OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.

DISCLAIMER

FAIR USE POLICY

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

D00165

United Nations Industrial Development Organization

Distr.
LIMITED

ID/WG.13/3
24 December 1968

ENGLISH
ORIGINAL: FRENCH

The Seminar on the Establishment and Development of the Automotive Industry in Developing Countries

Karlovy Vary, CSSR, 24 February - 14 March 1969

THE RATIONALE OF THE GRADUAL DEVELOPMENT OF THE AUTOMOTIVE INDUSTRY IN DEVELOPING COUNTRIES: FROM ASSEMBLY OF IMPORTED PARTS TO COMPLETE LOCAL PRODUCTION[1/]

by

Fernand L. Picard
Director-Consultant
National Administration of Renault Factories
France

Accompanied by Summary.
Includes graphs, and production statistics by Country and manufacturer.

1/ The views and opinions expressed in this paper are those of the author and do not necessarily reflect the views of the secretariat of UNIDO.

id.68-1000

United Nations Industrial Development Organization

Distribution
LIMITED

ID/WG.13/3 SUMMARY*
30 July 1968
ORIGINAL: ENGLISH

The Seminar on the Establishment and Development of the Automotive Industry in Developing Countries

Karlovy Vary, CSSR, 14 October - 1 November 1968

THE RATIONALE OF THE GRADUAL DEVELOPMENT OF THE AUTOMOTIVE INDUSTRY IN DEVELOPING COUNTRIES: FROM ASSEMBLY OF IMPORTED PARTS TO COMPLETE LOCAL PRODUCTION[1/]

by

Fernand L. Picard
Directeur Conseil à la Régie
Nationale des Usines Renault
France

SUMMARY

1. The considerations that must be made before planning the establishment of an automotive industry in a developing country include geographical situation, sources of raw materials, existing and planned network of roads, growth of the population, and development of the economy.

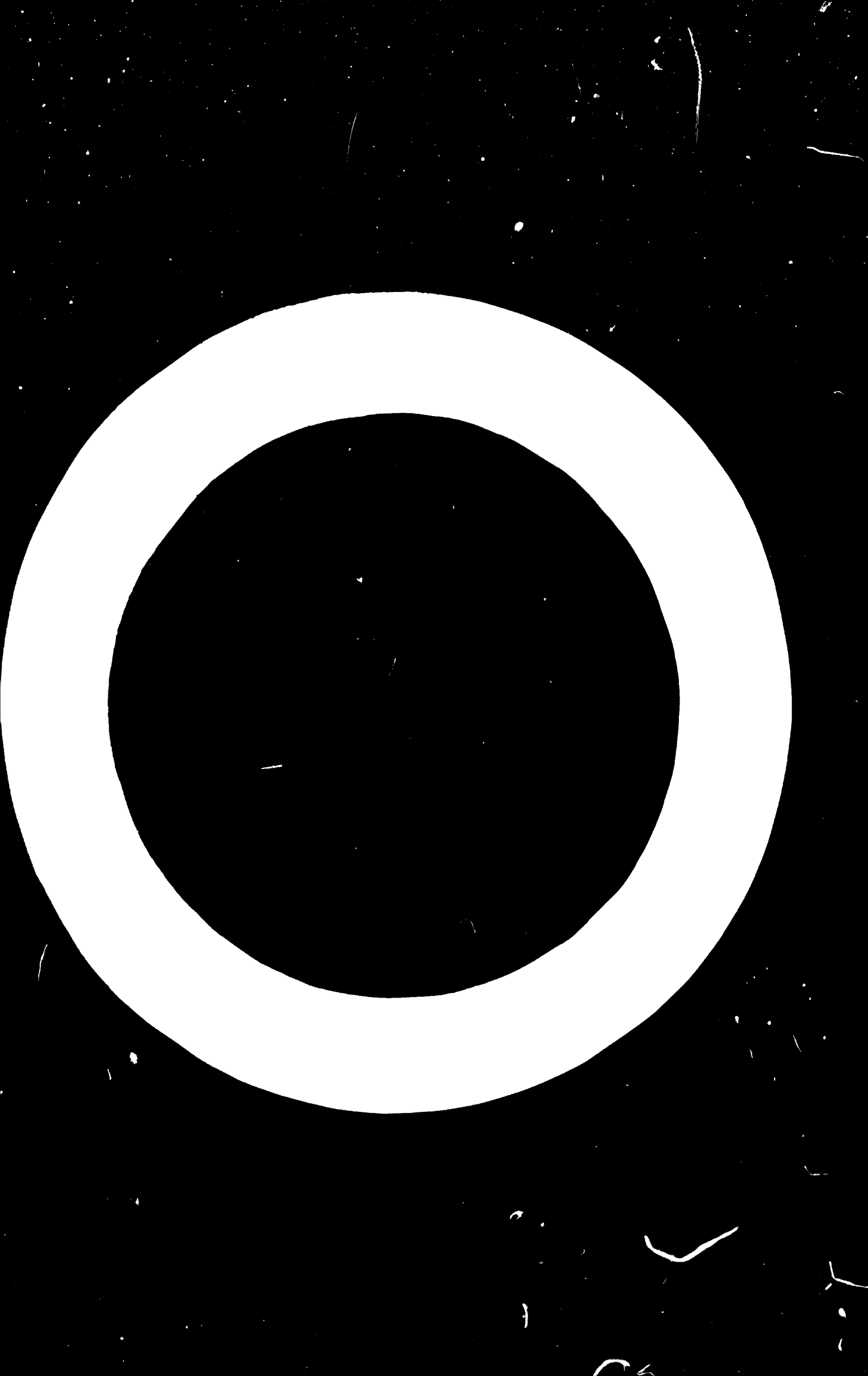
2. Relations between the usual number of automotive vehicles and the national income per capita are shown.

---

* This is a summary of a paper issued under the same title as ID/WG.13/3.

1/ The views and opinions expressed in this paper are those of the author and do not necessarily reflect the views of the secretariat of UNIDO.

id.68-2115



3. Preparatory work for starting an automotive industry should consider a ten-year programme for the progressive introduction of production of commercial goods vehicles, autobuses and other passenger vehicles, and private automobiles.

4. Governmental decisions necessary for the orderly development of the automotive industry are mentioned.

5. Allied industries, e.g. the iron and steel industry, the oil industry and other supplementary industries that must be established or developed further before setting up a local automotive industry, and the standards to which they should conform, are cited.

6. The availability of skilled labour, engineering and management in developing countries is a problem of a very delicate nature, and some recommendations are given for its possible solution.

7. The criteria for the selection of the vehicles to be produced and of the co-operating designer, and conditions under which vehicles must work, e.g. climate, terrain, network of roads, traffic regulations, are covered.

8. The financial questions which must be examined from the outset of the co-operative effort and considerations for the setting up of a financial plan are discussed.

9. Hints are offered for the selection of locations for the establishment of automotive industry plants.

10. Different stages of "integration" are described comprehensively:

(a) The assembly stage, which can be divided into the SKD (semi-knocked down) and the CKD (completely knocked down) stages;
(b) The stage where locally produced goods are to be incorporated;
(c) The stage of local production of tools and independent research.

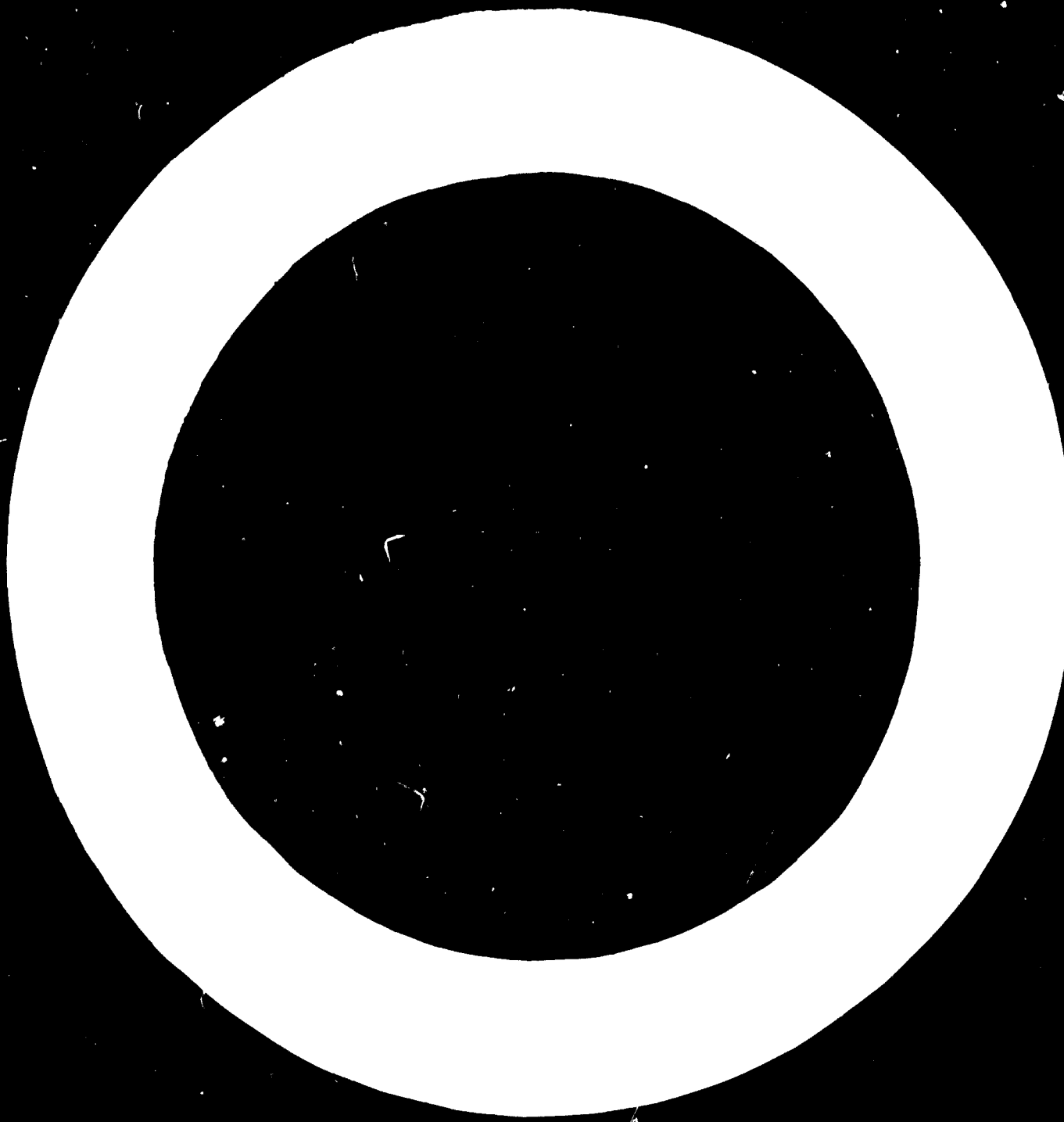
At each stage, special measures must be taken by the local producers and the supplementary industries. Important points to be discussed include the duty of the delegates of the co-operating and advising parent company and the problems of labour and management.

11. The cost of production rises with the percentage of "local integration"; the causes of this increase are discussed.

12. The development of the automotive industry in the four following countries is reviewed: South Africa, Argentina, Ivory Coast, and Portugal. The legal situation, the number of cars registered in 1964/1965, and the stage of the supplementary industry are described.

13. Countries in which an automotive industry has been established under supervision of foreign manufacturers are listed. The names of the firms, the types of vehicles produced, the scale of production in 1965, and the degree of "integration" are indicated.

14. In conclusion, it is stated that much preliminary work and planning are necessary for the establishment of an automotive industry in a developing country. Education of personnel, the help to be given by the government and the need for continuing activity are again emphasized. In building an automotive industry, the developing countries should stay within the limits of their capabilities.



Contents

		Page
Introduction		5
I	CONDITIONS FOR THE ESTABLISHMENT OF AN AUTOMOTIVE INDUSTRY	6-17
	Market	6
	Road system	10
	Ancillary industries	11
	Technical staff	13
	Selection of equipment	14
	Financing	16
II	THE VARIOUS PHASES OF INTEGRATION	17-29
	Establishment of the factory	17
	The different phases of integration	20
	The assembly phase	21
	Incorporation of local manufactures	24
	Autonomy in tooling and vehicle research	27
III	CONCRETE EXAMPLES	30-38
	South Africa	31
	Argentina	33
	Ivory Coast	35
	Portugal	36
IV	CONCLUSIONS	38
Annex 1.	Conditions for the use of motor vehicles	40
Annex 2.	Increase in the cost of vehicles in proportion to the percentage of local integration	44
Annex 3.	Table of assembly and manufacturing plants building automobile vehicles under licence	50

Tables

		Page
1.	Sample number of licensed automotive industries	30
2.	Analysis of the market for private vehicles in South Africa	31
3.	Analysis of the market for private vehicles in Argentina	33
4.	Analysis of the market for private vehicles in Ivory Coast	35
5.	Analysis of the market for private vehicles in Portugal	36
Annex 3.	Table of assembly and manufacturing plants building automobile vehicles under licence	50

Figures

1.	Hondermarcq graph - Number of vehicles in relation to national income (1960)	9

Figures in Annexes

2.	Variation in the increase of vehicle costs, by per cent of local integration	46
3.	Increase in net cost per vehicle for 8,000 vehicles a year in relation to the proportion of local integration	48

Introduction

1. Before the subject-matter of this study can be considered, some obvious questions arise. Is it wise for a developing country to devote much of its means, especially of its human and financial means, to creating an automotive industry when vehicles of every kind, whether necessary to the economy or desired by the public, can be supplied more cheaply by industrialized countries, which have the means to produce them? Could not better use be made of capital and manpower? Is this the best possible use of human and financial resources?

2. It is not possible to give a general affirmative reply, which might have to be reconsidered in the light of changes in circumstances, traditions and the economy. The problem, however, certainly deserves careful consideration in each particular case. In fact, it would be dangerous to give a categorically negative reply, based either on logic or on strict financial rules.

3. The automotive industry is an integrated industry. It brings with it other basic industries, the development of which enriches the country's whole economy. It requires large supplies of raw materials and manufactured goods, i.e. steel, castings, light alloys, plate glass, textiles, paint, chemical products and electrical apparatuses. To obtain these supplies, mines and quarries must be opened and new processes adopted; factories must be built, which can also make parts for other industries, in particular for domestic appliances such as refrigerators, stoves and washing machines.

4. The industry is also in great need of trained men: from tradesmen (i.e. smiths, smelters and tool makers) to technicians and managers. Providing this training raises many problems of education, such as the provision of technical colleges and further teacher training. These problems, however, largely overlap those of other industries, which benefit from their solution.

5. The strict requirements of automotive manufacturing generate a feeling for quality combined with quantity, which is extremely rare in developing countries. Quality is hard to achieve and still harder to maintain. It requires great mental and physical discipline and a firm adherence to the rules

at every stage. Such qualities are rare with people who have not been trained in such restraint. They must stop doing things approximately and "almost good enough".

6. However, this new mental attitude, once acquired, is apt to spread. A workman or foreman will probably take it outside the factory into his daily life at home. Social life is likely to become more methodical. Similarly, in relations between labour and management, it helps management to see situations more clearly and refrain from constantly modifying its decisions.

7. Industrialization in any form produces these beneficial effects, but they are especially conspicuous in the automobile industry, with its rigid requirements, with its complexity of manufacturing processes, and with the multiple uses and wide popularity of its products.

8. The automotive industry is a promotional industry, fully justifying the high priority it enjoys in a number of countries for other more spectacular reasons. But its creation and development are governed by specific conditions, which will be analysed in this study.

I CONDITIONS FOR THE ESTABLISHMENT OF AN AUTOMOTIVE INDUSTRY

9. Before starting the long and difficult adventure of creating an automotive industry in a developing country, the pioneer must carefully consider many questions. He must list the country's available resources, and assess the prospects of medium-term and long-term economic development. In short, he must be sure of a sufficient market for the product. He must be able to become part of the national economy and draw from it the raw materials he needs, to find the qualified and experienced staff when he needs them to manage and develop his industry, and to lay hands on the capital without which he cannot finance his investments or his operations.

Market

10. The market potential - for it can be no more than that at first - must be defined. An extrapolation of what has been achieved in other countries will be of little assistance in determining precise targets. From the start,

the study should include not only the market potential for private vehicles but also the country's transport requirements as a whole. Every developing country should have a well co-ordinated transport system, which will move both passengers and goods cheaply all over its territory.

11. In organizing such a system, much depends on the geography and terrain of the country, the distribution of its natural resources and of its population. Tabulating these factors is relatively easy. It is essential, however, to project their evolution for a period of ten to fifteen years by an exploratory survey and not merely by mathematical extrapolation. For example, it would be a serious error to overlook the constant decrease of the rural population in proportion to the economic growth and the increase in industry and services in the urban centres.

12. As the transport of goods depends wholly on the industrial and commercial sectors, it will be the first to be affected by economic growth. The study should determine whether the existing transport systems (seaports, railways, roads, navigable waterways and airports) can bear an increase in traffic or be sufficiently developed to meet the increased transport needs. It should also determine the contribution to that development of road transport, either long-haul (heavy trucks with semi-trailers) or delivery and cargo-transfer vehicles. Passenger transport also depends on the general economic development of the country.

13. In the initial phase of development there is always an increase in collective passenger transport, i.e. inter-urban buses, tramways being no longer a solution. Smaller buses suitable for shorter distances have the advantage of being adaptable to traffic increases during transitional periods, of not requiring heavy investment in infrastructure, and of being utilized at once. Moreover, they are usually made of the same mechanical components as heavy trucks (engines, transmissions, bearings, gears and brakes). Coach-building is easy and economical, and requires the same skills as the building of horse-drawn vehicles in the past.

14. Collective passenger transport is a transitional phase pending the development of private transport. It would be unwise to invest to cover the needs of the equipment period. It may be safely assumed that the vehicles

can be manufactured quickly in sufficient quantity, and that thereafter manufacturing will be for replacement only, that is to say, 10 per cent of the pool a year. This percentage should be borne in mind when contemplating construction of automotive factories.

15. Some very interesting studies have been made on the growth of national pools of private vehicles. The study made in 1960 by Mr. Henri Hondemarcq, Director-General of Roads and Bridges in the Belgian Ministry of Public Works[2/] showed that in that year the vehicle densities per thousand head of population in relation to the per capita income of the countries selected were distributed in log rithmic co-ordinates more or less along a straight line (Figure 1 below). Another statistician who attempted to express that density in an equation concluded that the number of vehicles per thousand inhabitants varies proportionally with the exponent 1.8 of the national per capita income. (Number of vehicles per thousand inhabitants = per capita income$^{1.8}$.)

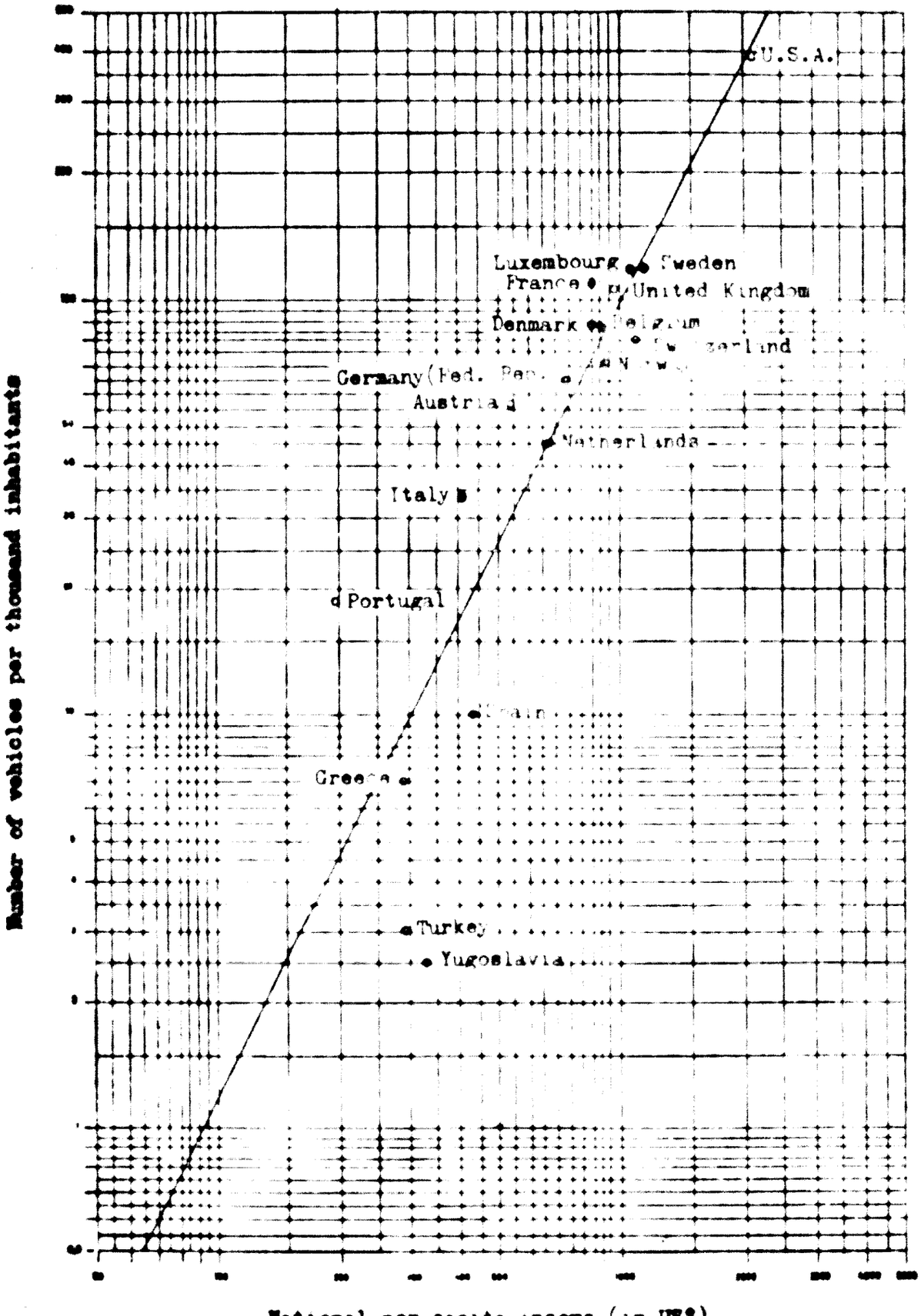
16. The maximum vehicle ownership that can be expected in a country and the growth of such ownership in proportion to growth of per capita income can easily be calculated from these studies. At the same time, however, the figures thus obtained can only be taken as rough guides and must be interpreted in accordance with the social structure and political system of the country.

17. It must also be borne in mind that these figures refer to private cars as single units, regardless of whether they are small economy cars, like the Renault 4, for example, or large cars such as the Cadillac. Moreover, in certain developing countries, the structure of the vehicle-owner population is quite different from that found in democratic countries where the tendency towards relative equalization of income has brought about a trend towards a homogeneous private car structure made up of vehicles of quite similar dimensions and characteristics, as in the United States of America.

2/ "Le Programme routier belge", TRANSPORTS, July-August 1960.

Figure 1

Hendermarcq graph - Number of vehicles in relation to national income (1960)



18. It remains true nevertheless that for a country with, for example, 10 million inhabitants and an annual per capita gross national product of about US$400, it would be unreasonable to plan on the basis of 500,000 private vehicles, whereas the Hondermarcq graph indicates only 17 cars per thousand inhabitants, i.e. a total of 300,000 vehicles.

19. These considerations should make it possible to establish a general programme for ten years ahead, with a forecast (on the basis of the anticipated growth in the number of inhabitants and gross national product) of the annual increase in the number of (a) utility vehicles, (b) coaches and buses and (c) private cars, on the road.

20. The annual maintenance and renewal of the existing vehicle fleet necessitates the production of a number of vehicles roughly equal to one tenth of the existing population.

21. It is for the government of the country to decide what proportion of the total vehicle requirements is to be satisfied by imports and what proportion by domestic production, and the government must adapt the legislative and customs regulations accordingly.

22. If the domestic manufacture of vehicles is to be encouraged for the reasons enumerated in the introduction of this paper, the government must decide, in order to attract private enterprise ventures, the number of vehicle manufacturers permitted to set up operations in the country as well as the number of models that they will be able to manufacture. In view of the technical and financial requirements for the establishment of an automotive industry and the consequences that failure could entail, the process should be supervised in developing countries. The position would be quite different in economically developed countries, where a liberal policy, with all the risks of loss or gain, could be followed without any danger of serious damage to the national economy.

Road system

23. A road system is essential for the development of a motor industry, even if it is at first out of proportion to the actual traffic. Such a system must cover the entire country and not be restricted to towns and their immediate suburbs. It must encourage motorists to travel increasingly great distances.

24. A survey must first be made to determine the present state of the road system. The survey must determine: whether the road system consists of paved highways, dirt highways, roads negotiable by motor traffic or mere tracks, and what are the proportions of each of these types of road; whether the roads are dusty or muddy according to the season; what are the maximum gradients of the roads in hilly country; how many ancillary facilities there are, and of what type - for example, what is the maximum width and loading capacity of bridges and the dimensions and slip-way gradient of ferries; whether the roads are paved or metalled in the towns, and whether there are holes, open transverse gullies or pot-holes in them.

25. These facts must be known in order to make a judicious choice of vehicle (i.e. utility vehicle, bus, coach, or private passenger car) most suited for use in the country in question, and to determine how it can be adapted to ensure that its use is as efficient and inexpensive as possible.

26. It is also essential to know the government's policy on the road system. While encouraging motor vehicle production, it should have parallel plans for developing and financing the road system. If there is an energetic policy on these points, it may be possible to envisage more rapid development of the motor vehicle construction programme and it may be easier to obtain financial aid both inside and outside the country.

Ancillary industries

27. If it is intended not merely to set up assembly plants but to create a local automotive manufacturing industry capable of satisfying the average needs of a country for motor vehicles, the basic industries needed to supply basic materials must be developed if they already exist or established if they are not yet in being. The most vital of these industries are the steel and petroleum industries. The establishment of these industries can be postponed to suit the country's development plan, but if so, account must be taken of this in determining the schedules for incorporation of locally produced materials.

28. The steel industry must be designed to produce high-quality steel, as the manufacture of motor vehicles calls for considerable quantities of carbon and alloy steels meeting strict standards. Depending on the particular vehicle, the amount of steel needed to manufacture one unit varies from 800 to 1,500 kg, half of high-quality sheet steel for body work and a quarter of special steels for transmission gearing, steering gear, and engine and suspension parts. The quality of steel must be entirely different from that for beams, rails or reinforcing bars, which steel and iron works produce in the greatest quantities. The special steels contain alloying agents such as nickel, chromium or manganese and must meet a number of strictly established specifications.

29. An order of priority must be established for the delivery of these steels by the local steel works in line with the plans for using locally produced components. Highly specialized steels used in small quantities, such as valve steels and stainless steels, can be imported for several years without having a serious effect on the cost of components. The thin sheets of steel for the manufacture of car bodies, which call for highly skilled technicians, and large investment in highly specialized installations should be imported until the quantities of thin-sheet steel required for local industries - and possibly also those of neighbouring countries - are sufficient to warrant the full use of such installations and to amortize their cost.

30. The petroleum industry is connected not with the production of motor vehicles but with their requirements for fuels and lubricants. Whether the establishment of domestic refineries is justified calls for careful study and balanced judgement. The fuel specification must meet international standards, particularly as to octane rating, if the task of the co-operating manufacturer is not to be excessively complicated during the long period in which engines will have to be imported.

31. Apart from the primary materials, almost a quarter of the cost of a motor car is in the purchase cost of specialized parts and units usually produced by specialized industries, some of which work for sectors other than the motor-producing sector. Most countries today - even those not highly developed - produce the glass and textiles they need. An inventory of the production capacities of these industries should be made to determine whether they will be able to meet the quality and volume requirements of a local motor industry.

32. It is also necessary to envisage the establishment of factories to produce accessories which are not usually manufactured by the motor industry but must be ordered from specialized firms. These include expendable components such as tires and tubes and brake and clutch linings; electrical equipment such as batteries, dynamos, starters, coils, distributors and spark plugs; specialized parts such as carburettors and fuel injection pumps; small equipment such as windshield-wipers and dashboard instruments; body parts such as locks, hinges and window winders, headlights, sidelights and miscellaneous lamps.

33. Such equipment is generally manufactured in accordance with national and international standards and varies very little from vehicle to vehicle. It is therefore desirable that these accessories should be produced by competent local firms with the technical assistance of specialists of the country of the co-operating manufacturers. The production facilities required for these accessories are generally smaller than those needed for the manufacture of motor vehicles and can be brought into operation more rapidly.

34. In order to reduce purchases abroad it is generally advantageous to establish firms that require only limited capital before the actual assembly line is set up, so that such firms can provide good quality accessories during the CKD (completely knocked down) assembly. Here too, quality must not be sacrificed. Local industrialists must seek their foreign partners from among the highest qualified and best known in the field, must follow their advice and avoid makeshift methods in trying to save on equipment, or improvization and untried techniques. Experience indicates that these are the greatest mistakes such firms may make and may be responsible in the main for the bad reputation of locally produced vehicles.

Technical staff

35. The problem of the labour force is one of the most difficult to solve, for here the very future of the industrial and economic life of the country is at stake. For want of a better solution the firm, once established, can organize an apprentice school to train young recruits to become skilled mechanics, or it can provide advanced instruction for skilled workers who are particularly able and intelligent. But the firm cannot train the engineers and

technicians it so urgently needs. If long-term reliance on the assistance of foreign engineers and technicians is considered undesirable, a technical and professional training system at several levels must be developed within the country, to provide the whole of the nation's industry with the necessary technical staff. This is a government responsibility. A government wishing to stimulate industrialization must make an early decision to set up technical schools and secure the necessary advice and assistance in working out programmes and obtaining teachers with good experience.

36. This lack of suitably qualified men, capable of adapting themselves to new methods and taking the advice of the experts of the co-operating manufacturer is the greatest difficulty to be overcome. The necessary measures should be taken as early as possible to emerge from the unscientific handicraft approach.

37. If the country already has universities providing scientific training, technical schools could be set up within their framework to make use of their teaching staff. This teaching staff should, however, be given appropriate training. Technicians and engineers are not trained in the same way as schoolteachers. They must become business-minded at the school stage, and should be helped to learn the art of leadership.

38. As time is short, training programmes must be set up for adults parallel to the courses for young people, so that they can acquire the general mathematical and scientific knowledge necessary to enable them to assimilate imported techniques. The engineers seconded from the co-operating manufacturer will most willingly participate in this programme if there is no language problem. This collaboration will also have a very favourable psychological effect on co-operation within the enterprise. It will lend an experimental tone to the training and make it more attractive for adults by showing them its advantages.

Selection of equipment

39. After the type of motor vehicle (utility vehicle or private car) has been decided upon, together with its price level, a difficult choice must be made among all the vehicles produced of this particular type. A number of conditions must be met, some of them important enough to immediately rule out certain choices.

40. The first factor in selection is the country of the co-operating manufacturer, which will obviously be influenced by the pattern of historical ties among countries, and particularly ties of common language and interest. It is difficult to organize consistent co-operation between men who do not speak the same language, for close links must be established between the factory and the co-operating manufacturer. Experts must be sent out to help bring the plant into operation, and the experts may wish to give courses or to attend courses at universities and technical schools near the plant.

41. If two languages are involved, basic documentation must be translated and even the units of measurement will have to be converted, e.g. from the English/American system to the metric system.

42. Community of interest is also a fundamental consideration if the many financial and commercial problems posed by co-operation are to be properly solved. This community of interest covers factors concerning the same monetary zone, trade agreements and trade between the countries, taking into consideration political systems and prospective international relations.

43. This would suggest that relations would be easier between the former countries of the British Commonwealth and the United Kingdom, or between former members of the French Empire and France, than between other countries. But there is nothing absolute about this, since the currents of trade exchanges fluctuate as much as those of political relations and indeed affect them.

44. Once the first choice has been made - and it need not necessarily be definitive - it remains to select the vehicle to be produced and the co-operating manufacturer, the latter choice obviously depending on the former. Here too, commercial considerations are as important as technical ones, and delicate negotiations will have to be undertaken with various companies to try to find the best compromise.

45. Financial considerations, and particularly the question of the most favourable credit terms, may result in the selection of a vehicle which may seem technically less suitable. Likewise, the commercial policy of manufacturers will have a great influence at this stage of the negotiations, some manufacturers being more attracted to international co-operation than others who concentrate primarily on their own national market.

46. When the co-operating manufacturer and the vehicle have been selected, there remains the important task of adapting the vehicle to the local market before decisions regarding the planning of operations can be taken. It is rare for a vehicle in its original version to be really well adapted to overseas conditions. The climate, the terrain and the habits of the customers may require modifications to be made (see Annex 1). These modifications must be decided upon jointly after investigations and tests have been carried out in the developing country itself by the technical departments of the co-operating manufacturer, with the full co-operation of the licensee. The key staff of the licensee's trading, sales and service departments must take part in this development and modification work so as to become acquainted with the product and to be able to prepare for its marketing more competently and confidently.

Financing

47. Financing may assume widely varied forms depending on the degree of financial collaboration between the local manufacturer and the co-operating manufacturer. A study of the question of financing must be undertaken in collaboration with both parties at the first stage of the planning of the project. It must be carried out without undue optimism, which is difficult, and it must take into account all the items on the investment and operating budgets.

48. The study must result in at least the following points:

(a) A financial plant must cover several years and specify as precisely as possible the amount and timing of the various costs and certain ways of meeting them. The rate of integration of local industry must be in accordance with the means available for financing the investments needed to bring such local industry into operation (i.e. construction of foundry, forging shop, machine shop, press shop etc.).

(b) A table of manufacturing costs should be made to ascertain what reductions can be expected from the various measures envisaged.

49. No item of expenditure must be overlooked in these forecasting studies. Thus, account must be taken of:

(a) Investments in the purchase of land, the construction of factories, and the purchase, transport and installation of machine tools.

(b) Obligations in connexion with shipping or manufacturing and storing of parts in order to maintain stocks must be forecast. These stocks must be large enough to cover any short-term difficulties in manufacture such as strikes at the suppliers' factories and shipping (bad weather, customs delays etc.).

(c) Costs must be determined for the establishment of sales and service facilities (which is more costly than is generally believed) and in particular of stocks of spare parts throughout the geographical area in which the vehicles are to be sold.

(d) The need to grant large-scale credit both to dealers in the sales network and to customers themselves must be envisaged. This point is of particular importance in order to stimulate purchases in countries where the per capita national product is low. There is no doubt about the need and the desire for motor vehicles, but the financing of the purchase of the first car is always a difficult matter and assistance through credit is essential.

II THE VARIOUS PHASES OF INTEGRATION

Establishment of the factory

50. The choice of the location of the factory is of greatest importance, for this choice affects the entire future of the enterprise. The quality of the cars produced and the cost of their manufacture will depend on it. Conditions will differ according to the phase of industrialization: will the country attempt vehicle assembly only or complete manufacture? The choice must be made in the light of long-term plans. If the ultimate objective is complete local manufacture, the advantages that might result from the choice of a particular situation beneficial to the first phase may have to be sacrificed, as the first stage will at most last a few years.

51. An assembly plant may be most suitably located in the vicinity of a port, equipped for handling heavy and cumbersome crates and in a position to dispatch vehicles throughout the country with ease and economy. The establishment of a free port may have certain advantages if a large number of the cars assembled are to be exported to neighbouring countries. Distribution is always difficult and costly, particularly in areas where road and rail communications are scarce or unreliable.

52. A port location also has the advantage of facilitating contact with the customs administration. This is by no means a negligible consideration in the initial production period when many administrative problems arise. It may be necessary to reduce the stocks of assembled parts by leaving them within the customs area and, consequently, avoid immobilizing financial resources. Proximity to the customs administration may also reduce the time required to begin the production of finished vehicles.

53. In the case of complete local manufacture, the choice of the ideal location is more complicated; the various optimum conditions may be contradictory. In the long run, economic considerations will be the main factors in this decision and will determine the success or failure of the enterprise, since the final objective is the economical production of a high-quality product.

54. The local manufacturing plant must be in immediate proximity to a meeting point of rail, road and if possible river communications, so that the raw materials and products purchased abroad or in other parts of the country can be economically transported to the factory and the finished vehicles can be easily transported to their delivery points. The location of the plant is extremely important, and should be preceded by an operational study, taking future needs into consideration: Where will the main suppliers be? Where will the major customers be? What area will permit the most economical distribution of finished vehicles in all seasons?

55. The plant should be located in a large population centre where high-quality labour capable of being trained for the automotive industry can be recruited in sufficient numbers. This problem will not be the same in all countries but will differ according to history and tradition. A country accustomed to handicraft production will be in a better position to develop an automotive labour corps than a country specializing in agriculture, particularly animal husbandry, or made up of nomadic groups.

56. The demographic situation must also be taken into account as young labourers - i.e. those who have not become set in occupational habits and practices - will be more able to absorb training and adapt themselves to practical experience in production. The site of the plant should be near a university and technical schools in order to provide access to professionally

qualified technicians and engineers, who will be needed to give basic and advanced training to the managers and supervisors. Ideally, there should be an exchange between factory and university: the factory, with its foreign engineers who have come to help set up production, supplying qualified teachers to the technical schools and colleges, which in turn provide the factory with newly trained engineers and technicians.

57. Attention must also be given to the fact that foreign engineers will not be willing to settle in a region unless it provides an attractive cultural centre for their families, and opportunities for their children to be educated.

58. The climate should be as temperate as possible, so that a large output can be obtained from the labour force without the necessity of spending large sums on heating or air conditioning the workshops. It should also be as dry as possible, since a humid climate causes oxidation of parts during manufacture, necessitating costly special treatment. The site should be free from sand-bearing winds, as dust shortens the working life of machine tools and endangers the painting process.

59. Finally, the site must be compatible with existing national development plans. At the same time, however, care should be taken not to over-emphasize the importance of choosing a site in a region qualifying for the maximum government subsidy. The immediate benefit in this respect might mortgage the future indefinitely. Even temporary relief in the form of credit might put a heavy burden on the net costs of later production.

60. Once the best possible region has been chosen, plans for designing and building the factory must be made. As a basic principle, the management of the undertaking must have complete freedom of decision regarding the choice of the site, the architect and the contractor. It must not give way to local pressures attempting to influence it.

61. The most certain way of reaching the right decisions quickly is to obtain expert advice from the manufacturing firm that is granting the licence. It should indicate the ideal site for the immediate programme and subsequent extensions and entrust the planning of installations and supervision of operations to an engineering firm with a background in the automotive industry if

possible, in association with the co-operating contractor's firm. With the help of this advice, the best possible choice of site will be made with a view to future expansion and to stockpiling at times when, for economic or climatic reasons, deliveries cannot keep pace with production. Experience shows that the area of the site should be at least three times, preferably ten times, the area necessary for the initial project.

62. The terrain should be as level as possible, not subject to flooding, with road and rail communications and an adequate supply of water and electricity. The layout should, from the outset, make optimistic, but not over-ambitious allowance for the possibility of subsequent extensions around the assembly shop, so that later additions can be worked in with the least possible expense, and without necessitating removal of the original installations. The paint shops in particular, which are needed from the beginning, are very costly and could not subsequently be moved without stopping production.

63. Seemingly time-saving and easy solutions, such as the purchase of a factory left vacant after a business failure, should be avoided. Economical high-quality production calls for a plant specifically thought out and designed for this purpose.

The different phases of integration

64. This section of the study does not consider the requirements to which automotive manufacturers are subject under the laws and regulations in force in the various developing countries. It deals with the actual process of establishing and developing automotive industry.

65. There are three principal phases in this process:

(a) The assembly phase, when most of the components are imported;

(b) The phase when local manufactures are incorporated; locally made items are incorporated in the different parts of the vehicles, following a cautious and gradual programme, still using imported tooling, until production is almost wholly local;

(c) The phase of national autonomy in tooling and vehicle research; this is the ultimate objective, the time taken depending much more on the over-all development of the engineering industry and of national education than on the automotive industry itself.

The assembly phase

66. The assembly phase can be divided into two logical parts: The first phase is called SKD, an abbreviation of the term "semi knocked-down", covering only final assembly of an imported vehicle. The body work (a completely welded shell already painted), the mechanical components supplied in complete units and interior trim and fittings ready to be put into place are assembled.

67. This is the most satisfactory temporary solution for small markets that would eliminate welding and paint shops, which are always costly. Regarded as a take-off point for more complete integration, it facilitates recruiting and training the labour force needed for the final assembly line. It calls for the establishment of an organizational nucleus and a quality control department. At the same time it provides the opportunity for organizing sales and services, setting up spare parts depots and training for repair and maintenance services throughout the country.

68. Once paint shops have been installed bodies can be imported unpainted, so that painting operations can begin. Customers often equate the quality of a vehicle with the quality of its finish, so this operation should be undertaken only when every guarantee is available that the resins used for priming and finishing coats will be of satisfactory quality, and the labour force sufficiently experienced to carry out the various operations properly under the supervision of a specialist from the co-operating manufacturer. The decision to import bodies "unpainted" must be arrived at cautiously, and one must be very careful about the terms. Light gauge sheet metal in transit requires protective greasing. It is difficult afterwards to remove the protective greases, which penetrate the welded joints and cause subsequent defects in the finish. Under the term "unpainted" one must therefore understand sheet metal with a first coat of primer, not liable to any extra customs duty as untreated sheet metal.

69. The second phase, the CKD phase (abbreviation for "completely knocked-down") will normally follow. This does not mean that the whole vehicle is reduced to a heap of separate parts. CKD usually means that the following are imported as units: body work without welding, shaped in the form of more or less complete units (platform frame, body panels, dashboards, hoods, bonnets and wings); mechanical parts (motor, transmission, steering gear, front and rear suspension in complete units) assembled and tested before dispatch; fittings and trim.

70. This phase can itself be subdivided into two stages. In the first, the body items come, as we have just seen, in the form of units; in the second, the units are in the form of sub-assemblies or even sets of pieces that are put together on the spot. This stage facilitates local fabrication of small sheet metal items, produced with simple tooling or even made by local craftsmen using their traditional hand tools (sheet metal cut and shaped). Bringing this phase into operation requires setting up welding and body building shops, with a more experienced labour force than is required for simple assembly work, under the supervision of a specialist seconded by the co-operating manufacturer.

71. The equipment for assembly work and welding should be imported. In view of the low level of skill of the labour force, the equipment should be sturdy and simple with no regulating equipment accessible to the workers, who are too often tempted to make rough and ready adjustments.

72. In incorporating items of local manufacture, those already manufactured within the country should be considered first, i.e. parts subject to wear and tear in existing vehicles such as glass, tires, tubes, batteries; standard components already utilized by other manufacturers and made under licenser's technical assistance such as dynamos, starters, windshield-wipers, headlamps, radiators, door handles, steering wheels.

73. This is a delicate phase. High-quality articles are difficult to obtain, as most producers do not have the necessary tooling to ensure quality. A quality control section for outside supplies must be set up with all the necessary apparatus for checking incoming articles against specifications. The co-operating manufacturer must take part in this work, sending his experts to visit the suppliers, checking the first deliveries in his own laboratories, making contact whenever necessary with licensers to secure their assistance so that the local licensees can achieve the necessary level of quality.

74. As well as these tasks on the spot, considerable preparatory work must be undertaken at the co-operating manufacturer's home base, specifying the nature and the form of items to be forwarded, gathering them together for packing and shipping. The methods used vary according to the size of the consignments, the range of models built simultaneously and the distance separating

the manufacturing and assembly plants. If these two points are in the same continent, the goods can be shipped in specially fitted wagons. If an ocean crossing is involved, which is almost always the case, then expensive packing suitable for maritime shipment and protection against impact and oxidation is needed. (For example, CKD packing for fifty Renault R.8 comes to 45 crates with a total volume of 306.7 m^3).

75. It is not always easy to reconcile the cost for what is a "lost" expense and the need to deliver the parts to workshops some thousands of miles away in the same condition as they would arrive on the co-operating manufacturer's own assembly line. For instance, packing materials and labour for a Renault 10 cost as much as assembly of the same car in the manufacturer's workshops. This explains the high cost of SKD or CKD assembly when progressive development of local integration covering accessories and parts is not part of the plan. This tendency is bound to become more pronounced in the future since assembly operations are easier to mechanize than collection and packing. The CKD formula is, however, still worthwhile for very distant destinations on account of the saving in freight, particularly during periods of intense business activity.

76. Obviously the items transported with such care must, on arrival, be unpacked and stocked carefully and methodically in suitably arranged and sheltered premises.

77. Technical expertise during the assembly phase is very important. As has been stated, welding and paint shop specialists would be needed to help the local management at the appropriate time to put the new plant into operation. Similarly, a specialist in assembly work should be available to train staff at the very beginning of operations.

78. An engineer will have to be seconded by the co-operating manufacturer to ensure technical liaison, supervise the quality of accessories and equipment bought locally and possibly to arrange for the modifications and adaptations that might eventually prove necessary in the light of experience. Similarly, a service technician should be seconded to set up the stocks of spare parts in co-operation with the local management of the undertaking, and to train the mechanics on the commercial side in maintenance and repair.

Incorporation of local manufactures

79. The incorporation of local manufactures must be a very gradual process, prepared by experts as soon as the first contract of co-operation is signed, to ensure that vehicles built or assembled away from the factories of the co-operating manufacturer meet the same quality requirements and result in the lowest possible net cost.

80. The replacement of parts from the original marufacturer by locally manufactured parts will be necessary for various reasons:

(a) Some parts or products may be difficult to transport or may deteriorate during the journey: for example - batteries, paints, stoppings and adhesives.

(b) Some parts of large dimensions involve freight costs that considerably increase their price at delivery. This applies to tires, wheels, seats (frames and upholstery), petrol tanks, air filters.

(c) In some cases customs tariffs entail local supply by imposing a heavy surcharge on certain parts or accessories. These conditions apply particularly in countries where it has been decided to protect an established local industry against foreign competition. The customs barrier makes the price of the local product artificially lower than the price of the imported product.

(d) It may also happen, owing to the price of materials or the cost of labour, that certain parts are cheaper to manufacture locally, even on a small scale, than the equivalent imported parts with the addition of freight costs and customs duties. Seat coverings very often come into this category.

(e) In the case of some parts two or more of the above stated reasons may favour local manufacture, although it is not possible to identify the decisive factor.

(f) There will be the legitimate desire of governments to have as much local labour as possible employed in carrying out craftsmanship type of work on the spot, such as the manufacture of seat coverings, electrical wiring and so on.

81. There are other matters that do not appear well justified a priori but must be taken into consideration, such as the financial relation between the licensee and certain local industrial groups, or government pressure for political, economic or financial reasons requiring a certain percentage of national production in the final product.

82. The selection of the parts to be made locally and the moment for their incorporation call for very detailed study before final decision. In some countries in which an automotive industry is already established, there may be factories belonging to manufacturers in industrially developed countries which produce accessories and equipment and are capable of satisfying the demand for standard or special parts. This is the case with ball and roller bearings, propeller shaft and connecting rod bearings, inlet and exhaust valves, valve springs, engine pistons and rings, steering wheels and items moulded in rubber or plastic. Such factories are usually well equipped and staffed. Co-operation has made it possible for them to attain the quality required at a reasonable price.

83. It would not, however, be appropriate to contemplate the incorporation of basic parts (pistons, ball or plain bearings) produced by local manufacture in assemblies for which the main parts are produced in the co-operating manufacturer's workshops (engine, transmission), as this would mean importing these mechanical assemblies in the form of separate parts, substantially increasing the volume and cost of packing and freight. It would also lead to shifts of responsibility for quality and thus inevitably to disputes between the co-operating manufacturer and the licensee.

84. In some cases local plants manufacture clutches, brakes, or transmissions to European or United States standards under licence. These parts can be adapted to the vehicles to be built. But in this case the parts can hardly be considered standard. The incorporation of parts that are absolutely basic to the vehicle, such as cylinder blocks, cylinder heads, crankshafts, gear-boxes and body work, create far more complicated problems and demand technical and financial resources on a far larger scale.

85. Local production of these items calls for a substantial capital investment, and the difference in the volume compared with that of the co-operating manufacturer would imply a production line rather less technically advanced (from the point of view of mechanization and automation) and, consequently, with higher net costs. Local manufacture of these items should be contemplated only if there is a legal obligation as to the minimum inclusion of locally manufactured material.

86. Studies for planning local manufacture must of course be undertaken by the co-operating manufacturer or by a qualified engineering company acting under his direction. In most cases, standard or special machine tools will have to be imported, as well as special equipment for both production and testing. Special problems arise in the case of castings and forgings. If the country possesses foundry and forging industries, the supply of rough parts may be sub-contracted, after investigation by specialists to ascertain that the facilities are capable of producing the necessary quality of work. To ensure that the manufacturing plans are not held up, the production workshops can start operations with imported blanks. Parts manufactured locally will gradually be taken into production as they become capable of satisfying the quality controls of the co-operating and local automotive manufacturers. Facilities for producing the blanks of advanced design, involving pressure casting in light alloys and foundry precision work with ferrous metals, will not be immediately available and if it is impossible to import blanks, special designs will have to be made for the sumps or mechanical parts involved. Crankshafts, made in Europe in special cast steel, will inevitably have to be forged locally. There are usually no foundries technically advanced enough to perform this process, and special studies and endurance testing will therefore be required.

87. Other difficulties arise in connexion with the use of special steels made in local works. High-quality steels, such as alloy steels, capable of meeting rigid standards are required in vehicle construction. These steels can be produced locally according to the required specifications, but their use will call for great caution and care. Importation of these steels will have to be considered until the quality of the local product can be fully guaranteed. During this phase the role of the test laboratory and of its quality control facilities will be vital. The technical adequacy of the laboratory must be beyond doubt. Usually it will have to be under the direction of an engineer seconded by the co-operating manufacturer, and his opinion must be the final authority even for the local general management. His findings will also have to be confirmed by the technical departments of the co-operating manufacturer in the case of all the vital parts of the vehicle and of those affecting its safety.

88. For this purpose, the samples approved locally will be sent to the co-operating manufacturer's laboratory to undergo shape and dimension tests, analysis of the basic material and the effects of heat treatment, and possibly endurance tests on each part separately or on complete vehicles. Only the co-operating manufacturer's approval of these samples will be valid authorization for incorporating the locally manufactured part. The local quality control section will also have to guarantee that series production conforms strictly to the samples provided.

89. Manufacturing the body work also demands heavy capital investment. Today's technique of shell construction, with electric welding of pressed sections, necessitates very costly equipment and special tooling for pressing, stamping and assembly. Amortization of this equipment over a reasonable period calls for large-scale series production.

90. As the quality of sheet metal required is very difficult to obtain locally, in most cases local production of the pressings should not be considered. A more attractive financial proposition from the point of view of capital investment and net cost is to continue to import them, and complete the shell and sub-units locally with tooling supplied by the co-operating manufacturer. There is a further advantage (which is not the case with mechanical units) i.e. the packed volume is reduced, thereby reducing the cost of packing cases and transport.

91. Construction of a press shop should not be undertaken until it is justified by a sufficient volume of production.

Autonomy in tooling and vehicle research

92. The phase of national autonomy in tooling and vehicle research is far more difficult to foresee as it depends much more on circumstances, on expansion of the business, and on general prosperity than do the preceding phases. It will extend over a period of many years and depend mainly on the availability of competent staff decisions. In fact it arises at the beginning of the first assembly phase and becomes more pronounced and more definite during the phase in which locally manufactured products are incorporated in the vehicle.

93. Local autonomy in methods of producing equipment this comes about naturally, through the development of the workshops for maintenance and service, which gradually takes over the production of more complex equipment as qualified staff gain more experience and competence, with the help of foreign personnel. Some of the most complicated plant equipment may be built locally according to the methods and designs supplied by the co-operating manufacturer.

94. The problem centres on the availability of local technicians. If there are technical colleges training them, there should be no hesitation in recruiting them in large enough numbers, so that each of them can find his appropriate place in the expanding factory. Technical training as well as production planning is a task of the foreign engineers. For the best trainees, training on the job should be supplemented by training courses in the co-operating manufacturer's workshops and offices. In the interest of maximum efficiency, it is essential for these young people to be able to speak the co-operating manufacturer's language. Language training should be provided both at school and later on in the factory.

95. There is also the question of machine tools and equipment. The management should make provision in its investment budget for the purchases needed to expand the facilities for production of tooling and inspection equipment in order to improve its capacity to undertake precision work. Training for skilled workers in the industry must follow, with upgrading courses to enable the most able and intelligent to improve the quality of their work.

96. The achievement of national autonomy in vehicle research follows a parallel course, but has its origin in the quality control and test departments. A very modest beginning may be made at the outset through technical liaison with the co-operating manufacturer in developing equipment specially adapted to local conditions, and in the application of modifications decided upon at the overseas headquarters.

97. The management should recruit a sufficient number of young engineers and technicians from national technical colleges and bring them in to contact with the engineers from the co-operating manufacturer's staff, so that they can learn their construction trade and develop disciplined habits of thought and

action. This will be the time for these young people to ask questions and be stimulated by study tours and in-service training at the co-operating firm's headquarters. Training should be highly specialized in the branches to which they are to be assigned (engines, transmission, body work). Over-all conspectus can come later.

98. In this way, the research office will gradually take shape and expand. At first it will simply be a classifying and nomenclature registry. It will go on to handle modifications and then suggest improvements and adaptations to suit the habits and tastes of the customers.

99. The local office will soon be offering solutions to problems side by side with the co-operating manufacturer's research office, and they will be discussing the merits of the solutions.

100. In the course of the evolution of models the local research office will be able to take its part in developing changes in a new car retaining the engine or transmission when the manufacturing installations have not yet been sufficiently amortized. It may also develop components suggested by a new local supplier.

101. To be fully effective, this development must take place with the full knowledge and agreement of the co-operating manufacturer. This is the only way of ensuring his full support and whole-hearted collaboration. It is in any case in the interest of the local firm to maintain a close relation with the co-operating manufacturer, to benefit from his experience in the development of equipment and production, to profit from his research work, and from any new discoveries that he may patent.

102. There is a psycological difficulty for the pupil wishing to shake off the tutelage of the master, but with sufficient goodwill on both sides each should find his own reward, pupil and master alike.

III CONCRETE EXAMPLES

103. Since 1946 the principal United States and European manufacturers have been collaborating with the countries interested in promoting the development of automotive industries on their territories. The situation as of 30 June 1966, regarding factories or assembly lines working under licence (Annex 3) can be summarized statistically as follows:

Table 1

Sample number of licensed automotive industries

	Number of assembly lines operating	Number of countries in which such assembly lines have been installed
Federal Republic of Germany (Excluding Ford and Opel)	55	22
France	62	26
Italy	25	22
Japan	49	22
Sweden	10	8
United Kingdom (Excluding Ford and Vauxhall)	64	27
United States of America (Including German, Australian and British subsidiaries)	122	41

104. The important automotive manufacturing countries control, either completely or only technically, more than 395 factories or assembly lines in 55 countries. There are, however, fairly wide differences in the status of these establishments. They may be classified in three main groups:

(a) Subsidiaries, in which the present company's holding is more than 50 per cent.

(b) Establishments in which the co-operating manufacturer has a minority financial interest.

(c) Establishments wholly dependent financially on domestic companies undertaking assembly or manufacture with the technical co-operation of a foreign manufacturer.

105. The establishment of these local manufacturing or assembly units has been made necessary primarily because of customs duties and taxes imposed in many countries on imported complete vehicles. Countries such as Brazil, Argentina, Mexico and Spain have progressively reached the stage of manufacturing 95 per cent of various models and in some cases the entire car.

106. The Régie Nationale des Usines Renault for instance, has set up 22 factories or assembly lines which delivered 158,000 vehicles in 1965 (Spain: 47,300; Belgium: 46,100; Argentina: 23,400). It may be useful at this point to review the circumstances in four of these twenty-two countries, so as to provide concrete examples illustrating the different phases of integration:

SOUTH AFRICA

Table 2

Analysis of the market for private vehicles in South Africa

Annual registrations

1964 : 140,254

1965 : 123,753

Distribution of private vehicles according to cylinder capacity

	1964	1965
Up to 1,100 cm^3	19%	19%
1,150 to 1,750 cm^3	65%	61%
over 1,800 cm^3	16%	20%

Legislation concerning entry of vehicles

107. Total prohibition of imports of series vehicles in "built-up" form. Luxury vehicles may be imported under a quota system on payment of very high customs duties.

108. The Government requires every manufacturer intending to set up an assembly line to submit a dossier showing the proposed operational plan for local manufacture in compliance with the regulations. Up to 1965, the requirement was 55 per cent of the total weight to be produced locally, machining of the engine being compulsory. The new regulations have raised this percentage to 75 per cent, but the Government realizes that it will be necessary to concede some interim period, which may be as long as three years, to achieve this result. When the prescribed percentage is achieved, the product can be declared locally "manufactured" and will benefit from supplementary quotas. However, quotas are cut down in proportion to any delay in the approved schedule for integrating locally produced materials.

Existing factories

109. Seventeen models of private cars stamped "Made in South Africa" and marketed in 57 variants, were brought out between July 1964 and March 1966. Others have recently appeared on the market or will soon do so. Broadly speaking, the large world manufacturers established in South Africa tend to aim at the status of "manufacturer" (see Annex 3).

Position of the Régie Nationale des Usines Renault

110. The Régie's vehicles are assembled in the East London (Cape Province) factories of the Car Distributors Assembly Company, which also builds other private cars (Alfa Romeo, Auto-Union, Jaguar and Mercedes) and utility vehicles (Hino, Price and Renault). This is an entirely South African enterprise.

111. The first Renault 8 was assembled in South Africa in 1967. Fifty-five per cent of integration was to be achieved by the end of 1967 and 75 per cent by 1970.

112.

Vehicles assembled	1964	1965
Renault 4	439	211
Dauphine	251	100
Renault 8/10	1,770	2,041
R.1134		100

113. Integration applies mainly to relatively heavy parts not entailing very substantial capital investments.

114. Main parts integrated were tires, batteries, seat coverings, wiring, glass, outside accessories, mechanical parts of front and rear suspensions, casting of cylinder blocks and machining parts of the engine.

115. Prior to the CKD phase steelworks, foundries and glass and textile industries were established. Industries established subsequent to the CKD phase were: tires, industrial rubber, seats and seat coverings, accessories, light-alloy foundries, industries producing factory equipment and general engineering workshops.

ARGENTINA

Table 3

Analysis of the market for private vehicles in Argentina

Annual production

1954	173
1959	18,290
1964	114,619
1965	131,800

Distribution of private vehicles according to cylinder capacity

	1964	1965
Up to 1,100 cm^3	48%	43%
1,150 to 1,750 cm^3	14%	17%
over 1,800 cm^3	39%	40%

Legislation concerning entry of vehicles

116. Since 1956, when Argentina began to operate a policy of CKD with compulsory integration of local parts, practically no "built-up" vehicles have been brought in. In exceptional cases, a very small number of "built-up" vehicles are imported under licence, the customs duty going as high as 300 per cent.

117. The Argentine Government requires submission of an assembly and manufacture plan for new vehicles. Registration is not accepted unless the firm undertakes to manufacture 93 per cent of the vehicle locally in the first year and 95 per cent in subsequent years. Up to 1966 the percentages were calculated on value; now they must be calculated on weight.

118. If the percentage is not achieved, import licences for parts (the 5 per cent not integrated) are restricted. In cases of force majeure, authorization may be granted to import parts under a special tariff heading "supplementary parts" subject to a duty of 200 per cent.

Existing factories

119. Twelve undertakings were producing, at the beginning of 1966, a total of 15,000 to 18,000 vehicles a month, comprising 23 private car models and 20 utility models of all categories (see Annex 3). Six of the twelve undertakings operating are Argentine. The most important, Industrias Kaiser Argentina (I.K.A.) turned out about 30 per cent of the total production in 1966. In 132 months, I.K.A. built 210,000 m^2 of factory space and manufactured 320,000 vehicles, of 20 different American and European models.

120. Twelve manufacturing shops have been set up or incorporated as a result of agreements concluded with other industrial undertakings. This activity has strongly encouraged the development of other Argentine industries: it has raised to 1,500 the number of factories and workshops supplying it with materials and equipment in the value of more than 15 thousand million pesos a year. At present I.K.A. is manufacturing vehicles based on the production of the Kayser Jeep Corporation and American Motors Corporation in the United States and of the Régie Nationale des Usines Renault in France.

Vehicles corresponding to the Régie Nationale des Usines Renault models

121.

Vehicles manufactured	1964	1965
Renault 4	11,122	10,099
Dauphine	8,456	13,317

122. Vehicles are now manufactured entirely on the spot. The only parts imported amount to 5 per cent of the vehicle in cases where the local suppliers have difficulty in supplying the I.K.D. plants.

123. The first Dauphine was assembled in 1961. Ninety-five per cent integration of locally produced components was achieved in two years. New vehicles are now required to reach the 95 per cent content at the end of the year following Government approval of the contract.

124. Industries working for the automotive industry prior to the CKD phase included iron and steel works, chemical industries, foundries and general engineering.

125. Existing industries have expanded in response to the demand created by the automobile manufacturers. All the other automobile sub-contracting industries have been established in response to the course of events.

IVORY COAST

Table 1

Analysis of the market for private vehicles in Ivory Coast

Annual registration

1964 : 1,974

1965 : 3,356

Distribution of private vehicles according to cylinder capacity

	1964	1965
Up to 1,100 cm^3	57%	53%
1,150 to 1,750 cm^3	39%	43%
over 1,800 cm^3	4%	4%

Legislation concerning entry of vehicles

126. There is no prohibition on importing "built-up" vehicles. Quota system and customs duty apply.

127. As far as CKD assembly goes quota and customs duty advantages are granted for local assembly. Penalties are not applicable since local integration is not yet legally compulsory.

Existing CKD plant

128. The Régie Nationale des Usines Renault has built a factory at Abidjan, managed by the Société Africaine de Fabrication des Automobiles Renault. Covered area: 9,300 m^2. Production amounts to 10 to 12 units a day and includes: private cars R4 - R8 - R10 - R16; light vans in the R4 range: SAVIEM lorries and transport tractors.

129. Position of the Régie Nationale des Usines Renault

Vehicle assembled	1964	1965
Renault 4 L	300	330
Renault 4 F	150	120
Renault 8	250	103
R.1132		150
Renault 10		42

130. All sets for assembly are despatched complete, apart from a few items purchased locally (tires, batteries, paints and ingredients). The first Renault 4 was assembled in April 1962. The main parts integrated are paints and ingredients.

131. Prior to the CKD phase paints and ingredients industries were established. As far as industries established subsequent to the CKD phase go the Government is considering regulations that would encourage the development of new industries related to the automobile industry.

PORTUGAL

Table 5

Analysis of the market for private vehicles in Portugal

Annual registrations

1964 : 19,8[illegible]

1965 : 33,8[illegible]

Distribution of private vehicles according to cylinder capacity

	1964	1965
Up to 1,100 cm^3	34%	31%
1,150 to 1,750 cm^3	61%	69%
over 1,800 cm^3	5%	

132. Each assembly firm was authorized to import 75 "built-up" vehicles a year (this may include several models) from 1 January 1963 onwards. Concerning CKD assembly: under decree No. 44,104 of 20 December 1961 a minimum of 25 per cent of local integration is required. Local integration is taken to mean any expenditure in Portugal (cost of assembly, locally-produced parts, packings, internal transport). By incorporating more than the minimum percentage some exemption from customs duties is earned. The figure achieved by the RNUR is 40 per cent of integration. If the proportion of integration is found to be below the declared proportion, the factory is obliged not only to pay the customs duty improperly waived, but also a fine equal to three times the sum improperly waived.

Existing CKD plants

133. Some twenty makers have decided to establish themselves in the Portuguese market. Sites have been purchased and assembly operations put in the hands of either a subsidiary or the importing firm concerned (Annex 3). The assembly plants could not be established at Lisbon or Oporto or in the immediate vicinity of either town. The "threshold of profitability" for an assembly line in Portugal is reckoned at 400 private cars a year and the minimum investment involved at 25 million escudos. A number of makers have therefore set up associations for joint working.

Position of the Régie Nationale des Usines Renault

134. The Renault subsidiary "Industrias Lusitanas Renault SARL" assembles Renault 4, Renault 6 and Renault 10 private cars and R4 light vans at Guarda. The assembly lines are planned to produce 1,250 cars and 250 utility vehicles a year. Covered area: 3,500 m².

135.

Vehicles assembled	1964	1965
Renault 4	722	1,198
Renault 6/10	352	964

136. Integration has been concentrated on parts produced by established local industries in the hope of obtaining parts of good quality. The first Renault 4 was assembled in 1963. Forty per cent integration was achieved at the end of the second year. The main parts integrated were tires, batteries, seat coverings, glass, electrical equipment and small items in sheet metal and packings.

137. Prior to the CKD phase tire industry, battery manufacture and light general engineering were established. Subsequent to the CKD phase expansion of existing industries and development of accessory manufacture were encouraged.

IV CONCLUSIONS

138. This study will have afforded an idea of the difficulties that arise in the course of establishing the automotive industry in a developing country. It demands substantial resources in the form of competent staff (managers, engineers, technicians, skilled workers), and a great deal of discipline in organization and execution.

139. It is not possible to improvise all this. Much patience and time is needed because financial resources are limited and no waste can at any time be justified. But the most difficult and time-consuming task is training - especially of managerial and supervisory staff. As well as being educated and skilled in their speciality, they must also be experienced, and experience takes time to acquire.

140. The outlined methods will enable a satisfactory result to be achieved. The Régie Nationale des Usines Renault has found this to be true in a number of different countries. But time is needed and the stages cannot be rushed on any pretext. At no time should the quality of the product be sacrificed, even temporarily. It is better to delay the transition to the next stage of industrialization than to risk a drop in quality. Consistency of quality is vital to the success of the undertaking and to the maintenance of the morale of producers and the sales force.

141. On this point, a government can do a great deal to help the manufacturer, but must show discipline and moderation in its plans and decisions. A prime necessity is absolute consistency of policy. This is difficult, especially in countries where political stability is always in doubt. No industry can be built on uncertainty, or change its production plans with every change of government or minister.

142. There must therefore be moderation in the legal requirements. The programme must be feasible. Production capacity of automotive and supplying industries should not be over-estimated.

143. Finally, it is essential to protect the developing industry with customs duties on finished imported vehicles, to ensure reasonable profitability for national investment and to offset the inevitably higher net cost due to the modest scale of series production, to the need to train manpower and to all the uncertainties involved in starting up production. The industry will never really justify itself until it is in a position to export, that is, until its prices are competitive. The question of net cost is therefore of vital importance if the country is to avoid entering a state of structural inflation.

ANNEX 1

CONDITIONS FOR THE USE OF MOTOR VEHICLES

The conditions in which motor vehicles are used vary considerably. The mere fact of the automobile's mobility and the longer and longer journeys to be undertaken by drivers means that any car must be able to function without difficulty in varied conditions.

Climate

Climate, and particularly temperature, must be considered. While in maritime regions temperatures seldom fall below -20°C, very low temperatures are encountered in continental regions such as the heart of Siberia (Verkhoyansk) or North America (the State of Minnesota, for instance), down to or below -40°C. At these temperatures, starting from cold is a serious problem - that can be aggravated by humidity or wind - especially for cars that normally have to be kept outside. With cars for use in cold regions interior heating and window demisting and defrosting equipment are very important.

On the other hand, during the summer, tropical regions experience temperatures going up to +45°C in the shade, whereas in the maritime regions temperatures rarely exceed +40°C. These extreme conditions lead to vapourization of the petrol in the carburettor, which makes starting difficult and causes vapour locks which may result in stalling.

The capacity of the engine cooling system must therefore be largely designed to maintain water and lubricating oil temperatures within satisfactory limits. On the whole, engines with liquid cooling systems are the most widely used and are best able to cope with extreme conditions (contrary to the general opinion). The air-cooled motor is, by its very structure, not suitable for any but temperature regions since starting in conditions of extreme cold is problematical and cooling in high temperature conditions is difficult.

Reasonable comfort for the passengers in hot regions, should be ensured by a highly efficient ventilation system and often even by air conditioning.

Atmospheric humidity in temperatures between 0 and 5°C, may lead to icing in the carburettor. It may also cause fog in regions with a maritime climate, where special lighting equipment will be necessary.

Around 0°C, humidity may often lead to the formation of ice on the road which makes travelling difficult and even dangerous. It is then that the fundamental road-holding qualities of the vehicle become important, especially the adhesion of the driving wheels, to enable the vehicle to be used in spite of the conditions.

At lower temperatures, humidity will cause precipitation in the form of snow. Even in these conditions a suitable vehicle will be capable of use with a reasonable degree of safety. In countries where snowfall is frequent and abundant, snow is often cleared from city roads and streets by scattering of salt. The paint work, chrome plating, and underbody if frequently exposed to these conditions, are likely to suffer serious deterioration and special protection is therefore needed against corrosion.

When the vehicle is likely to be exposed to violent rain and storms - in tropical regions where these conditions are frequently encountered during the wet season - care must be taken to ensure that the body openings (doors, hoods and bonnets, opening roofs) are watertight. The engine and ignition system must be protected against water splash from the wheels so that the vehicle can keep moving in any conditions.

It should also be mentioned that there are dangerous effects of wind on road-holding. A wind-tunnel test would not only produce a design with low resistance to forward movement at high speed in order to save petrol; it could also ensure reasonable stability of the vehicle in wind. The weight of the vehicle and its shape are both important.

Relief

The relief of the country is more important than the altitude at which the vehicle is used. In a vehicle to be used in a level country a three-speed gear-box may be quite satisfactory and an automatic gear change could be used even with a low-powered engine, but for regular use in mountainous country greater power would be needed and a four-speed gear-box is preferable if the weight-power ratio is high.

In economically advanced countries with well-developed road networks mountain roads are usually designed with slopes of less than 10 per cent, often at high engineering costs. In other countries, slopes of 20 per cent or more are often found.

The car will have to be modified for use in mountainous country according to the severity of the conditions mentioned above and, if necessary, speed will have to be sacrificed to hill-climbing ability.

Continous use of a vehicle at high altitudes may make special modifications necessary. On the high plateaux of Central and South America in particular, light-weight cars with larger than standard engines will be needed to compensate for the loss of power due to lower atmospheric pressure. Carburettors will often require a mixture regulator to avoid over-richness likely to reduce cylinder life.

The road network

In countries highly developed for automobile use, natural obstacles have been corrected to permit optimum utility for vehicles. The road network is dense and well surfaced. There are roads suitable for heavy traffic and even special highways where road engineering has eliminated intersections and left only gradual inclines. Road surfaces are even and the use of concrete or bitumen ensures a smooth non-skid surface. Cars can be fitted with soft and comfortable suspension and normal tires are adequate. There is no great distance between petrol stations and the petrol tank of the vehicle is of a size to allow a range of 400-500 kilometres.

In developing countries the road network is not yet adapted to this kind of traffic. Roads are often narrow and hilly, the surfaces stony and sometimes poorly maintained, with frequent pot-holes. The absence of top-surfacing means that they are dusty in summer, muddy or waterlogged in winter. Stronger cars are necessary, with heavy suspension and special shock absorbers. The dusty atmosphere will require the use of specially efficient air-filters to protect the engine against premature wear. Larger petrol tanks are needed as petrol stations are infrequent.

A high ground clearance is essential (at least 20 cm) and vehicles must be fitted with special tires, with inner casing and tread to stand up to road damage. There must be a reserve of power to enable the driver to get out of difficult situations. Sheet-metal guards or grills can protect the vital components (engine sump, transmission and petrol tank) against shock or flying stones. On earth tracks the traffic may cause the formation of a dangerous "corrugated iron" surface, and for these conditions a special suspension system must be fitted to avoid reverberation. Where rivers have to be crossed by ferry, there may be steep access ramps and the car will need good forward and rear clearance to avoid grounding.

Dust roads may create even more serious problems than old stone roads. Protective equipment, especially air filters for the engine must be suitable for all particle sizes and kinds of dust, from red laterite (mainly iron oxide) to the pure silica of desert sands.

Legal requirements

Even in Europe, each country has its own approach to automobile traffic problems and safety and traffic rules. Steering wheel has sometimes to be placed on the left and sometimes on the right. The highway codes governing signalling and safety vary. Number plates, lighting and signalling apparatus are of different kinds, dimensions, and positioning. Rules about brakes are far from being identical. Regulations for the protection of third-party interests, such as restrictions on exhaust noise, suppression of radio and television interference or the prohibition of dangerous projections likely to injure pedestrians or cyclists in a collision, vary in strictness.

Lastly, we should mention the importance of the characteristics of the motor fuel, which differ from country to country: the octane number, which limits the engine compression ratio, and the volatility, which may involve pre-heating for carburettors. These differences may make engine modifications necessary.

ANNEX 2

INCREASE IN THE COST OF VEHICLES IN PROPORTION TO THE PERCENTAGE OF LOCAL INTEGRATION

There are many reasons for the higher cost of vehicles manufactured in developing countries. Some have to do with problems of assembly and some with problems of manufacture.

Assembly

Assembly operations in developing countries do not necessarily entail an increase in cost. It is necessary to compare prices and show the excess cost (due to the fact that production is relatively small) of local assembly operations over the cost of transporting vehicles. The results arrived at by prior investigation vary widely from case to case, depending upon:

(a) relative distance of the country from the co-operating manufacturer's factories;

(b) the rate of output of assembled vehicles, in relation to the size of the local market;

(c) wage rates for local labour;

(d) productivity of local labour.

In several cases the figures show that local assembly operations can be justified. The difference in freight costs for "built-up" vehicles and CKD transport may leave a sufficient margin to absorb price increases resulting from local assembly of parts.

For this reason some manufacturers from the United States installed assembly lines in developing countries long before they were obliged to do so by local legislation. For example, Ford Motor Company installed an assembly line in Mexico in 1925.

The incorporation of locally made parts introduces the problem of increased costs. As a guide to deciding between assembly and local manufacturing, it is useful to consider the proportionate increase in net cost of the whole set of imported parts in relation to the cost of integrating items manufactured domestically.

Figure 2 shows the variation in the increase A per cent of a set of parts with a local integration content ranging from 0 to 24 per cent for a factory situated in a North African country.

A per cent is the proportion $\frac{Pr}{Pd} - 100$ where Pr is the net cost of the set of parts delivered to the assembly line plus the parts purchased locally.

Pd is the net cost of the set delivered to the assembly line where all the parts are supplied from France.

The percentage of integration I is the proportion of the price of locally integrated parts to the price of the complete set. The figure shows that for the country in question:

For 10 per cent of local integration, the set costs 2 per cent more.

For 20 per cent of local integration, 10 per cent more.

For 23.5 per cent of local integration, 20 per cent more.

Problems of local manufacture

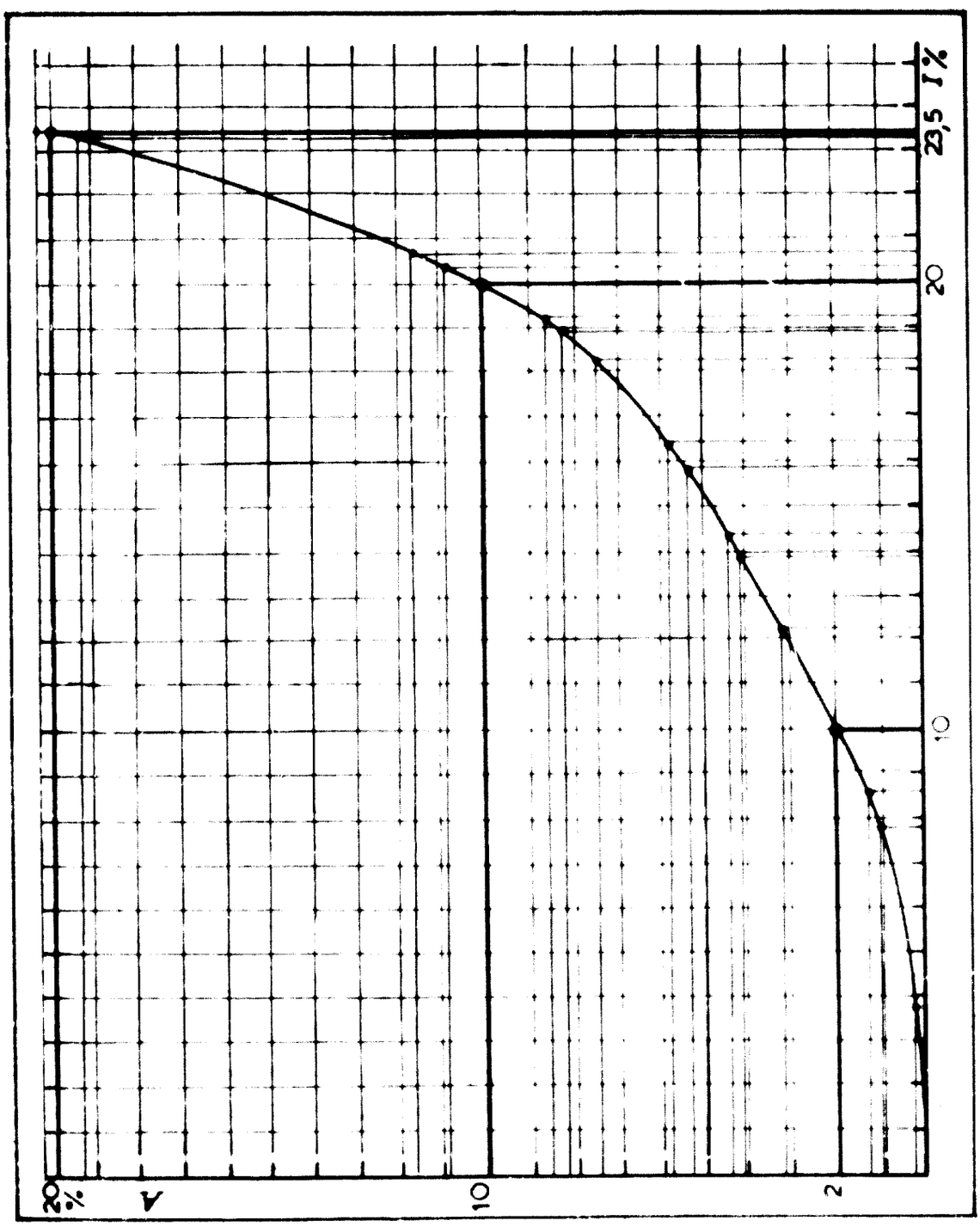
It is a well known fact that the automotive industry is a mass production industry, in which the relationship between cost and volume is very marked. The bigger manufacturers, who produce for world markets, under strong competitive pressure, have lowered the costs of vehicle manufacturing by concentrating on the techniques of mass production (conveyor machinery).

However, the advantages of mass production do not operate in the same way in all the different types of manufacturing required to produce a vehicle. The "critical volume" is not the same in foundry operations, in forging or in body work.

The guideline for any manufacturing policy in developing countries should therefore be to start local incorporation with parts for which the "cost - volume" effect is of least importance; and then go on to those for which the effect is more substantial. This presupposes, in the first place, that a classification of parts can be worked out, by scale of relative increase in net cost, for a given rate of manufacturing compatible with the market of the country in question.

Figure 2

Variation in the increase of vehicle costs, by per cent of local integration



Percentage of local integration

Percentage of increase in costs for a set of parts

The next assumption is that an operational plan can be drawn up for local integration taking into account both the classification of parts and the repercussions of each stage in local integration on other operations. It would, for example, be absurd to consider the net cost of manufacturing gear-box pinions for a vehicle without examining the problem of assembling the gear-box. In this connexion, therefore, it would be necessary to establish a system of priorities through research in time studies and methods (Program Evaluation and Research Techniques - PERT).

If the right approach is found, the result will be a net cost increase curve shown in figure 3, based on an output rate of 8,000 vehicles a year.

The percentage of increase in costs is calculated on the basis of the price of a complete set "ex-works".

The figure shows that three phases can be identified in the cost increase curve in relation to the proportion of local integration:

(a) A first phase (A), in which costs increase disproportionately to the increase in local integration;

(b) A second phase (B), in which costs rise more or less in pro-portion to the increase in the rate of local integration;

(c) A third phase (C), in which the rise in cost is more than proportionate.

This is corroborated in the cases of Brazil and Argentina, where cars are built with a very high proportion of locally manufactured parts. The following results are shown for the Renault Dauphine:

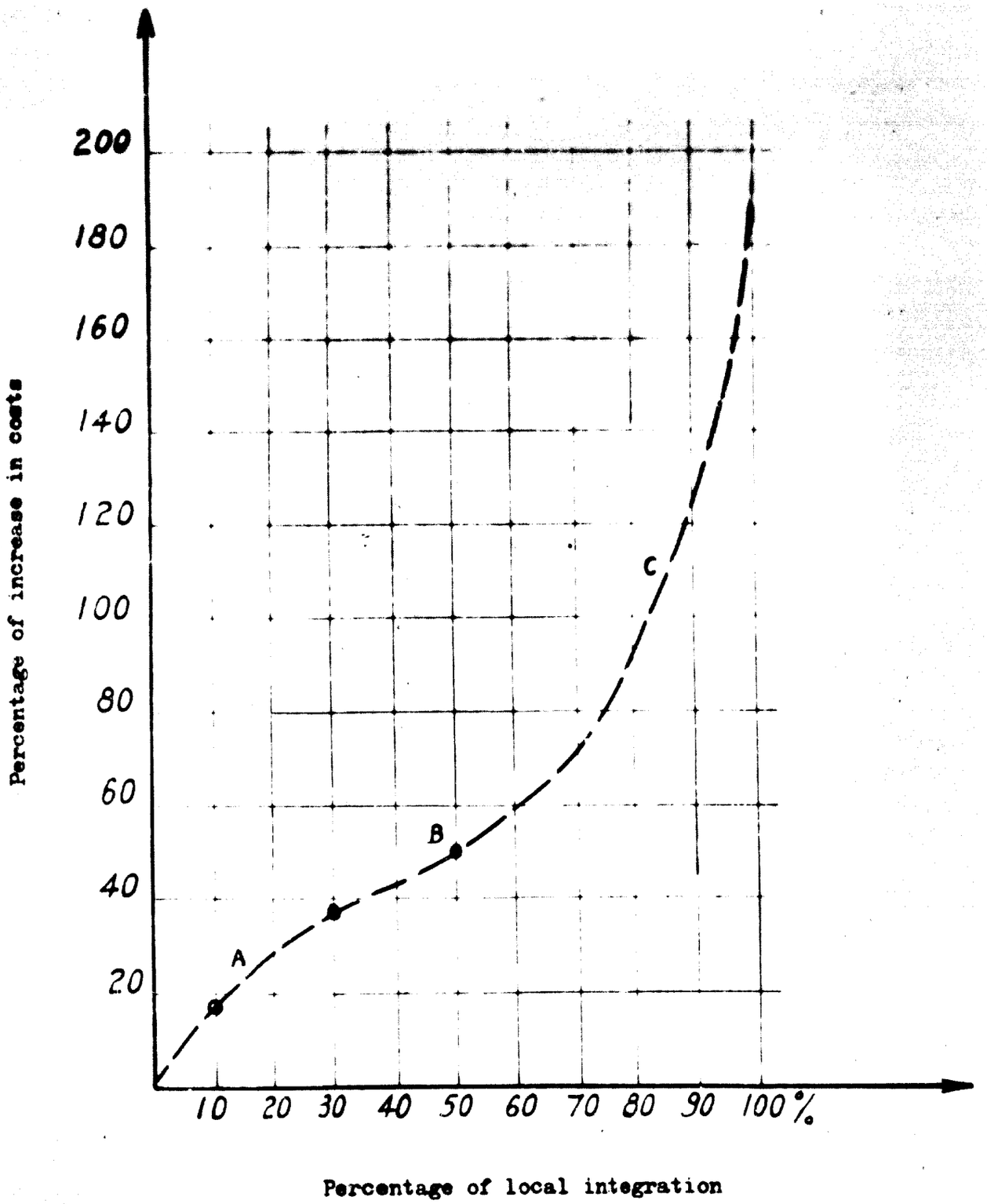
Selling price of the Renault Dauphine car
(Base 100 = price on the French market)

	Brazil	Argentina
Rate of local integration	92%	85%
Price index	210	297

Account must, of course, be taken of the volume of production, which is not exactly the same in Argentina as in Brazil, and also of the fact that the official rates of exchange used to establish the price indices are not altogether satisfactory indicators, in view of the rapid inflation taking place in both countries.

Figure 1

Increase in net cost per vehicle for 5,000 vehicles a year in relation to the proportion of local integration



The slope of the curve in its exponential portion (C) is due to the fact that the parts concerned are portions of the body work. Manufacture of such parts in small series results in heavy amortization charges since the press tools used are designed to produce a much larger volume of parts than is practicable for a developing country.

Every country must therefore decide for itself in the light of the capacity of the market how far to follow the curve. Each country can set a limit for the acceptable rise in net cost per vehicle and on this basis decide to what point incorporation of local parts should be insisted on.

ANNEX 3

TABLE OF ASSEMBLY AND MANUFACTURING PLANTS BUILDING AUTOMOBILE VEHICLES UNDER LICENCE
(as of 30 June 1966)

This table does not include assembly or manufacturing plants assembling or manufacturing vehicles of the manufacturer's design in his own country. However, it does list all plants that are technically or financially dependent on a foreign manufacturer, where the total 1965 production was more than 50 vehicles.

Population in thousands

From United Nations Statistical Year Book, 1963 edition: pages 24 to 41. The census dates range from 1956 to 1961 - shown in parenthesis.

Gross national product per capita

From "National Accounts Statistics. Expenditure, production and income 1955 - 1964", OECD, Paris, March 1966.

The figures refer to 1964, except where the year is shown in parenthesis.

Automobile Builder/Manufacturer

Official name of firm or abbreviation in current use.

Co-operating manufacturer

AMC - American Motors Corporation
BMC - British Motor Corporation
GMC - General Motors Corporation
KJC - Kayser Jeep Corporation
RNUR - Régie Nationale des Usines Renault

Type of vehicle

VP - Private car
VU - Utility vehicle (of any weight)
BUS - Coach or bus
4x4 - Jeep, Landrover, or the like

Degree of integration

CKD - Completely knocked down

SKD - Semi knocked down

n% - estimate (where possible) of percentage of local participation in the final price, including assembly.

Preparation - plants under construction or about to begin operations.

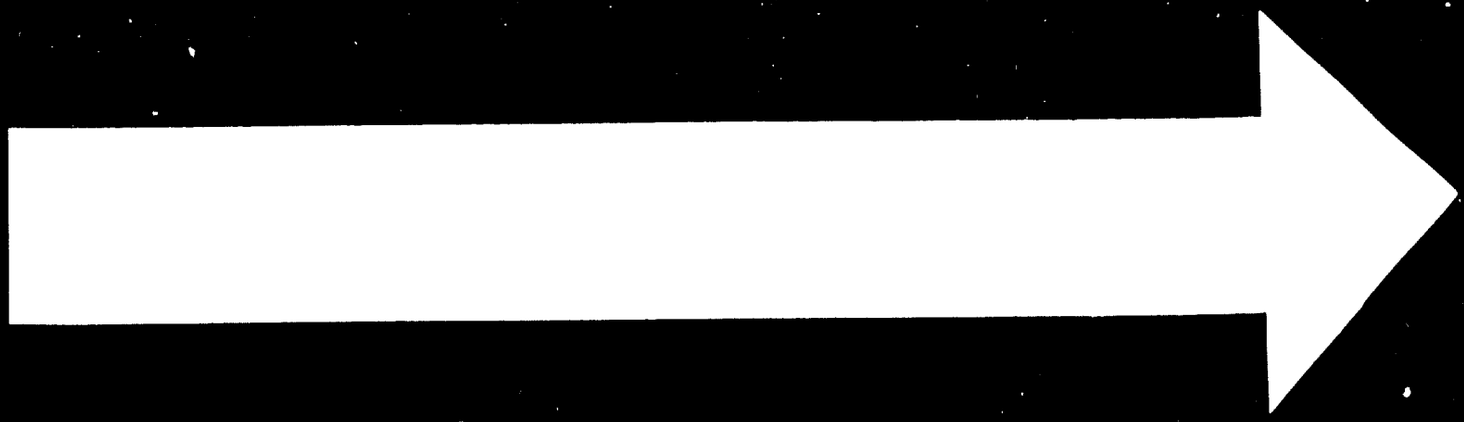
Production in 1965

Quoted when the figures are available.

* indicates 1964 production.

(RFA = Federal Republic of Germany)

Country	Population in thousands	GNP in US $ per cap.	Local builder/ Manufacturer	Co-operating manufacturer	Type of vehicle	Country of co-operating manufacturer	Place of assembly/ manufacture	Degree of integration	Production in 1965	Remarks
SOUTH AFRICA	16,015 (1960)	605 (1963)	(CDA) Car distributors Assembly Ltd.	RWUR	VP.VU	France	East London		2,374	
				ALFA ROMEO	VP	Italy	- " -	CKD	8,173*VP	
				JAGUAR	VP	GB	- " -	CKD	1,360*VU	
				DKW	VP	RFA	- " -	CKD		
				HINO	VU	Japan	- " -	CKD		
			BMC South Africa Johannesburg	BMC	VP	GB	Blackheath	CKD	16,682*	
				"	VU	"	- " -	CKD	2,919*	
				Nissan Motor	VP	Japan	Rosselyne	CKD		
				- " -	VI	"	- " -	CKD		
				AMC	VP	USA		CKD		
			GM South Africa (Pty) Ltd.	GMC	VP	USA	Port Elizabeth		38,282*	All makes
					VU	"	- " -		11,155*	USA,FRG,GB
			South African Motor Assembler	Volksuagon	VP	FRG	Witenhage	CKD	18,081	
					VU	"	- " -	CKD		
			Chrysler South Africa	Chrysler	VP	USA	Elsies River			
				Simca	VP	France	- " -		1,171	6,060 VP*
				Dodge	VU	USA	- " -			2,227 VU*
			Forest Engineering	Berliet	VU	France	Durban	CKD		
			Ford Motors of South Africa	Ford Corp.	VP	USA	Port Elizabeth	CKD	29,687	Ford cars: USA, GB, FRG
					VU	"	- " -	CKD	9,160*	

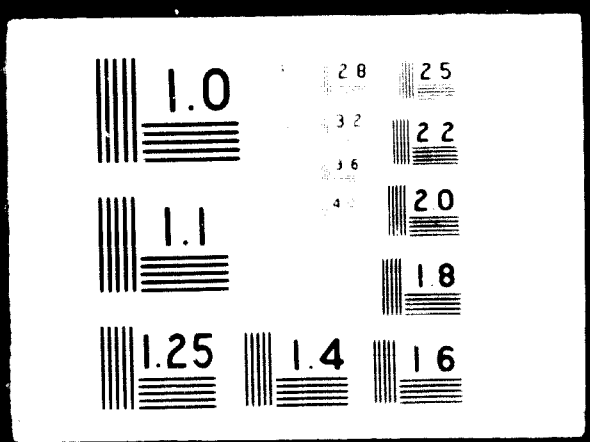


28. I. 72

2 OF 2

DO

0165



Country	Population in thousands	GNP in US $ per cap.	Local builder/ manufacturer	Co-operating manufacturer	Type of vehicle	Country of co-operating manufacturer	Place of assembly/ manufacture	Degree of integration	Production in 1965	Remarks
SOUTH AFRICA (continued)			International Harvester South Africa	International Corporation	VU	USA	Johannesburg	CKD	900*	
			Bus Bodies Ltd.	Leyland Motor Corporation	Bus	GB	Port Elizabeth	Body	2,690*	
			MacCarthy Rodway	Magirus	VU	FRG		CKD		
				Mazda	VU	Japan		CKD		
			Motor Assembles Ltd.	Toyota	VU	"	Durban	CKD	)	
				Fiat	VP	Italy		CKD	)	
					VU	"		CKD	)	
				Lancia	VP	"		CKD	) 7,910*VP	
				Nissan	VP.VU	Japan		CKD	) 14,234*VU	
				Triumph	VP	GB		CKD	)	
				Volvo	VU	Sweden		CKD	)	
			Rover South Africa Manufacturing	Rover	VP	GB	Port Elizabeth	CKD	460*	
					4 x 4	"	- " -	CKD	788*	
			Stanley Motors	Citroën	VP	France	Johannesburg	CKD	850)	
				Peugeot	VP	"	- " -	CKD	2,035)	Totals
				AMC	VP	USA	- " -	CKD	)	7,133 VP*
				Rootes	VP.VU	GB	- " -	CKD	)	1,950 VU*
				Peugeot	VU	France	- " -	CKD	912)	
				Isuzu	VU	Japan	- " -	CKD	)	

Country	Population in thousands	GNP in US $ per cap.	Local builder/ manufacturer	Co-operating manufacturer	type of vehicle	Country of co-operating manufacturer	Place of assembly/ manufacture	Degree of integration	Production in 1965	Remarks
SOUTH AFRICA (continued)			United Car and Diesel Distributors	Mercedes Benz	VP	FRG		CKD		
			Willys Africa	KJC	Jeep 4 x 4	USA	Johannesburg	CKD	779[a]	

NOTE The situation is changing rapidly. The principal builders/manufacturers are building or planning production plants to increase the proportion of locally-made parts to a minimum of 55 per cent (by weight) in 1968 and thus claim the status of "manufacturer".

Country	Population in thousands	GNP in US $ per cap.	Local builder/ manufacturer	Co-operating manufacturer	Type of vehicle	Country of co-operating manufacturer	Place of assembly/ manufacture	Degree of integration	Production in 1965	Remarks
ALGERIA	10,800 (1960)		Saral Construction des Automobiles Renault en Algerie	RNUR Savien	VP VU	France "	Alger "	CKD CKD	6,000 2,200	
			Berliet Algeria	Berliet	VU Bus	"	Rouiba	CKD	1,351	
ARGENTINA	20,500 (1960)	54- (1963)	Chrysler Argentina	Chrysler	VP.VU	USA	Fevre and Basset		8,741 7,500	VP VU
			Dinfia	Dorguard	VU	FRG	Cordoba		3,200	
			Ford Motorar	Ford Corporation	VP	USA	Buenos Aires		16,481	
					VU	"	"		14,100	
			Fiat Argentina	Fiat	VP VU	Italy "	Cordoba "		27,485 300	
			General Motors Argentina SA	General Motors	VP	USA	San Martin		10,886	
					VU*	"	"		14,500	
			Safrar Sociedad Anonima Franco Argentina de Automotores	Peugeot	VP	France	Buenos Aires		6,492	
				Citroën	VP VU	" "	" "		4,007 700	
			Industrial Kayser Argentina (IKA)	RNUR	VP	"	Cordoba		23,416	
					VU	"	"		600	
				Kaiser Jeep	VU	USA	"		18,600	
				AMC	VP	"	"		15,424	
			Perkins AR	Perkins	VU	GB	"			

Country	Population in thousands	GNP in US $ per cap.	Local builder/ manufacturer	Co-operating Manufacturer	Type of vehicle	Country of co-operating manufacturer	Place of assembly/ manufacture	Degree of integration	Production in 1965	Remarks
ARGENTINA (continued)			S.I.A.M. di Tella	BMC	VP	GB	Buenos Aires			
				DKW	VP	FRG			5,357	
				Triumph	VP	GB				
			Industrias Argentinas Man SA	Man	VU	FRG	Buenos Aires			
			Deutz Cantabrica Industrial & Commercial SA	Klackner Humboldt Deutz AG	VU	FRG	- " -			
			Isard - Los Cedros	Goggomobil	VP	FRG	- " -		500	
				Bedford	VI*	GB	San Martin			
			Industria Automotriz Santa Fe SA	DKW	VP	FRG	Santa Fe		5,400	
					VU	"	"		200	
			Mercedes Benz Argentina	Mercedes Benz	VU	"	Buenos Airea		3,000	
			Metalmecanica	BMW	VP	FRG		)	400	
				SIMCA	VP	France		)		

On 1 August 1966 customs duties on VP and VC imported complete were raised 10 points: 45 per cent for all countries except GB; 35 per cent to encourage assembly within the country.

AUSTRALIA	10,508	1,680 (1963)	Continental G. Distr.	RNUR	VP	France	West Heidelberg	CKD	922	
				Citroën	VP	"	- " -	CKD		
				Peugeot	VP	"	- " -	CKD	1,453	

Country	Population in thousands	GNP in US $ per cap.	Local builder/ manufacturer	Co-operating Manufacturer	Type of vehicle	Country of co-operating manufacturer	Place of assembly/ manufacture	Degree of integration	Production in 1965	Remarks
AUSTRALIA (continued)			BMC (Australia)	BMC	VP	GB	Sydney	National	39,900	
					VP	"	Moorabbin			
					VU	"	Rocklea		2,500	
				Perkins	Motors	"				
			GM Holden's Pty. Ld	GMC	VP	USA	Melbourne (7 factories)	100% Holden and CKD	169,275	
					VU	"	(7 factories)			
			Ford Australia	Ford Corporation	VP	GB USA	(5 factories)	95%	57,400	
					VU	USA GB		CKD	7,500	
			Hartney Holding Pty	Nissan	VP.VU	Japan	Melbourne	CKD	10,767*	
			Chrysler Australia	Chrysler Corp.	VP	USA		5 factories	43,500	
					VU	"			3,500	
			Neal investments Ltd.	Fiat	VP	Italy	Sydney			
			International Australia	International Harvester	VU	USA	Geelong Dandenong	100%	6,100	
			Isuzu Australia	Isuzu	VP	Japan		CKD	893*	
			Leyland Australia	Leyland Corp.	VU Bus	GB	Sydney	CKD 38%	1,414*	
			Australian Motor Industries Ltd.	Mercedes Benz	VU	FRG	Port Melbourne	CKD		
				AMC	VP	USA	- " -	CKD	1,500	
				Triumph	VP	GB	Waterloo	CKD	1,500	
				Toyota	4 x 4	Japan	- " -	CKD	6,000	
				Mitsubishi	VP	"				
			Rover Australia	Rover	4 x 4	GB	Sydney	National	3,300	

Country	Population in thousands	GNP in US $ per cap.	Local builder, manufacturer	Co-operating manufacturer	Type of vehicle	Country of co-operating manufacturer	Place of assembly/ manufacture	Degree of integration	Production in 1965	Remarks
AUSTRALIA (continued)			Rootes Australia	Rootes	VP	GB	Port Melbourne	CKD		
				Commer	VU	"	- " -			
			Volkswagen Australasia	Volkswagen	VP.VU	FRG	Clayton	70%	19,264	
			Willys Australia	KJC	4 x 4	USA	Rocklea		5,000	
			Great Western Pty Ltd.	Mack	VU	"	Brisbane	preparation		
			Freighter Industries	Hino motors	Bus	Japan		preparation		
AUSTRIA	7,074 (1961)	1,280	Eisner	Hanomag	VU	FRG	?	?	?	
			Steyr Daimler-Puch AG	Fiat	VP	Italy	Steyr	CKD	2,100	
				Saurer	VU	Switzerland	"	National	2,400	
BELGIUM	9,190 (1961)	1,650	Renault	RNUR	VP	France	Haren	CKD	49,661	
				AMC	VP	USA	"	CKD	1,659	
				RNUR	VU	France	"	CKD	1,223	
			BMC Belgium	BMC	VP.VU	GB	Seneffe	CKD	3,025	
			GM Continental	GMC	VP	USA	Anvers	CKD	55,870	All European and American GMC makes
					VU	"	"	CKD	4,876	
			Ford Werke SA	Ford	VP.VU	FRG	Genk	CKD and presses	169,904	
					TA	USA	Anvers	National		
			Ragheno Factories	Peugeot	VP.VU	France	Malines	CKD	13,498	

Country	Population in thousands	GNP in US $ per cap.	Local builder/ manufacturer	Co-operation manufacturer	Type of vehicle	Country of co-operating manufacturer	Place of assembly/ manufacture	Degree of integration	Production in 1965	Remarks
BELGIUM (continued)			Citroën	Citroën	VP	France	Forest	CKD	40,584	
					VU	"	"	CKD	2,772	
			D'Ieteren Frères	Volkswagen	VP	FRG	"	CKD	76,761	
			AEC Continental	Leyland Motor Corporation	VU	GB		CKD	77	
			Leyland Triumph SA	Triumph	VP.VU	"	Malines	CKD	10,079	
			I.N.A.	Mercedes Benz	VP	FRG	"	CKD	5,602	
			International	International Harvester	VU	USA	Vilvorde	CKD	74	
			Magi-Bel	Magirus	VU	FRG	Kontich	CKD	190	
			Martinauto	Mercedes Benz	Bus	FRG		CKD	836	
			Moorkens	BMW	VP	"	Kontich	CKD	4,649	
			Avonds NV	Hanomag	VU	FRG		CKD	244	
			J. Hocke	Steyr	VU	Austria	Brussels	CKD	64	
			Pierreux	Wartburg	VP	GDR		CKD	370	
			Podevijn	OM	VU	Italy		CKD	145	
			S.A.M.A.F.	Fiat	VP	"		CKD	15,918	
			Scaldia Volga	Mosk Witch	VP	USSR		CKD	2,174	
			Van Doornes Auto Mobielfabriek SA	DAF	Vu	Holland	Geel-Oevel	CKD	743	
			Van Hool	Fiat	Autobus	Italy		Mec.Fiat body Van Hool	470	
			Volvo Europa	Volvo	VU	Sweden	Alsemberg	CKD	1,305	
					VP	"	Gand	CKD	2,612	

Country	Population in thousands	GNP in US $ per cap.	Local builder/ manufacturer	Co-operation manufacturer	Type of vehicle	Country of co-operating manufacturer	Place of assembly/ manufacture	Degree of integration	Production in 1965	Remarks
BURMA	20,824 (1941)	75 (1963)	Hino	Hino	VU bus	Japan	Rangoon	CKD	650	
			Local Government	Mazda	VP	"	"	CKD	1,200	
BOLIVIA	2,704 (1950)	64 (1963)	Toyota Bolivia	Toyota	VP	Japan			350	
BRAZIL	70,967 (1960)	156 (1963)	Willys, Overland Brazil	Kayser Jeep Corporation	VP	USA	Sao Bernardo do Campo	Manuf. 95%	14,500	
					VU	"	"	"	24,200	
				Renault	VP	France	"	"	12,800	
			Toyota do Brasil SA	Toyota Motor	VP 4 x 4 VI	Japan "	Sao Bernardo do Campo "		900	
			Perkins	Perkins	Motors	GB				
			General Motors do Brasil SA	GM (Chevrolet)	VU	USA	Sao Paulo (2 factories)	100%	10,800	
			Mecanica Pesada SA	Man	VI	FRG	Taubate			
			VW do Brasil	VW	VP	FRG	Sao Bernardo do Campo	100%	61,931	
					VI	"	- " -	95%	13,100	
			Mercedes Benz do Brasil	Mercedes Benz	VU	"	- " -	100%	6,800	
			Otto Deutz SA Motors and Tractors	Klockner Humboldt Deutz AG	VU	"	Sao Paulo			
			Demisa Deutz Minas SA	- " -	VU	"	Bel-Horizone			
			Fabrica Nacional de Motores	Alfa Romeo	VP VU	Italy	Duque de Caxias		400 VP 1,600 VU	
			Ford Motores do Brasil SA	Ford	VU	USA	Ypiranga		11,400	

Country	Population in thousands	GNP in US $ per cap.	Local builder/ manufacturer	Co-operation manufacturer	Type of vehicle	Country of co-operating manufacturer	Place of assembly/ manufacture	Degree of integration	Production in 1965	Remarks
BRAZIL (continued)			International do Brazil	International Harvester	VU	USA	Sao Paulo		600	
			Scania Vabis do Brasil	Scania Vabis	VU Bus	Sweden	"	CKD	800	
			Simca do Brasil	Simca	VP	France	Sao Bernardo		7,000	
			Vemag SA Veiculos	DKW	VP	FRG	Sao Paulo		5,500	
			Maquinas Agricolas	"	VU	"	"		9,763	
CANADA	18,238 (1961)	2,260	Quebec General Investment Corp.	RNUR	VP	France	St. Bruno	CKD		
				Peugeot	VP	"	"	CKD		
			Austin Motor Company (Canada)	BMC	VP		Toronto			
			GM of Canada	GMC	VP	USA	Oshawa	100%		
					VI	"	"	100%		
			McKinnon Indus Limited	GMC	VP.VI	"	St.Catherines			
			GM Diesel Ltd.	"	VI	"	London			Bus Euclid Products
			American Motors Canada	AMC	VP	"	Toronto	CKD	31,347	
			Volvo Canada	Volvo	VP	Sweden	Dartmouth	SKD		
			Willys Canada	KJC	VU 4 x 4	USA	Windsor	CKD	2,500	
			White	White	VU	USA	Brantford	CKD		
			Mack trucks Manufacturing Company of Canada	Mack	VU	"	Oakville	CKD	preparation	

Country	Population in thousands	GNP in US $ per cap.	Local builder/ manufacturer	Co-operation manufacturer	Type of vehicle	Country of co-operating manufacturer	Place of assembly/ manufacture	Degree of integration	Production in 1965	Remarks
CHILE	7,339 (1960)		Industrias Automotriz Nissan	Nissan Motor	VP VU	Japan "		CKD) CKD)	1,200	
			Industrias Unidas	RNUR	VP VU	Franco	Arica	CKD	302	
				AMC	VP	USA	"	CKD		
			Equipos Mecanicos Salfa Siam	BMC	VP. VU	GB	"	CKD		
			Citroën Chilena SA	Citroën	VP VU	France		CKD	946	
			Fiat Automoviles	Fiat	VP	Italy	Arica	CKD		
				GMC	VP VU	USA		CKD		
				Ford	VU	"	Santiago			
			Socieda Automotore Chilena Ltd.	SIMCA	VP	France	Arica	CKD	722	
COLOMBIA	11,548 (1951)		Fabrica Colombiana de Automotores	BMC	VP	GB	Bogota	CKD		
			Fabrica Chrysler Colombiana de Automotores SA	Chrysler Corporation	VP VU	USA "		CKD CKD		
			Leonidas Lara	KJC	4 x 4	"		CKD	2,500	
				Nissan	VU	Japan		CKD	1,300	
SOUTH KOREA	24,989 (1960)		Asia Motors	Saviem	VU	France	Kwangju)	preparation		
				UNIC	VU	"	")			
			Shinjin	Mitsubishi	VP	Japan	)			
COSTA RICA	1,325 (1963)		Auto Ensemblad	RNUR	VU	France	San Jose	CKD	297	
			Assembladora Centroamericana	AMC	VP	USA		CKD		
				Toyota	4 x 4	Japan		CKD		

Country	Population in thousands	GNP in US $ per cap.	Local builder/ manufacturer	Co-operation manufacturer	Type of Vehicle	Country of co-operating manufacturer	Place of assembly/ manufacture	Degree of integration	Production in 1965	Remarks
COSTA RICA (Continued)			Coopesa	BMC	4 x 4	GB		CKD	50	
				GMC	VP	USA FRG		CKD	325	
			Autotecnica	KJC	4 x 4	USA		CKD	125	
			Compania Comercial Aizemman	Nissan	VP	Japan		CKD	30	
			Almacen Electra SA	Rootes	VP	GB		CKD	125	
					4 x 4	"		CKD	400	
IVORY COAST	3,100		S.A.F.A.R. Société Africaine de Fabrication des Automobiles Renault	RNUR	VP	France	Abidjan	CKD	1,121	
				Savien	VU	"	"	CKD	1,197	
DENMARK	4,585 (1960)	1,890	GM International A/S	GMC	VP	USA	Copenhagen	CKD)	1,500	All GMC makes including European
					VU	"	"	CKD)		
			Ford	Ford	VP	"	"	CKD)	10,000	Ford, USA, GB and Cologne
					VU	"	"	CKD)		
			Dansk Oversoisk Motor Industri	BMC (Morris)	VP	GB	Glostrup	CKD	4,200	
				Chrysler Fargo	VP.VU	USA	"			
			De Forenede Automob Automobil Fabriker	BMC (Austin)	VU	GB	Odense	CKD	1,100	
			Bohnstedts Peterson	Mercedes Benz	VP	FRG	Copenhagen	CKD	1,000	
					VU	"	"	CKD	1,100	

Country	Population in thousands	GNP in US $ per cap.	Local builder/ manufacturer	Co-operation manufacturer	Type of vehicle	Country of co-operating manufacturer	Place of assembly/ manufacture	Degree of integration	Production in 1965	Remarks
DENMARK (continued)			International Harvester	International	VU	USA	Copenhagen	CKD	102	
			Dansk Automobil Syggeri	Leyland	VU	GB	Sylkeborg	CKD	227	
			Scandinavisk Motor Co.	Chrysler Dodge	VU	USA	Copenhagen	CKD		
			Willys Overland Samlefabrik	KJC	4 x 4	USA	- " -	CKD		
SPAIN	30,431 (1980)	570	Sociedad Espanola de Automoviles de Turismo (SETA)	FIAT	VP VU	Italy "	Barcelona - " -	100% 100%	86,641 3,100	
			Fasa-Renault	RNUR	VP VU	France "	Valladolid - " -	95%	39,100 8,242	
			Barreiros Diesel	Chrysler Corp. Simca 1000 AEC	VP VP VU	USA France GB	Villaverde - " -	CKD CKD	 300	
			Citroën Hispana	Citroën	VP VU	France "	Vigo "	93% 93%	16,100 21,505	
			Empresa Nacional de Autocamiones SA	Leyland	VU Bus	GB	Madrid Barcelona	100%	6,700	Pegaso
			Borgward ISO Espanol	Borgward	VU	FRG			700*	
			Enmasa Mercedes Benz	Daimler Benz	VU	"			944*	
			Fadisa	Alfa Romeo	VU	Italy	Avila		1,100	
			Industrias del Motor	DKW VW	VU	FRG	Victoria		10,301	Iseco
			Metallurgica Santa Ana	Rover	4 x 4	GB	Linares		3,500	

Country	Population in thousands	GNP in US $ per cap.	Local builder/ manufacturer	Co-operating manufacturer	Type of vehicle	Country of co-operating manufacturer	Place of assembly/ manufacture	Degree of integration	Production in 1965	Remarks
SPAIN (continued)			Munghia Industrial	Goggomobil	VP	FRG	Bilbao		453	
			Motor Iberica	Ford	VU	GB	Barcelona	CKD	6,800	Ebro
			SA Vehiculos Automoviles	BMC	VU	GB	Valladolid	CKD	2,900	
				Berliet	VU	France	•	CKD	62	
			Tempo Iberica	Tempo	VU	FRG	Madrid	CKD	1,000	
			Vehiculos Industriales y Agricolas	Hotchkiss	4 x 4	France	Saragossa		650	
				KJC		USA				
			Neuva Montana Quijano	BMC	VP	GB	Santander Pampelune	about to start operations		
			Perkins Hispana	Perkins	Motors	GB				
FINLAND	4,446 (1960)		O/Y Ford A/B	Ford	VU	GB	Helsinki	CKD		
FORMOSA (Taiwan)	9,368 (1956)		Yue Long Motor Co.	Hino	Bus	Japan	Taipei	CKD	300	
				Nissan	VP VU	•	•	CKD	2,300	
				KJC	4 x 4	USA	•	CKD	1,200	
FRANCE	46,520 (1962)	1,820	Perkins SA (Moteurs)	Perkins Ltd.	Diesel motors	GB	Saint Denis	100%		
			Hotchkiss Leyland SA	Leyland Motor Corporation	VU	•	• •	CKD	56	
			Société des Camions Bernard	Mack trucks	VU	USA		CKD		
GHANA	6,727 (1960)		United Africa Company	Bedford (GMC)	VU	GB		CKD		

Country	Population in thousands	GNP in US $ per cap.	Local builder/ manufacturer	Co-operating manufacturer	Type of vehicle	Country of co-operating manufacturer	Place of assembly/ manufacture	Degree of integration	Production in 1965	Remarks
GREAT BRITAIN	55,676 (1961)	1,700	Vauxhall Motors Ltd.	GMC	VP	USA	Luton (8 factories)	100%		Vauxhall
				GMC	VU	"	- " -	100%		
			Chrysler Motors Ltd. and Dodge Brothers Ltd.(Britain)	Chrysler	VU	"	Kew		6,530	
			Carr Hill orks	International	VU	USA	Doncaster			
GREECE	8,387 (1961)	. 588	Chrysler Hellas	Chrysler Corp.	VU	USA	Salonique		800	
				Hino Motors	Autobus	Japan		CKD		
				Isuzu Motors	VU Bus	"		CKD		
INDIA	435,512 (1961)	74 (1963)	Government	Nissan Motor Ltd.	VP	Japan	Calcutta	CKD		
					VU	"	"	80%	2,400	
				Perkins Ltd.	Diesel Motors	GB				
			Tata Mercedes	Daimler Benz	VU	FRG	Yamshedpur	90%	17,000	
			Ashoka Leyland	Leyland Corp.	VU	GB	Madras	80%	4,600	
			Ashoka Leyland	Standard Motors	VP	GB	Madras	61%	3,700	
			Hindustan Motors	Bedford	VU	GB	Calcutta Utapara	61%	4,700	
				BMC	VP	GB	- " -	80%	14,000	
			Mahindra and Mahindra	KJC	4 x 4	USA	Bombay	80%	10,400	
			Government	Man	VU	FRG	Jabalpur Kanpur	65%		Shaktiman
			Premier Automobiles	Fiat	VP	Italy	Bombay	65%	5,400	
				Chrysler Corp.	VP	USA	"	preparation		
				Dodge	VU	"	"	80%	9,700	
			Kirkloskar Cummins	Cummins	Motors	"	Poona	100%	2,000	

Country	Population in thousands	GNP in US $ per cap.	Local builder/ manufacturer	Co-operating manufacturer	Type of vehicle	Country of co-operating manufacturer	Place of assembly/ manufacture	Degree of integration	Production in 1965	Remarks
INDONESIA	96,319 (1961)			GMC (Holden)	VP	Australia	Surabaya	CKD		
			Dana Motor	Fiat	VF	Italy	Djakarta	CKD		
				DAF	VU	Netherlands	Batu	CKD		
				Chrysler	VP VU	USA				
IRAN	18,955 (1956)		Saica	Fiat	VP	Italy	Teheran	CKD	1,000	
			Leyland Motors Iran Corporation	Leyland Corp.	VU	GB	"	CKD		
			Sahami Automobilsazi Chavar	Mercedes Benz	VU	FRG		CKD	700	
			Iran National	- " -	Autobus	FRG	Teheran	65%	400	
				Rootes Commer	VU	GB	"	CKD		
			Iran National	Rootes	VP	GB	Teheran	in preparation		
			Zamyad Co.	Volvo	VU	Sweden	"	CKD		
			Sherkat Sahami Jeep	KJC	Jeep	USA	"	CKD		
				American Motor	VP	"	"	CKD	in preparation	
IRELAND	2,818 (1961)	918	Motor Distributors Ltd.	RNUR	VP	France	Dublin	CKD		
				Volkswagen	VP VU	FRG	"	CKD	6,000	
				Mercedes	VP VU	"	"	CKD		
			Commercial Road Vehicles Ltd.	AEC	VU	GB				
			Lincoln and Nolan Ltd.	BMC (Austin)	VP VU	GB	Dublin	CKD		

Country	Population in thousands	GNP in US $ per cap.	Local builder/ manufacturer	Co-operating manufacturer	Type of vehicle	Country of co-operating manufacturer	Place of assembly/ manufacture	Degree of integration	Production in 1965	Remarks
IRELAND (continued)			Booth Poole and Co. Ltd.	BMC Morris MG-Wolseley	VP VU	GB				
			Ashenhurst Williams and Co.	Citroën	VP	France		CKD		
				Leyland	VU	GB		CKD		
			Fiat Ireland	Fiat	VP	Italy	Dublin	CKD		
			Henry Ford and Son Ltd.	Ford Corp.	VP VU	USA GB	Cork	CKD	12,000	
			Reg Armstrong Motors Ltd.	NSU	VP	FRG		CKD		
			O'Shea's Ltd.	Opel	VP	FRG		CKD		
				Prince	VU	Japan		CKD		
			Peugeot Distributors Ltd.	Peugeot	VP	France		CKD		
			Buckley's Motors Ltd.	Rootes	VP VU	GB		CKD		
				Skoda	VP	Czechoslo-vakia				
			Standard Triumph (Eire) Ltd.	Triumph	VP VU	GB		CKD		
				Rover	VP VU	"		CKD		
			McCairns Motors Ltd.	Scammel (Leyland)	VU	GB	Dublin	CKD		
				SIMCA	VP	France	"	CKD		
				Vauxhall	VP	GB		CKD		
				Bedford	VU	"		CKD		
ISRAEL	2,183 (1961)	1,232 (1963)	Kaiser Ilin	KJC	VP	USA	Haifa	CKD	)	
					VI	"	"	CKD	)	4,100
				Hino	VP	Japan	"	CKD	)	

Country	Population in thousands	GNP in US $ per cap.	Local builder/ manufacturer	Co-operating manufacturer	Type of vehicle	Country of co-operating manufacturer	Places of assembly/ manufacture	Degree of integration	Production in 1965	Remarks
ISRAEL (continued)			Leyland Motor	Leyland Corp.	VI	GB	Ashdod	50%	1,500	
				Triumph	VP	"	"			
				Chrysler	VU	USA	Nazareth	in preparation		
			Autocar	Reliant Engineering	VU	GB	Tirat Hakarmel	CKD	2,790	Sabra
ITALY	49,877 (1961)	970	Innocenti	BMC	VP	GB	Milan	50 to 80%	24,749	
			Alfa Romeo	RNUR	VP	France	"	CKD		
					VP	"	Pomigliano	CKD		
					VI	"	"	CKD		
				Perkins Ltd.	Diesel motors	GB				
			OSI	Ford GB	VP	GB	Turin	50%		
			Willys Mediterranee	KJC	4 x 4	USA	Carini			
			Motauto	Honda	VP	Japan	Bologne	in preparation		
MADAGASCAR			Somacoa	RNUR	VP	France	Tananarive	CKD	1,452	
					VU	"	"	CKD		
				Diamond	VU	USA	"	CKD		
			Ecam	Citroën	VP	France		CKD	960	
MALAYSIA	7,725 (1966)			Ford	VP	USA	Singapore	CKD		
SINGAPORE				Mercedes Benz	VP	FRG	"	CKD	1,400	
					VU	"	Kuala Lumpur	preparation		
			Champion Motors	Rover	4 x 4	GB	"	CKD		
				Volkswagen	VP	FRG		CKD		
			Kah Motor Co. Ltd.	Toyota	VP	Japan		CKD		
				Holden	VP	Australia		preparation		
				Volvo	VP	Sweden	Batu. Tiga	"		

Country	Population in thousands	GNP in US $ per cap.	Local builder manufacturer	Foreign collaborating manufacturer	Type of vehicle	Country of collaborating manufacturer	Place of assembly/ manufacture	Degree of integration	Production in 1965	Remarks
MALTA	319 (1957)		Rambler Automobile Assembly Ltd.	American Motors	VP	USA	Malta	CKD		
			BMC (Malta)	BMC	VP	GB	"	CKD		
			Leyland Motor Corp.	Triumph	VP	"	"	CKD		
MOROCCO	11,626 (1960)		Berliet, Morocco	Berliet	VU	France	Ain Es Sebaa	CKD	600	
				BMC	VU	GB	"	CKD		
			SOMACA	Fiat	VP	Italy	Casablanca	CKD	3,600	
			Société Marocaine de Construction Automobile	Simca	VP	France	"	CKD	2,100	
			Société Africaine pour l'Industrie Automobile	Ford	VU	GB	"	CKD	370	
				Volvo	VU Bus	Sweden	"	CKD	200	
			Atlas Maroc	Rover	4 x 4	GB		CKD	240	
			Sadia	KJC	4 x 4	USA		CKD	300	
MEXICO	34,923 (1960)		Dina	RMUR	VP	France	Sahagun	CKD	12,000	
			Diesel Nacional		VU	"	"	CKD		
				Willeam	VP	GB	"	CKD		
			Automotives Ingleses	BMC	VP	GB	Mexico	CKD		
			Nissan Mexican	Nissan Motors	VP	Japan	Cuernavaca	preparation		
					VI	"				
			General Motors Mexico S.A. de CV	GMC	VP	USA	Mexico City (2 factories)	CKD Motor manuf.	12,500	
					VI	"	- " -	CKD	8,700	

Country	Population in thousands	GNP in US $ per cap.	Local builder/ manufacturer	Co-operating manufacturer	Type of vehicle	Country of co-operating manufacturer	Place of assembly/ manufacture	Degree of integration	Production in 1965	Remarks
MEXICO (continued)			Willys Mexicana	AMC	VP	USA	Mexico City	CKD	4,500	
				KJC	VI	"		CKD		
			International	International Harvester	VI	"	Saltillo		3,400	
			Volkswagen de Mexico SA	Volkswagen	VP	FRG	Xalostoc	preparation		
			Fabricas Automex	Chrysler	VP	USA	Toluca		24,200	
				Dodge	VU	"	"		9,400	
			FKC	Ford	VP	"	Mexico		15,900	
					VU	"	"		9,000	
			Automotriz Delta	DKW	VP	FRG	Silao		1,700	
				Mercedes Benz	VU	"	"	preparation		
NIGERIA	30,418 (1958)		Sté Commerciale de l'Ouest Africain (SCOA)	Berliet	VU	France	Lagos	CKD		
				BMC	VU	GB	"	CKD	1,000	
				Chrysler	VU	USA	"	CKD		
			J. Allen Co.	Ford	VU	GB		CKD		
			United Africa Cy.	GMC (Bedford)	VU	GB		CKD	1,100	
				Willys	Autobus 4 x 4	USA		CKD	50	
			Union Trading Cy.	GMC (Opel)	VU	FRG		CKD		
				Man	VU	"		CKD		
			Bevac	Leyland Corp.	VU	GB		CKD	120	
				Rover	4 x 4	"		CKD		
			Leventis	Mercedes Benz	VU	FRG		CKD	600	

Country	Population in thousands	GNP in US $ per cap.	Local builder/ manufacturer	Co-operating manufacturer	Type of vehicle	Country of co-operating manufacturer	Place of assembly/ manufacture	Degree of integration	Production in 1965	Remarks
NEW ZEALAND	2,415 (1961)	1,324 (1963)		AMC	VF	USA		CKD		
			Associated Motor Industries Ltd.	BMC (Austin)	VP	GB	Wellington	CKD		
					VU	"	"	CKD		
			Dominion Motors Ltd.	BMC (Morris)	VP	GB	Auckland	CKD	14,000*	
					VU	"	"	CKD	2,000*	
				Chrysler (Dodge)	VF	Australia		CKD	3,700*	
					VU	USA			100*	
			Torino Motors (N.Z.) Ltd.	Fiat	VF	Italy	Auckland	CKD	994*	
			Ford Motor Co of N.Z. Ltd.	Ford	VP	USA GB	Wellington	CKD	13,700*	
					VU	" "	- " -	CKD	1,800*	
			General Motors of N.Z. Ltd.	GMC	VP	" "	"	CKD	16,834*	
					VU	Australia GB	"	CKD	2,400*	
			International Harvester (N.Z.)	International Harvester Corp.	VU	USA	Christchurch	CKD	300*	
			Leyland Motors Ltd. (N.Z.)	Leyland Corp.	VU	GB	- " -	CKD	165*	
			Motor Assemblies Ltd.	Triumph	VP	GB	- " -	CKD	2,100*	
				Rover	4 x 4	"	- " -	CKD		
			Gardner Motors Ltd.	Nissan	VP VU	Japan	Auckland	CKD	2,000	
			Volkswagen Motors (N.Z.) Ltd.	Volkswagen	VP	FRG	"	CKD	1,600*	
					VU	"	"	CKD		
				Peugeot	VP	France	"	CKD	389*	
			Todd Motor Industries Ltd.	RMUR	VP	"	Wellington	CKD	500	
				Rootes	VP	GB	"	CKD	7,000*	
					VU	"	"	CKD		

Country	Population in thousands	GNP in US $ per cap.	Local builder/ manufacturer	Co-operating manufacturer	Type of Vehicle	Country of co-operating manufacturer	Place of assembly/ manufacture	Degree of integration	Production in 1965	Remarks
NEW ZEALAND (continued)			Butcher Ltd.	Simca	VP	France	Auckland	CKD	543	
				Skoda	VP	Czechoslovakia	Christchurch	CKD		
PAKISTAN	93,832 (1961)		Unimen Daihatsu Motors	Daihatsu Kogyo Kabushiki Kaisha	VP	Japan	Karachi	CKD		
					VI	"	"	CKD		
			Haroon Industries Ltd.	Chrysler	VP	USA		CKD	1,200	
				Rootes	VU	GB		preparation		
			Ali Automobiles	Ford	VP VU	"		CKD	1,000	
			GM Pakistan	GMC	VP	USA	Karachi	CKD		
				(Bedford)	VU	GB	"	CKD		
			East Pakistan Industrial Development Co.	Mack	VU	USA	"	CKD	2,000	
NETHERLANDS	11,462 (1960)	1,390	J.J. Molenars Automobielbedrijf	BMC	VP	GB	Amersfoort	CKD		
			GM Continental	GMC	VP	USA	Rotterdam	CKD		
					VU	"	"	"		
			Chrysler Corp.	Chrysler	VP	"	Sluisjesdijk	CKD	3,554	
				Dodge	VU	"	"	CKD	192	
			Scania Vabis Nederland NV	Scania Vabis	VU	Sweden	Zwolle	CKD	1,378	
			NV Automobiel Fabriek	Hino Motors	VP	Japan	Zuid Sloe	) Factories		
					VU	"	" "	) under		
								) construction		
			Ford	Ford	VP	GB USA	Amsterdam	CKD	25,379	

Country	Population in thousands	GNP in US $ per cap.	Local builder/ manufacturer	Co-operating manufacturer	Type of vehicle	Country of co-operating manufacturer	Place of assembly/ manufacture	Degree of integration	Production in 1965	Remarks
NETHERLANDS (continued)			Ford	Ford	VU	GB	Amsterdam	CKD	1,663	
			Citroën Netherlands	Citroën	VP	France	"	CKD	1,612	
					VU	"	"	CKD	1,400	
			H.Englebert NV	International	VU	USA	La Haye	CKD	60	
			Verheul	AEC	VU	GB	Woddinwveen	CKD	29	
			Leyland Holland	Leyland	VU	"	Halsmeen	CKD	246	
			Motorkracht	Magirus	VU	FRG	Hoogeveen	CKD	249	
			N.V.I.M.	Volvo	VU	Sweden	Gravenhage	CKD	164	
PERU	**10,364 (1961)**		G.M. del Peru SA	GMC	VP	USA	Lima	CKD		
					VU	"	"	CKD		
			Ford Peru	Ford	VP	"	"	CKD		
					VI	"	"	CKD		
			Chrysler Peru	Chrysler	VP	"	"	starting operations		
					VU	"	"	- " -		
			Motor Import	Volkswagen	VP	FRG	Puente	in preparation		
				Mercedes Benz	VU	"	"	- " -		
				Fiat	VP	Italy	Lima			
			Pedro Martinto SA	Toyota Motor Co.	VP	Japan		- " -		
			Isuzu Peru	Isuzu Motors Ltd.	VP VU	"		- " -		
			Maquinarias and Marubeni	Nissan Motors Co.	VP	"		- " -		
			Industria Automotriz	RNUR	VP	France	Lima	in preparation		
			Peruana SA	Saviem	VU	"	"	"		
				AMC	VP	USA	"	"		
				Peugeot	VP	France	"	"		

Country	Population in thousands	GNP in US $ per cap.	Local builder/ manufacturer	Co-operating manufacturer	Type of vehicle	Country of co-operating manufacturer	Place of assembly/ manufacture	Degree of integration	Production in 1965	Remarks
PHILIPPINES	27,088 (1960)		Liberty Motors	RNUR	VP	France	Manila	CKD	350	
			Hino Motors (Phil.) Inc	Hino Motors	VP	Japan	Caloocan	CKD	300	
					VU	"	"	CKD	150	
				Nissan	VP 4 x 4	"	Cebu	CKD	150	
			Filipinas Vehicle and Equipment Co.	AMC	VP	USA		CKD		
			Fabarinc	BMC	VP	GB		CKD)	1,500	
					VU	"		CKD)		
			Chrysler Corp.	Chrysler	VP	USA	Manila	CKD		
					VU	"	"	CKD		
				Simca	VP	France	"	CKD	220	
			Ysmael Steel	Fiat	VP	Italie		CKD)	1,000	
					VU	"		CKD)		
			Manila Trading	Ford	VP	USA	Manila	CKD)		
					VU	GB	"	CKD)		
			Luneta Motors	Ford	VP VU	"		)	6,000	
			G.A. Machineries	Ford	VP VU	USA		)		
				Rover	4 x 4	GB		)		
			Yutico Sons	GMC Opel Vauxhall, Holden, Chevrolet	VP	USA FRG GB	Manila	CKD)	5,500	
				Chevrolet-Bedford	VU	GB	"	CKD)		
			International Maclead	International Harvester Corp.	VU	USA		CKD	700	
				Isuzu	VP VU	Japan		CKD	1,200	(VP)
				Man	VU	FRG		CKD	100	
				Mercedes Benz	VP	"		CKD	1,000	
					VU	"		CKD	500	
			Delta Motors Corp.	Toyota	VP	Japan		CKD	1,300	

Country	Population in thousands	GNP in $ per cap.	Local builder/ manufacturer	Co-operating manufacturer	Type of vehicle	Country of co-operating manufacturer	Place of assembly/ manufacture	Degree of integration	Production in 1965	Remarks
PHILIPPINES (continued)			DMG Inc.	Volkswagen	VP	FRG		CKD	1,500	
					VU	"		CKD		
				KJC	4 x 4	USA		CKD		
				Peugeot	VP	France		CKD		
				Rootes	VP VU	GB		CKD		
POLAND	29,731 (1960)		Varsovie Zeran	Fiat	VP	Italy	Zeran			
PORTUGAL	8,851 (1960)	330 (1963)	Industrias Lusitanas	RNUR	VP	France	Guarda	CKD	1,166	
			Renault Sarl		VU	"	"	CKD	60	
			GM de Portugal Limitada	GMC Opel	VP	FRG	Lisbon	CKD	3,550	
				Bedford	VU	GB	Azambuja	CKD	1,813	
				BMC	VP	GB				
			Ford Lusitania	Ford Cologne	VP VU	FRG	Azambuja	CKD	7,200	
				Ford GB	VP VU	GB	"	CKD		
			Companhia Portuguese de Motores et Camiones	Barreiros	VU	Spain	Setubal	CKD	330	
				Berliet	VU	France	Tramagal	CKD	558	
			Metalurgica Duarte Ferreira	BMC	VP	GB	Setubal	CKD	5,319	
			Industrias de Montagen		VU	"	"	CKD	1,566	
			Automobeis Ltd.	BMW	VP	FRG	Vendas Novas	CKD		
				Man	VU	"	"	CKD	333	
				Steyr	VU	FRG	"	CKD	36	
			Citroën Lusitania	Citroën	VP VU	France	Mangualdo	CKD	275	
			Fiat Portuguese	Fiat	VP	Italy	Vendas Novas	CKD	3,700	

Country	Population in thousands	GNP in US $ per cap.	Local builder/ manufacturer	Co-operating manufacturer	Type of vehicle	Country of co-operating manufacturer	Place of assembly/ manufacture	Degree of integration	Production in 1965	Remarks
PORTUGAL (continued)			Somave	Simca	VP	France	Vendas Novas	CKD	1,348	
			Leyland Portuguesa	Leyland	VU	GB	Setubal	CKD		
			Movauto	Mercedes Benz	VU	FRG	"	CKD		
				Peugeot	VP VU	France	"	CKD	1,405	
				NSU	VP	FRG	"	CKD	545	
			Sociedad Commercial Tasso de Sousa	Rootes	VP	GB	Ovar	CKD		
				Volvo	VU	Sweden	"	CKD	385	
			Garrido e.Filho	Scania Vabis	VU	"	Bombarral	CKD	164	
			Volkswagen Lusitania	Volkswagen	VP	FRG	Setubal	CKD	4,252	
					VU	"	"	CKD	741	
SOUTHERN RHODESIA	3,858 (1962)		Austin Motor Co. (Rhod)	BMC	VP	GB	Umtali	CKD	3,000	
				AEC	VU	"	"	CKD	120	
			Ford	Ford GB	VP VU	"	Salisbury	CKD	2,400	VP + VU
			Corrosserie du Zambeze	Leyland Motor Corp.	VU	"	"	CKD body		
				Rover	VP 4 x 4	"		CKD	400	
UNITED ARAB REPUBLIC	26,085 (1960)		N.A.S.R.	Fiat	VP	Italy	Lattaque	CKD	4,000	
				Magirus	VU Bus	FRG	Helouan	CKD	3,700	
			Egyptian Automotive Co.	NSU	VP	FRG	Cairo	Mec.NSU nat. bodywork	1,000	Ramses

Country	Population in thousands	GNP in U.S.$ per cap.	Local builder/ manufacturer	Co-operating manufacturer	Type of vehicle	Country of co-operating manufacturer	Place of assembly/ manufacture	Degree of integration	Production in 1965	Remarks
DOMINICAN REPUBLIC	3,014 (1960)			Toyota	VF	Japan		SKD	180	
FEDERAL REPUBLIC OF GERMANY	56,115 (1961)	1,780	Adam Opel AG	GMC	VP	USA	Russelheim (2 factories)	100%		
					VI	"	Russelheim Bochum	100%		
			Fiat Automobil AG/Neckar	Fiat	VP	Italy	Heilbronn	50%	14,731	
			International	International Harvester	VI	USA	Heidelberg	CKD	286	
SALVADOR	2,511 (1961)			Isuzu	VU	Japan		SKD	200	
SENEGAL	3,109 (1961)		Berliet	Berliet	VU	France	Thies	CKD	159	
			Senegal		VU	"	Dakar	CKD		
SWITZERLAND	5,429 (1960)	2,190	GM Suisse SA	GMC	VP	USA	Bienne	CKD	25,000	All American and European GM makes
					VU	"	"	CKD		
			Automobile Schinznach Bade AG	Chrysler	VP	USA	Schinznach Bade	CKD	1,800	
THAILAND	26,258 (1960)		The That Hino Industrie Co.	Hino Motors Ltd.	VP	Japan	Sumrontay	CKD		
					VU	"	"	CKD		
			The Siam Motors Co. Ltd.	Nissan Motor	VP	"	Bangkok	CKD		
					VU	"	"	SKD		
			Toyota Motor Thailand Co.	Toyota Motor	VP	"	Samut Prakan	CKD	1,200	
					VU	"		SKD	600	

Country	Population in thousands	GNP in US $ per cap.	Local builder/ manufacturer	Co-operating manufacturer	Type of vehicle	Country of co-operating manufacturer	Place of assembly/ manufacture	Degree of integration	Production in 1965	Remarks
THAILAND (continued)			Karnasuta General Assembly Co.	Fiat	VP	Italy	Bangkok	CKD	1,000	
			Anglo-Thai Motors Ind	Ford	VP VU	GB "	Parknam "	CKD CKD	1,200 300	
			Mitsubishi Thailand	Isuzu Mitzubishi	VU VP	Japan "		SKD preparation	3,500	
			Thonburi Phanich Ltd.	Mercedes Benz	VU	FRG		CKD	2,100	
			Ruam Chak Ltd.	Simca	VP	France		Preparation		
			Prince Motors Thailand Ltd.	Prince	VP	Japan	Samrong	CKD	800	
TUNISIA	3,783 (1956)		S.T.I.A.	RNUR Saviem	VP VI	France "	Sousse "	SKD SKD	235 126*	
TURKEY	27,755 (1960)	240	K.A.V.I.	RNUR	VP VU	France "	Istanbul "	SKD SKD		
			CIFCILU	Volkswagen	VP VU	FRG	Mecidikoy	SKD		
			BMC Sanayi Ve Ticaret AS	BMC Bussing	VP VU VU	GB FRG	Izmir	CKD CKD	1,000	
			Chrysler Sanayi AS	Chrysler Ford GB	VU VI VU	USA GB "	Gebze	CKD CKD CKD	200	
			Saki Canlisoy	Isuzu	VU	Japan	Izmir	CKD		
			Sulahattin Bayazid	Leyland Motor	VU	GB	Mersin	CKD		

Country	Population thousands	GNP in US $ per cap.	Local builder/ manufacturer	Co-operating manufacturer	Type of vehicle	Country of co-operating manufacturer	Place of assembly manufacture	Degree of integration	Production in 1965	Remarks
URUGUAY	2,556	478 (1964)	Automotor Fund d'Est	RNUR	VP	France	Montevideo	SKD		
			Santa Rosa							
			Automotores	SIMCA		•	•	CKD		
			Domingo Baso	FIAT	VP	Italy	•	CKD		
			Domingo Baso	Toyota	VP	Japan		CKD		
					4 x 4					
				Rootes				CKD		
				Peugeot	VP	France		CKD		
					VU	•		CKD		
				AMC	VP	USA		CKD		
VENEZUELA	7,524	544	Covenal	RNUR	VP	France	Maracay	CKD	) 2,397[a]	
					VP	USA	•	CKD	)	
			Caracas Liaison	Nissan Motor Ltd.	VP	Japan	Caracas	CKD		
			Office		VU	•	•	CKD	380[a]	
			GM de Venezuela CA	GMC	VP	USA	•	CKD	10,709[a]	
					VU	•	•	CKD	3,772[a]	
			Chrysler	Chrysler	VP VU	USA	•	CKD	) 4,498[a][b]	
				Simca	VP	France	•	CKD	) 1,774[a][b]	
			Fabrica	Fiat	VP	Italy	Victoria	CKD	1,800[a]	
			Industrial		VU	•	•	CKD	260[a]	
			Automotores							
			Venezuela SA							
			Ford de Venezuela	Ford	VP	USA	Valencia	CKD	6,861[a]	
						[illegible]	•	CKD		
					VU	FRG	•	CKD	2,917[a]	
			Industria	International	4 x 4	USA			812[a]	
			Venezolanande							
			Maquinaria CA	Rootes	VP	[illegible]	Valencia	CKD	2,256[a]	
				Mercedes Benz	VU	FRG	•	CKD	199[a]	

Country	Population in thousands	GNP in US $ per cap.	Local builder/ manufacturer	Co-operating manufacturer	Type of vehicle	Country of co-operating manufacturer	Place of assembly/ manufacture	Degree of integration	Production in 1965	Remarks
VENEZUELA (continued)			Volkswagen	Volkswagen	VP	FRG	Puerto Cabello	CKD	3,857*	
					VU	"	"		60*	
			Willys de Venezuela	KJC	4 x 4	USA			1,560*	
YUGOSLAVIA	18,550 (1961)	500	Zavodi Crvena Zastava	Fiat	VP	Italy	Kragujevac	70%	34,100	
					VU	"	"	CKD	7,000	
			Fabrika Priboj	Saurer	VU	Austria	Priboj Na Limu	70%	3,109*	
				OM	VU	Italy	- " -	70%		
			Tovarna Automobilov Maribor	Magirus Deutz	VU	FRG	Maribor	70%	3,900*	
			Goša	Alfa Romeo	Bus	Italy	Smederevska Palanka	70%		
			Tomos	Citroën	VP	France	Koper	CKD	700*	
				NSU	VP	FRG		CKD	400	

28. I. 72