UNIDO's COMFAR Expert software are represented in the tables on the following pages. They take into account an exemption of income tax of ten years but does not take into account the ICMS tax incentives which could change from one day to another and could improve the financial debt situation. Only the major financial schedules are included.

Salvage value applied is as follows:

	Initial Value	**Salvage Value**	**Period**	**Depreciable Amount**	**Depreciation**
Pre-operational expenses	9.0	20%	5 yrs.	7.2	1.44
Equipment	644.3	10%	10 yrs.	579.87	57.99
Interest	72.9	0 %	5 yrs.	72.90	14.58
					74.01

ANNUAL COSTS OF PRODUCTS - TOTAL
MILLION US DOLLAR

	Production 2000	Production 2001	Production 2002	Production 2003	Production 2004	Production 2005	Production 2006	Production 2007	Production 2008	Production 2009
Capacity utilization (%)	75.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Raw materials	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Factory supplies	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Utilities	9.90	13.20	13.20	13.20	13.20	13.20	13.20	13.20	13.20	13.20
Energy	18.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00
Spare parts consumed	1.20	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
Repair, maintenance, material	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Royalties	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labour	62.40	83.20	83.20	83.20	83.20	83.20	83.20	83.20	83.20	83.20
Labour overhead costs (taxes etc.)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Factory overhead costs	12.30	16.40	16.40	16.40	16.40	16.40	16.40	16.40	16.40	16.40
FACTORY COSTS	103.80	138.40	138.40	138.40	138.40	138.40	138.40	138.40	138.40	138.40
Administrative costs	4.80	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40
OPERATING COSTS	108.60	144.80	144.80	144.80	144.80	144.80	144.80	144.80	144.80	144.80
Depreciation	74.00	74.00	74.00	74.00	74.00	57.99	57.99	57.99	57.99	57.99
Financial costs	81.62	76.97	71.76	65.93	59.39	52.07	43.88	34.70	24.41	12.90
TOTAL PRODUCTION COSTS	264.22	295.77	290.56	284.73	278.19	254.86	246.66	237.48	227.20	215.68
Direct marketing costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COSTS OF PRODUCTS	264.22	295.77	290.56	284.73	278.19	254.86	246.66	237.48	227.20	215.68
Foreign share (%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Variable share (%)	41.10	48.96	49.83	50.86	52.05	56.82	58.70	60.97	63.73	67.13

FINANCIAL FLOW - TOTAL
MILLION US DOLLAR

	Total inflow	Construction 1999	Production 2000	Production 2001	Production 2002	Production 2003	Production 2004	Production 2005	Production 2006
Equity capital	290.20	290.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ordinary capital	260.20	260.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Preference capital	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Subsidies, grants	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Automatic equity	30.00	30.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Long-term loans	680.18	680.18	-38.76	-43.41	-48.62	-54.45	-60.99	-68.31	-76.50
TOTAL LONG-TERM FINANCE	970.38	970.38	-38.76	-43.41	-48.62	-54.45	-60.99	-68.31	-76.50
Total short-term loans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL FINANCIAL FLOW	970.38	970.38	-38.76	-43.41	-48.62	-54.45	-60.99	-68.31	-76.50
Foreign share (%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

FINANCIAL FLOW - TOTAL
MILLION US DOLLAR

	Production 2007	Production 2008	Production 2009	Scrap 2010
Equity capital	0.00	0.00	0.00	0.00
Ordinary capital	0.00	0.00	0.00	0.00
Preference capital	0.00	0.00	0.00	0.00
Subsidies, grants	0.00	0.00	0.00	0.00
Automatic equity	0.00	0.00	0.00	0.00
Long-term loans	-85.68	-95.97	-107.48	0.00
TOTAL LONG-TERM FINANCE	-85.68	-95.97	-107.48	0.00
Total short-term loans	0.00	0.00	0.00	0.00
TOTAL FINANCIAL FLOW	-85.68	-95.97	-107.48	0.00
Foreign share (%)	0.00	0.00	0.00	0.00

CASH FLOW FOR FINANCIAL PLANNING - TOTAL
MILLION US DOLLAR

	Construction 1999	Production 2000	Production 2001	Production 2002	Production 2003	Production 2004	Production 2005	Production 2006	Production 2007
TOTAL CASH INFLOW	940.38	300.30	400.40	400.40	400.40	400.40	400.40	400.40	400.40
Inflow funds	940.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Inflow operation	0.00	300.30	400.40	400.40	400.40	400.40	400.40	400.40	400.40
Other income	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL CASH OUTFLOW	970.38	228.98	265.18	265.18	265.18	265.18	265.18	265.18	265.18
Increase in fixed assets	867.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Increase in current assets	30.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Operating costs	0.00	108.60	144.80	144.80	144.80	144.80	144.80	144.80	144.80
Marketing costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Income (corporate) tax	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Financial costs	72.88	81.62	76.97	71.76	65.93	59.39	52.07	43.88	34.70
Loan repayment	0.00	38.76	43.41	48.62	54.45	60.99	68.31	76.50	85.68
Dividends	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equity capital refund	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SURPLUS (DEFICIT)	-30.00	71.32	135.22	135.22	135.22	135.22	135.22	135.22	135.22
CUMULATIVE CASH BALANCE	-30.00	41.32	176.54	311.76	446.98	582.20	717.42	852.64	987.86
Foreign surplus (deficit)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Local surplus (deficit)	-30.00	71.32	135.22	135.22	135.22	135.22	135.22	135.22	135.22
Foreign cumulative cash balance	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Local cumulative cash balance	-30.00	41.32	176.54	311.76	446.98	582.20	717.42	852.64	987.86
Net flow of funds	867.50	-120.38	-120.38	-120.38	-120.38	-120.38	-120.38	-120.38	-120.38

CASH FLOW FOR FINANCIAL PLANNING - TOTAL
MILLION US DOLLAR

	Production 2008	Production 2009	Scrap 2010
TOTAL CASH INFLOW	400.40	400.40	310.43
Inflow funds	0.00	0.00	0.00
Inflow operation	400.40	400.40	0.00
Other income	0.00	0.00	310.43
TOTAL CASH OUTFLOW	265.18	265.18	0.00
Increase in fixed assets	0.00	0.00	0.00
Increase in current assets	0.00	0.00	0.00
Operating costs	144.80	144.80	0.00
Marketing costs	0.00	0.00	0.00
Income (corporate) tax	0.00	0.00	0.00
Financial costs	24.41	12.90	0.00
Loan repayment	95.97	107.48	0.00
Dividends	0.00	0.00	0.00
Equity capital refund	0.00	0.00	0.00
SURPLUS (DEFICIT)	135.22	135.22	310.43
CUMULATIVE CASH BALANCE	1,123.08	1,258.30	1,568.73
Foreign surplus (deficit)	0.00	0.00	0.00
Local surplus (deficit)	135.22	135.22	310.43
Foreign cumulative cash balance	0.00	0.00	0.00
Local cumulative cash balance	1,123.08	1,258.30	1,568.73
Net flow of funds	-120.38	-120.38	0.00

DISCOUNTED CASH FLOW - TOTAL CAPITAL INVESTED
MILLION US DOLLAR

	Construction 1999	Production 2000	Production 2001	Production 2002	Production 2003	Production 2004	Production 2005	Production 2006	Production 2007
TOTAL CASH INFLOW	0.00	300.30	400.40	400.40	400.40	400.40	400.40	400.40	400.40
Inflow operation	0.00	300.30	400.40	400.40	400.40	400.40	400.40	400.40	400.40
Other income	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL CASH OUTFLOW	897.50	108.60	144.80	144.80	144.80	144.80	144.80	144.80	144.80
Increase in fixed assets	867.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Increase in net working capital	30.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Operating costs	0.00	108.60	144.80	144.80	144.80	144.80	144.80	144.80	144.80
Marketing costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Income (corporate) tax	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NET CASH FLOW	-897.50	191.70	255.60	255.60	255.60	255.60	255.60	255.60	255.60
CUMULATIVE NET CASH FLOW	-897.50	-705.80	-450.20	-194.60	61.00	316.60	572.20	827.80	1,083.40
Net present value	-897.50	171.16	203.76	181.93	162.44	145.03	129.49	115.62	103.23
Cumulative net present value	-897.50	-726.34	-522.58	-340.65	-178.21	-33.17	96.32	211.94	315.18
NET PRESENT VALUE	at 12.00 %	578.88							
INTERNAL RATE OF RETURN	24.69 %								
MODIFIED INTERNAL RATE OF RETURN	24.69 %								
NORMAL PAYBACK	at 0.00 %	5 years							
DYNAMIC PAYBACK	at 12.00 %	7 years							
NPV RATIO	0.64								

DISCOUNTED CASH FLOW - TOTAL CAPITAL INVESTED
MILLION US DOLLAR

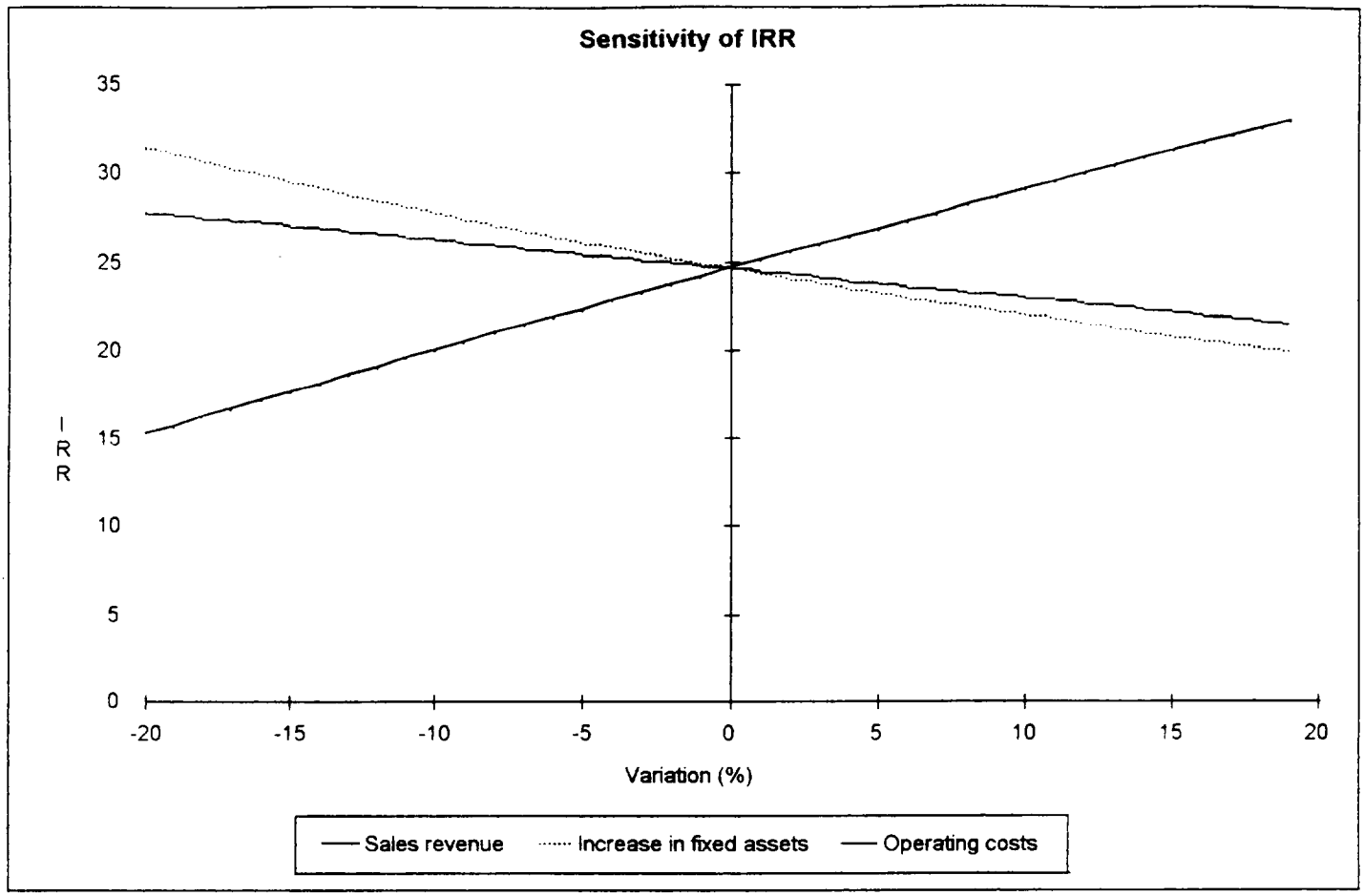
	Production 2008	Production 2009	Scrap 2010
TOTAL CASH INFLOW	400.40	400.40	310.43
Inflow operation	400.40	400.40	0.00
Other income	0.00	0.00	310.43
TOTAL CASH OUTFLOW	144.80	144.80	0.00
Increase in fixed assets	0.00	0.00	0.00
Increase in net working capital	0.00	0.00	0.00
Operating costs	144.80	144.80	0.00
Marketing costs	0.00	0.00	0.00
Income (corporate) tax	0.00	0.00	0.00
NET CASH FLOW	255.60	255.60	310.43
CUMULATIVE NET CASH FLOW	1,339.00	1,594.60	1,905.03
Net present value	92.17	82.30	89.24
Cumulative net present value	407.35	489.64	578.88
NET PRESENT VALUE			
INTERNAL RATE OF RETURN			
MODIFIED INTERNAL RATE OF RETURN			
NORMAL PAYBACK			
DYNAMIC PAYBACK			
NPV RATIO			

NET INCOME STATEMENT
MILLION US DOLLAR

	Production 2000	Production 2001	Production 2002	Production 2003	Production 2004	Production 2005	Production 2006	Production 2007	Production 2008	Production 2009
Sales revenue	300.30	400.40	400.40	400.40	400.40	400.40	400.40	400.40	400.40	400.40
Less variable costs	108.60	144.80	144.80	144.80	144.80	144.80	144.80	144.80	144.80	144.80
VARIABLE MARGIN	191.70	255.60	255.60	255.60	255.60	255.60	255.60	255.60	255.60	255.60
in % of sales revenue	63.84	63.84	63.84	63.84	63.84	63.84	63.84	63.84	63.84	63.84
Less fixed costs	74.00	74.00	74.00	74.00	74.00	57.99	57.99	57.99	57.99	57.99
OPERATIONAL MARGIN	117.70	181.60	181.60	181.60	181.60	197.61	197.61	197.61	197.61	197.61
in % of sales revenue	39.19	45.35	45.35	45.35	45.35	49.35	49.35	49.35	49.35	49.35
Interest on short-term deposits	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Financial costs	81.62	76.97	71.76	65.93	59.39	52.07	43.88	34.70	24.41	12.90
GROSS PROFIT FROM OPERATIONS	36.08	104.63	109.84	115.67	122.21	145.54	153.74	162.92	173.20	184.72
in % of sales revenue	12.01	26.13	27.43	28.89	30.52	36.35	38.40	40.69	43.26	46.13
Extraordinary income	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Extraordinary loss	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Depreciation allowances	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GROSS PROFIT	36.08	104.63	109.84	115.67	122.21	145.54	153.74	162.92	173.20	184.72
Investment allowances	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TAXABLE PROFIT	36.08	104.63	109.84	115.67	122.21	145.54	153.74	162.92	173.20	184.72
Income (corporate) tax	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NET PROFIT	36.08	104.63	109.84	115.67	122.21	145.54	153.74	162.92	173.20	184.72
in % of sales revenue	12.01	26.13	27.43	28.89	30.52	36.35	38.40	40.69	43.26	46.13
Dividends	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RETAINED PROFIT	36.08	104.63	109.84	115.67	122.21	145.54	153.74	162.92	173.20	184.72
Ratios (%)										
Net profit to equity	13.86	40.21	42.21	44.45	46.97	55.93	59.08	62.61	66.56	70.99
Net profit to net worth	11.06	24.28	20.31	17.62	15.70	15.75	14.26	13.13	12.25	11.55
Net profit+interest to investment	12.13	18.71	18.71	18.71	18.71	20.36	20.36	20.36	20.36	20.36

PROJECTED BALANCE SHEET
MILLION US DOLLAR

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
TOTAL ASSETS	970.38	967.69	1,028.91	1,090.13	1,151.35	1,212.56	1,289.80	1,367.03	1,444.26	1,521.49	1,598.73
Total current assets	30.00	101.32	236.54	371.76	506.98	642.20	777.42	912.64	1,047.86	1,183.08	1,318.30
Total fixed assets, net of depreciation	940.38	866.37	792.37	718.37	644.37	570.37	512.38	454.39	396.40	338.42	280.43
Accumulated losses brought forward	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loss in current year	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL LIABILITIES	970.38	967.69	1,028.91	1,090.13	1,151.35	1,212.56	1,289.80	1,367.03	1,444.26	1,521.49	1,598.73
Total current liabilities	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total long-term loans	680.18	641.42	598.01	549.39	494.93	433.94	365.64	289.13	203.45	107.48	0.00
Total equity	290.20	290.20	290.20	290.20	290.20	290.20	290.20	290.20	290.20	290.20	290.20
Reserves, retained profit brought forward	0.00	0.00	36.08	140.70	250.54	366.21	488.42	633.96	787.69	950.61	1,123.81
Net profit after tax	0.00	36.08	104.63	109.84	115.67	122.21	145.54	153.74	162.92	173.20	184.72
Net worth	290.20	326.28	430.90	540.74	656.41	778.62	924.16	1,077.89	1,240.81	1,414.01	1,598.73
Ratios (%)											
Equity to total liabilities	29.91	29.99	28.20	26.62	25.21	23.93	22.50	21.23	20.09	19.07	18.15
Net worth to total liabilities	29.91	33.72	41.88	49.60	57.01	64.21	71.65	78.85	85.91	92.94	100.00
Long-term debt to net worth	2.34	1.97	1.39	1.02	0.75	0.56	0.40	0.27	0.16	0.08	0.00
Current assets to current liabilities	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00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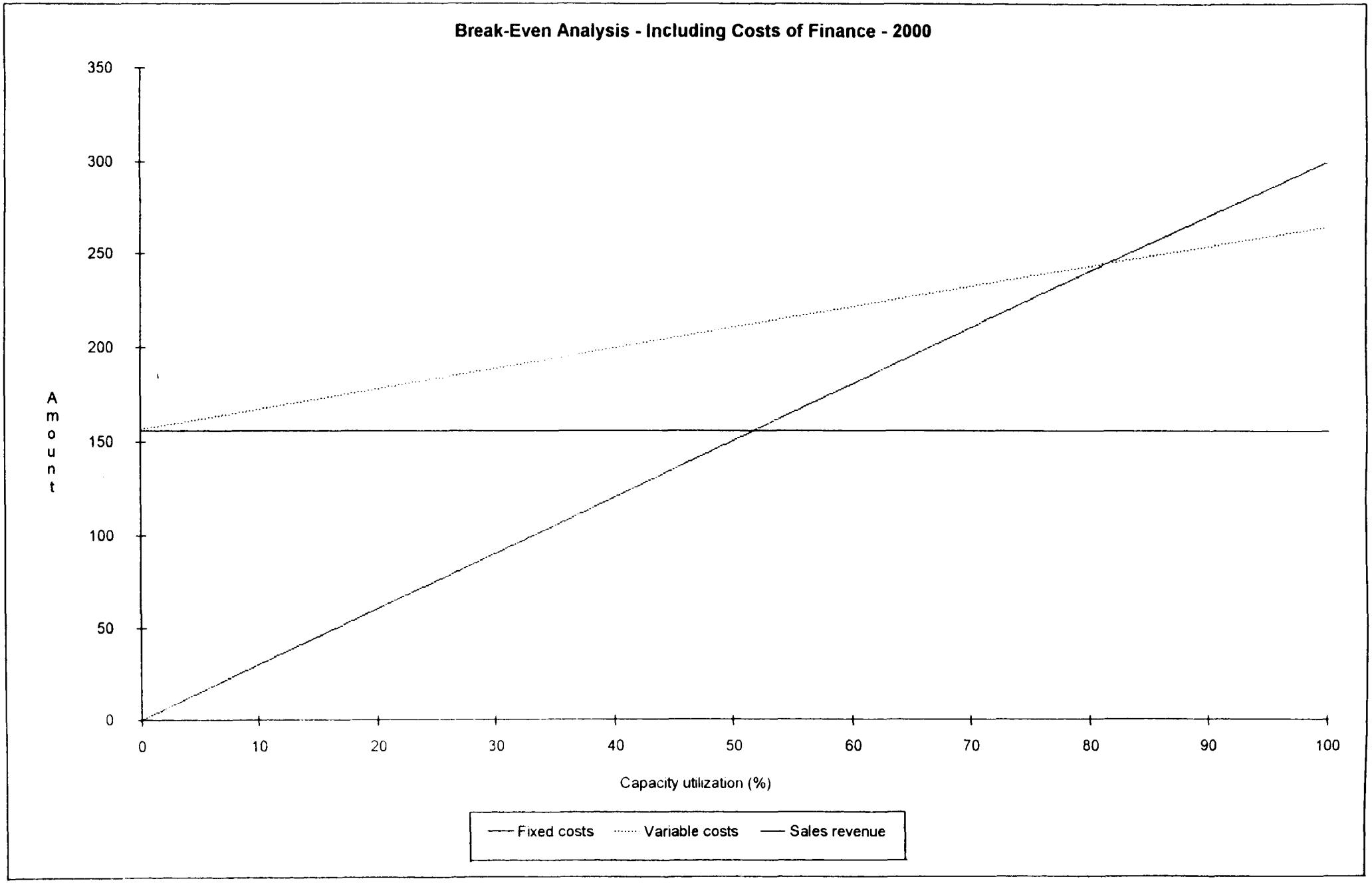
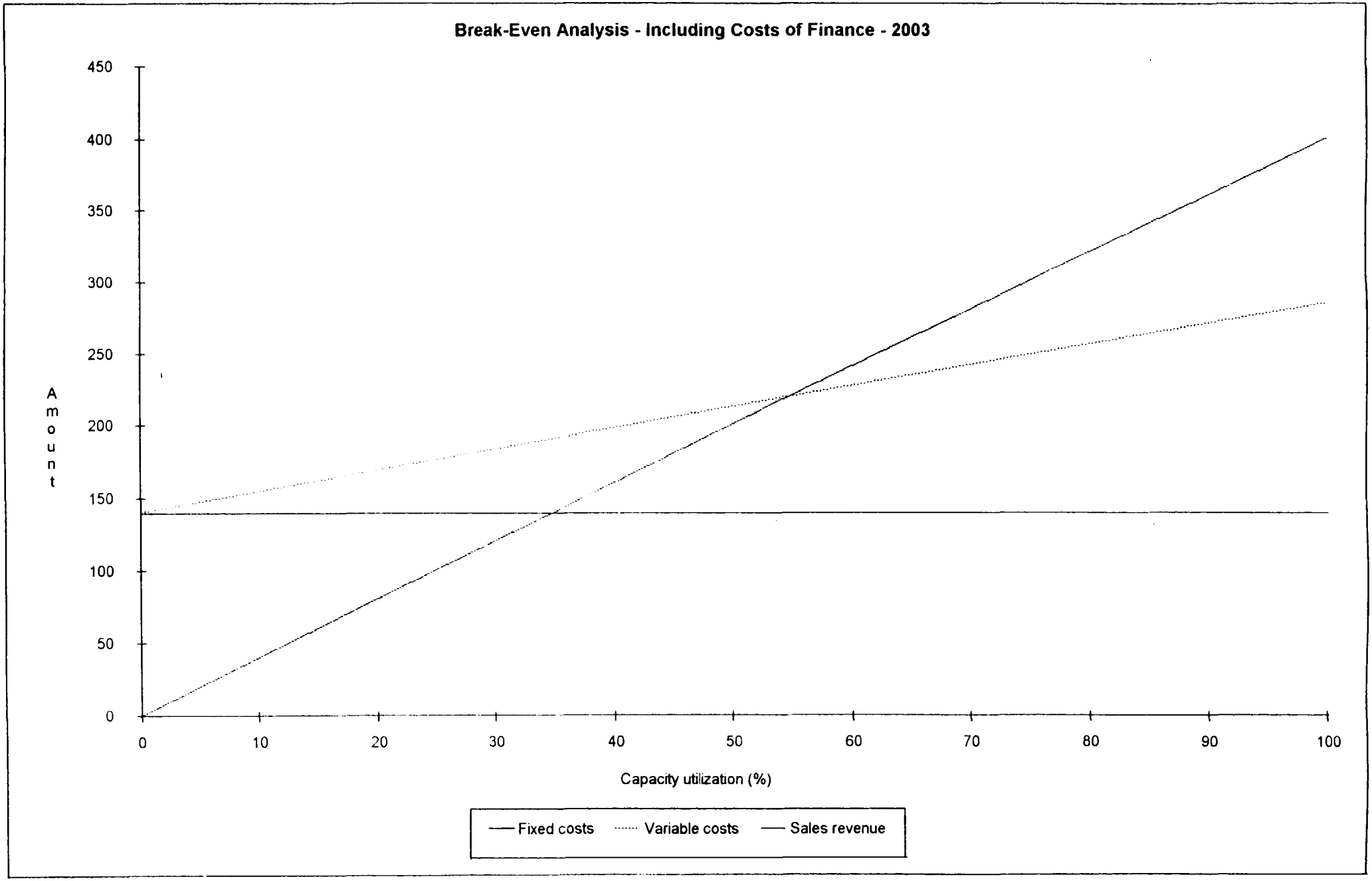
30
25
20
15
10
5
0
IRR
-20
-15
-10
-5
0
5
10
15
20
Variation (%)
Sales revenue
Increase in fixed assets
Operating costs


Break-Even Analysis - Including Costs of Finance - 2000
350
300
250
200
150
100
50
0
Amount
0
10
20
30
40
50
60
70
80
90
100
Capacity utilization (%)
Fixed costs
Variable costs
Sales revenue


Break-Even Analysis - Including Costs of Finance - 2003
Amount
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400
350
300
250
200
150
100
50
0
0
10
20
30
40
50
60
70
80
90
100
Capacity utilization (%)
Fixed costs
Variable costs
Sales revenue

The internal rate of return I.R.R. for this project has been calculated by determining cash flow. (see tables Funds flow Statements).

The resulting estimate is an I.R.R. of 24.7 p.a. It must be stated that this rate of return should be considered as a minimum.

There are several reasons for this :

- the real rate of 12% interest on borrowing has been adopted whereas in practice a lower rate of interest could be obtained on international market

- only a minimal (one year) grace period has been adopted whereas substantially longer terms could be negotiated for a grace period for interest repayment thus enhancing the I.R.R.

- no allowance has been made for the progressive expansion of production volumes; for example the starting up of a third shift production which could enhance the I.R.R.

Further practical simulations may be required against the background of a more concrete project proposal to test out these additional hypotheses.

9.8 A Financial Comparative Evaluation

We have chosen to consider passenger cars production as this sector which appears to have the greatest potential for growth in Brazil. However, other branches of the automotive industry such as trucks also have a high potential. Also within the passenger car category, the range of products is very vast and there are many possible variations. It is not possible to determine arbitrarily which vehicle should be manufactured in the state of Bahia, this choice will have to be made by the individual investor. It would seem advisable to leave the door open to any possibility and to simply compare the costs of production of the main elements which go to make up the price of vehicle depending on whether it is manufactured in the South East or North East Regions.

A draft law (N°85) has been submitted to the Federal Senate to encourage the establishment of the automotive industry in economically backward regions such as Bahia. This law has been under consideration since March 1995.

While awaiting a decision on this law, political and macro-economic factors are the same for all Brazilian States as far as external relations are concerned (exchange rates, export incentives, customs barriers, credit conditions....). It may be considered that those factors which enter into consideration for the choice of a production site are either of financial or qualitative nature. Brazilian States nevertheless have a certain degree of freedom in granting financial incentives; the following table compares these incentives granted by the different states.

SUMMARY TAX INCENTIVES

	SOUTHEAST				SOUTH			NORTH EAST	MID WEST
ITEM	SP	ES	MG	RJ	PR	SC	RS	BA(&)	GO
ICMS TAX INCENTIVES									
FINANCING	0	75	50	75/40*	100	75/40*	50	50/75	70
PERIOD YEARS	0	15	5	5	3	10	5	6/10	7
GRACE PERIOD YEARS	0	5	1	5	3	5	0	3/5	3
INTEREST RATE/ YEAR%	0	1	6	0	0	0	12	3	6
MONET. CORRECTION	0	0	100	60	100	100	100	50	25
FIXED ASSET FINANCING									
FINANCING	0	0	80	0	0	0	0	0	60
PERIOD YEARS	0	0	5	0	0	0	0	0	6
GRACE PERIOD YEARS	0	0	3	0	0	0	0	0	2
INTEREST RATE /YEAR%	0	0	6	0	0	0	0	0	8
MONET. CORRECTION	0	0	100	0	0	0	0	0	100
INCOME TAX									
EXEMPTION FOR 10 YEARS	N	33%#	N	N	N	N	N	Y	N

(&) 2nd number is applied for investments outside the Metropolitan region or for investments > to R$ 400 millions or for production of products not produced in the state

(*) 1st year 75%. 2 nd year 60%. 3rd year 50%. 5th year 40%.

(#) Deduction up 33% applying 23% in industries project and the remaining 10% covering to - Investment Certificate.(C.L.)

SP - Sãn Paulo
ES - Espírito Santo
MG - Minas Gerais
RJ - Rio de Janerio
PR - Paraná
SC - Santa Catarina
RS - Rio Grande do Sul
BA - Bahia
GO - Goiás

It can be seen that Bahia is one of the states which offers the most fiscal incentives. Also according to companies interviewed, wages are 20% lower than in the south states. In general, labour costs account for between 13 and 20 % of the sales value of an automobile. This would mean an economy of cost of production of the smallest type of "Popular" medium price car of:

8733 X 20 % X 13% = 227 R$

or

8733 X 20 % X 20% = 349 R$

Set against this advantage, the cost of transport is a quantifiable negative element, but according to a senior manager of an international company established in Brazil, this would amount to a maximum extra cost of 50 R$ per unit transported or 0.6% of the lowest average price for a small car. According to a manufacturer of automobile components located in Bahia, the cost of road transport amounts to an average of 2% of the final price of products. Extrapolating this we arrive at a figure of :

8733 R$ x 2% = 175 R$

For confirmation of this unofficial transport cost we have found in a review 'Carga & Transporte' some boat and road freight costs.

The inland freight transport prices by boat as communicated by Aliança Navigation were, as of June 1995, the following:

- by container dry, standard of 24 to 48 tonnes from 800 R$ to 1500 R$ depending on destination and on a prepaid basis is to say a variation of price by tonne, going from 16.7R$ to 62.5 R$.
- for the 'break-bulk' freight (i.e. not in a container due to the dimensions) the price on a prepaid basis is 55 US$.

By road the freight value for big volumes is calculated in percentage of the good price carried and start at 0.30% for a distance of 50km to 1.20% for a distance not exceeding 6,000 km.

The average weight for the kind of cars in question varies from 0.8 tonne to 1.5 tonne.

If we look at the possible profits from these to our scenario, we can see that the minimum gain per annum is:

227 R$ x 100,000 vehicles = 22,700,000 R$

less 50 R$ x 100,000 vehicles = 5,000,000 R$

But we must take into account that only 40% of the value of the car will be built in Bahia initially so the profits will be reduced to 22,700,00 R$ x 40% = 9,080,000 R$ or 8.7 million US$.

While it appears evident that at the financial level, the operation could be profitable, other conditions (explained in chapter 4.2 Local Conditions) seem up to now to have placed an obstacle in the way of the manufacture of an automobile production plant.

9.9 Project Impacts

The possible implications of this project for the state of Bahia are as follows

- The creation of more than 2,000 direct new jobs, with indirect job creation estimated at 45,000.

- Training of a pool of qualified labour not yet present in the State.

- Establishment of training programmes both at the company level and in specialised schools. Three organisations are at present or are ready to begin specialised training programmes for the automotive industry. These are the Envaldo Lodt Professional Training Centre, the Roberto Simonsen North Easter Diesel Centre and the SENAI.

- Attraction and creation of satellite companies in the field of sub-contracting.

- Increased orders for existing industries, especially petrochemicals.

- Increase in industrial investments. Over the last 20 years more than US$ 18 billion has been invested in major projects in Bahia by domestic and international investors. Industries have included petroleum, steel, metal working, pulp paper and agri-business among others. In addition over the last four years PROBAHIA, a program established to grant special incentives to new business partners, has encouraged new investment in Bahia. For the period 1995 to 2001 current forecasts are for US$ 4.5 billion for 224 new projects and if this investment takes place the level will be raised to US$ 5.5 billion during this period and will lead to at least as much, investment for the following years.

- The direct participation of the automobile industry in the state of Bahia (the actual GDP of Bahia is about US$ 28 billion in 1995) will be of little importance during a first phase but could rise very quickly as a result of financial income generated by trade flows.

- The implications for the balance of payments of Bahia and Brazil in general can only be favourable since according to the conditions of the provisional law (M.P.), the import of machinery and other goods cannot be greater than 50% of the total investment. The consequences for the trade balance will also be positive for the same reasons.

- Otherwise, if the investor is already established as an importer of manufactured vehicles the part of his local production which is exported will permit him to import vehicles not manufactured in MERCOSUR at much more advantageous import duties than before. However, this kind of benefit may not last long since Brazil wishes to belong to that group of countries whose trade is open to the outside world, free of customs barriers which are too high and which prevent its international trade from growing through the acquisition of new technologies and developing its economy in general.

APPENDIX I

APPENDIX I

WORLD PRODUCTION 1992-1993

Production by Country for the Top 40 Manufacturers

Rank	1992 Passenger Cars	1992 Commercial Vehicles	1992 Total	1993 Passenger Cars	1993 Commercial Vehicles	1993 Total
1. GENERAL MOTORS						
G.M. - US	2,466,290	1,356,719	3,823,009	2.542.455	1,516,285	4,158,7
G.M. - Canada	329,263	338,940	668,203	457,425	290,046	747,4
Opel - Germany	1,071,464	14,499	1,085,963	808,164	6,977	815,1
Lotus - UK	691	0	691	320	0	3
Vauxhall - UK	287,884	14,112	301,996	232,569	12,216	244,7
G.M. - Spain	378,428	0	378,428	350,802	0	350,8
G.M. - Brazil	173,333	40,042	213,375	236,900	38,072	274,9
G.M. - Mexico	128,737	71,623	200,360	141,294	50,985	192,2
G.M. - Holden -Australia	77,891	14,095	91,986	82,239	17,201	99,4
TOTAL	4,913,981	1,850,030	6,764,011	4,852,166	2,031,762	6,883,9
2. FORD						
Ford - US	1,333,578	1,496,412	2,829,990	1,469,699	1,859,480	3,349,1
Ford - Canada	366,299	127,852	494,151	337,035	136,296	473,3
Ford - Germany	622,377	0	622,377	437,065	0	437,0
Ford - Belgium	222,680	75,392	298,072	347,424	56,528	403,9
Ford - UK	302,146	157,749	459,895	271,793	132,663	404,4
Ford - Spain	310,753	0	310,753	211,786	0	211,7
Ford - Brazil	107,556	45,727	153,283	145,585	67,542	213,1
Ford - Mexico	198,258	58,942	257,200	169,931	39,428	209,3
Ford - Australia	93,934	13,652	107,586	101,200	15,103	116,3
Ford - Argentina	28,782	64,351	93,133	20,479	20,835	41,3
Ford - Taiwan	92,224	23,398	155,622	66,000	17,000	105,0
TOTAL	3,678,587	2,063,475	5,742,062	3,619,997	2,344,875	5,964,8
3. TOYOTA						
Toyota - Japan	3,171,311	760,030	3,931,341	2,882,698	679,052	3,561,7
Toyota - US	345,752	75,287	421,039	356,114	114,403	470,5
Toyota - Canada	68,092	0	58,092	72,919	0	72,9
Toyota - Australia	57,417	47,650	105,067	70,456	52,103	122,5
Toyota - Brazil	103	3,053	3,156	0	2,627	2,6
TOTAL	3,642,675	886,020	4,528,695	3,382,187	848,185	4,230,3
4. VOLKSWAGEN						
VW - Germany	1,549,485	108,120	1,657,605	1,163,045	77,079	1,240,1
VW Audi - Germany	492,085	0	492,085	340,956	0	340,8
VW - Argentina	21,862	0	21,862	46,652	0	46,5
VW - Brazil	288,784	58,825	347,609	379,920	79,556	459,4
VW - Mexico	175,030	13,458	188,488	227,104	11,888	238,9
Seat -- Spain	578,047	0	578,047	473,145	0	473,1
TOTAL	3,105,293	180,403	3,285,696	2,630,822	168,523	2,799,3
5. NISSAN						
Nissan - Japan	1,750,829	366,835	2,117,664	1,524,541	287,057	1,811,5
Nissan Diesel - Japan	0	51,946	51,946	0	47,765	47,7
Nissan - Mexico	121,743	50,819	172,562	137,606	48,316	185,9
Nissan - Australia	21,330	14,899	36,229	14,847	11,857	26,7
Nissan - Spain	0	76,676	76,676	0	82,036	82,0
Nissan - UK	179,009	-0	179,009	246,281	0	246,2
Nissan - US	171,404	128,924	300,328	292,182	93,791	385,9
TOTAL	2,244,315	690,099	2,934,414	2,215,457	570,822	2,786,2

WORLD PRODUCTION 1992-1993 (continued)

Production by Country for the Top 40 Manufacturers

Rank	1992 Passenger Cars	1992 Commercial Vehicles	1992 Total	1993 Passenger Cars	1993 Commercial Vehicles	1993 Total
6. CHRYSLER						
Chrysler - US	522,660	760,713	1,283,373	494,573	932,899	1,427,4
Chrysler - Canada	50,645	413,878	464,523	256,754	386,617	643,3
Chrysler - Mexico	154,645	80,152	234,797	159,144	69,284	228,4
TOTAL	727,950	1,254,743	1,982,693	910,471	1,388,800	2,299,2
7. PSA						
Peugeot - France	1,126,267	60,499	1,186,765	946,988	43,257	990,2
Citroen - France	699,112	69,255	768,367	624,664	53,827	678,4
Sevel PSA - Italy	0	55,851	55,851	0	35,371	35,3
Peugeot/Citroen - Spain	340,921	0	340,921	292,463	0	292,4
Peugeot/Talbot - UK	85,821	0	85,821	72,902	0	72,9
TOTAL	2,252,121	185,605	2,437,726	1,937,017	132,455	2,069,4
8. RENAULT						
Renault - France	1,504,111	308,166	1,812,277	1,264,628	221,967	1,486,5
Renault - Argentina	61,465	7,647	69,112	83,895	10,472	94,3
Fasa-Renault - Spain	364,282	0	364,282	294,182	0	294,1
Renault RVI - Spain	0	2,649	2,649	0	2,041	2,0
Renault - UK	0	819	819	0	165	1
Mack - US	0	13,085	13,085	0	18,003	18,0
Mack - Canada	0	2,107	2,107	0	1,699	1,6
TOTAL	1,929,858	334,473	2,264,331	1,642,705	254,348	1,897,0
9. HONDA						
Honda - Japan	1,067,289	132,531	1,199,820	1,021,814	129,035	1,150,8
Honda - Canada	104,123	0	104,123	100,708	0	100,7
Honda - US	458,254	0	458,254	403,775	0	403,7
TOTAL	1,629,666	132,531	1,762,197	1,526,297	129,035	1,655,3
10. MITSUBISHI						
Mitsubishi - Japan	939,590	456,285	1,395,875	944,247	418,200	1,362,4
Mitsubishi - Australia	41,066	22,936	64,002	53,781	22,416	76,1
Mitsubishi - US	139,783	0	139,783	136,035	0	136,0
TOTAL	1,120,439	479,221	1,599,660	1,134,063	440,616	1,574,6
11. FIAT						
Fiat - Italy	1,103,037	13,887	1,116,924	844,221	12,848	857,0
Lancia - Italy	96,517	0	96,517	83,875	0	83,8
Autobianchi - Italy	109,880	0	109,880	75,051	0	75,0
Iveco - Italy	0	80,227	80,227	0	62,164	62,1
Sevel Fiat - Italy	0	58,540	58,540	0	38,771	38,7
Ferrari - Italy	3,470	0	3,470	2,325	0	2,3
Iveco - Argentina	0	1,371	1,371	0	1,720	1,7
Fiat - Brazil	244,652	65,620	310,272	337,445	56,146	393,5
Iveco-Pegaso - Spain	0	8,479	8,479	0	9,740	9,7
Iveco-Magirus - Germany	0	14,720	14,720	0	9,011	9,0
TOTAL	1,557,556	242,844	1,800,400	1,342,917	190,400	1,533,3

WORLD PRODUCTION 1992-1993 (continued)

Production by Country for the Top 40 Manufacturers

Rank	1992 Passenger Cars	1992 Commercial Vehicles	1992 Total	1993 Passenger Cars	1993 Commercial Vehicles	1993 Total
12. MAZDA						
Mazda - Japan	1,037,133	243,917	1,281,050	864,468	164,660	1,029,1
Mazda - US	168,859	0	168,859	219,096	0	219,0
TOTAL	1,205,992	243,917	1,449,909	1,083,564	164,660	1,248,2
13. HYUNDAI						
Hyundai - S. Korea	701,654	157,596	859,250	774,949	185,108	960,0
Hyundai - Canada	14,866	0	14,866	14,585	0	14,5
TOTAL	716,520	157,596	874,116	789,534	185,108	974,6
14. SUZUKI						
Suzuki - Japan	535,171	309,240	644,411	510,265	286,396	796,6
Suzuki - Canada	656	6,177	6,833	3,310	0	3,3
Suzuki Motor - Spain	0	36,416	36,416	0	32,061	32,0
TOTAL	535,827	351,833	887,660	513,575	318,457	632,0
15. DAIMLER-BENZ						
Mercedes-B - Germany	531,456	156,597	688,053	480,627	114,932	595,5
Mercedes-B - Argentina	0	4,484	4,484	0	5,106	5,1
Mercedes-B - Brazil	0	34,148	34,148	0	33,679	33,6
Mercedes-B - Spain	0	26,461	26,461	0	19,384	19,3
Mercedes-B - Mexico	0	10,665	10,665	0	9,588	9,5
Mercedes-B - US	0	327	327	0	0	
Freightliner - US	0	32,359	32,359	0	41,787	41,7
Freightliner - Canada	0	2,612	2,612	0	1,778	1,7
TOTAL	531,456	267,653	799,109	480,627	226,254	706,8
16. VAZ - CIS	676,857	0	676,857	660,275	0	660,2
17. KIA - S. Korea	315,459	186,768	502,227	405,081	194,823	599,9
18. FUJI						
Fuji-Subaru - Japan	366,502	147,423	513,925	322,622	115,302	437,9
Subaru-Isuzu - US	57,623	66,868	124,491	47,117	79,441	126,5
TOTAL	424,125	214,291	638,416	369,739	194,743	564,4
19. DAIHATSU - Japan	392,478	217,854	610,342	352,855	207,465	560,3
20. BMW-Germany	580,295	0	580,295	510,112	0	510,1
21. ROVER GROUP						
Austin-Rover - UK	339,054	3,238	342,292	356,280	2,572	358,8
Land Rover - UK	39,743	17,626	57,369	50,524	17,368	67,8
TOTAL	378,797	20,864	399,661	406,804	19,940	426,7
22. ISUZU - Japan	118,391	354,887	473,278	73,854	324,209	398,0
23. VOLVO						
Volvo - Sweden	208,930	34,526	243,456	208,041	33,191	241,2
Volvo - The Netherlands	94,019	0	94,019	80,246	0	80,2
Volvo - Brazil	0	4,285	4,285	0	5,739	5,7
Volvo - Canada	6,288	0	6,288	5,504	0	5,5
Volvo GM - US	0	17,451	17,451	0	22,822	22,8
TOTAL	309,237	56,262	365,499	293,791	61,752	355,5

WORLD PRODUCTION 1992-1993 (continued)

Production by Country for the Top 40 Manufacturers

Rank	1992 Passenger Cars	1992 Commercial Vehicles	1992 Total	1993 Passenger Cars	1993 Commercial Vehicles	1993 Total
24. GAZ - CIS	69,001	228,027	297,028	105,654	217,145	322,7
25. DAEWOO - S. Korea	172,484	6,536	179,020	293,247	6,847	300,0
26. SKODA - Czech Rep.	200,059	0	200,059	219,612	0	219,6
27. FSM - Poland	143,400	0	143,400	192,239	0	192,2
28. SEVEL - Argentina	108,393	11,054	119,447	135,938	14,193	150,1
29. ZAZ - CIS	132,661	0	132,661	128,949	0	128,9
30. PROTON - Malaysia	99,048	0	99,048	118,040	0	118,0
31. UAZ - CIS	54,317	54,680	108,997	57,604	58,030	115,6
32. ALFA ROMEO - Italy	152,354	0	152,354	109,598	0	109,5
33. SAAB-SCANIA						
Saab - Sweden	84,569	0	84,569	70,961	0	70,9
Scania - Sweden	0	58,570	28,570	0	25,193	25,1
Scania - Argentina	0	1,724	1,724	0	1,724	1,7
Scania - Brazil	0	5,453	5,453	0	6,284	6,2
TOTAL	84,569	35,747	120,316	70,961	33,201	104,1
34. ZIL - CIS	14	134,791	134,805	7	97,493	97,5
35. Izhmach - CIS	114,000	68,662	182,662	31,000	65,000	96,0
36. AZLK - CIS	101,870	0	101,870	95,801	0	95,8
37. NAVISTAR						
Navistar - US	0	66,269	66,269	0	73,518	73,5
Navistar - Canada	0	10,054	10,054	0	14,498	14,4
TOTAL	0	76,323	76,323	0	88,016	88,0
38. HINO - Japan	0	79,182	79,182	0	70,922	70,9
39. FSO - Poland	77,672	5,177	82,849	69,549	0	89,5
40. KAMAZ - CIS	4,483	89,198	93,681	5,190	59,544	67,7
Total 40 Manufacturers	34,711,494	11,026,457	45,737,951	32,767,301	11,107,623	43,874,9
Others	511,001	1,516,339	2,027,340	1,000,627	1,431,312	2,431,9
Total World	35,222,495	12,542,796	47,765,291	33,767,928	12,538,935	46,306,8

APPENDIX II

BRAZILIAN PRODUCTION BY MODEL
1992-1994

				Of WHICH CKD		
	1992	1993	1994	1992	1993	1994
Passenger cars	**815959**	**1100309**	**1248773**	**148557**	**190274**	**210479**
FIAT	**244652**	**337453**	**426848**	**85248**	**108624**	**123072**
PREMIO	57316	60271	49295	31680	42576	47760
TEMPRA	20889	36851	44985	0	0	0
ELBA	21976	24695	24932	1392	1584	2016
UNO	120615	186596	267172	28320	35424	32832
SPAZIO (147)	23856	29040	40464	23856	29040	40464
FORD	**107556**	**145535**	**155386**	**26102**	**19505**	**17484**
VERONA	19554	3506	28089	0	0	0
VERSAILES	23771	26042	14896	0	0	0
ESCORT	59968	110286	106824	26102	19505	17484
ROYALE	4263	5701	5577	0	0	0
GENERAL MOTORS	**173333**	**236900**	**250680**	**9678**	**12690**	**7560**
MONZA	58799	71787	67551	750	210	0
OMEGA	11276	25513	16567	0	0	0
VECTRA	0	4018	25804	0	0	0
CHEVETTE	49962	45253	7560	8928	12480	7560
COMODORO	908	0	0	0	0	0
DIPLOMATA	764	0	0	0	0	0
OPALA	698	0	0	0	0	0
VERANEIO	953	1036	684	0	0	0
KADETT	41774	69167	51298	0	0	0
IPANEMA	7154	13584	8615	0	0	0
SUPREMA	0	5543	3661	0	0	0
BONANZA	836	999	636	0	0	0
CARAVAN	209	0	0	0	0	0
CORSA	0	0	68304	0	0	0
CURGEL	**1634**	**428**	**0**	**0**	**0**	**0**
SUPERMINI	1634	428	0	0	0	0
VOLKSWAGEN	**288784**	**379993**	**415859**	**27529**	**49455**	**62363**
VOYAGE	60143	42134	36322	27529	24795	28093
SANTANA	22755	26212	17396	0	0	0
APOLLO	9971	0	0	0	0	0
LOGUS	0	43592	40990	0	0	0
FUSCA	0	6343	17334	0	0	0
POINTER	0	372	13701	0	0	3573
GOL	153717	212625	248379	0	24660	30697
PARATI	32513	36072	33315	0	0	0
QUANTUM	9685	12643	8422	0	0	0

COMMERCIAL VEHICLES

				Of WHICH CKD		
	1992	1993	1994	1992	1993	1994
LIGHT COMMERCIAL	**201591**	**224441**	**251044**	**17363**	**24297**	**72926**
FIAT	**65620**	**56143**	**73890**	**6480**	**4512**	**45656**
UNO PICKUP	19932	18669	24405	1200	96	0
UNO FIORINO	44270	36153	48110	5280	4416	45656
UNO OTHER	1418	1321	1375	0	0	0
FORD	**39124**	**58075**	**54584**	**10483**	**19737**	**23830**
PANPA	20775	25322	20068	0	0	0
F 1000	18349	32753	34516	10483	19737	23830
GENERAL MOTORS	**38273**	**35714**	**36152**	**400**	**48**	**3440**
VERANEIO	149	106	29	0	0	0
A/C/D 10/20	25719	29831	32578	160	0	3440
CHEVY 500	11708	5363	2282	240	48	0
OTHERS	697	414	1263	0	0	0
CURGEL X12	**37**	**9**	**0**	**0**	**0**	**0**
TOYOTA	**3053**	**2627**	**3734**	**0**	**0**	**0**
OJ 50/55	3053	2627	3734	0	0	0
VOLKSWAGEN	**55484**	**71873**	**82684**	**0**	**0**	**0**
KOMBI	24523	35168	45072	0	0	0
SAVEIRO	27093	33758	36636	0	0	0
GOL	3868	2947	976	0	0	0

				Of WHICH CKD		
	1992	1993	1994	1992	1993	1994
TRUCKS	**32022**	**47054**	**64137**	**1005**	**1103**	**1536**
AGRALE	**612**	**1444**	**1475**	**198**	**364**	**0**
TX 1600	25	94	58	0	0	0
TX 1800	587	832	227	198	364	0
TX 7000	0	518	906	0	0	0
TX 7500	0	0	165	0	0	0
TX 4500	0	0	19	0	0	0
TX 5000	0	0	100	0	0	0
FORD	**6591**	**8100**	**11686**	**0**	**0**	**0**
F 4000	2775	3862	6062	0	0	0
F 11000	275	0	0	0	0	0
F 12000	775	857	855	0	0	0
F 14000	1421	1746	2733	0	0	0
CARGO 1215	120	112	149	0	0	0
CARGO 1415	194	168	342	0	0	0
CARGO 1422	186	136	81	0	0	0
CARGO 1617	95	72	545	0	0	0
CARGO 1622	465	655	383	0	0	0
CARGO 2322	70	116	95	0	0	0
CARGO 2324	0	0		0	0	0
CARGO 2422	96	177	231	0	0	0
CARGO 3224	30	63	17	0	0	0
CARGO 3530-4030	89	136	193	0	0	0
GENERAL MOTORS	**1769**	**2358**	**2584**	**100**	**60**	**130**
442/443/D40	787	1364	1260	100	60	80
653/682/683-1100	445	557	571	0	0	0
D 12000	0	0	50	0	0	50
753/783-1300	537	437	703	0	0	0
MERCEDES BENZ	**14183**	**19108**	**27434**	**681**	**679**	**1376**
709-710	1955	3220	3994	24	208	64
712	171	251	313	0	0	0
912-913-914	1102	1782	3811	0	176	952
L/LK 1214-1215	1240	996	2325	0	0	200
L/LK 1218	538	1022	1161	0	0	0
L/LK 1414	477	283	370	36	40	16
L/LA/LK/LAK 1418	994	1700	2061	1	147	28
L 1420	0	0	101	0	0	0
LP 1517	16	48	24	16	48	24
L/LK 1614	462	273	296	0	0	0
L/LK 1618-1620	2536	3025	3953	44	0	0
L/LK 1714-1715	62	48	334	0	0	0
L/LK 1718	372	478	405	0	24	88
L/LK 2314-2414	26	0	42	0	0	0
L/LK/LB 2318	782	967	983	0	0	0
L 2418	67	83	138	0	0	0
L/LK 1620-21-22	552	1091	1046	0	0	0
L/LS 1625	136	86	60	0	0	0
L/LS 1630-1633	740	985	1241	204	0	0

L/LK 1721	37	83	188	0	0	4
L/LS 1935-38-41-45	1621	2407	3906	356	36	0
L/LK/LB 2325	297	280	233	0	0	
L 2635	0	0	449	0	0	0
SCANIA	**3440**	**5130**	**6754**	**26**	**0**	**30**
R/T 112-113-143	3440	5130	6754	26	0	30
VOLVO	**2303**	**4702**	**5562**	**0**	**0**	**0**
NL 10/NL 12	2303	4702	5562	0	0	0
VOLKSWAGEN	**3124**	**6212**	**8642**	**0**	**0**	**0**
7.90-7.110	1685	3071	4529	0	0	0
11.140-12.140	422	881	1168	0	0	0
14.150/220	474	1050	1116	0	0	0
16.170/220	290	635	1201	0	0	0
24.220/250	153	342	355	0	0	0
35.300	100	233	273	0	0	0
BUSES	**24186**	**18891**	**17435**	**0**	**0**	**0**
MERCEDES	**19962**	**14571**	**13091**	**0**	**0**	**0**
O 371-O 400	2935	2032	1731	0	0	0
CHASSIS	16177	11534	10317	0	0	0
PLATFORM	850	1005	1043	0	0	0
SCANIA	**2013**	**1154**	**1056**	**0**	**0**	**0**
CHASSIS	2013	1154	1056	0	0	0
VOLVO	**1982**	**1037**	**1267**	**0**	**0**	**0**
CHASSIS	1982	1037	1267	0	0	0
VOLKSWAGEN	**217**	**1527**	**1218**	**0**	**0**	**0**
CHASSIS	217	1527	1218	0	0	0
FORD	**12**	**602**	**711**	**0**	**0**	**0**
CHASSIS	12	602	711	0	0	0
MAFERSA	**0**	**0**	**92**	**0**	**0**	**0**
M210	0	0	92	0	0	0

APPENDIX III

UTILITIES COSTS

Water cost per m3

Potable water

minimum 20 m3 - R$ 23.66
from 21 to 50 m3 - R$ 1.89 per m3
from 50 m3 up - R$ 2,07 per m3

Industrial water - R$ 0.13 per m3 ICMS (sales tax) included

Power cost - COELBA (electricity company)

industrial rates
96,35/1000 = kW/h
0 09635 = kW/h

Electric power CIA 13.800V ICMS-17% cost per KW/h = R$ 1.00

Natural gas

Consumption per m3		rates
Minimum	maximum	r$/m3
1 14.000	0,1280	
14.001	56.000	0,1226
56.001	140.000	0,1173
140.001	245.000	0,1119
245.001	420.000	0,1066
420.000	over	0,1043

Source: Bahiagas company

OPERATING COSTS

Maritime cargo transportation

Ships Santos/Salvador October 14 - October 30 and November 11

Container freight

20 foot containers R$ 1.000,00
40 foot containers R$ 1.500,00

Ships: 1 per month between the 10th and the 15th
Container freight

Hong Kong/Salvador	20 foot containers US$ 2.800,00
	40 foot containers US$ 5.000,00
Taiwan//Salvador	20 foot containers US$ 2 800,00
	40 foot containers US$ 5.000.00
Indonesia/Salvador	20 foot containers US$ 2.900,00
	40 foot containers US$ 5.400,00
Thailand/Salvador	20 foot containers US$ 2.900,00
	40 foot containers US$ 5.200,00

PERSONNEL COSTS

Labour costs

Minimum wage - R$ 104,16

Determined duration contract

The same rights as those of a regular employee apply

Employee (deductions)
Social security: 8%

Employer
Social security: 20%

Undetermined duration contract

Employee (discounts)
Social security 8%,. Depending, on the employee's contribution, 9%, or 11%
Transportation. Up to the company. The deduction not to exceed 6%, of base salary
Transportation tickets: 6% of base salary
Food tickets (under mutual agreement). up to 20%
Housing. Up to 25% (gross salary)
Labour union contribution: one day's salary per year

* in accordance with legislation, after deductions, the employee shall not receive under 30% of his salary

Company - expenses per employee

- FGTS (Employee's Indemnity Guarantee Funds)- 8% over gross salary
- Vacation: payment of vacation period (Employees are granted a vacation bonus equivalent to 1/3 of monthly salary)
- Social Security: 20% over payroll as per social security table

- 13th salary - double payment of the year base salary
- PIS:(Social Integration Programme) 1% over payroll for non-profit institutions and 0,65 for other companies
- COSINS (Social Contribution on Gross Sales): 2% over billings as of 1991

Note: total charges are approximately 65% over the gross value of payroll

Temporary labour (temporary services)

not to be employed over 90 days.

employees' deductions

tax on services rendered: 5% (in case of not having a license for self-employed services)

Urban buses in Salvador

Regular	R$ 0,50
Regular	R$ 0,70 Lapa/Lauro de Freitas, Arembepe
Special	R$ 1,20 Praca da Se/Airport
	R$1 00 Praca da Se/Iguatemi

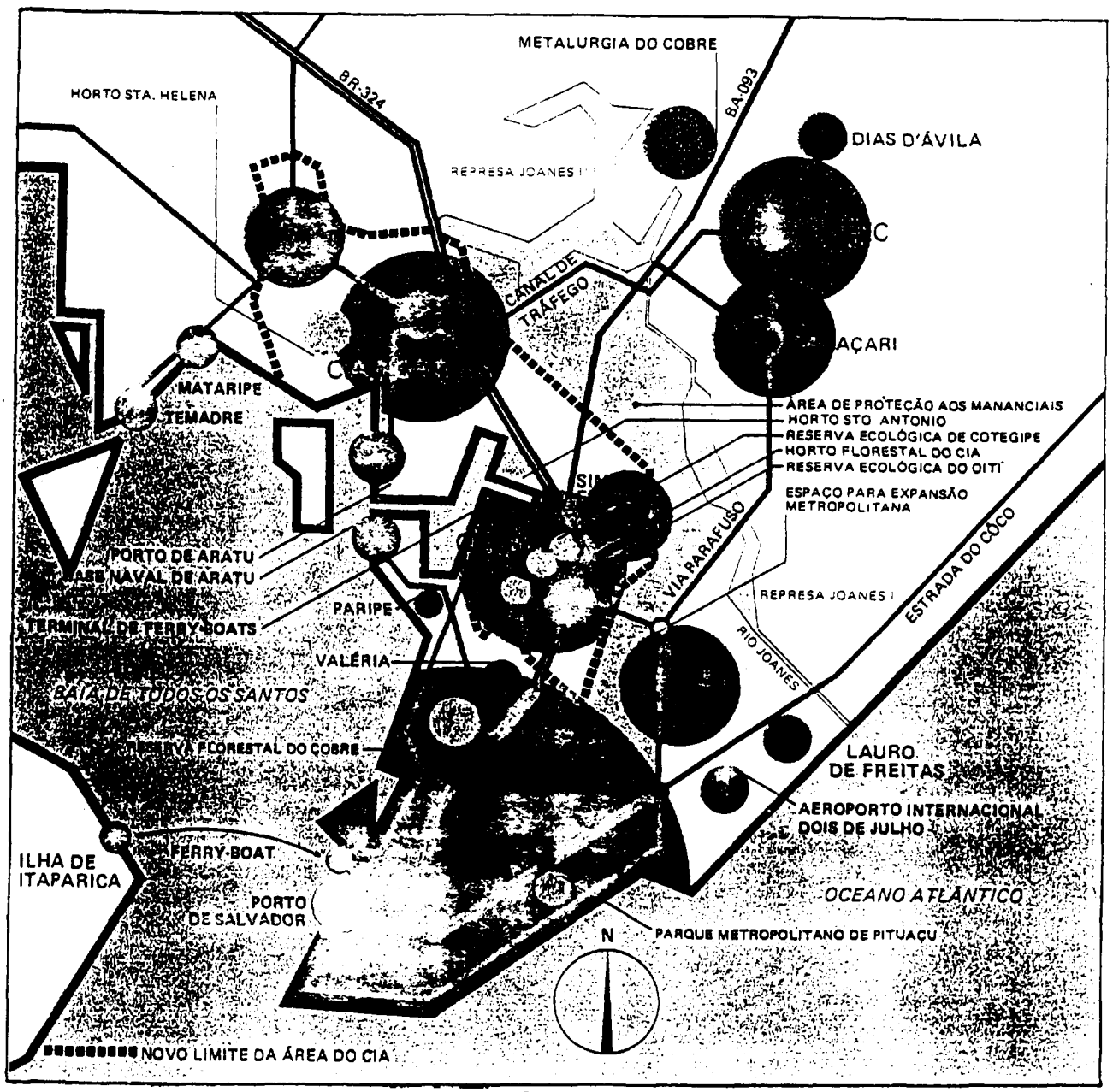
Personnel transportation cost

Salvador/CIA/Salvador: R$146,00 monthly (cost per person)

APPENDIX IV

SUDIC

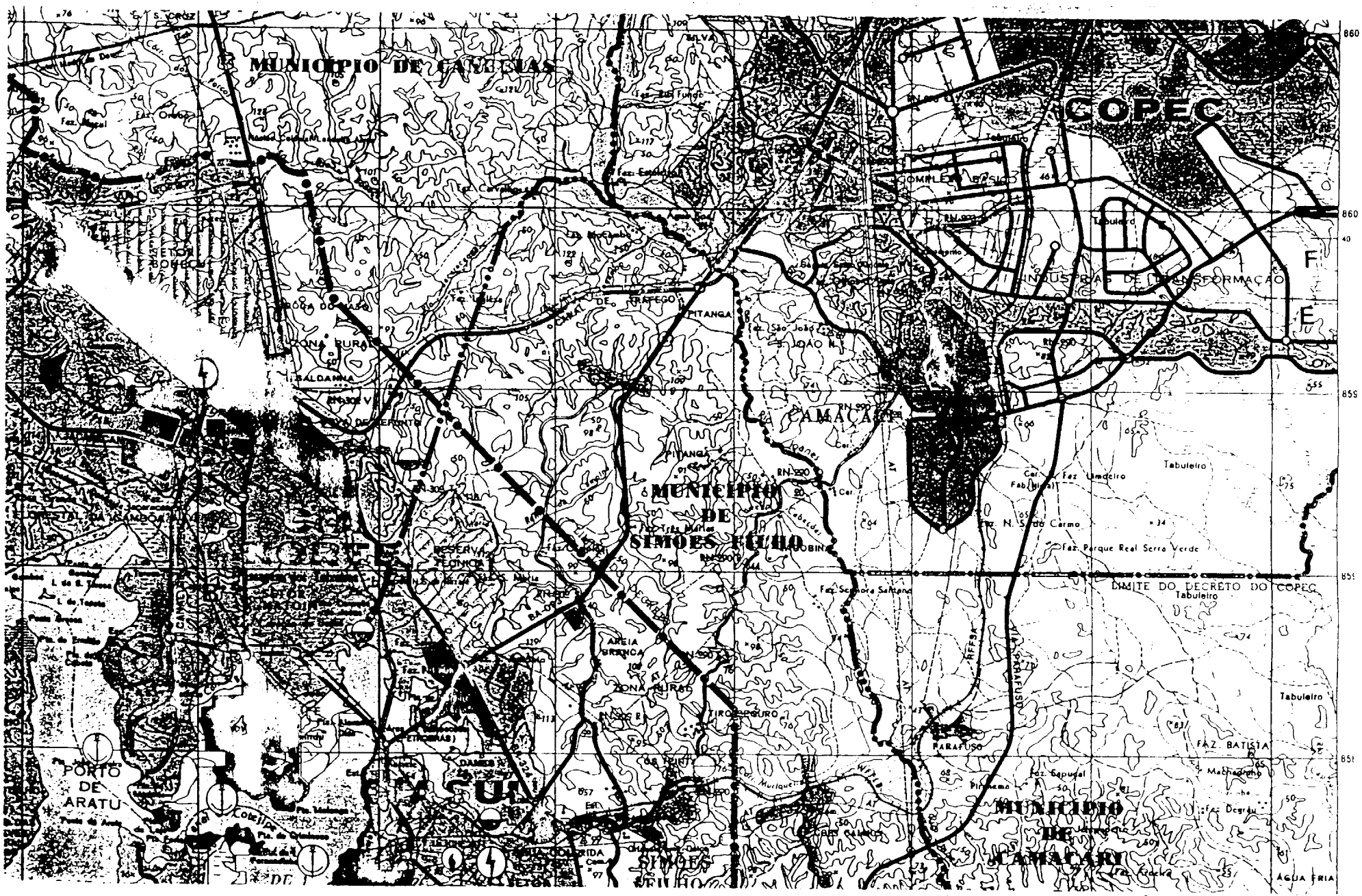
SUPERINTENDÊNCIA DE DESENVOLVIMENTO INDUSTRIAL E COMERCIAL



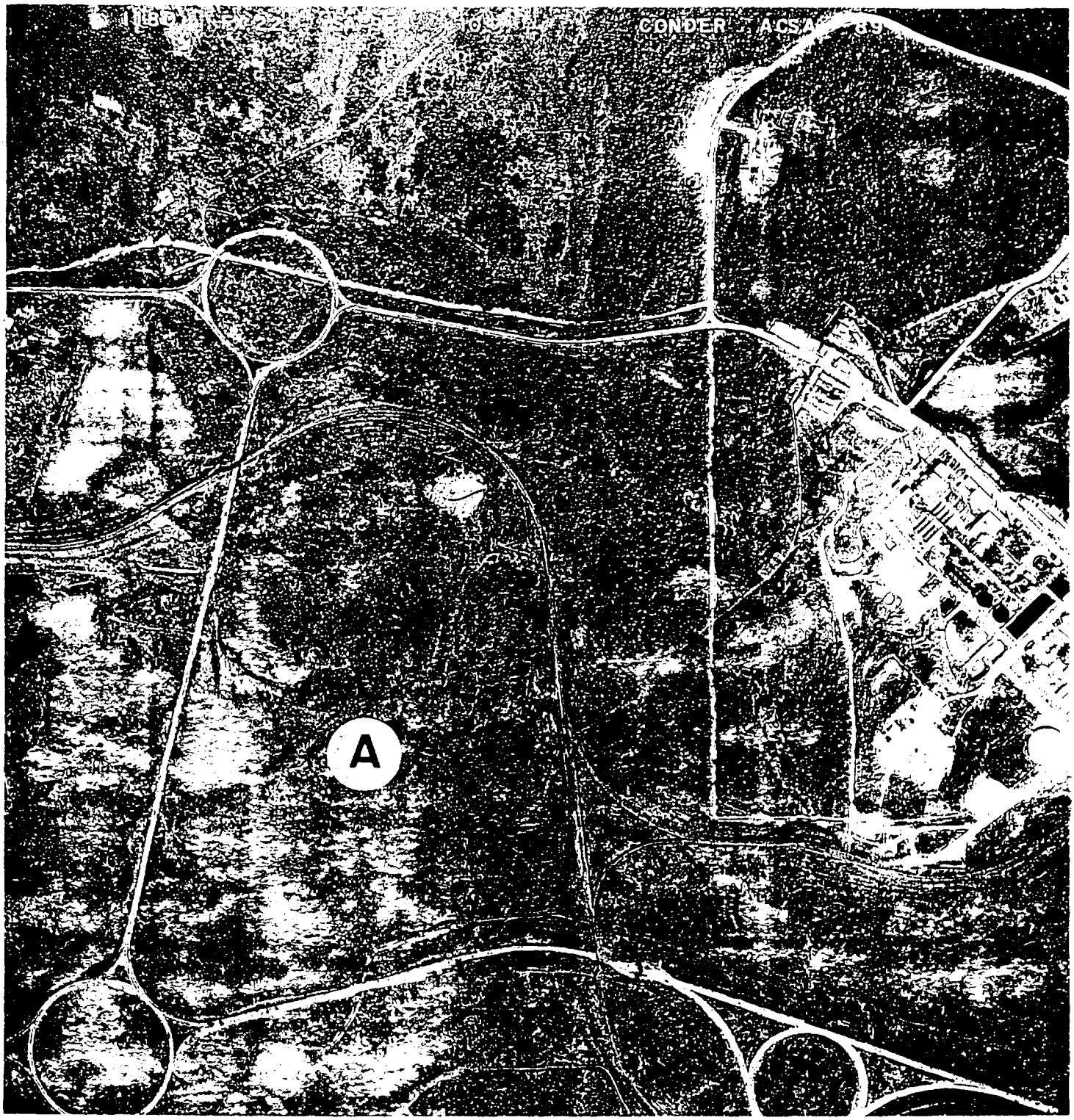
INDICAÇÃO DE ÁREAS INDUSTRIAIS

CIA - NORTE / COPEC

JULHO/95

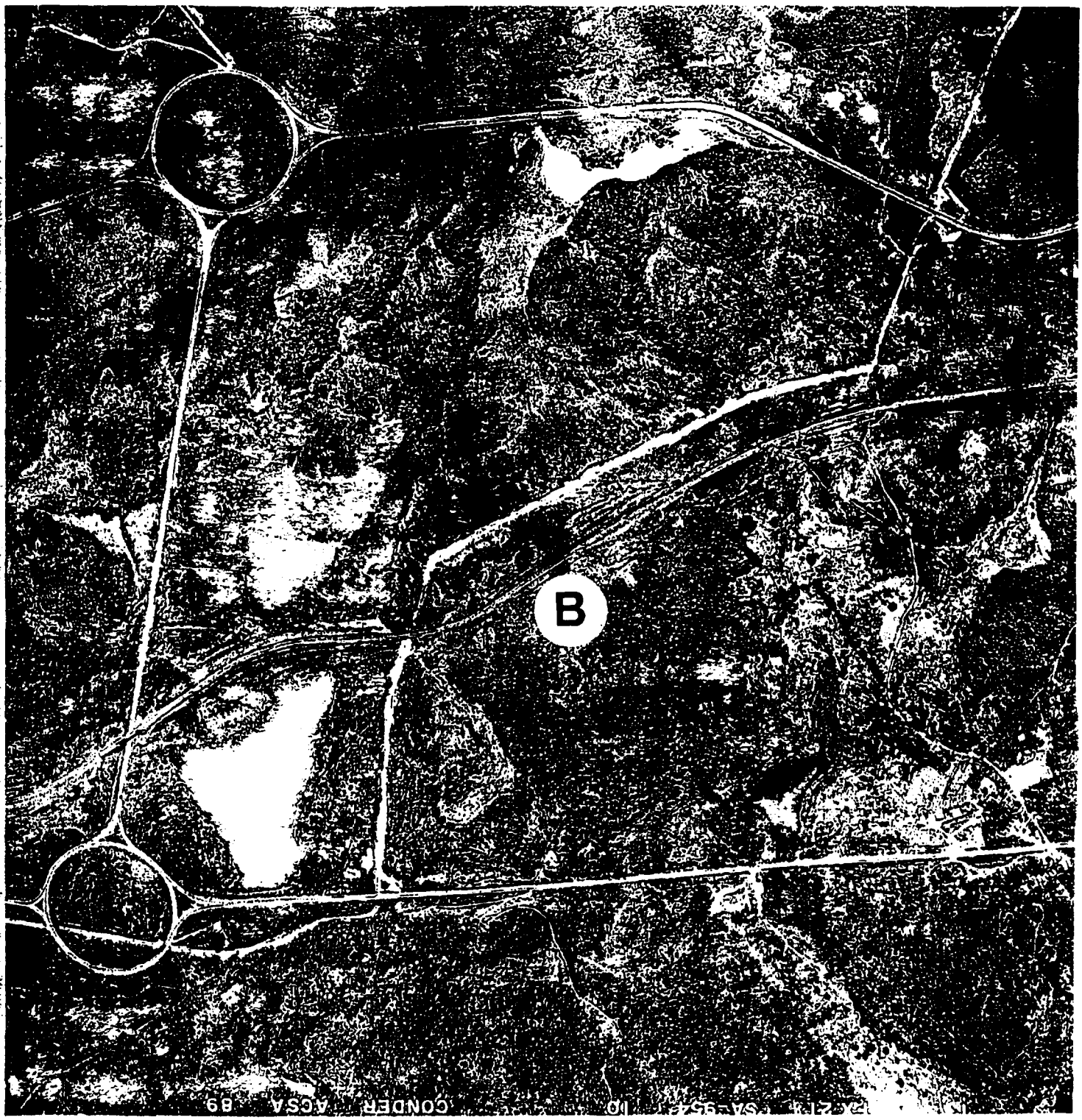


LOCALIZAÇÃO DAS ÁREAS



LOCALIZAÇÃO: BRAÇO "DC"
PRÓXIMO AO PORTO DE ARATU

A



LOCALIZAÇÃO: MARGEM ESQUERDA DO CANAL DE TRAFEGO

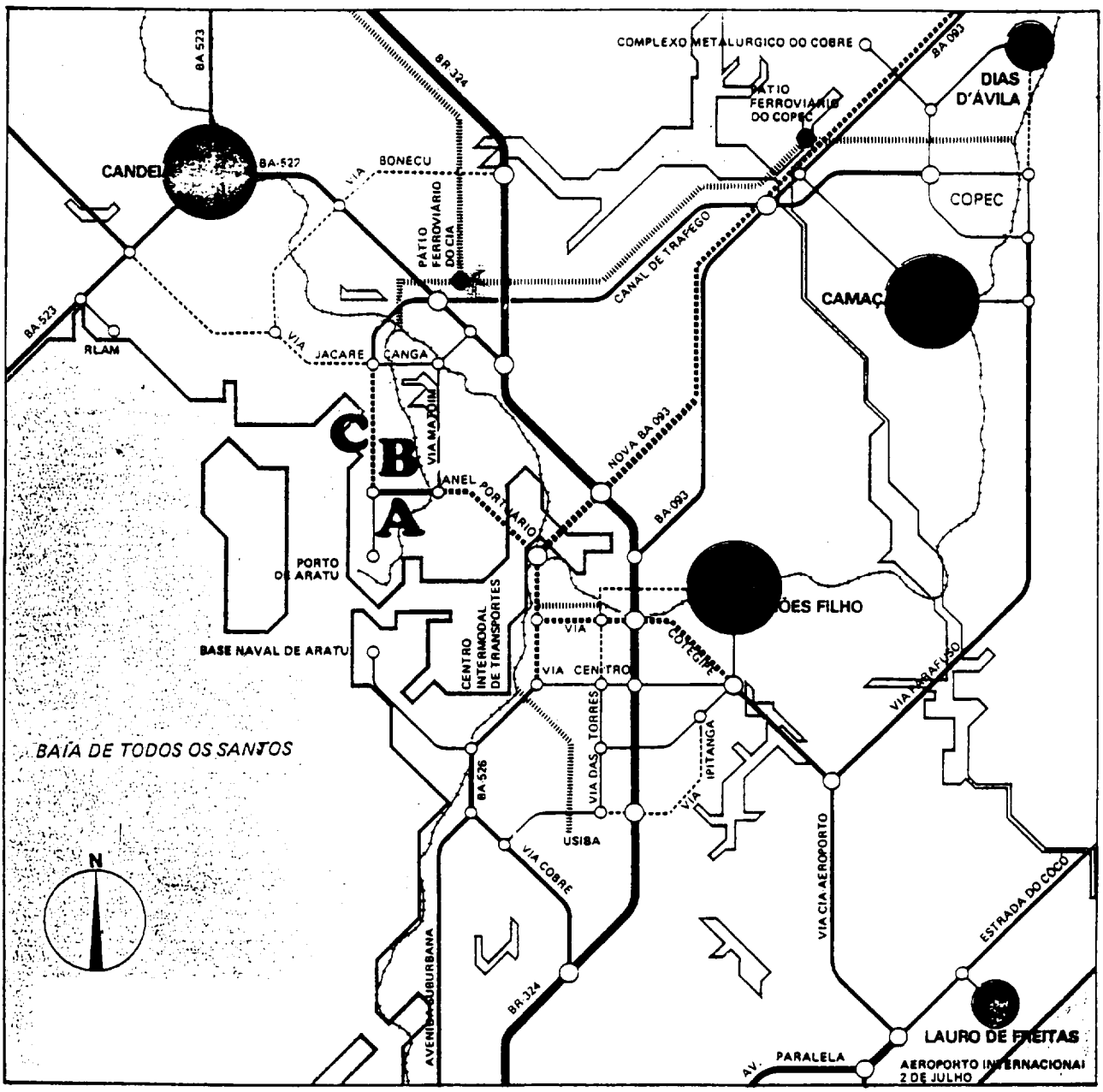
B

LOCALIZAÇÃO: MARGEM DIREITA DO CANAL DE TRÁFEGO

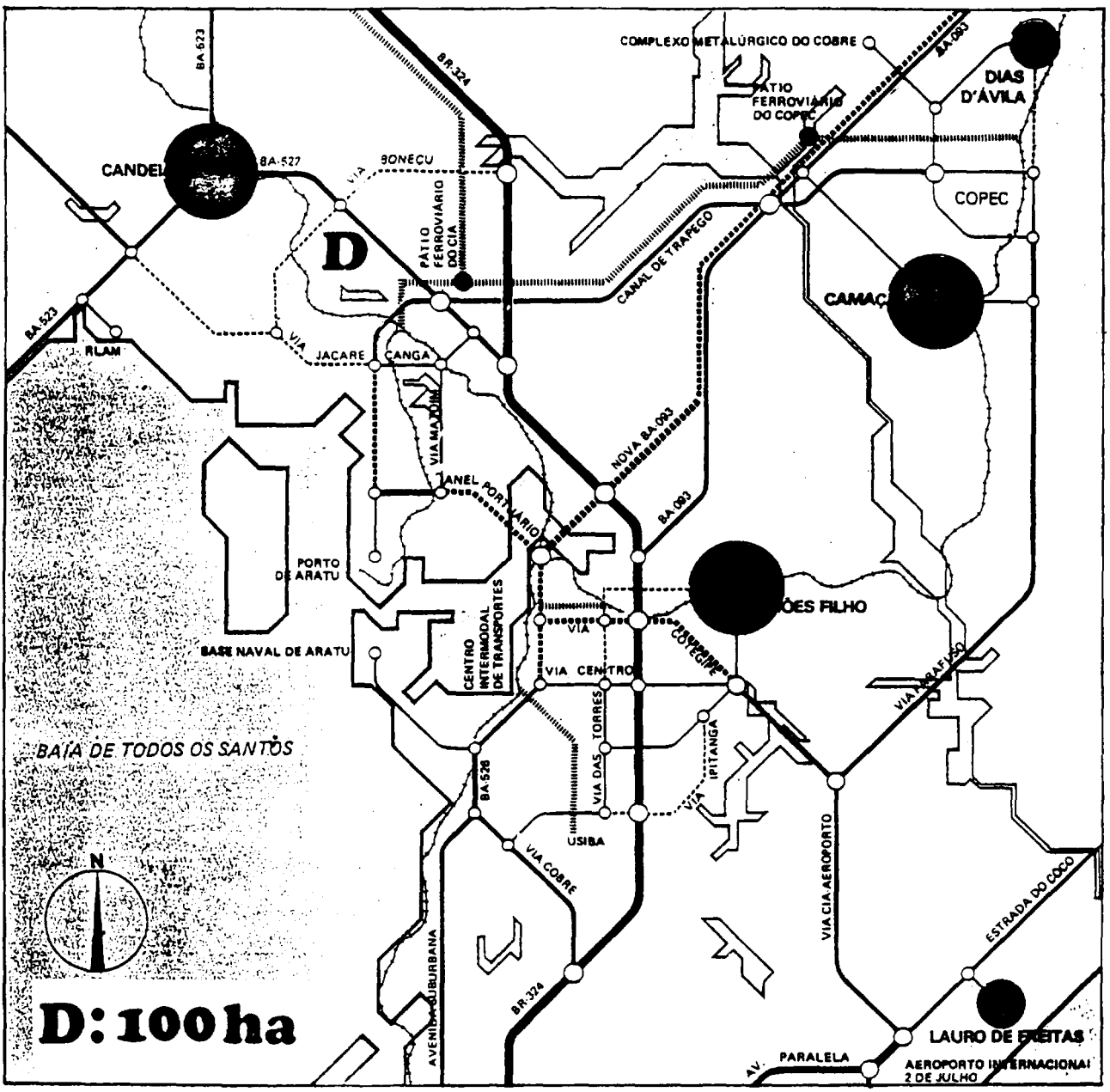
C

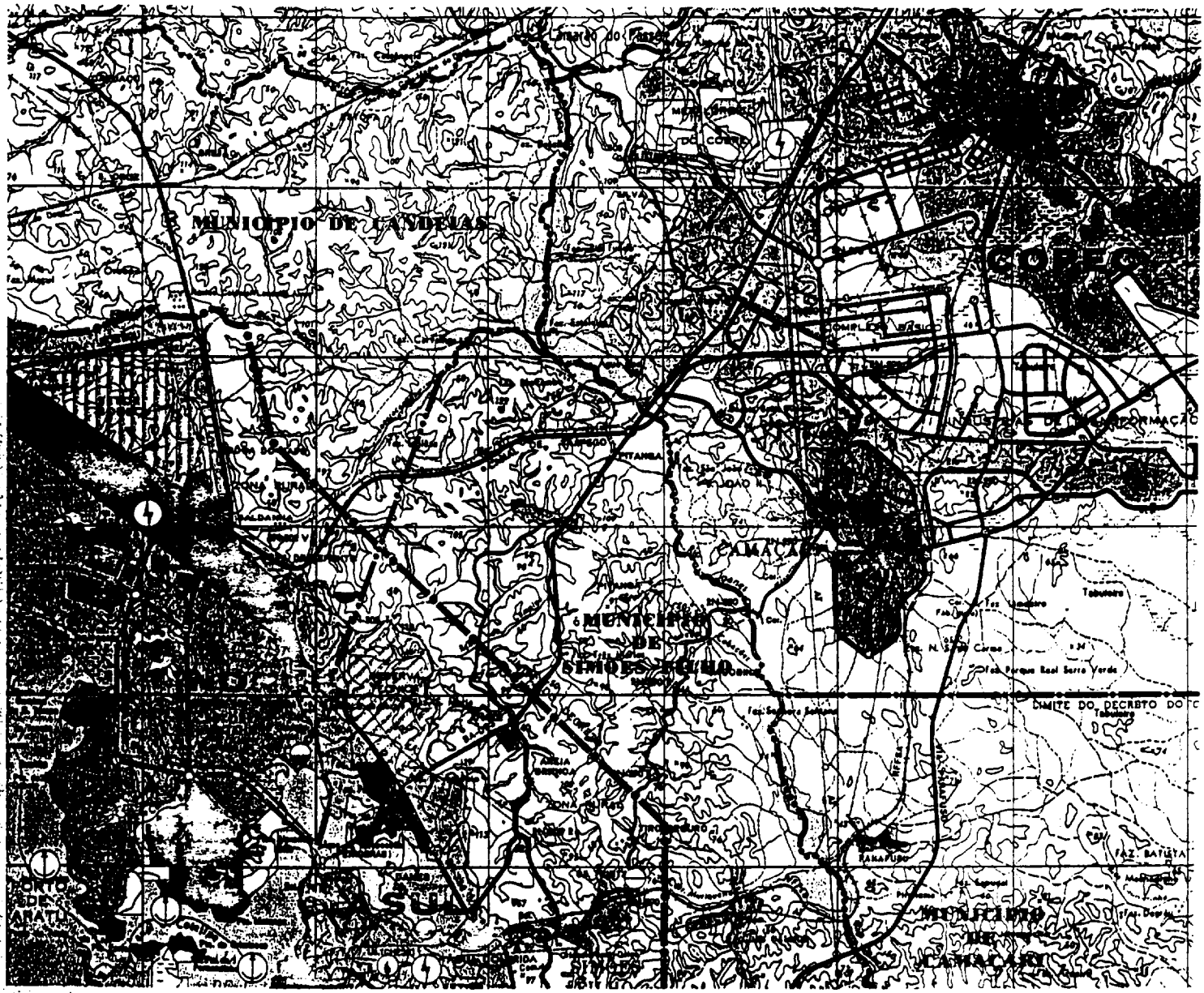
LOCALIZAÇÃO: VIA CANDEIAS
PRÓXIMO À METACRIL

D



A: 100 ha
B 300 ha
C: 250 ha


COMPLEXO METALÚRGICO DO COBRE
BA-093
DIAS D'ÁVILA
PÁTIO FERROVIÁRIO DO COPEC
BA-523
BR-324
CANDEL
BA-527
VIA BONOCU
COPEC
D
PÁTIO FERROVIÁRIO DA CIA
CANAL DE TRAPEGO
CAMAÇ
BA-523
RLAM
VIA JACARE
CANGA
VIA MADIM
NOVA BA-093
ANEL PORTUÁRIO
BA-093
PORTO DE ARATU
ÕES FILHO
BASE NAVAL DE ARATU
CENTRO INTERMODAL DE TRANSPORTES
VIA
COTEGIPE
VIA CENTRO
VIA MARFIM
BAÍA DE TODOS OS SANTOS
BA-526
VIA DAS TORRES
VIA ITAPANGA
USIBA
VIA COBRE
VIA CIA AEROPORTO
ESTRADA DO COCO
N
D: 100 ha
AVENIDA SUBURBANA
BR-324
AV. PARALELA
LAURO DE FREITAS
AEROPORTO INTERNACIONAL 2 DE JULHO



E:100ha
F:200ha

APPENDIX V

REPORT ON THE AUTOMOTIVE INDUSTRY WORLD-WIDE, WITH A FOCUS ON THE BRAZILIAN INDUSTRY

BRIEFING DOCUMENT PREPARED FOR STUDY MISSION TEAM

UNIDO

Project Number	**SF / BRA / 94 / 002**
Contract Number	**95 / 097 / AV**
Presented by	**P-E International**

Private & Confidential **September 1995**

CONTENTS *PAGE*

1. INTRODUCTION

This briefing document has been prepared by P-E International and pertains to :

UNIDO Project No. SF / BRA / 94 / 002 Opportunity Study - Market Analysis and Conceptual Plan For The Establishment of Automobile Production Plant in the State of Bahia - Contract No. 95 / 097 / AV.

This briefing document outlines the state of the automobile industry world-wide, with a specific focus on the Brazilian automotive industry. The aim of the report is to provide the study mission team to Bahia with an understanding of the Brazilian automotive industry, supported by pertinent statistics. It also meets the requirements set out in the work programme prepared by P-E International.

Should further clarification on any part of this report be necessary, please contact the undersigned.

Signed on behalf of P-E International

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Project Manager

September, 1995

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2. *GLOBAL TRENDS IN THE AUTOMOBILE INDUSTRY*

The Industry

The automobile industry has been one of the most powerful driving forces behind the development of economies in Europe, USA, Japan as well as Brazil during the last thirty years. The assembly operations (themselves substantial industrial enterprises) depend on supplies of components and on the design and installation of special-purpose mechanical transfer, welding, painting, and robotic placement and assembly equipment. Downstream from the assembly plant, the industry provides employment for distributors, dealers (including the used vehicle trade), service and repair operations, and the expenditure on advertising, marketing and promotion and of course insurance.

The passenger car is also a major contributor to environmental pollution, although the exhaust gas manifestations of this are being partly overcome by technical advances. Despite these advances, increasing traffic densities are a growing problem in most major cities, leading to waste of valuable space, noise, accidents, loss of time and stress-related medical disorders.

However, the passenger car provides a degree of personal mobility which has come to be regarded almost as a fundamental human right in industrialised nations. It is also regarded by many as a symbol of material success. It is therefore not only perceived as a necessity, but also as a fashion item. In this sense it is subject to changes in styling and continuous upgrade of performance and enhancement. New standards and accessories are introduced which make replacement desirable long before an existing vehicle reaches the end of its useful life.

Despite approaching saturation of markets in W Europe, USA and Japan, there will continue to be a demand for new cars which can reach new standards of performance, style, fuel economy, and perceived value for money.

World production of passenger cars peaked in 1990 at 35.0 million (DRI World Automotive Forecast Report - August 1993). The 1990 total is expected to be exceeded in 1995 with continuing growth thereafter, particularly supported by significant increases in car ownership in S Korea, China, Thailand, Latin America and E Europe. Table 1 presents the world vehicle production statistics from 1984 - 1993 and Table 2 shows the export of vehicles from major countries.

Table 1 Vehicle production- 20 major countries - 1984/1993

Thousand units

Country	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Japan	11,465	12,271	12,260	12,249	12,700	13,026	13,487	13,245	12,499	11,228
USA	10,939	11,650	11,335	10,910	11,187	10,852	9,780	8,811	9,778	10,890
Germany	4,045	4,446	4,597	4,634	4,625	4,852	4,977	5,034	5,194	3,991
France	3,062	3,016	3,195	3,493	3,698	3,920	3,769	3,611	3,768	3,156
Canada	1,829	1,933	1,854	1,635	2,043	1,940	1,896	1,905	1,983	2,239
Korea	265	378	602	980	1,084	1,129	1,322	1,498	1,730	2,050
Spain	1,309	1,417	1,533	1,704	1,866	2,046	2,053	2,082	2,304	1,768
CIS	2,209	2,200	2,226	2,229	2,180	2,100	2,040	1,929	1,448	1,589
UK	1,134	1,311	1,248	1,390	1,545	1,626	1,566	1,454	1,540	1,569
Brazil	**865**	**967**	**1,056**	**920**	**1,069**	**1,013**	**915**	**960**	**1,074**	**1,391**
China	316	443	373	473	645	587	509	709	1,080	1,310
Italy	1,601	1,573	1,832	1,913	2,111	2,221	2,121	1,877	1,686	1,267
Mexico	344	398	272	233	511	641	821	989	1,083	1,080
Belgium	252	267	276	335	399	388	385	338	314	418
India	181	231	239	288	312	333	364	354	355	373
Poland	343	312	356	364	351	339	365	185	223	354
Sweden	432	461	487	502	484	466	410	345	303	337
Australia	399	411	362	323	347	358	384	293	209	295
Yugoslavia	272	258	282	324	330	343	319	240	31	8
E Germany	231	244	264	267	262	257	187	-	-	-
Others	246	92	584	514	867	552	521	643	978	3,115
Total	**41,739**	**44,279**	**45,233**	**45,680**	**48,616**	**48,989**	**48,191**	**46,502**	**47,580**	**48,428**

Source: Anfavea

Table 2 Vehicle exports by major countries - 1984/1993

Thousand units

Country	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Japan	6,109	6,730	6,605	6,305	6,104	5,884	5,831	5,753	5,668	5,018
Germany	2,389	2,746	2,694	2,607	2,677	2,898	2,766	2,360	2,730	2,176
France	1,677	1,700	1,731	1,852	2,035	2,111	2,096	2,197	2,296	1,968
Canada	1,569	1,611	1,543	1,331	1,621	1,664	1,486	1,356	1,464	1,697
Spain	741	831	791	824	918	1,112	1,255	1,465	1,473	1,382
USA	783	896	910	911	993	976	872	870	880	913
UK	296	292	246	299	334	431	510	715	708	624
S Korea	52	123	306	546	576	356	347	390	456	639
Italy	584	564	718	766	827	847	901	807	698	504
Brazil	**197**	**208**	**183**	**346**	**320**	**254**	**187**	**193**	**342**	**332**
Belgium	236	253	285	321	382	370	372	323	271	ND
Sweden	273	258	274	271	214	205	206	183	198	302

Source: Anfavea

World car production has evolved through continuous standardisation of design and rationalisation of manufacture so that (apart from specialist and luxury car manufacturers) the major markets are now dominated by a few multinational corporations (e.g. GM and Ford) and by national corporations, generally with formal links with other national corporations (e.g. Renault, Volvo, Rover and Honda), or with wholly-owned production plants in other countries (e.g. Peugeot, Nissan and Toyota). Further rationalisations seem likely, particularly in W Europe, in the struggle to remain profitable whilst continuing to undertake the investment in new models and technology necessary to stay in business.

Typically, Western manufacturers produce between two and five times more passenger cars than commercials. Four of the world's leaders produce between ten and fifteen times more passenger cars than commercials. Only two produce more commercials than passenger cars. Overall, the average is three times more passenger cars.

Overall, the European market for passenger cars in 1993 compared with 1992 is down 17.7%, representing some 1.5 million cars. The total European market 1993 has been forecast at 11 million cars (ACEA). MIRA forecasts that the 1992 total of 13.5 million will not be reached again until 1997.

In 1991 the European car industry reached an agreement with the Japanese industry to limit imports of Japanese cars. The agreement is variously interpreted between the status of a voluntary agreement in some countries to that of an agreement enforceable by a variety of non-tariff barriers in certain others. Partly as a result of this agreement, and partly as a result of escalating wage costs in Japan, Japanese manufacturers are setting up assembly plants in Europe.

Increasingly these assembly lines are being required to source components within Europe to qualify for "European car" status. Japanese manufacturers assembled approximately 300,000 cars in UK alone in 1993 and this figure is expected to rise to 800,000 in 1998 (DRI). The agreement runs out in 1999.

It is estimated that there is excess manufacturing capacity for 7 million vehicles in Europe. Further mega-mergers are likely in order to rationalise management, R&D, sourcing and other overhead.

Despite serious efforts to reduce costs in the last few years, volume is still critical to profitability in the European motor industry. For instance:

- German manufacturers have reduced employment by 95,000 in the last few years, yet they expect to further reduce employment as part of an overall cost reduction of 20-30%
- Volkswagen cut jobs in six plants in 1993 and 1994, reducing total employment to about 100,000 in Germany
- About 13,000 jobs were cut by Mercedes-Benz in 1992, reducing total employment in Germany to 212,000 at end-1992
- Fiat (who made a profit of US $1.5 billion in 1989) lost US $339 million in 1992 and have cut their workforce from 133,000 to 125,000. Fiat reduced output of vehicles by 259,000 in 1991, 230,000 in 1992 and 173,000 in 1993
- Rover capacity is more than 500,000 vehicles per year, of which 80,000 is for 4x4 units. At a total current production level of about 400,000 vehicles Rover is capable of making a profit before interest of around US $60 million, but with some US $600 million of debt to service there is likely to be a net loss before tax. Rover has invested more than US $300 million since 1990 and has improved productivity by 18% this year, but increased volume of cars is still critical to future profitability after interest.

Productivity per (manufacturing) employee varies in Europe depending on the complexity of the model, the extent of the labour-saving investment and the efficiency of the workforce. The following table is indicative:

Manufacturer	Cars/year/manufacturing employee
Ford (Europe)	15
VAG (VW & Audi)	15
BMW	13
Rover Cars	12
Renault	19
PSA (Citroen)	18

Source : MEMO - USA and Japan

Unit labour costs are particularly high in Germany, partly due to high wages but also due to German workers having been overtaken by others in the productivity race. Wage rates/hour and hours worked/year are an indication:

Country	Wage/hour US $	Hours worked/year
Germany	32.6	1483
Rest of EEC	19.7	1700
USA	23.9	2022
Japan	23.9	2181

Unit labour costs, taking into account productivity, are some 20% lower in France than in Germany and 25-30% lower in Japan (VDA).

European manufacturers are looking increasingly to component manufacturers to yield further cost reductions in the future. Measures being adopted include single sourcing (for economy of scale), partnership purchasing (for improving design and quality and reducing the cost of R&D), factories located close to the assembly plant (to minimise inter-company inventory) and purchase of systems rather than components (to reduce assembly costs).

Technical

After general and common development of more powerful engines, drive trains to match, corrosion resistant body shells and noise reducing measures, motor manufacturers have directed technical effort down more diverse avenues.

- Passenger safety has been a common objective, with crash-absorbing front and rear body designs and strengthening against side impact now usual
- ABS is now incorporated in many medium-priced cars
- Airbags are becoming more common in more expensive models or as an extra
- Electronic fuel management systems are becoming common even in smaller cars (e.g. Nissan Micra, Opel Corsa, Rover 200/400)
- Zero Emission Vehicles (ZEV) will gain some following in the future (California will expect 2% of all manufacturers' sales to be ZEV in 1998 and 10% by 2010). ZEVs will be electric vehicles with limited driving range before re-charge. They will be supplemented by Low Emission Vehicles (LEV) which will achieve low emissions partly through fuel management and partly through catalysis. LEVs will not of course eliminate CO2 emissions.
- Weight reduction is perhaps the single most common direction of development. The prime modification is fuel economy, with a view both to the environment and

to the eventual reducing supplies of fossil fuel. Aluminium engine components are already common. Audi, Ford and GM are developing aluminium space frames.

- Magnesium is used extensively by more expensive models for wheels, seat frames and housings
- Manufacturers including Mercedes, BMW, Nissan, Renault, Fiat and VW are experimenting with the "City Car". This may be hybrid or electric engined and is designed for local service, recognising that most private passenger car journeys are less than 20-30 Km
- Both Dow Chemical and DuPont have development programmes for the increased use of structural plastics in automobiles
- The use of robotics in car assembly is extensive and increasing. In Japan, for instance, the following table shows the development of robotic production techniques and a forecast to 2000:

Percent Robotic Operations in Japanese Auto Industry 1980-2000

Activity	1980	1990	2000
Spot Welding	45	75	90
Arc Welding	15	55	75
Coating/sealing	10	50	70
Engine Production	10	40	60
Assembly	5	40	45

Source: Consultants for Trade & Industry

Comments

1. The value to the economy of the automobile industry is in the upstream (steel, foundry and component) and downstream (sales and service) industries as well as in the automobile design and assembly industries themselves. The industry can provide employment for as many as four or five times the numbers employed by the core motor manufacturers.
2. World growth of the industry is set to level off after the high levels of growth experienced in the last three decades. Nevertheless, pressures for replacement, improved safety and fuel efficiency will continue to sustain a market in the developed markets.
3. Of the 12 major World manufacturers, GM, Ford and Toyota predominate, with VW and Nissan also having leading positions due to dominant positions in Europe and Japan, respectively, rather than World positions.

4. Production volume is critical to financial success in the industry. This is not a question of assembly plant size. Assembly plants turning out as few as 200,000 cars or other vehicles/year can be profitable provided they are part of a larger group. Economy of scale at manufacturing level is perhaps the least important. It is **more important** for a manufacturer to have leverage in the purchasing of components, materials and systems. Most important of all is the need to spread R&D, design, testing and marketing costs over a large number of vehicles.

5. Despite the ability of manufacturers to license and sub-contract certain of these functions, it is difficult to see how the manufacturer of a modern passenger car can be profitable and can invest the funds needed to continue in business unless annual production exceeds 500,000 - 1 million vehicles, especially if the manufacturer is supporting totally the costs of R&D, new model development, testing and launching.

6. For instance, Ford are reported to have spent US $800 million on development alone of the Mondeo car. New production facilities and modifications to existing plants will have added to that figure and testing, launch and promotion costs may have trebled the figure before the first car was sold.

7. After production rationalisations, model rationalisations, design-for-manufacture, sub-contracting of component supply, robotic assembly and increasing direct labour productivity through training, organisation and motivation, it seems likely that automobile manufacturers will seek their next round of cost effectiveness from component rationalisation and sharing development costs with other manufacturers (e.g. Rover/Honda, Renault/Volvo).

3. *BRAZILIAN AUTOMOTIVE SECTORIAL AGREEMENTS*

The automotive sectorial agreements of 1992 and 1993 resulted from the works of the Automotive Sectorial Chamber, a forum which is formed by the private sector, the workers, and the government. The sectorial chambers were established by the federal government with the objective of co-ordinating the understandings among all sectors in the economy, workers and authorities, presenting suggestions and recommendations for industrial and sectorial policies, and to set short and long term goals for the segments within their operational field.

The first automotive agreement was signed in Brazil on February 26th 1992 and completed on April 9th of the same year for trucks and buses.

On July 1st 1992 the first automotive agreement was renewed by the sectorial chamber, in Brazil.

The second automotive agreement was signed in Brazil on February 15th 1993.

The first automotive sectorial agreement

The first automotive agreement was signed after two days of negotiations with the workers and the public and private sectors, crowning a process which had begun in 1991. The fall in the domestic sales recorded before the agreement (1991 and the first trimester of 1992) led the participants meeting in the chamber to concentrate on measures that could recover the market in the short term. Medium term measures were also recommended.

1. Measures to be applied immediately

Employment and wages Keeping employment level. Monthly correction of wages according to inflation rates.

Prices of cars and light commercials A 22% reduction in prices, attained through lower rates of IPI and ICMS taxes, and also through a reduction in the margins of the production and distribution sectors.

2. Medium term measures recommended

"Consórcios" Opening of new group for "consórcios", with new rules.

Foreign Trade Studies for adoption of foreign trade automotive programs, by rule of law (the topic was resumed in the 2nd automotive agreement).

Financing Extended official credit for sales of trucks, buses, and agricultural machinery.

Automotive investment programs

Negotiation on cost reductions by the productive chain

The complimentary agreement for heavy commercials

One month after the 1st automotive agreement, new measures were taken towards reducing consumer prices in about 16% for trucks, truck tractors, bus chassis and platforms. This reduction in prices, signed by the entities that represent the industry and distribution was made possible by the reduction in the ICMS and in production and commercialisation margins.

Renewal of the 1st automotive agreement

The private and public sectors together with the workers returned to Brazil in July 1992 to assure the renewal and extension of the 1st automotive agreement, which was preceded by negotiations. According to the renewed document, the reduction in prices, caused by the lower taxation (IPI and ICMS) and business margins, was extended until December 31st 1993.

On that occasion, the debates about the foreign trade for the automotive sector were continued, and would be resumed and concluded in the 2nd automotive agreement.

The 2nd automotive sectorial agreement

The successful outcome of the 1st automotive sectorial agreement, reducing taxes on vehicles and business margins and so contributing to reduce the consumer price, stimulated the participants of the automotive sectorial chamber to approve, a year later, in the 2nd automotive agreement, longer lasting measures. Other measures of immediate application were also approved: new reduction on taxes and business margins, which caused a second decrease in prices of vehicles to the consumer in about 10%.

The general objectives of the 2nd automotive sectorial agreement are: to increase production, employment, domestic market, investments, and gross domestic product; to maintain and raise salary standards; to improve quality; to keep tax revenue level; to strengthen automotive exports.

The 2nd automotive sectorial agreement is to reach these goals by means of reducing tax on vehicles and margins in the production and distribution chains, resulting in a lower consumer price and a better access to the final products by the increase in "consórcios" and financing; implementing projects of quality improvement, productivity gains and technological advances.

Here are the main clauses in the 2nd automotive sectorial agreement:

1. Taxes

IPI Tax reduction on cars and light commercials. The measure took effect on February 20th 1993, at the publication of decree no. 755/93.

IPI Recommendation to reduce IPI on raw materials, parts and components for trucks, buses and agricultural machinery, extended to the final product. The measure took effect by the federal decree no. 1,178/94, published in Diário Oficial da União of July 5th 1994.

IPI and accelerated depreciation. Following in congress the bill that aims to prolong law no. 8.191/91 which establishes IPI exemption and accelerated depreciation for agricultural machinery. The exemption deadline in this law expired on March 31st 1993. The bill was passed in congress and became law no. 8.643/93 which extended the IPI exemption for agricultural machinery up to December 31st 1994.

ICMS Recommendations to reduce ICMS on raw materials, parts, and components for trucks, buses, and agricultural machinery, extended to the final products.

2. Credit

"Consórcios" Longer periods for "consórcios" of cars, light commercials, buses and agricultural machinery.

Financing Increase in the share financed by the finance office, from BNDES (National Bank for Economic and Social Development), for buses, trucks, and road tractors, and obtainment of additional funds during the 1993 term for the financing of trucks, buses and agricultural machinery.

3. Contributions from the production and distribution chains

Margins Reduction in the business margins "in a way to result in an additional decrease in the consumer price of at least 5%".

Demand A commitment to guarantee the meeting of the demand, with the following production goals: in 1993, 1.2 million units; in 1994, 1.35 million; in 1995, 1.5 million; and in 2000, 2 million.

Employment An increase in employment level by creating, until the year 2000, 91 thousand jobs, in the sectors of: assembly (about 4 thousand jobs); commercialisation (about 5 thousand); financial (about 11 thousand); and other sectors (about 70 thousand).

Investments Distributed over the segments of autoparts, tyres, foundry, raw materials, and commercialisation, investments amounting to US $ 20 billion until the year 2000.

Quality and productivity A more effective participation of the automotive sector in the PBQP (Brazilian Quality and Productivity Program), especially in training and recycling of personnel and research work development.

4. Foreign trade

Incentives to exportation The sending of a bill to congress, by the executive power, with incentives to increase foreign trade for vehicles, car parts and components. The bill was sent to congress in April 1993; in the first semester of 1994, studies were resumed and concluded, within the tourism, commerce and industry ministry, about a program to stimulate international competitivity, of a normative character, with the objective of substituting with improvements, the original bill.

5. Collective work relations

Collective convention The understanding between the industry and the workers attained in the automotive sectorial chamber was documented in a collective work convention for the automotive sector, signed in April 1993. Effective until March 31st 1995, it may be automatically extended up to October 31st 1995. The convention guarantees: salary correction; real salary increase of 20% distributed in three annual instalments (1993, 1994 and 1995); maintenance of employment level for the sector. In April 1994, due to the economic stabilisation plan which introduced the URN and, later, on July 1st, the new currency, the "real" , the convention was partially complemented in its salary clauses.

The "popular vehicle" regime Like the 2nd automotive agreement, the popular vehicles were the object of federal decree no. 799, published on April 19th 1993.

The amendment to this decree states that its objective is to reduce IPI (tax on industrialised products) rates on the popular vehicles.

This decree considers "popular" the vehicles of about one thousand cylinder capacity especially, and certain light commercials, according to IPI classification norms.

The negotiations around the popular vehicles were held between the federal government and the companies Autolatina Brasil (Ford and Volkswagen divisions), Fiat Automóveis and General Motors do Brasil. Both negotiations - sectorial chamber and popular vehicles - have the objective of increasing the number of consumers of new vehicles through a reduction on taxes, and in this way, stimulate production and employment.

Therefore, according to decree no. 799/93, the aim is to fulfil the commitments taken in the agreements signed by the government and the companies Autolatina, Fiat Automóveis and General Motors, "in order to enable a decrease in the consumers' sale price for the popular vehicles, with positive reflections on employment, financing level and industrial production".

The acreements to which decree no. 799/93 refers to were published in Diário Oficial da Uniáo in the issues from March 4th to 31st. and April 19th 1993.

Decree no. 799/93 reduces to 0.1% the IPI on some vehicles - cars of about one-thousand cylinder capacity and certain light commercials. The regime implies observance of the local contents indexes and the exercise of consumer sale prices as in the agreements and decree no. 799/93.

Brief evaluation of the automotive agreements The main numbers lead to the conclusion of a thorough success in the agreements carried out by the private sector. workers. and the government.

1. Price

Tables 3 and 4 below present a summary of the results obtained. Reductions in prices amount to 30% for vehicles in general and 35.7% for the popular vehicles. in a period of 16 months. in real terms.

Table 3 Reduction in the price of vehicles - 1st and 2nd sectorial agreements

Reductions	March 92 (1st Agreement)	February 93 (2nd Agreement)	Total
IPI	6.00*	6.00*	12.00*
ICMS	6.00*	-	6.00*
Industrial margin	7.5*	4.2*	11.7*
Distribution margin	2.5*	0.8*	3.3*
Consumer price	22%	10%	30%

(*) In percentage (points)

Table 4 - Reduction in prices of popular vehicles

Reductions	1000 Cylinder		Popular*	Total
	March 92 (1st Agreement)	February 93 (2nd Agreement)		
IPI	6.00**	6.00**	7.9**	19.9**
ICMS	6.00**	-	-	6.00**
Industrial margin	7.5**	42.**	-	6.00**
Distribution margin	2.5**	0.8**	-	3.3**
Consumer price	22%	10.2%	8.2%	35.7%

(*) Successors of the 1000 cylinder capacity vehicles
(**) In percentage (points)

2. Domestic sales and production

The reduction in prices, along with quality improvement and modernisation of the vehicle lines, with successive launchings of new models, were fundamental to the domestic market and production growth recorded especially in 1992, as follows:

Table 5 - Domestic sales and production

Units

	1993	1992	Variation % (1993/1992)
Production	1,391,376	1,073,761	29.58
Domestic sales of local production	1,061,397	740,228	43.39

3. Popular vehicles

The popular vehicles, successors of the one-thousand-cylinder-capacity cars (April/93), have achieved a greater share of the domestic market sales, in general, which confirms the acceptance by the consumers in terms of quality and price.

Table 6 Vehicle sales - market share

In %

Annual averages	1.000 cylinder capacity Popular	Up to 100 hp	Above 100 hp
1991	11.6	72.1	16.3
1992	16.1	63.6	20.1
1993	28.5	51.5	20.0
1994*	39.4	41.3	19.3

(*) From January to June

4. Generating taxes

The tax revenue from the automotive sector, both federal and the ICMS, from the state, showed an increase in 1993. The revenue from the federal taxes IPI, PIS and COFFINS, went from US $ 136 million on a monthly average in the first quarter of 1992 (before the 1st automotive agreement) to US $ 222 million averaged monthly in the last quarter of 1993. In the state tax ICMS, there was also progress, when comparing the revenue from the first quarter of 1993 - first consistent basis to be considered for the introduction of the tax substitution regime from September to December, in 1992 - with the one obtained in the last quarter of the same year, all over the country.

5. Position of the Brazilian industry in the world ranking

In 1993, the good performance of the Brazilian automotive industry placed it two positions above in the world ranking of producers, surpassing Italy and Mexico. The country went from the 12th place, in 1992, to the 10th place, in 1993. The permanent efforts to increase production may take the country three or four positions above in the ranking, until the year 2000.

4. *STATISTICS ON THE BRAZILIAN AUTOMOTIVE INDUSTRY*

The following pages outline the size of the automotive industry in Brazil. The tables present statistics on:

Table 7 National Vehicle Fleet - 1985

Units

REGION/STATE	PASSENGER CARS	LIGHT COM-MERCIALS	TRUCKS	BUSES	NOT CLASSIFIED	TOTAL
NORTH	131.092	31.035	21.979	3.420	10.979	198.505
Rondônia	13.351	8.991	5.737	596	1.501	30.176
Acre	4.353	1.924	893	110	385	7.665
Amazonas	39.513	7.403	4.803	1.148	2.908	55.775
Roraima	3.464	2.315	1.041	32	379	7.231
Pará	64.721	9.087	8.698	1.475	5.544	89.525
Amapá	5.690	1.315	807	59	262	8.133
NORTH-EAST	908.293	137.797	113.019	17.883	51.853	1.228.845
Maranhão	43.151	9.072	8.585	1.471	2.399	64.678
Piauí	26.796	5.368	4.028	538	1.786	38.516
Ceará	152.120	24.705	16.332	2.693	6.541	202.391
Rio Grande do Norte	61.968	10.828	7.772	1.052	3.844	85.464
Paraíba	70.174	12.190	9.316	1.374	2.612	95.666
Pernambuco	228.675	28.575	29.133	3.759	9.817	299.959
Alagoas	48.337	8.354	9.252	734	3.721	70.398
Sergipe	39.474	6.064	5.487	916	2.600	54.541
Bahia	237.598	32.641	23.114	5.346	18.533	317.232
SOUTH-EAST	6.050.410	429.188	519.139	78.868	207.750	7.285.355
Minas Gerais	873.698	113.633	111.220	14.829	44.247	1.157.627
Espírito Santo	137.391	18.776	22.533	3.910	4.258	186.868
Rio de Janeiro	1.225.616	54.326	63.118	15.913	31.165	1.390.138
São Paulo	3.813.705	242.453	322.268	44.216	128.080	4.550.722
SOUTH	1.938.603	223.902	263.018	22.438	98.611	2.546.572
Paraná	683.624	95.138	110.919	8.765	33.252	931.698
Santa Catarina	368.939	39.018	52.018	3.490	15.098	478.563
Rio Grande do Sul	886.040	89.746	100.081	10.183	50.261	1.136.311
CENTER-WEST	498.898	83.278	61.941	8.110	25.779	678.006
Mato Grosso do Sul	89.124	24.485	17.227	887	4.949	136.672
Mato Grosso	48.142	14.545	11.290	894	6.779	81.650
Goiás	162.019	32.639	24.919	2.984	8.044	230.605
Distrito Federal	199.613	11.609	8.505	3.345	6.007	229.079
TOTAL BRAZIL	**9.527.296**	**950.200**	**979.096**	**130.719**	**394.972**	**11.937.283**

Note: The sources for this table are Serpro (Data Processing Service), from the Internal Revenue Servie, and Geipot (Brazilian Company of Transportation Planning), connected to the Ministry of Transportation. No data has been released since 1986.

Table 8 Vehicle Sales by State - 1993

Units

REGION/STATE	CARS			LIGHT COMMERCIALS				HEAVY COMMERCIALS			
	PASSEN-GER CARS	STATION WAGONS	TOTAL	VANS	JEEPS	PICK-UPS	TOTAL	TRUCKS	BUSES	TOTAL	GRAND TOTAL
NORTH	6,463	11,127	17,590	650	14	6,523	7,187	1,581	267	1,848	26,625
Amazonas	1,276	1,526	2,802	87	1	1,958	2,046	192	14	206	5,054
Para	2,819	4,710	7,529	350	4	1,811	2,165	935	181	1,116	10,810
Rondônia	964	2,365	3,329	110	1	1,273	1,384	330	69	399	5,112
Acre	224	470	694	15	1	316	332	54	3	57	1,083
Amapá	605	831	1,436	43	1	366	410	36	0	36	1,882
Roraima	148	240	388	13	6	293	312	12	0	12	712
Tocantins	427	985	1,412	32	0	506	538	22	0	22	1,972
NORTH-EAST	35,025	62,204	97,229	2,471	45	17,961	20,477	4,471	898	5,369	123,075
Maranhão	1,987	3,161	5,148	162	4	1,318	1,484	336	86	422	7,054
Piaui	1,458	2,305	3,763	80	0	805	886	292	16	308	4,956
Ceara	4,384	7,855	12,239	345	5	2,258	2,608	817	239	1,056	15,903
Rio Grande do Norte	1,853	3,157	5,010	87	1	1,001	1,089	339	59	398	6,497
Paraiba	2,301	4,975	7,276	161	0	1,265	1,426	222	39	261	8,963
Pernambuco	8,430	14,615	23,045	530	9	3,504	4,043	957	206	1,163	28,251
Alagoas	2,811	5,008	7,819	223	6	1,458	1,687	269	28	297	9,803
Sergipe	1,147	1,976	3,123	79	0	547	626	209	39	248	3,997
Bahia	10,654	19,152	29,806	804	20	5,805	6,629	1,030	186	1,216	37,651
SOUTH-EAST	170,707	369,745	540,452	15,768	139	75,949	91,856	19,145	7,795	26,940	659,248
Minas Gerais	24,687	60,757	85,444	2,136	20	13,798	15,954	3,655	1,006	4,661	106,059
Espirito Santo	5,030	9,459	14,489	388	7	2,657	3,052	826	109	935	18,476
Rio de Janeiro	29,623	60,932	90,555	2,559	47	9,818	12,424	2,153	2,801	4,954	107,933
São Paulo	111,367	238,597	349,964	10,685	65	49,676	60,426	12,511	3,879	16,390	426,780
SOUTH	48,174	91,037	139,211	4,165	23	22,323	26,511	9,511	1,392	10,903	176,625
Parana	17,620	34,090	51,710	1,912	17	9,518	11,447	3,894	399	4,293	67,450
Santa Catarina	10,145	18,305	28,450	687	3	4,451	5,141	2,304	282	2,586	36,177
Rio Grande do Sul	20,409	38,642	59,051	1,566	3	8,354	9,923	3,313	711	4,024	72,998
CENTER-WEST	19,459	36,621	56,080	1,898	35	13,782	15,715	3,061	968	4,029	75,824
Mato Grosso	2,235	4,922	7,157	227	3	2,443	2,673	985	53	1,038	10,868
Mato Grosso do Sul	3,123	5,369	8,492	245	0	2,651	2,896	790	87	877	12,265
Goiás	8,293	15,208	23,501	779	3	6,013	6,795	766	338	1,104	31,400
Distrito Federal	5,808	11,122	16,930	647	29	2,675	3,351	520	490	1,010	21,291
TOTAL BRAZIL	**279,828**	**570,734**	**850,562**	**24,952**	**256**	**136,538**	**161,746**	**37,769**	**11,320**	**49,089**	**1,061,397**

Table 9 Value of Sales in the Domestic Market - Vehicles - 1966/1993

Thousand US $ (1993 level)

Year	1st Semester	2nd Semester	Total
1966	1,109,180	1,270,730	2,379,910
1967	884,781	1,081,399	1,966,180
1968	1,114,166	1,454,229	2,568,395
1969	1,614,930	1,409,096	3,024,026
1970	1,348,525	1,724,161	3,072,686
1971	1,789,002	2,133,151	3,922,153
1972	1,886,461	2,314,430	4,200,891
1973	2,372,367	3,087,716	5,460,083
1974	3,052,016	3,751,377	6,803,393
1975	3,143,582	3,771,272	6,914,854
1976	3,107,345	4,151,451	7,258,796
1977	3,643,691	4,631,465	8,275,156
1978	3,861,963	5,200,373	9,062,336
1979	4,300,228	5,991,150	10,291,378
1980	3,695,705	6,826,605	10,522,310
1981	3,699,483	3,933,160	7,632,643
1982	3,084,991	5,004,021	8,089,012
1983	2,689,079	4,540,510	7,229,589
1984	2,506,002	5,803,191	8,309,193
1985	2,953,420	7,194,934	10,148,354
1986	5,017,040	5,137,369	10,154,409
1987	3,363,435	6,828,856	10,192,291
1988	3,058,864	9,209,778	12,268,642
1989	1,877,132	11,668,271	13,545,403
1990	2,498,421	7,239,039	9,737,460
1991	2,358,863	8,043,322	10,402,185
1992	2,180,265	8,197,992	10,378,257
1993	1,706,727	10,548,681	12,255,408

Table 10 Automotive Dealer Network - 1986/1993

Units

REGION/STATE	1986	1987	1988	1989	1990	1991	1992	1993
NORTH	93	94	95	108	117	120	124	113
Amazonas	12	12	12	13	13	13	13	12
Pará	35	34	37	38	39	38	38	34
Rondônia	24	26	25	33	31	32	35	33
Acre	9	9	9	10	11	10	10	7
Amapá	6	6	6	7	7	7	7	6
Roraima	7	7	6	7	7	8	8	7
Tocantins	0	0	0	0	9	12	13	14
NORTH-EAST	347	359	366	380	378	378	394	382
Maranhão	25	27	27	28	26	28	29	28
Piaui	24	25	24	26	25	24	25	25
Ceará	42	42	42	43	44	45	47	44
Rio Grande do Norte	20	21	23	25	26	25	27	26
Paraiba	27	29	31	32	30	29	30	27
Pernambuco	67	68	69	71	74	77	78	74
Alagoas	25	25	25	27	26	25	30	30
Sergipe	12	15	12	13	14	13	13	13
Bahia	105	107	113	115	113	112	115	115
SOUTH-EAST	1,195	1,220	1,233	1,265	1,263	1,281	1,311	1,296
Minas Gerais	303	311	316	322	321	321	325	323
Espirito Santo	46	46	46	47	46	48	49	50
Rio de Janeiro	188	193	193	198	197	194	201	198
São Paulo	658	670	678	698	699	718	736	725
SOUTH	612	626	635	654	658	677	684	670
Paraná	206	209	210	215	217	225	226	220
Santa Catarina	137	145	145	155	158	162	165	163
Rio Grande do Sul	269	272	280	284	283	290	293	287
CENTER-WEST	180	185	189	194	188	187	195	193
Mato Grosso	30	31	31	34	32	33	39	41
Mato Grosso do Sul	50	51	52	52	53	53	56	55
Goiás	80	82	85	86	81	80	79	77
Distrito Federal	20	21	21	22	22	21	21	20
BRAZIL	**2,427**	**2,484**	**2,518**	**2,601**	**2,604**	**2,643**	**2,708**	**2,654**

Source: Anfavea.

Notes: 1. Does not include authorised service stations.
2. Position as of December 31 of each year.

Table 11 Auto Parts Sector Invoicing and Investment - 1977/1993

YEAR	INVOICING					INVESTMENT	
		PERCENTAGE DISTRIBUTION BY DESTINATION					
	US $ MILLION	AUTO-MAKERS	REPLACE-MENT MARKET	EXPORTS	OTHER COMPANIES	US $ MILLION	SHARE % IN THE INVOICING
1977	3.347	72.8	18.5	3.1	5.6	325.3	9.72
1978	4.415	70.7	21.6	3.7	4.0	226.8	5.14
1979	4.897	71.2	19.5	4.0	5.3	264.7	5.41
1980	5.287	70.7	18.4	5.8	5.1	284.0	5.37
1981	4.351	65.0	21.6	6.2	7.2	226.4	5.20
1982	4.986	65.0	20.0	6.7	8.3	270.8	5.43
1983	3.758	62.8	22.7	9.2	5.3	189.4	5.04
1984	4.819	58.9	21.6	1.0	4.5	231.7	4.81
1985	5.541	60.3	22.5	1.7	4.5	254.3	4.59
1986	6.637	56.2	25.1	1.4	5.3	429.5	6.47
1987	8.338	51.3	27.2	1.3	5.2	440.0	5.28
1988	10.462	60.3	21.3	1.1	5.3	627.8	6.00
1989	15.544	59.7	24.8	10.2	5.3	1.061.0	6.83
1990	12.244	57.7	26.0	11.1	5.2	986.7	8.06
1991	9.848	59.5	22.3	13.5	4.7	764.0	7.76
1992	10.122	60.1	20.3	15.1	4.5	715.0	7.06
1993*	12.500	63.0	17.5	15.5	4.0	750.0	6.00

*Estimate
Source: Sindicato Nacional da Indústria de Componentes para Veículos Automotores (Sindipeças).

Table 12 Direct and Indirect Jobs Created by the Automotive Industry

(December 1993)

SECTOR	TOTAL EMPLOY-MENT	EMPLOYMENT RELATED TO AUTOMOTIVE INDUSTRY
MINING	69,709	4,253
STEEL	108,419	10,998
FOUNDRIES	52,067	20,357
GLASS AND NON-METALLIC	23,712	3,271
FORGED PARTS	22,790	17,141
AUTOMOTIVE PARTS	235,900	235,900
ELECTRIC AND ELECTRONIC	176,000	14,080
TYRES	24,000	24,000
RUBBER PARTS	57,911	5,663
PAINTS AND GLUES	16,875	1,131
PLASTICS	181,000	5,430
BATTERIES	6,867	6,867
LUMBER	77,486	728
CHEMICAL PRODUCTS	92,872	1,025

SECTOR	TOTAL EMPLOY-MENT	EMPLOYMENT RELATED TO AUTOMOTIVE INDUSTRY
ETHANOL	800,000	652,000
OIL PRODUCTS	57,859	27,256
FUEL DISTRIBUTORS	13,883	13,883
VEHICLE DEALERS	225,087	225,087
TYRE DEALERS	14,719	14,719
TRUCK AND BUS BODIES	24,873	24,873
AGRICULTURAL MACHINERY	11,203	11,203
HIGHWAY FREIGHT TRANSPORTATION	484,788	484,788
HIGHWAY PASSENG. TRANSPORTATION	58,430	58,430
CITY PASSENGER TRANSPORTATION	64,956	64,956
MOTOR RECTIFIER OPE./INDEP. GARAGES	1,220,000	1,220,000
PARTS AND ACCES-SORIES DEALERS	140,000	140,000
DRIVERS - COMMERCIAL VEHICLES AND TAXIS	1,500,000	1,500,000
WORKERS IN GAS AND SERVICE STATION		250,000

Total employment 5.2 million

Table 13 Productivity in the Automotive Industry (product/employee) - 1976/1993

Year	Vehicles		
	Production in units	Employees	Vehicles per Employee
1976	986,611	112,429	8,8
1977	921,193	111,514	8,3
1978	1,064,014	123,974	8,6
1979	1,127,966	127,081	8,9
1980	1,165,174	133,683	8,7
1981	780,883	103,992	7,5
1982	859,304	107,137	8,0
1983	896,462	101,087	8,9
1984	864,653	107,447	8,0
1985	966,708	122,217	7,9
1986	1,056,332	129,232	8,2
1987	920,071	113,474	8,1
1988	1,068,756	112,985	9,5
1989	1,013,252	118,369	8,6
1990	914,466	117,396	7,8
1991	960,044	109,428	8,8
1992	1,073,761	105,664	10,2
1993	1,391,376	106,738	13,0

Table 14 Vehicle Exports by Country of Destination - 1992/1993

Units

COUNTRIES	CARS		LIGHT COMMERCIALS		HEAVY COMMERCIALS		TOTAL	
	1992	1993	1992	1993	1992	1993	1992	1993
SOUTH AMERICA								
Argentina	175.970	195.129	24.782	30.572	3.859	5.591	204.611	231.652
Bolivia	49	149	106	24	545	529	700	702
Chile	12.852	6.017	7.142	2.802	6.161	5.809	26.155	14.628
Colombia	5.328	9.083	1	-	6	165	5.335	9.248
Ecuador	5.052	3.991	854	200	158	223	6.064	4.414
Fr. Guyana	-	-	85	58	-	10	85	68
Paraguay	722	1.653	602	1.096	388	604	1.712	3.353
Peru	863	508	444	133	762	285	2.069	926
Uruguay	10.762	11.810	1.414	1.559	1.292	1.372	13.468	14.741
Venezuela	12.848	7.009	1.346	1.426	216	75	14.410	8.510
TOTAL	**224.446**	**235.349**	**36.776**	**37.870**	**13.387**	**15.023**	**274.609**	**288.242**
CENTRAL AMERICA AND CARIBBEAN ISLES TOTAL	236	540	879	1.011	644	581	1.759	2.132
NORTH AMERICA								
Canada	269	-	-	-	-	-	269	-
USA.	12.023	5.205	-	12	21	-	12.044	5.217
Mexico	-	1	-	-	1.627	1.263	1.627	1.264
TOTAL	**12.792**	**5.206**	**-**	**12**	**1.648**	**1.263**	**13.940**	**6.481**
EUROPE								
Germany	-	1	10.561	5.826	2	-	10.563	5.827
Austria	-	-	491	253	-	-	491	253
Belgium	-	-	881	770	-	-	881	770
Spain	-	-	-	1.055	-	1	-	1.056
France	-	-	3.126	2.255	-	1	3.126	2.256
Greece	-	-	2.905	676	-	-	2.905	676
Netherlands	-	-	295	272	-	-	295	272
England	-	-	342	1.034	-	-	342	1.034
Ireland	-	-	4	21	-	-	4	21
Italy	6.037	8.152	17.342	10.327	-	-	23.379	18.479
Norway	-	-	-	65	-	-	-	65
Switzerland	-	-	1.569	770	-	-	1.569	770
Others	-	-	1	-	-	7	1	7
TOTAL	**6.037**	**8.153**	**37.517**	**23.324**	**2**	**9**	**43.556**	**31.486**

(continued)

Vehicle Exports by Country of Destination - 1992/1993 (continuation)

Units

COUNTRIES	CARS		LIGHT COMMERCIALS		HEAVY COMMERCIALS		TOTAL	
	1992	1993	1992	1993	1992	1993	1992	1993
AFRICA								
South Africa	-	-	-	-	186	273	186	273
Algeria	-	-	-	1	-	-	-	1
Angola	34	16	123	72	200	1	357	89
Burundi	-	-	-	-	13	2	13	2
Ivory Coast	2	23	75	112	76	43	153	178
Ghana	-	-	-	2	-	-	-	2
Madagascar	-	-	40	20	29	1	69	21
Nigeria	9	175	25	24	415	224	449	423
Reunion	-	-	130	150	-	-	130	150
Zaire	1	-	8	-	48	8	57	8
Others	65	58	55	50	178	222	298	330
TOTAL	**111**	**272**	**456**	**431**	**1,145**	**774**	**1,712**	**1,477**
ASIA								
Saudi Arabia	-	-	443	-	260	231	703	231
Qatar	-	-	130	60	-	-	130	60
China	4	6	-	-	-	-	4	6
Singapore	-	-	54	-	10	11	64	11
Indonesia	-	-	-	-	126	-	126	-
Kuwait	-	-	20	-	60	144	80	144
Lebanon	-	1	10	30	44	3	54	34
Malaysia	-	-	-	-	486	582	486	582
Oman	-	-	2	-	-	-	2	-
Syria	-	-	4,170	5	-	-	4,170	5
Taiwan	-	-	36	-	-	-	36	-
Others	-	80	160	115	78	163	238	358
TOTAL	**4**	**87**	**5,025**	**210**	**1,064**	**1,134**	**6,093**	**1,431**
OCEANIA								
Australia	-	-	-	-	197	218	197	218
New Caledonia	-	-	-	55	-	-	-	55
Others	-	-	30	-	4	-	34	-
TOTAL	-	-	**30**	**55**	**201**	**218**	**231**	**273**
GRAND TOTAL	**243,126**	**249,607**	**80,683**	**62,913**	**18,091**	**19,002**	**341,900**	**331,522**

Table 15 Trade Balance of the Automotive Industry - 1940/1993

US $ thousand (1993 level)

Year	Vehicles	
	Imports	Exports
1940 a 1950	420.547	-
1951	256.846	-
1952	180.522	-
1953	40.964	-
1954	65.417	-
1955	32.403	-
1956	44.701	-
1957	87.862	-
1958	106.125	-
1959	106.246	-
1960	83.505	39
1961	24.607	1.163
1962	17.420	1.520
1963	17.798	111
1964	10.250	2.144
1965	8.256	3.192
1966	44.134	6.253
1967	49.327	2.100
1968	74.709	2.305
1969	75.633	4.408
1970	69.128	8.922
1971	83.205	12.511
1972	97.642	54.146
1973	207.542	62.977
1974	347.947	203.769
1975	302.439	334.085
1976	235.088	385.742
1977	226.314	490.305
1978	292.889	610.408
1979	276.392	759.717
1980	524.185	1.101.168
1981	468.702	1.566.415
1982	318.386	1.154.834
1983	367.729	1.187.058
1984	394.618	1.433.450
1985	435.522	1.603.739
1986	656.240	1.487.560
1987	826.327	2.453.116
1988	695.606	2.617.686
1989	678.110	2.570.009
1990	733.095	1.897.484
1991	848.699	1915.376
1992	1.078.804	3.012.225
1993	1.809.487	2.660.266

5, *ANFAVEA MEMBER COMPANIES*

Anfavea stands for Associação National dos Fabricantes de Veiculos Automotores. Member companies of the association are:

Agrale S.A.
Autolatina Brasil S.A.
Divisão Ford
Divisão Volkswagen
Caterpillar Brasil S.A.
Fiatallis Latino Americana S.A.
Fiat Automóveis S.A.
General Motores do Brasil Ltda.
Gurgel Motores S.A.
Iochpe-Maxion S.A.
J.I. Case do Brasil E Cia.
Karmann-Ghia do Brasil Ltda.
Komatsu do Brasil Ltda.
Mafersa Sociedade Anônima
Mercedes-Benz do Brasil S.A.
New Holland Latino Americana Ltda.
Scania do Brasil Ltda.
SLC S.A. Indústria e Comércio
SR Veículos Especiais Ltda.
Toyota do Brasil S.A.
Valmet do Brasil S.A.
Volvo do Brasil Veículos Ltda.
Yanmar do Brasil S.A.

APPENDIX I

RESEARCH MATERIAL ON BRAZIL / BAHIA

- **Department of Trade and Industry - Overseas Trade Services**
  Information Pack Brazil 1995
  Summary:
  - Brazil Fact Sheet
  - Import Regulations and Documentation
  - Quarterly Economic Report
  - UK/Brazil Trade Statistics

- **Latin American Investment Report 1994**
  Investment Profile Brazil
  Summary:
  - Economic Profile
  - Political Profile
  - Foreign Investment Regulations
  - Equity / Debt Markets
  - Investor Perception

- **The LATAG Bulletin**
  Economic Fact File May/June 1995

- **ABDIB (Associao Brasileira para o Desenvolvimento das Industrias de Base)**
  Relatorio Anual 1994
  Industrial Indicators

- **Fundacao Getulio Vargas**
  1) Conjuntura Economica July 1995
  Conjuntura Estatistica

  2) Conjuntura Economica August 1995
  Politica Economica- Indicatores Economicos

- **CNC (Confederacao Nacional do Comercio)**
  Synthesis of the Brazilian economy 1995

- **The Economist Intelligence Unit Limited 1995**
  EIU Country Forecast 1st quarter 1995
  Factsheet

- **The Economist Intelligence Unit Limited 1995**
  EIU Country Forecast 2nd quarter 1995
  Summary:
  - Fact Sheet
  - Political Outlook
  - Economic Forecast
  - Business Environment
  - Historical Summary
  - Forecast Summary

- **The Economist Intelligence Unit Limited 1995**
  EIU Country Risk Service 2nd Quarter 1995
  Summary:
  - Structural Review
  - Political Risk Outlook
  - Economic Outlook
  - Domestic Financial Markets
  - External Finance and Credit Risk
  - Pointers for Portfolio Investors
  - Data Supplements

- **The Economist Intelligence Unit Limited 1995**
  EIU Country Profile
  Summary:
  - Population and Society
  - Economy
  - Employment
  - Wages and Prices
  - Mining
  - Energy
  - Manufacturing Industry
  - Raw Materials
  - Construction
  - Tourism
  - Transport and Communications
  - Finance
  - Money and Banking

- **British Consulate - General, Rio de Janeiro**
  Factsheet July 1994
  Brazil Power Sector

- **CNEN (Comissao Nacional de energia Nuclear)**
  Brazilian Nuclear Entities

- **C & L**
  State Power Utilities Listed

- Brazil's Ethanol Programme (source unknown)

- **Euromonitor 1994**
  The World Economic Factbook
  Brazil - General Facts

- **Euromonitor**
  Consumer Latin America
  Summary:
  - Demographic Statistics 1993
  - Economic Indicators Statistics 1989-1993
  - Standard of Living Statistics 1993
  - Households Statistics 1991
  - Consumer Expenditure Statistics 1993

- The Southern States of Brazil- Energy Prospects (source unknown)

- **Brazil- A Profile**
  Summary: Investment Climate:
  - Legal System
  - Population and Social Patterns
  - Geography and Climate
  - Economy
  - Planning Guide for the Foreign Investor

  Investment Incentives
  Doing Business

- **Brazilian Embassy**
  Brazil in Brief 1994
  Summary:
  - Land
  - People
  - History
  - Political Institutions
  - Economy
  - Agriculture
  - Industrial Development
  - Transportation
  - Education and Culture
  - Architecture
  - Sports
  - Food and Drink

- **CIA**
  CIA World Factbook 1994
  Summary:
  - Geography
  - People
  - Government
  - Economy
  - Communications
  - Defense

- Fact Sheet May 1992 (source unknown)
  Brazil Highway System

- Directory - Brazil (no further indications)
  Transport

- **The Country and its Institutions**
  Summary:
  - Geography and Climate
  - Government
  - Economy
  - Basic Infrastructure
  - Mining
  - Agriculture
  - Industry
  - Energy
  - Transportation
  - Foreign Relations
  - External Debt
  - Prices and Wages

- **Market**
  Latin America, June 1994
  Latin American Population

- **Market**
  Latin America, February 1994
  Consumer Markets insights - Trends/Surveys Brazilian Auto Market

- **Business Monitor International Ltd**
  Latin America Monitor - Brazil, July 1995
  Business Environment changes

- **DTI**
  Country Profile 1992
  The North-East Region

- BAHIA- Salvador
  General Data + Tourist Information

- BAHIA
  Summary:
  - Facts
  - Industry
  - Agriculture (1988 figures)
  - Mineral Resources
  - Tourism
  - Environmental Matters
  - State Government
  - Existing British Interests
  - Opportunities for British Investors

- **Financial Times**
  Survey - Brazil May 26, 1994
  Summary:
  - Politics
  - Economy
  - Car Industry
  - Guides for Visitors
  - Agriculture

- **Financial Times**
  Survey - Latin American Finance April 11, 1994
  Summary: - Country Focus (variuos countries)
  - Regional Issues (Trade agreements, Project finance, Debt problems, Regional finance)
  - The Markets (International equities, Eurobonds, Brady bonds, Derivatives, Pension funds)

- **Financial Times**
  Articles about: - Inflation Brazil
  - North-East region Brazil
  - Latin America after Mexican crisis

- **Latin America Economy and Business, May 1995**
  Macro-economic problems Brazil

- **Latin American Economy and Business, June 1995**
  - Economic forecasts Brazil + Argentina 1995/96
  - Economic Statistics Brazil + Argentina 1995/96

MAPS

- **Euromonitor**
  Consumer Latin America
  Map South America + Brazil Regions

- **IBGE**
  Anuario Estatistico do Brazil
  Population Distribution

- **IBGE**
  Anuario Estatistico do Brazil
  Urbanisation

- **IBGE**
  Anuario Estatistico do Brazil
  Major Urban Centres

- **IBGE**
  Anuario Estatistico do Brazil
  Mineral Resources

- **EMBRATUR - Brazilian Tourist Board**
  Tourist Map

MOTOR INDUSTRY

- **The Economist Intelligence Unit Limited 1995**
  The Motor Industries of South America and Mexico
  The Brazilian Motor Indurtry
  Summary:
  - Motor Industry Development
  - Production + Outlook
  - Domestic Market + Outlook
  - Exports + Outlook
  - Profiles of Brazilian Vehicle Manufacturers
  - Brazilian Automotive Components Industry
  - Brazilian Component Manufacturers Listed
  - Latin American Motor Industry-Outlook to 2000
  - Latin American Trade Associations

- **ANFAVEA**
  Carta da ANFAVEA

  1) N 104 January 1995
  Statistics on Brazilian Motor Industry 1983-1994
  Summary:
  - Production
  - Units sold
  - Exports/Imports
  - Alcohol-fuelled Vehicles
  - Agrarian Vehicles

  2) N 105 February 1995
  Statistics as above but from 1994/5 January

  3) N 106 March 1995
  Same as above + 1995 February

  4) N 107 April 1995
  Above + 1995 March Statistics

  5) N 108 May 1995
  Above + 1995 April

6) N 109 June 1995
Above + 1995 May

7) N 110 July 1995
Above + 1995 June

8) N 111 August 1995
Above + 1995 July

- **ANFAVEA**
  Brazil - Motor Vehicle Production 1984-92

- **ANFAVEA**
  Brazilian Automotive Industry - Statistical Yearbook - 1994

- **DTI Sector Report**
  Brazil - Automobile and Autoparts Market
  Location of Industries and Companies

- **MIRA (Motor Industry Research Association)**
  1) Motor Industry Brazil - Literature Research
  Articles on: - Alcohol Fuel
  - Automotive Complementation
  - Various

  2) **Society of Motor Manufacturers & Traders Limited**
  World Automotive Statistics 1994
  Survey of Motor Vehicle producing Countries (by vehicle type + bymanufacturer)

  3) **AMMA**
  World Motor Vehicle Data 1994
  Motor Vehicle Production Brazil 1957-1992 by Type + Manufacturer

- **The Economist Intelligence Unit Limited 1995**
  International Motor Business 3rd quarter 1995
  Global Vehicle Markets: Prospects to 2000

- **The Economist Intelligence Unit Limited 1995**
  International Motor Business 1st quarter 1995
  Statistics on Brazil - Passenger Cars
  - Commercial Vehicles

- **Financial Times**
  Survey - World Car Industry; October 4, 1994
  Summary: Overviews: Forecasts/ Europe/ Japanese in Europe/ North America/ Asia
  Features: Automotive Trade, EU Block Exemption/ Retail Germany in the US/ New European Models/ Electric Vehicles
  Markets: Germany/ France/ UK/ Italy/ Spain/ China/ Japan/ South Korea/ Mexico/ Brazil/ Sweden
  Profiles: Ford/ General Motors/ Chrysler

- **Financial Times**
  Survey - Automotive Components; June 29, 1995

- **Financial Times**
  2 Articles about Ford; January 5 / April 3,1995

  Article about Japanese carmakers in Europe; January 31, 1995

  Article about Mazda; January 23, 1995

  Article about Brazilian Car Industry; May 26, 1994

- **FT**
  The Latin American Automotive Industry
  Summary:
  - Forecasts
  - Business Opportunities
  - Brazil Automotive Sector
  - Brazil Porduction
  - Brazil Manufacturers
  - Brazil Vehicle Market + Market Shares
  - Statistics 1987 - 1993

- **The Economist Intelligence Unit Limited 1994**
  The new Car Market in Europe 1994
  Outlook for the European Car Market
  Summary:
  - Market Size -
  - Market Segmentation
  - Car Sales by Origin

- **The Economist Intelligence Unit Limited 1994**
  Global Automotive Forecasts
  South America and Mexico

- **The Economist Intelligence Unit**
  The Motor Industry and Markets of South America
  Outlooks

- **Motor Industry of Japan 1994**
  Motor Vehicle Statistics of Japan 1984-1993
  Summary: - Production
  - Export
  - Registration

  Motor vehicle Statistics of Selected Countries 1984-1993
  - Production

- **University of Michigan**
  Best Markets
  Automotive Parts and Service Equipment 1994

- **National Trade Bank US**
  Brazil Autoparts
  Summary: - Overview
  - Statistical Data
  - Market Assessment
  - Best Sales Prospects
  - Competitive Situation
  - Market Access
  - Trade Promotion Oppotunities

- **National Trade Bank US**
  Brazil Textile Filaments
  Summary: - Overview
  - Statistical Data
  - Market Assessment
  - Best Sales Prospects
  - Competitive Situation
  - Market Access
  - Trade Promotion Oppotunities

- **National Trade Bank US**
  Brazil - Environmental Cleanup Project

- **Department of Trade and Industry**
  Overseas Contacts Service
  Summary: Brazil - All Aspects of Car Wheels in Brazil
  - Ethanol Programme
  - Principal Companies Motor Vehicle Sector
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