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

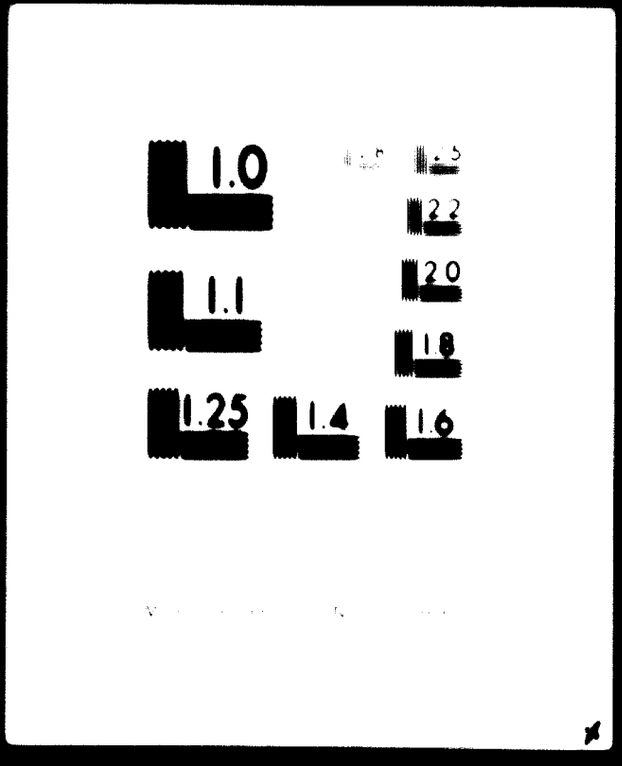
FAIR USE POLICY

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



Battelle
Frankfurt

Report

Q2564

CON 71/28
RECEIVED 17/1/72

TEPCO FILECOPY

000075

Feasibility Study on Passenger Cars Assembly and Local Manufacture of Components in Nigeria

E. Rennert,
UNIDO

Battelle

Battelle-Institut e.V.

6000 Frankfurt (Main) 90
Am Römerhof 35
(Opelrondell)

Telefon (0611) 7908 (1)
Telex 0411-966

Possibility Study on Passenger Cars Assembly and Local Manufacture of Components in Nigeria

Report for
United Nations Industrial Development Organization
Vienna

October 1971

Summary

This report has established that the assembly of passenger cars in Nigeria under present prevailing conditions is feasible. With the help of a suitable ancillary industry the cars produced in Nigeria should not be more expensive than the imported EC cars including import duty (Section 6.1).

At the time of writing this report no passenger car assembly plants exist in Nigeria.

In 1967 98,000 passenger cars were re-licensed in Nigeria. Among the different makes Volkswagen with 18 percent and Peugeot with 20 percent were leading.

The total "car population" in Nigeria has been computed as follows:

1979 - 98,000 passenger cars
1980 - 111,000 passenger cars

It is not recommended to establish more than two assembly plants, because with too many different types of passenger cars present production costs will rise. The same applies to the ancillary industry.

It has been assessed that the 15 percent customs dut. relief granted by the Government for CKD packs should make the locally assembled cars competitive with imported EC cars until about 20 percent local components are incorporated in the final product.

Both assembly plants have to install the same percentage of locally produced components.

The capital investment of DM [illegible] mm (equity capital) will be paid off by net profits during the sixth year.

Participation in the equity and dividends is suggested as follows:

- manufacturer [illegible] %
- Government } 49 %
- Nigerian public }

100 %

Each of the two assembly plants has been planned for a capacity of about 10.000 passenger cars p.a.
The sales forecast for 1980 has been calculated at 12.100 passenger cars for Peugeot (Section 1.1.2). The additional output will be taken care of by a second shift.

The following recommendations on Government grants and support have been made :

- exemption from import duty and reconstruction surcharge for all production equipment, specific tooling and installations
- special support to an assembly plant located outside the Lagos area
- exemption from excise tax
- exemption from reconstruction surcharge on CKD packs
- special protection surcharge on additional imports of PC cars
- establishment of bonded storage facilities
- allocation of foreign currency

In the first place Lagos has been recommended as site for the assembly plant and in the second place Warri or Port Harcourt. Kaduna as site has been rejected

Intensive theoretical instruction in appropriate institutes and practical in-plant training is necessary. It is strongly recommended not to precipitate Nigerianisation of the top level technical and administrative management.

It is feasible to produce components for the passenger car assembly plants by the local industries, though their possibilities are limited due to the small quantity of the specific parts to be manufactured.

Manufacturing of fibreglass-reinforced plastic bodies cannot be recommended.

Contents

Page

Lists, Tables and Figures

Abbreviations:

£ N	=	Nigerian pound
sh	=	shilling
d	=	pence
US $	=	dollar USA
BU car	=	built up car
CKD pack	=	completely knocked down car
cif	=	cost, insurance, freight
fob	=	free on board
t	=	metric ton
kg	=	kilogram
cc	=	cubic centimeter
cub. m	=	cubic meter
OE	=	original equipment
l.c.	=	local components
h	=	hour
sq.ft.	=	square foot
VW	=	Volkswagen
R.A.C.	=	Royal Automobile Club
NRC	=	Nigerian Railway Corporation

1. Introduction

In May 1971, the United Nations Industrial Development Organisation, Vienna, requested Battelle-Frankfurt to investigate the

> Feasibility of Passenger Car Assembly and
> Local Manufacture of Components in Nigeria.

It was stated in the terms of reference that the report on the results of this investigation should supply the Government of the Federal Republic of Nigeria (hereafter referred to as Government) with information to make a decision with regard to the development of a viable automotive industry.

After arrival of the staff members of Battelle-Frankfurt, at Lagos in the beginning of June 1971, it appeared that the Government had decided in the meantime to install two assembly plants for passenger cars in the Federal Republic of Nigeria (hereafter referred to as Nigeria), one of the Volkswagenwerk AG (hereafter referred to as Volkswagen) and one of Automobiles Peugeot Comp. (hereafter referred to as Peugeot).

The decision to select from the 13 proposals submitted Volkswagen as well as Peugeot each to establish a passenger car assembly plant in Nigeria coincides with the results of this study.

To obtain the data required for the investigation, two industrial engineers and one legal expert stayed three months and one month, respectively in Nigeria for field work activities.

The results of the inquiries made in Nigeria and the studies of Battelle-Frankfurt, are included in this report showing the possibilities and limits for the development of an automotive industry in Nigeria.

The future industrialisation is determined by the regulations of the Government:

The New Industrial Policy of the Government[1)]

The objectives of the new policy are to

- promote even development and fair distribution of industries in all parts of the country
- ensure rapid expansion and diversification of the industrial sector of the economy
- increase the incomes realised from manufacturing activity
- create more employment activities
- promote the establishment of industries which cater for overseas markets to earn foreign exchange
- continue the programme of import-substitution, as well as raise the level of intermediate and capital goods production
- initiate schemes designed to promote indigenous manpower development in the industrial sector
- raise the proportion of indigenous ownership of industrial investments.

---

1) Second National Development Plan 1970-74

In pursuance of these objectives, the Government will lay down priorities from time to time and initiate positive measures to achieve them. Apart from setting priorities in respect of public sector-programmes, the Government will also endeavour in its investment promotion efforts to give firm guidelines to private sector investments in priority areas, through appropriate selective incentive measures.

Industrial Priorities

In the effort to promote expansion of the intermediate and capital goods industries in order to raise the contribution of value added in the manufacturing sector, the Government is not oblivious to the problem posed by the relatively low economies of scale under present Nigerian conditions. It is clear that the Government must now give greater support to those industries seeking additional markets for their products outside Nigeria in order to raise their scale of operations.

In pursuing rapid industrial development, the planning of industrial projects will be closely integrated with the development of projects for modernising agricultural production.

The following order of priorities has, to this end, been adopted as a guide for further expansion:

- agro-allied industries
- petro-chemical and chemical industries
- greater integration, linkage and diversification of the textile industries
- an integrated iron and steel complex
- passenger motor vehicle assembly and related industries

- expansion of existing industries for export
- further import substitution in selected goods

2. Aims and Method of Investigation

The report is designed to establish number and type of passenger cars to be assembled in Nigeria. The survey made by Battelle-Frankfurt has been commissioned by United Nations Industrial Development Organization (hereafter referred to as UNIDO).

To prepare a detailed market analysis the following groups of passenger cars and variations have been investigated:

- imported cars
- new registrations
- re-licensed cars
  - average age
  - average mileage

The report is based on data obtained by

- evaluation of secondary statistics
- utilization of primary statistics gained in Nigeria
- evaluation of publications and reports
- contacting motor vehicle producers and assembly firms as well as manufacturers of components.

The data employed in this report have been mainly procured from the following Nigerian authorities and international as well as national organizations:

- Federal Ministry of Industry and Trade
- Federal Ministry of Finance
- Federal Ministry of Information
- Federal Ministry of Transport
- Federal Ministry of Works and Housing
- Federal Ministry of Economic Planning

- Nigerian Institute of Social and Economic Research
- Investment Centre
- Federal Office of Statistics
- Central Motor Registry
- Nigerian Railway Corporation
- Lagos Chamber of Commerce
- Nigerian Ports Authority
- International Bank for Reconstruction and Development
- Central Bank of Nigeria
- Barclays Bank
- Board of Customs and Excise
- United Nations Development Program
- International Labour Office
- Nigerian Institute of Management
- Embassy of the Federal Republic of Germany

The Battelle experts performed field surveys by making inquiries with the following group of persons and enterprises:

- importers
- traders
- transport enterprises
- taxi and car owners as well as drivers
- owners and managers of assembly plants
- owners and managers of factories producing components

The results of these field surveys and the secondary statistics were supplemented by information obtained from several reports and publications of different institutions.

Data on the techniques and costs of passenger car assembly and manufacture of components have also been obtained from the different offers submitted by prospective automotive assembly firms and discussions with manufacturers of components both in Nigeria and other industrial countries. In

several interviews in Nigeria and abroad the latest experience in engineering techniques in the automotive industries was evaluated and taken into consideration.

On the basis of the data obtained from the above sources it was possible to elaborate a detailed market survey by means of the following tables:

- Table No. 1: Passenger Cars Re-licensed, Classified by Make and Year (1960 to 1968)
- Table No. 2: Volkswagen and Peugeot in Relation to the Re-licensed Cars (1960 to 1967)
- Table No. 3: Passenger Cars and Taxis, New Registration, Classified by Make and Year (1960 to 1969)
- Table No. 4: Passenger Cars Imports, Classified by Stroke Volume (1960 to 1970)
- Table No. 5: Passenger Cars and Taxis, Re-licensed, Classified by R.A.C. Horsepower Rating and Year (1960 to 1968)

From the data obtained the average lifetime of the cars, especially Volkswagen and Peugeot, has been calculated the annual elimination of cars and the rate of increment (Table No. 6 to 13).

The future demand for passenger cars in the period up to 1980 has been forecast by trend extrapolation using the method of least squares (Section 3.4).

At the time of writing this study assemply plants for passenger cars did not exist in Nigeria. A prototype programme for a ten-year period for the types, sizes and quantity of the passenger cars to be assembled has been described.

The question of the necessity and the amount of additional imports of built up (BU) passenger cars has been investigated and discussed.

Local industries suitable for the manufacture of car components have been visited and analysed with regard to capability, cost structure and quality control.

The need for training workers, foremen and managers for future assembly plants has been examined and discussed.

The optimum proportion of locally produced car components to be mounted into the cars during assembly and the increase over a ten-year period has been explained.

The capital requirements have been analysed.

The possible savings in foreign exchange owing to the assembly of the cars in the country and the utilisation of local components has been demonstrated by calculating the assembly costs of an average car with a stroke volume not exceeding 1,750 cc.

Special rates or deletion of import duties and taxes as well as other incentives to be granted by the Government have been investigated.

Ancillary industries not yet existing in Nigeria have been contacted abroad and their conditions of participation in the manufacture of car components in Nigeria have been studied.

A selection of optimum sites has been investigated considering the available labour, present and potential transportation means of CKD packs and locally manufactured car components as well as distribution of finished cars to the selling areas.

The problems of the manufacture of FRP bodies have been discussed.

A general forecast of the long-term advantage of the Nigerian economy has been elaborated.

The exchange rate prevailing during the time of reporting was

1 £N = 2.8 US $

All prices and costs quoted in this report are subject to change within the range of the national and international development.

3. Market Analysis

3.1 Explanation of the Statistics

The following has to be said with regard to the keeping of the statistics in Nigeria:

Passenger cars

In the Nigerian statistics passenger cars include the following vehicles:

- saloon cars
- taxis
- station waggons
- privately owned hit cars (light trucks)
- privately owned mini busses

New registrations

A car falls under the column "new registration" if it is registered in Nigeria for the first time. The age of the car is of no importance.

Re- licensed cars

On account of the fiscal system in Nigeria all cars have to stick each year a new tax licence visibly at the inside of the wind shield. After the first repetition of this procedure the car is considered to be re-licensed.

In the former Northern Region the registration system is quite different and for this reason the since 1965 figures are no longer kept in the general statistics or are only estimated by the officials.

Place of registration

The distribution of the vehicles according to regions does not give a clear picture of the local traffic density as the registration of a vehicle is not dependent on the place of residence of the owner and has not to be registered in the region where it is put into service.

1.8 Size and Structure of the Passenger Car Market

At the time of writing this study no passenger cars have been assembled in Nigeria contrary to light and heavy trucks as well as buses.

The local industries supply tyres, tubes and batteries but only for such vehicles of which the necessary sizes comply with standard dimensions.

The paint required originates exclusively from local industries.

1.8.1 Present Passenger Car Market

On the Nigerian car market almost all car manufacturers of the whole world are represented with their cars of various types and different age groups. The fact that the importers try to sell as much as possible these cars which they represent and consider to be the best resulted in the course of the year in today's picture of an unmanageable car market in Nigeria.

The importers of cars and their different makes of cars sold in Nigeria are specified in List No. 1. As a result of the salesmen's power of persuasion and the unawareness of the buyers it is possible to introduce even more different types of motor vehicles into the Nigerian market.

List No. 1: Importers of Passenger Cars

At the moment, there are 17 (seventeen) registered companies engaged in the importation and distribution of passenger cars in Nigeria:

Company	Passenger Car Model
- Joe Allen 89, Creek Road, Apapa.	Ford cars
- British Engineering West Africa Ltd. (BEWAC) 1, Commercial Road, Apapa.	Rolls Royce Rover Triumph
- R.T. Briscoe (Nigeria) Ltd., 81, Creek Road, Apapa.	Volvo Toyota
- Compagnie Francaise de l'Afrique Occidentale Ltd. (CFAO) 1, Davis Street, Lagos	Morris BMW Wolseley
- Imear (Nigeria) Ltd., 10, Ijora Causeway, Apapa.	Fiat
- Intra Motors (Nigeria) Ltd., 6, Ijora Causeway, Apapa.	Simca Datsun
- Leventis Motors Ltd. Apapa Road, Apapa.	Mercedes Renault
- Nigerian Commercial and Industrial Enterprises Ltd. (NCIE) Ind. Est., Ilupeju	BMW Skoda Chrysler
- Mandilas Ltd., 96/102, Yakubu Gowon Street, Lagos	Volkswagen Audi Porsche
- Niger Motors Ltd., 17, Creek Road, Apapa.	Vauxhall Chevrolet

Company	Passenger Car Model
- Société Commerciale de l'Ouest Afrique, (SCOA) 11/13, Davis Street, Lagos	Austin Peugeot Jaguar
- Union Trading Comp. Ltd. (UTC) 139, Yakubu Gowon Street, Lagos	Opel Holden
- Nigerian Techn. Company Ltd., 11/13, Warehouse Road, Apapa.	Citroen

The foregoing list practically covers the entire lines of popular cars imported into the country. Less popular models are marketed in small quantities by indigenous firms as follows:

- National Motors (Nigeria) Ltd., 52/54, Denton Street, Ebute Metta	Hillman Humber Singer
- Butam Ltd., Apapa Road, Iganmu	Mazda
- Mid Motors, Industrial Estate, Iganmu	Zuk
- West Africa Automobile and Engineering Co. Ltd., (WAATECO) 6/8, Market Street, Ebute Metta	Moskwich

The intense competition has its advantage with regard to the selling price of the cars, but has a very detrimental effect on maintenance and supply of spare parts. Wrong spare parts which do not conform to the brand of the car, cannot be installed correctly and thus reduce considerably reliability and average age of the motor vehicles. Even in highly industrialised countries such a diversity of cars is not reasonable from the economic point of view.

To stop the waste of capital, whose size cannot be evaluated, it is high time to start in Nigeria the assembly of a type of passenger car suitable for the local market as successfully practised in other development countries.

3.2.2 Analysis of the Type of Car

All saloon cars and taxis have been compiled in Table No. 1 according to their manufacturer and country of origin. The less represented makes have been included under "others".

This table clearly shows that in the course of the years Volkswagen and Peugeot have achieved the gighest market share of a specific make. This trend will continue because the users of these cars questioned intensively by the Battelle experts complained about these cars relatively seldom. Besides the toughness of these two car types, i.e. their low rate of necessary repair work, the continuance of the unchanged body design of both firms should also be noted. In general, this point is especially important for the African market, as every change of the model increases the stock and price of spare parts and would cause an alteration of the disign of the respective local components. This would lead to a further rise in the price of the components.

Table No. 1: Passenger Cars Re-Licensed, Classified by Make and Year (1960 to 1968)

Make of Vehicle \ Year		1960	1961	1962	1963	1964	1965	1966	1967	1968
British:	Austin	1,048	1,095	1,084	1,044	1,310	925	1,049	974	583
	Ford	4,428	4,853	4,798	4,673	5,632	3,917	4,559	4,427	2,540
	Landrover	1,054	807	634	1,277	792	102	1,318	714	153
	Morris	2,482	3,111	3,292	3,917	5,043	1,603	1,651	1,700	979
	Vauxhall	2,478	2,488	2,388	2,346	2,740	1,884	2,098	2,219	1,258
	Others	4,478	4,897	4,463	4,232	4,636	2,950	2,715	2,422	1,578
	Total	15,968	17,251	16,659	17,489	20,153	11,381	13,390	12,456	7,091
American:	Total	2,185	2,523	2,395	2,262	2,597	1,566	1,552	1,269	861
French:	Peugeot	1,860	2,634	3,779	5,183	7,160	5,225	6,832	8,516	4,978
	Renault	744	903	826	732	854	672	748	819	569
	Others	402	493	547	698	851	708	754	801	683
	Total	3,006	4,030	5,152	6,613	8,865	6,605	8,334	10,136	6,230
German:	Mercedes	630	936	1,092	1,285	1,603	1,352	1,426	1,369	929
	Opel	3,186	4,343	4,262	4,226	4,936	3,698	4,062	4,347	2,724
	Volkswagen	2,778	3,970	4,853	6,085	7,461	6,332	7,185	7,556	3,768
	Others	417	588	897	1,083	1,352	1,077	1,087	1,029	582
	Total	7,011	9,837	11,104	12,679	15,352	12,459	13,760	14,301	8,003
Other Countries:	Total	995	1,495	1,978	2,424	3,253	2,877	3,236	3,663	2,894
Grand Total		29,165	35,136	37,288	41,467	50,220	34,888	40,272	41,825	25,079

Note: From 1965 figures exclude Northern Region and taxis
From 1968 figures exclude Norther and Eastern Region and taxis

Sources: Central Motor Registry, Lagos

3.2.3 Market Share of Volkswagen and Peugeot

Both firms, Volkswagen and Peugeot, have increased their market share considerably over the years not only on account of the quality but also owing to the growing demand for passenger cars in Nigeria, as is shown in the following table.

Table No. 2: Volkswagen and Peugeot in Relation to Re-licensed Cars (1960 to 1967)

Year	Re-licensed Cars				
	Total Number	Volkswagen		Peugeot	
		Number	% of Cars Re-licensed	Number	% of Cars Re-licensed
1960	29,165	2,778	9.5	1,860	6.4
1961	35,136	3,970	11.4	2,634	7.5
1962	37,288	4,853	13.0	3,779	10.1
1963	41,467	6,085	14.6	5,183	12.5
1964	50,220	7,461	14.9	7,106	14.1
1965	34,888	6,332	18.2	5,225	15.0
1966	40,272	7,185	17.9	6,832	16.9
1967	41,825	7,556	18.1	8,516	20.3

Note: 1965-1967 figures exclude Northern Region and taxis
Source: Central Motor Registry, Lagos

Owing to the quality of their cars, the two firms have achieved the following shares of the total number of re-licensed passenger cars:

Volkswagen 1967 - 18.1 %
Peugeot 1967 - 20.3 %

From the two makes mentioned above

Volkswagen's Beetle and
Peugeot's 404

are the most favoured. They represent the major part of the present imports and the future assembly. The remaining types of the two firms will only achieve 20 to 30 percent of the passenger car assembly plants, according to statements by local car dealers.

Table No. 3 confirms the statements with regard to the market share of Volkswagen and Peugeot made above in connection with Table No. 1. Table No. 3 shows a heavy decrease in new registrations from 1967 to 1969 which has been caused by the civil war and the resulting strict control of foreign exchange and the import restriction LN No. 11 from 17th Jan., 1968 to 1st April, 1971[1].

In addition, the selection of Volkswagen and Peugeot cars is emphasised by the fact that the category of engine volume rating from 1,200 to 1,750 cc as produced by both firms is the most frequently employed model in Nigeria, as indicated in Table 4.

---

1) The legal notice No. 11 of 17th Jan., 1968 placed the imports of passenger cars on license. In practice banned for pay in local currency. Import allowed with license when paid in foreign currency. The restriction ended on 1st April, 1971.

Table No. 3: Passenger Cars and Taxis New Registration, Classified by Make and Year (1960 to 1969)

Make of Vehicles	Year	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
British:	Austin	336	319	281	303	436	429	291	771	156	122
	Ford	1,298	1,253	946	1,212	2,040	1,337	1,260	645	270	255
	Landrover	-	-	-	-	502	273	277	288	240	299
	Morris	1,154	1,118	1,091	1,262	1,049	1,200	1,463	1,344	322	107
	Vauxhall	617	696	504	555	747	550	330	[illegible]	80	105
	Others	1,461	1,124	[illegible]	595	747	1,038	520	595	420	285
	Total	4,886	4,510	3,726	3,927	5,521	4,895	4,957	3,241	1,504	1,175
American:	Total	1,113	651	543	400	532	291	270	376	92	154
French:	Peugeot	995	1,629	2,063	2,380	3,142	3,027	3,272	2,253	770	600
	Renault	371	201	112	288	401	455	330	195	167	57
	Others	230	232	377	375	470	376	435	260	127	40
	Total	1,596	2,062	2,552	3,043	4,021	3,853	3,977	2,708	1,044	705
German:	Mercedes	412	460	434	355	520	430	304	257	107	175
	Opel	1,409	901	660	851	1,407	1,135	1,066	750	100	[illegible]
	Volkswagen	1,617	1,900	1,707	1,512	2,135	2,010	1,044	1,176	430	553
	Others	157	411	435	320	430	377	770	723	49	25
	Total	3,655	3,040	3,246	3,038	4,492	3,960	3,394	[illegible]	655	860
Other Countries:	Total	652	900	910	1,343	1,806	2,253	[illegible]	1,900	442	376
Grand Total		11,827	12,044	10,978	11,556	16,554	14,962	12,82[illegible]	[illegible]	[illegible]	[illegible]

Note: from 1965 figures exclude Northern Region
from 1968 figures exclude Northern and Eastern Region

Source: Central Motor Registry, Lagos

Table No. [illegible]: [illegible] (19[illegible] to 19[illegible])

Stroke Volume \ Year	1960	1961	1962
Not exc. 1,400 cc	[illegible]	[illegible]	[illegible]
exc. 1,400 cc	[illegible]	[illegible]	[illegible]
exc. 1,[illegible] cc	[illegible]	[illegible]	[illegible]
exc. 2,500 cc	[illegible]	[illegible]	[illegible]
Total	12,353	12,[illegible]	[illegible]

Stroke Volume \ Year	1963	1964	1965	1966	1967	1968	1969	1970
Not exc. 1,200 cc	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
exc. 1,200 cc	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
exc. 1,750 cc	[illegible]	[illegible]	[illegible]	[illegible]	523	[illegible]	[illegible]	[illegible]
exc. 2,750 cc	[illegible]	[illegible]	130	[illegible]	[illegible]	61	[illegible]	[illegible]
exc. 3,500 cc	[illegible]	[illegible]	128	61	[illegible]	[illegible]	3	[illegible]
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Source: Federal Ministry of Trade, Lagos

Table No. 3: [illegible]

Year / [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Under 10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	673
10 to 11	[illegible]	[illegible]	[illegible]	[illegible]	6,422	[illegible]	[illegible]	[illegible]	[illegible]
12 to 15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
16 to 20	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	15,072	[illegible]	10,952	[illegible]
21 to 25	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1,639
26 to 30	[illegible]	[illegible]	[illegible]	2,357	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Over 30	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	525
Total	[illegible]	[illegible]	[illegible]	[illegible]	58,220	[illegible]	48,272	61,825	[illegible]

Note : 1985 to 1987 figures exclude Northern Region and [illegible]
1988 figures exclude Northern and Eastern Region and [illegible]

Source: Federal Office of Statistics, Lagos

A further confirmation results from Table 5, where the two makes mentioned above are found in the category cited most frequently. The R.A.C. horse power rating can be converted to the stroke volume rating of the engine with the help of the R.A.C. horse power rating formula

$$H.P. = D^2 \times N - 2{,}5"$$

where D is the diameter in inches of the cylinder and

N is the number of cylinders.

In a rough estimate it can be assumed that one R.A.C. horse power is about equal to 100 cc; e.g. a car with 15 R.A.C. has a stroke volume of 1,500 cc.

The decision already made by the Nigerian Government to select from the proposals submitted by 13 firms Volkswagen as well as Peugeot, each to erect a passenger car assembly plant is already justified by the demand for these.

3.3 Average Age of the Passenger Cars

At first sight it seems that in general all passenger cars in Nigeria are overage. However, close investigations and accurate calculations have shown that the technical state of the vehicles is not satisfactory for the following reasons:

- Carelessness of the car owner with regard to maintenance (inspection, change of oil, greasing etc.)
- Want of spare parts (caused by the unjustified diversity of the types of cars)

Table No. 6: Saloon Cars Re-licensed 1965, Classified by Year of Manufacture

		1st January		31st December	
Year of Manufacture	Number of Cars	Age of Cars	Number x Age	Age of Cars	Number x Age
Pre 1951	71	15	1,065	16	1,136
1951	28	14	392	15	420
1952	32	13	416	14	448
1953	55	12	660	13	715
1954	120	11	1,320	12	1,440
1955	202	10	2,020	11	2,222
1956	737	9	6,633	10	7,370
1957	789	8	6,312	9	7,101
1958	1,688	7	11,816	8	13,504
1959	2,947	6	17,682	7	20,629
1960	5,939	5	29,695	6	35,634
1961	6,600	4	26,400	5	33,000
1962	6,508	3	19,524	4	26,032
1963	6,698	2	13,396	3	20,094
1964	2,474	1	2,474	2	4,948
Total	34,888	-	139,805	-	174,693

Source: Federal Office of Statistics, Lagos

Table No. 7: Saloon Cars Re-licensed 1966, Classified by Year of Manufacture

		1st January		31st December	
Year of Manufacture	Number of Cars	Age of Cars	Number x Age	Age of Cars	Number x Age
Pre 1952	71	15	1,065	16	1,136
1952	45	14	630	15	675
1953	44	13	572	14	616
1954	80	12	960	13	1,040
1955	133	11	1,463	12	1,596
1956	457	10	4,570	11	5,027
1957	630	9	5,670	10	6,300
1958	1,241	8	9,928	9	11,169
1959	2,302	7	16,114	8	18,416
1960	4,527	6	27,162	7	31,689
1961	4,467	5	22,335	6	26,802
1962	6,465	4	25,860	5	32,325
1963	7,855	3	23,565	4	31,420
1964	9,050	2	18,100	3	27,150
1965	2,905	1	2,905	2	5,810
Total	40,272	-	160,899	-	201,171

Source: Federal Office of Statistics, Lagos

Table No. 8: Saloon Cars Re-licensed 1967, Classified by Year of Manufacture

Year of Manufacture	Number of Cars	1st January		31st December	
		Age of Cars	Number x Age	Age of Cars	Number x Age
Pre 1953	54	15	810	16	864
1953	26	14	364	15	390
1954	59	13	767	14	826
1955	106	12	1,272	13	1,378
1956	238	11	2,618	12	2,856
1957	408	10	4,080	11	4,488
1958	713	9	6,417	10	7,130
1959	1,682	8	13,456	9	15,138
1960	3,550	7	24,850	8	28,400
1961	3,788	6	22,728	7	26,516
1962	5,313	5	26,565	6	31,878
1963	5,894	4	23,576	5	29,470
1964	8,211	3	24,633	4	32,844
1965	8,637	2	17,274	3	25,911
1966	3,146	1	3,146	2	6,292
Total	41,825	-	172,556	-	214,381

Source: Federal Office of Statistics, Lagos

[illegible]

[illegible]

Number : Age on 1st January	:	[illegible]
Number : Age on 31st December	:	[illegible]
Total	:	[illegible]
Average Number : Age	:	[illegible]
	:	[illegible]
Average Age of a Car in [illegible]	:	[illegible]
	:	[illegible] Years

[illegible]

Number : Age on 1st January	:	[illegible]
Number : Age on 31st December	:	[illegible]
Total	:	[illegible]
Average Number : Age	:	[illegible]
	:	101,079
Average Age of a Car in 1956	:	[illegible]
	:	4.21 Years

[illegible]

Number : Age on 1st January	:	172,990
Number : Age on 31st December	:	216,101
Total	:	[illegible]
Average Number : Age	:	[illegible]
	:	193,460
Average Age of a Car in 1957	:	[illegible]
	:	[illegible] Year

- Unskilfully performed repair work in small repair shops

Consequently, the durability of the cars is decreasing rapidly and danger of accidents is increasing accordingly.

In addition, it is not generally practised in Nigeria to replace a damaged car engine by a reconditioned engine. This is clearly proved by the many derelict cars lying at the roadside with their chassis still serviceable.

To calculate the average age of the passenger cars related to the middle of the year the vehicles have been classified in Tables 6 to 8 according to their age-group and multiplied by the age of the car at the beginning and at the end of the year.

In Table 9 the computation of the data gained from the Tables 6 to 8 has been continued, and as a result the average age for the years 1966 to 1968 has been obtained. Altogether the average age of the passenger cars in Nigeria amounts to

4.6 years.

The Volkswagen and Peugeot cars have been compiled in the same way in Tables No. 10 to 12 according to the year of their manufacture. Subsequently, the average age of the cars has been computed and entered in Table No. 13.

Table No. 10: Volkswagen and Peugeot Saloon Cars Re-licensed 1965, Classified by Year of Manufacture

	Volkswagen					Peugeot			
		1st January		31st December			1st January		31st December	
Year of Manufacture	Number of Cars	Age of Cars	Number x Age	Age of Cars	Number x Age	Number of Cars	Age of Cars	Number x Age	Age of Cars	Number x Age
Pre 1952	11	14	154	15	165	8	14	112	15	120
1952 - 1957	234	10.5	2,457	11.5	2,691	103	10.5	1,081	11.5	1,184
1958	337	7	2,359	8	2,696	159	7	973	8	1,112
1959	676	6	4,056	7	4,732	263	6	1,578	7	1,841
1960	1,127	5	5,635	6	6,762	677	5	3,385	6	4,062
1961	1,273	4	5,092	5	6,365	996	4	3,984	5	4,980
1962	1,209	3	3,867	4	5,156	1,162	3	3,486	4	4,648
1963	957	2	1,914	3	2,871	1,322	2	2,644	3	3,966
1964	428	1	428	2	856	555	1	555	2	1,110
Total	6,352	-	25,962	-	32,294	5,225	-	17,798	-	25,023

Source: Federal Office of Statistics, Lagos

Table No. 11: Volkswagen and Peugeot Saloon Cars De-Licensed 1984, Classified by Year of Manufacture

	Volkswagen					Peugeot				
		1st January		31st December			1st January		31st December	
Year of Manufacture	Number of Cars	Age of Cars	Number x Age	Age of Cars	Number x Age	Number of Cars	Age of Cars	Number x Age	Age of Cars	Number x Age
Pre 1952	12	35	420	36	432	4	35	140	36	144
1952 - 1957	180	31	1,860	32	2,160	77	31	847	32	924
1958	284	26	2,272	27	2,556	109	26	872	27	981
1959	561	25	3,927	26	4,488	189	25	1,325	26	1,512
1960	955	24	5,640	25	6,565	520	24	3,120	25	3,640
1961	890	23	4,370	24	5,160	787	23	3,905	24	4,296
1962	1,377	22	5,280	23	6,585	1,105	22	4,420	23	5,525
1963	1,259	21	3,777	22	5,038	1,609	21	4,809	22	6,432
1964	1,352	20	2,704	21	4,056	1,973	20	3,826	21	5,759
1965	427	19	427	20	854	611	19	611	20	1,222
Total	7,185	-	30,695	-	37,680	6,852	-	25,395	-	30,225

Source: Federal Office of Statistics, Lagos

Table No. V: Volkswagen and Peugeot Saloon Cars On-1 January 1967, Classified by Year of Manufacture

	Volkswagen					Peugeot				
		1st January		31st December			1st January		31st December	
Year of Manufacture	Number of Cars	Age of Cars	Number x Age	Age of Cars	Number x Age	Number of Cars	Age of Cars	Number x Age	Age of Cars	Number x Age
Pre 1953	8	15	120	16	128	5	15	75	16	80
1953 - 1957	108	11.5	1,242	12.5	1,350	38	11.5	437	12.5	475
1958	164	9	1,476	10	1,640	69	9	641	10	690
1959	453	8	3,624	9	4,077	155	8	1,240	9	1,395
1960	740	7	5,180	8	5,920	406	7	2,842	8	3,248
1961	769	6	4,614	7	5,383	635	6	3,810	7	4,445
1962	1,133	5	5,665	6	6,798	1,038	5	5,170	6	6,228
1963	998	4	3,992	5	4,990	1,292	4	5,168	5	6,460
1964	1,261	3	3,705	4	5,044	1,791	3	5,373	4	7,164
1965	1,365	2	2,730	3	4,095	2,123	2	4,246	3	6,369
1966	557	1	557	2	1,114	964	1	964	2	1,928
Total	7,556	-	32,903	-	40,539	8,516	-	29,966	-	38,482

Source: Federal Office of Statistics, Lagos

Table No. 13: Calculation of the Average of Volkswagen and Peugeot Saloon Cars (1965 to 1967)

		Volkswagen	Peugeot
1965			
Number x Age on 1st January	=	25,962	17,798
Number x Age on 31st December	=	32,294	23,023
Total	=	58,256	40,821
Average Number x Age	=	58,256 / 2	40,821 / 2
	=	29,128	20,410
Average Age of a Car in 1965	=	29,128 / 6,332	20,410 / 5,225
	=	4,61 Years	3,93 Years
1966			
Number x Age on 1st January	=	30,435	23,393
Number x Age on 31st December	=	37,620	30,225
Total	=	68,055	53,618
Average Number x Age	=	68,055 / 2	53,618 / 2
	=	34,027	26,809
Average Age of a Car in 1966	=	34,027 / 7,185	26,809 / 6,832
	=	4,74 Years	3,94 Years
1967			
Number x Age on 1st January	=	32,983	29,966
Number x Age on 31st December	=	40,539	38,482
Total	=	73,522	68,448
Average Number x Age	=	73,522 / 2	68,448 / 2
	=	36,761	34,224
Average Age of a Car in 1967	=	36,761 / 7,556	34,224 / 8,516
	=	4,86 Years	4,02 Years

It has to be emphasized again that both types of vehicles are very popular in Nigeria on account of their good quality and the widespread dealer network. The two firms, Volkswagen and Peugeot, will obtain in the future an increasingly higher share of the market when they have erected their planned assembly plants.

3.4 Evaluation of Trend

The data up to the beginning of the civil war as indicated in the various tables, related to the market analysis, are used as a basis for the evaluation of trend. This was accomplished by using the method of least squares[1]), thus forecasting the demand for passenger cars for a period of ten years, i.e. until 1980.

- The method of the least squares means that the square of the deviation of the single values from the trend should be a minimum, so that the extreme deviations influence the calculation to a lesser degree than data lying on the trend line.

Thus, data are obtained which with a 95 percent probability lie within the confidence limits.

---

[1]) Calculation method: G. Udny Yule/M.G. Kendall "An Introduction to the Theory of Statistics" 1953

However, the following evaluations carry weight only on the assumption of an economical stability in the country. Political and economical changes could deviate in the near future the calculated straight trend line to a lower level

3.4.1 Saloon Cars and Taxis Re-licensed

The values obtained by the market analysis (Table 14) and entered in Figure No. 1 indicate for the years 1960 to 1967 a considerable upward trend, whereby from 1965 only offically estimated numbers for the Northern Region could be utilised Figures obtained after 1968 could not be considered in this evaluation owing to the civil war. The first useful statistics from the Eastern States cannot be expected before 1973

On this Basis of computer calculations (Table 15) by Battelle-Institut the total "car population" in Nigeria has been evaluated as follows:

1975 - 92,185[1)]	in round figures	92,000 passenger cars
1980 - 112,910	in round figures	113,000 passenger cars

The average annual rate of increment amounts to

4,145	in round figures	4,150 passenger cars

1) In this and the following trend calculations the exact readings have been reproduced to facilitate for the reader to locate the origin of the different values.

Table No. 14c Saloon Cars and Vans Re-Licensed, Classified by Regions (1960 to 1968)

Region / Year		1960	1961	1962	1963	1964	1965	1966	1967	1968
Lagos	Saloon	n.a.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Vans	n.a.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Western	Saloon	n.a.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Vans	n.a.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Mid-Western	Saloon	Prior to 1964 figures for Western Region include Mid-Western Region				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Vans					[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Total					[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Eastern	Saloon	n.a	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	n.a
	Vans	n.a	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	n.a
	Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	n.a
Northern	Saloon	n.a	[illegible]	[illegible]	[illegible]	[illegible]	n.a	n.a	n.a	n.a
	Vans	n.a	[illegible]	[illegible]	[illegible]	[illegible]	n.a	n.a	n.a	n.a
	Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	n.a
Total Saloon		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total Vans		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Grand Total		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*/Estimated figures of Northern Region

Source: Central Motor Registry, Lagos

Table No. [illegible]: [illegible]

[illegible]

List of Input Data

X (Time)	Y (Value)
1960.00	29950.00
1961.00	35135.00
1962.00	37200.00
1963.00	41467.00
1964.00	50220.00
1965.00	49407.00
1966.00	55669.00
1967.00	57700.00

The equation of the linear trend Y = YM + A (X - XM) shows the following data:

N = 8. = number of input data
XM = 1963.50 = mean value of X
YM = 44916.63 = mean value of Y
A = .4198 04 = trend increase per unit of time (year)
S = .1868 04 = mean deviation of the input data from the calculated trend
SA = .2070 03 = region of confidence of A (One-Sigma-Region)

Calculated Trend with Limits of Confidence (95 %)

X (Time)	Lowest Limit Y 1	Trend Value Y (Value)	Highest Limit Y 2	Factor
1960.00	25403.63	30008.92	34614.20	1.0000
1961.00	29787.06	34153.98	38520.90	1.0000
1962.00	34098.54	38299.04	42499.53	1.0000
1963.00	38329.33	42444.10	46558.86	1.0000
1964.00	42474.39	46589.15	50703.92	1.0000
1965.00	46533.72	50734.21	54934.71	1.0000
1966.00	50512.35	54879.27	59246.19	1.0000
1967.00	54419.05	59024.33	63629.62	1.0000
1968.00	58264.27	63169.39	68074.52	1.0000
1969.00	62058.53	67314.45	72570.38	1.0000
1970.00	65811.32	71459.51	77107.71	1.0000
1971.00	69530.66	75604.57	81678.48	1.0000
1972.00	73223.10	79749.63	86276.16	1.0000
1973.00	76893.06	83894.69	90895.52	1.0000
1974.00	80547.05	88039.75	95532.45	1.0000
1975.00	84185.90	92184.81	100183.71	1.0000
1976.00	87812.99	96329.87	104846.75	1.0000
1977.00	91430.32	100474.93	109519.53	1.0000
1978.00	95039.52	104619.99	114200.46	1.0000
1979.00	98641.06	108765.05	118888.23	1.0000
1980.00	102230.40	112910.11	123581.01	1.0000

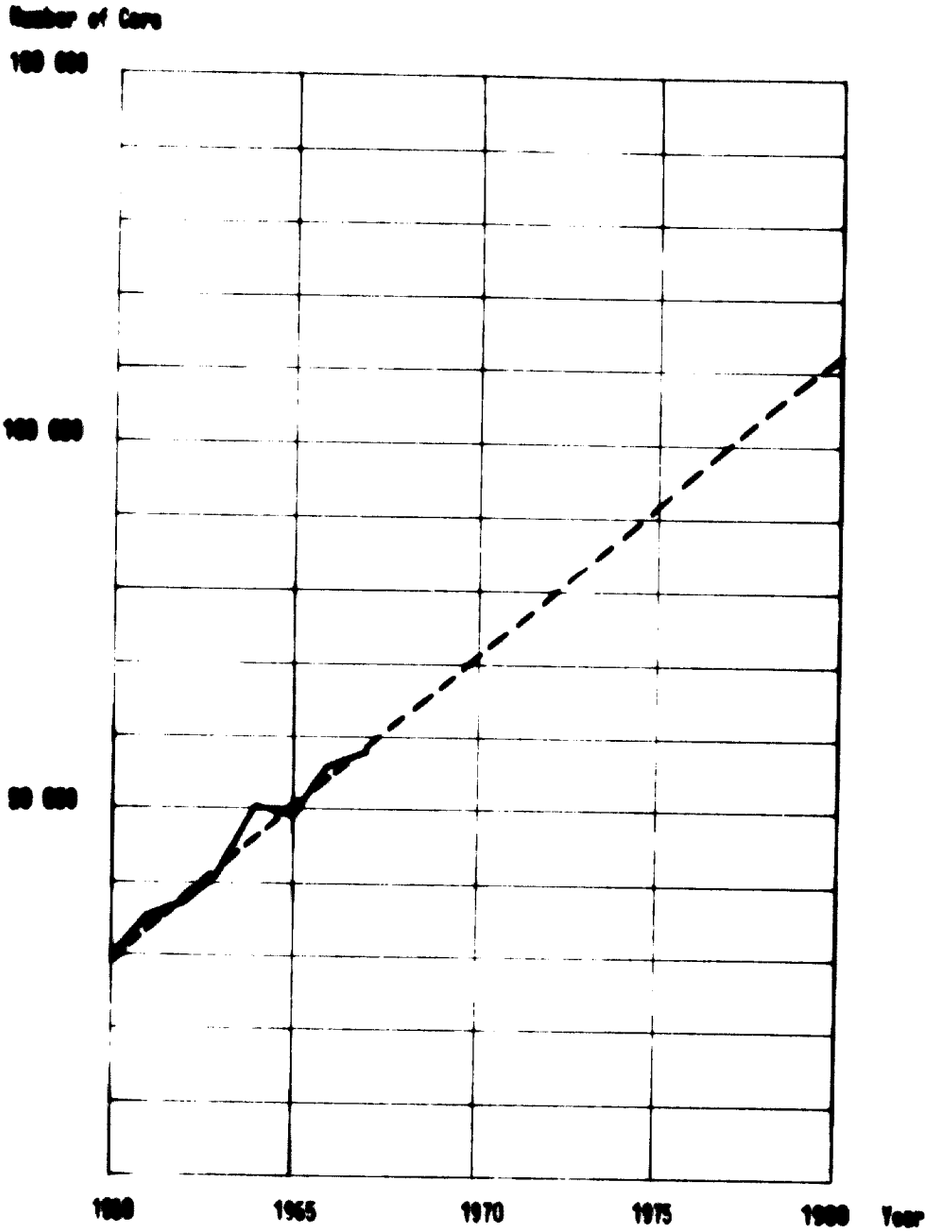


Figure No 1: Trend of Saloon Cars and Taxis Re-figured with Estimated Figures for the Northern Region

3.4.2 New Registration of Saloon Cars and Taxis

The values obtained by the market analysis with regard to the new registrations have been entered in Figure No. 2 in the same way as the re-licensed passenger cars in Figure No. 1.

However, to estimate the future development only data up to 1965 inclusive could be used, because owing to the later political instability, the resulting civil war and the import restrictions for passenger cars the number of cars for new registrations showed a heavy decline. The number of relicensed cars, however, increased until 1967 owing to the sales of secondhand cars.

Only after the abolition of the import restriction on 1st April, 1971, the imports of passenger cars and thus new registrations will most probably increase. Until 1975 imports are expected to increase to make up for the former import restriction. Thus, the new registrations will most probably exceed the calculated trend line up to the year 1975. In the long run, however, the rate of the new registrations will correspond to the trend line.

According to the evaluations of the computer calculations (Table No. 16) by Battelle-Institut, the new registrations for passenger cars for the whole of Nigeria will amount to

23,630 in round figures 24,000 for 1975
27,887 in round figures 28,000 for 1980

and the rate of the average annual increment to

851 in round figures 850 passenger cars.

Table No. 16: Trend Calculation for Saloon Cars and Taxis New Registration

Linear Trend 02 (by Computer)

List of Input Data

X (Time)	Y (Value)
1960.00	11822.00
1961.00	12049.00
1962.00	10979.00
1963.00	11559.00
1964.00	16555.00
1965.00	14962.00

The equation of the linear trend Y = YM + A (X - XM) shows the following data:

N = 6. = number of input data
XM = 1962.50 = mean value of X
YM = 12987.67 = mean value of Y
A = .851E 03 = trend increase per unit of time (year)
D = .175E 04 = mean deviation of the input data from the calculated trend
DA = .418E 03 = region of confidence of A (One-Sigma-Region)

Calculated Trend with Limits of Confidence (95 %)

X (Time)	Lowest Limit Y 1	Trend Value Y (Value)	Highest Limit Y 2	Factor
1960.00	6365.01	10859.24	15353.46	1.0000
1961.00	7567.14	11710.61	15854.08	1.0000
1962.00	8605.53	12561.98	16518.43	1.0000
1963.00	9456.90	13413.35	17369.80	1.0000
1964.00	10121.25	14264.72	18408.20	1.0000
1965.00	10621.87	15116.10	19610.32	1.0000
1966.00	10993.27	15967.47	20941.66	1.0000
1967.00	11268.88	16818.84	22368.80	1.0000
1968.00	11475.35	17670.21	23865.07	1.0000
1969.00	11632.06	18521.58	25411.10	1.0000
1970.00	11752.62	19372.95	26993.28	1.0000
1971.00	11846.48	20224.32	28602.17	1.0000
1972.00	11920.26	21075.70	30231.13	1.0000
1973.00	11978.67	21927.07	31875.46	1.0000
1974.00	12025.11	22778.44	33531.76	1.0000
1975.00	12062.09	23629.81	35197.53	1.0000
1976.00	12091.45	24481.18	36870.91	1.0000
1977.00	12114.63	25332.55	38550.47	1.0000
1978.00	12132.73	26183.92	40235.12	1.0000
1979.00	12146.58	27035.30	41924.01	1.0000
1980.00	12156.87	27886.67	43616.46	1.0000

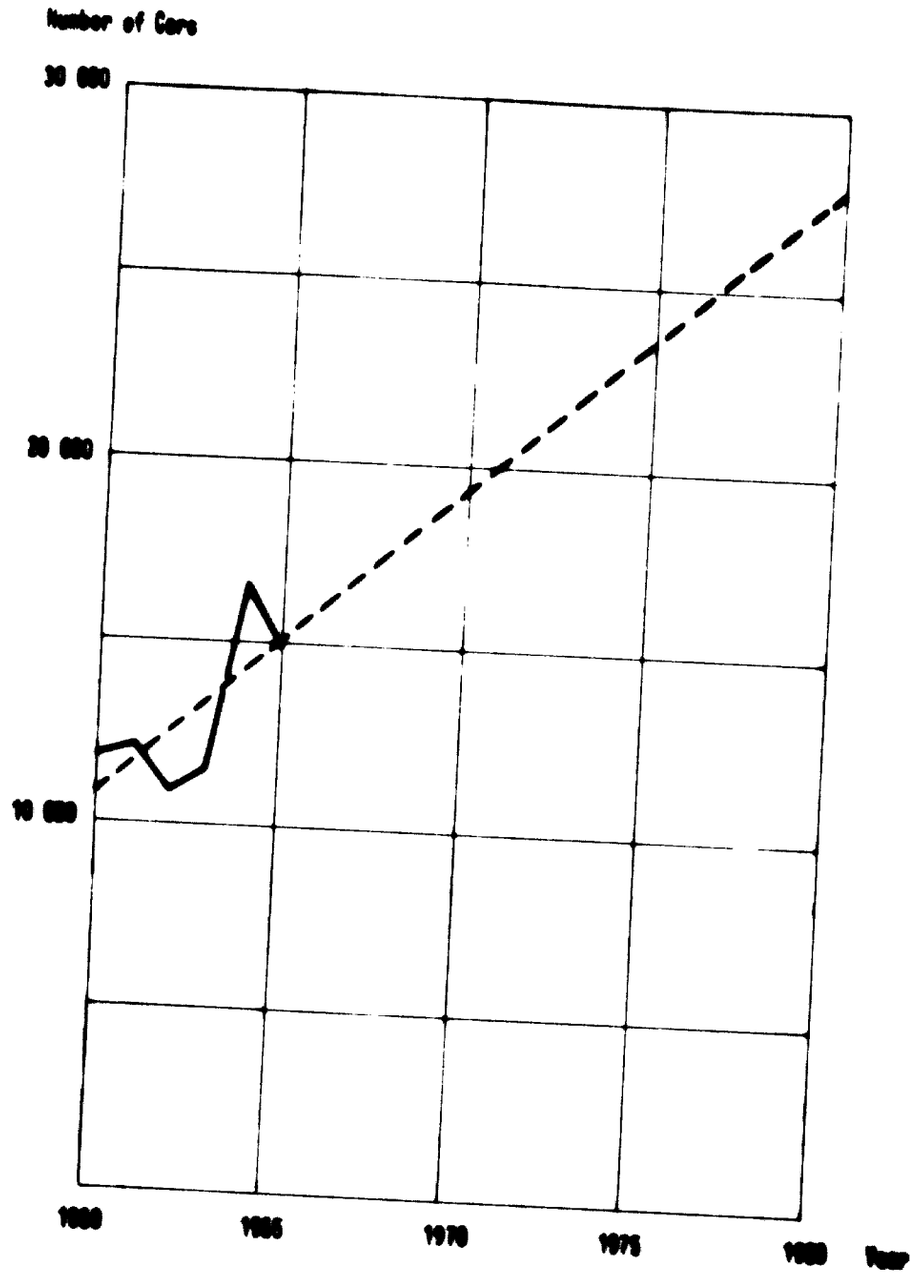


Figure No 2: Trend of Saloon Cars and Taxis New Registration

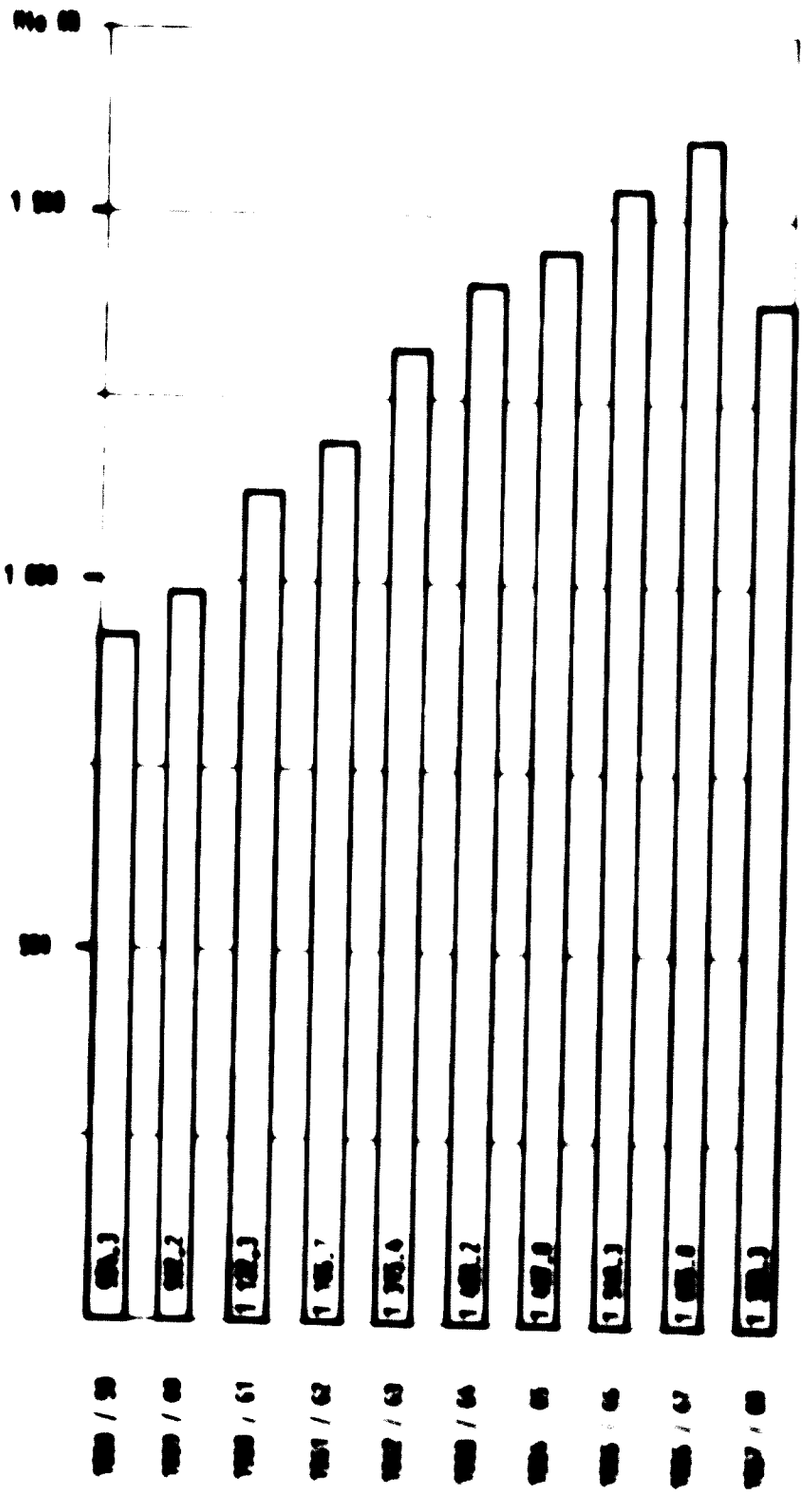


Figure No 3: Gross Domestic Product at Current Factor Cost in Rs. Cr. (1950/51 to 1967/68)

Note : 1967 / 68 Figures exclude the Eastern Region

For a confirmation of the trend calculation Figure No. 3 has been attached, stating the Gross Domestic Product of Nigeria during the period between 1958/59 and 1967/68. Like the trend calculation the Gross Domestic Product also shows a continuously increasing tendency. It may thus be concluded that the consumption of passenger cars will continue to have an upward trend.

3.4.3 Scrappage

To ascertain the scrappage rate of vehicles in the past years the following method is applied:

The vehicle population at the beginning of any year has been estimated by using the figures of cars re-licensed in that year[1]. To this figure the number of cars newly registered during the year is added[2]. The difference between this sum and the number of cars re-licensed in the subsequent year is assumed to be equal to the number of cars scrapped during the year under consideration. In order to compute the scrappage rate of a particular year the number of cars scrapped during the year is compared with the sum of cars re-licensed at the beginning of the year and the number of cars newly registered during that year; the latter sum is equal to the potential car population from which there are drop-outs during the year due to scrappage. The result of these calculations is indicated below :

Year	Scrappage Rate
1960	14 %
1961	21 %
1962	14 %
1963	5 %
1964	26 %
1965	24 %
1966	21 %
1967	51 %

1) Table No 5 2) Table No. 3

For 1968 and the following years no scrappage rate could be computed because from 1969 onwards the number of cars re-licensed cannot be considered due to the civil war.

The normal scrappage rates appear to range from 14 % to 26 %. The abnormally high scrappage rate in 1967 may be attributed to the civil war; the unusually low scrappage rate in 1963 may be accounted for by the fact that in 1964 the Nigerian Federal Office of Statistics applied for the first time a new method in ascertaining the car population re-licensed in that year. Application of this method for the first time may well have led to an over-statement of the car population re-licensed in 1964 and accordingly to an under-rated scrappage rate for 1963. As a matter of fact, according to the statistics used the size of the car population re-licensed in 1964 would be higher than the corresponding figure for 1965 (including estimate for the Northern region).

If the projected scrappage rate for 1979 is computed along the lines outlined above using the trend values of tables 15 and 16 a figure of 17 % is arrived at which would be well within the limits of 14 % and 26 % and would be compatible with the conditions prevailing in Nigeria.

3.4.4 Trend of the Market Share of Volkswagen and Peugeot[1)]

The upward trend of Volkwagen and Peugeot has been demonstrated in Figure No. 4. In the opinion of car dealers and their clients this trend will continue in the future, whereby Peugeot has overtaken Volkswagen in 1965, which also in future will remain second owing to the 404 model of Peugeot.

---

1) Table No. 2

Table No. 17: Trend Calculation for [illegible] Cars in Relation to [illegible] Cars in Total

Linear Trend 03 (by Computer)

List of Input Data

X (Time)	Y (Value)
1960.00	9.50
1961.00	11.40
1962.00	13.00
1963.00	14.60
1964.00	14.90
1965.00	18.20
1966.00	17.90
1967.00	18.10

The equation of the linear trend Y = YM + A (X - XM) shows the following data:

N = 8. = number of input data
XM = 1963.50 = mean value of X
YM = 14.70 = mean value of Y
A = .129E 01 = trend increase per unit of time (year)
S = .887E 00 = mean deviation of the input data from the calculated trend
SA = .137E 00 = region of confidence of A (One-Sigma-Region)

Calculated Trend with Limits of Confidence (95 %)

X (Time)	Lowest Limit Y 1	Trend Value Y (Value)	Highest Limit Y 2	Factor
1960.00	7.98	10.17	12.37	1.0000
1961.00	9.39	11.47	13.55	1.0000
1962.00	10.76	12.76	14.76	1.0000
1963.00	12.09	14.05	16.02	1.0000
1964.00	13.38	15.35	17.31	1.0000
1965.00	14.64	16.64	18.64	1.0000
1966.00	15.85	17.93	20.01	1.0000
1967.00	17.03	19.23	21.42	1.0000
1968.00	18.18	20.52	22.86	1.0000
1969.00	19.31	21.81	24.32	1.0000
1970.00	20.41	23.10	25.80	1.0000
1971.00	21.50	24.40	27.29	1.0000
1972.00	22.58	25.69	28.80	1.0000
1973.00	23.64	26.98	30.32	1.0000
1974.00	24.70	28.28	31.85	1.0000
1975.00	25.75	29.57	33.38	1.0000
1976.00	26.80	30.86	34.92	1.0000
1977.00	27.84	32.15	36.47	1.0000
1978.00	28.88	33.45	38.01	1.0000
1979.00	29.91	34.74	39.56	1.0000
1980.00	30.95	36.03	41.12	1.0000

Table No. [illegible]: Trend Calculation for Percent Saloon Cars in Relation to Re-Licensed Cars in Total

Linear Trend 05 (by Computer)

List of Input Data

X (Time)	Y (Value)
1960.00	6.40
1961.00	7.50
1962.00	10.10
1963.00	12.50
1964.00	14.10
1965.00	15.00
1966.00	16.90
1967.00	20.30

The equation of the linear trend Y = YM + A (X - XM) shows the following dates

N = 8. = number of input data
XM = 1963.50 = mean value of X
YM = 12.05 = mean value of Y
A = .191E 01 = trend increase per unit of time (year)
D = .642E 00 = mean deviation of the input data from the calculated trend
DA = .99E 01 = region of confidence of A (One-Sigma-Region)

Calculated Trend with Limits of Confidence (95 %)

X (Time)	Lowest Limit Y 1	Trend Value Y (Value)	Highest Limit Y 2	Factor
1960.00	4.57	6.16	7.75	1.0000
1961.00	6.56	8.07	9.58	1.0000
1962.00	8.53	9.98	11.43	1.0000
1963.00	10.47	11.89	13.31	1.0000
1964.00	12.39	13.81	15.23	1.0000
1965.00	14.27	15.72	17.17	1.0000
1966.00	16.12	17.63	19.14	1.0000
1967.00	17.95	19.54	21.13	1.0000
1968.00	19.76	21.45	23.15	1.0000
1969.00	21.55	23.37	25.18	1.0000
1970.00	23.33	25.28	27.23	1.0000
1971.00	25.09	27.19	29.29	1.0000
1972.00	26.85	29.10	31.35	1.0000
1973.00	28.60	31.01	33.43	1.0000
1974.00	30.34	32.93	35.51	1.0000
1975.00	32.08	34.84	37.60	1.0000
1976.00	33.81	36.75	39.69	1.0000
1977.00	35.54	38.66	41.78	1.0000
1978.00	37.27	40.57	43.88	1.0000
1979.00	38.99	42.48	45.98	1.0000
1980.00	40.71	44.40	48.08	1.0000

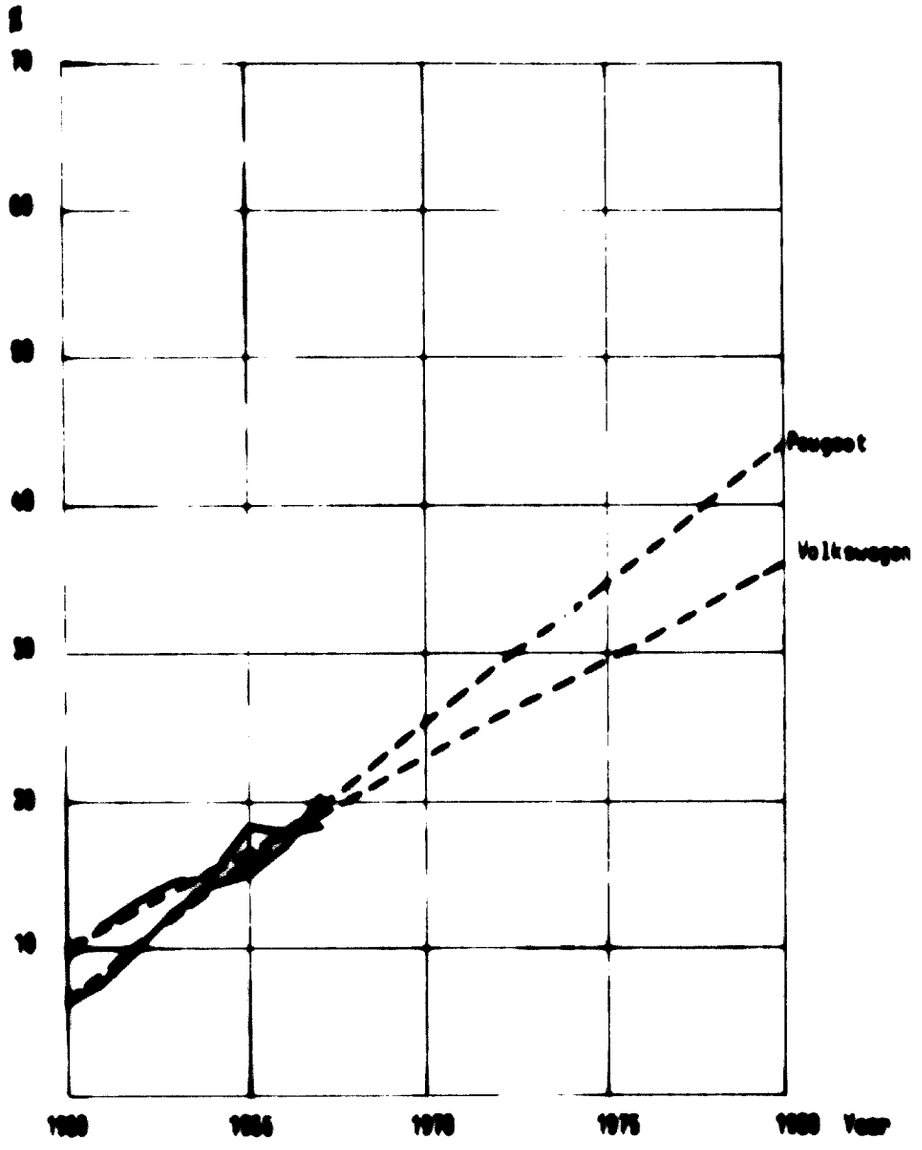


Figure No 4: Volkswagen and Peugeot in Relation to Re-licensed Cars in Total

According to the trend calculation (Tables No 17 and 18) of Battelle-Institut the two firms will thus achieve the following market share in relation to re-licensed cars:

Year	1975	1980
Volkswagen	29.6 %	36.0 %
Peugeot	34.8 %	44.4 %
Total	64.4 %	80.4 %

3.5 Assessment of Types, Sizes and Number of Volkswagen and Peugeot Passenger Cars to be Assembled

The number of Volkswagen and Peugeot passenger cars to be assembled has been assessed according to the calculated trend for the years 1973, 1975 and 1980, by multiplying the percentage of the market share of Volkswagen and Peugeot (Tables No. 17 and 18) by the total number of new licensed cars of the same years (Table No. 16). The various types have been estimated and specified by applying Sections 3.5.1 and 3.5.2

To simplify the calculation only those types have been considered which have or are supposed to have, in the future, the biggest market share.

3.5.1 Volkswagen

Year	Total Market Share	Type	Stroke Volume cc	% of Market Share	Number of Vehicles
1973	6,000	1200 411	1,200 1,700	85 15	5,100 900
1975	7,000	1200 411	1,200 1,700	80 20	5,500 1,500
1980	10,000	1200 411	1,200 1,700	80 20	8,000 2,000

The Volkswagen 1300 is charged with a much higher import duty (50 percent)than the Volkswagen 1200 (33 1/3 percent). While the outer appearance and the size of the body of both models are the same, only the power of the engine is different. Therefore, the future market share for the Volkswagen 1300 is estimated to be of minor importance, and therefore omitted from the calculation.

The same applies to the different modifications of the Volkswagen type 1600 which unlike the Volkswagen delivery van has only a rather limited share of the market. As this model will probably not be assembled in Nigeria, it is not discussed in this study.

The new model Volkswagen 411 appeared on the Nigerian market only in 1971. As this is the first Volkswagen model with four doors, it is expected to obtain a considerable share of the market, but will by no means reach that of the Peugeot 404, which belongs to almost the same class with regard to the stroke volume. In future, the Volkswagen 1200, the so-called Beetle, will be the Volkswagen model purchased most frequently.

3.5.2 Peugeot

Year	Total Market Share	Type	Stroke Volume cc	% of Market Share	Number of Vehicles
1977	7,000	404	1,700	80	5,500
		204	1,100	20	1,500
1975	8,500	404	1,700	75	6,500
		204	1,100	25	2,000
1980 [1]	12,500	404	1,700	80	10,000
		204	1,100	20	2,500

Among the different Peugeot models the Peugeot 404 has and will have the biggest share of the Nigerian market. A similar development could be predicted for the planned economical and simplified Peugeot 404 8 HP, while the model 204 will show a lower market share.

It has been learned that the model 404 is being phased out in France but that the production of CKD packs will be continued in order to supply especially the African Assembly plants.
However, it is doubtful, that this will go on for more than two or three years. Due to this the production of Peugeot passenger cars would possibly start with an obsolete model as the assembly could but start earliest in 1979.

On the other hand Battelle Frankfurt has been informed by Peugeot that at present it is not intended to modify mechanical or body parts or to cancel model 404 from the production program for the next few years.

Peugeot plan to manufacture a new model in the future, called "Peugeot small" but this is not discussed in this report, as no details have been available at the time of writing the study.

1) The capacity of the assembly plant is planned for a capacity of about 90,000 passenger cars. The additional output will be taken care of by a second shift.

4. Optimum Percentage of Locally Produced Components

4.1 Increase of Volume of Local Components[1)]

Locally manufactured components have to be integrated progressively to allow for local development and manufacture of more complex components (section 9).

The following stages of local content are proposed (Section 4.3):

Starting period	8 % of CKD value cif
1975/76	12 % of CKD value cif
1980/81	10 % of CKD value cif
Total	30 % of CKD value cif

The parts to be produced during the single stages are listed here after

- starting period
  - . tyres and tubes
  - . batteries
  - . paint
  - . grease
- 1975/76
  - . safety glass
  - . car seats
  - . wire harnesses
  - . various rubber parts
  - . various plastic parts
  - . rubber mats
  - . sound absorbing material
  - . adhesives
  - . sunshields
  - . generator and starter assembly

[1)] Volkswagen and Peugeot proposals

1980/81

- wheels and hub caps
- exhaustsystems
- aluminium profiles
- various rubber parts
- various plastic parts
- tail-light covers

4.2 Cost-Coefficient of Local Components[1)]

In the investigation of the Nigerian market with regard to locally-made components, e.g. tyres, batteries, paint etc., it was found out that these parts to be incorporated during the starting period would cost about the same price as the imported ones including import duty and cif expenses.

On the basis of the general experience gained in other developing countries, our investigations in Nigeria with regard to the prices of locally manufactured components (Section 9) and the expected capacity and productivity of the local manufacturers of car components, it was possible to work out a balanced average coefficient of overcost of locally-made components compared to equivalent parts imported from Europe cif including customs duty.

This coefficient increases with each stage as a result of the mounting expenses.

---

1) Volkswagen and Peugeot proposals

This is due to the limited production volume in Nigeria compared to the manufacturing volume in highly industrialised countries. As a result, production in Nigeria has to be less automatised than in industrialised countries and operating expenses and depreciation have to be spread over smaller volumes.

The coefficient has been estimated as follows:

Starting period	1
1975/76	1.5 to 2
1980/81	2 to 3

4.3 Determination of the Costs of Locally Assembled Passenger Cars with Increasing Local Content

As indicated by the calculation in Table No. 35 the average cif price of a BU passenger car with a stroke volume not exceeding 1,750 cc amounts to

about £N 630.

With an average rate of customs duty of 44 percent this price increases to

about £N 910.

The cif price of a complete CKD pack is estimated to be 15 percent lower than the cif price of an average BU car, i.e.

about £N 540.

The rate of customs duty on a CKD pack is 15 points lower than that of a BU car[1] and for an average car amounts to

44 percent less 15 points = 29 percent

---

1) Official Gazette No. 55 (Customs Tariff)

Thus, the price of an imported complete CKD pack (duty paid) comes to

about £N 695.

It is estimated that this last price with a 30 percent share of locally produced components almost corresponds to that of a 1980-81 BU car of the same size at a price of £N 700 plus 44 percent customs duty (break-even point).

Owing to the increase of local content the cost of the locally assembled passenger car would be as follows:

	Importation		
	92 % CKD	100 % CKD	BU Cars
Starting period (1973)	£N	£N	£N
CKD (£N 540) - 8 % l.c.	495	540	630
Customs duty	140 (29 %)	155 (29 %)	280 (44 %)
Total assembly cost	170	170	-
Local components,[1] coef. 1	45	-	-
Total	850	865	910

Ratio of local value added in the starting period:

	£N
Imported CKD pack	495
Assembly cost	170
Local components	45
Total	710

$$\frac{\text{Value added}}{\text{Turnover}} \times 100 = \frac{170 + 45}{710} \times 100$$

Local value added = 30 %

1) Tyres, tubes, battery, paint, grease

1975/76 Period[1]	Importation 80 % CKD	100 % CKD	BU Cars
	£N	£N	£N
CKD (£N 565) - 20 % l.c.	450	565	665
Customs duty	130 (29 %)	165 (29 %)	290 (44 %)
Total assembly cost	175	175	-
Local components, coef. 1	45	-	-
Local components,[2] coef. 1.5 to 2	115	-	-
Total	915	905	955

Ratio of local value added in 1975/76

	£N
Imported CKD pack	450
Assembly cost	175
Local components	160
Total	785

$$\frac{\text{Value added}}{\text{Turnover}} \times 100 = \frac{175 + 160}{785} \times 100$$

Local value added = 42.5 %

1) Calculated with 5 percent price increase

2) Glass, car seats, wire harness, various rubber and plastic parts, rubber mats, sound absorbing materials, adhesives, sunshield, generator and starter assembly

1980/81 Period[1]	Importation 70 % CKD	100 % CKD	BU Cars
	DM	DM	DM
CKD (DM 595) - 30 % l.c.	415	595	595
Customs duty	180 (29 %)	170 (29 %)	305 (44 %)
Total assembly cost	185	185	-
Local components, coef. 1	50	-	-
Local components, coef. 1.5 to 2	180	-	-
Local components,[2] coef. 2 to 3	145	-	-
Total	1,035	950	1,000

Ratio of local value added in 1980/81:

	DM
Imported CKD pack	415
Assembly cost	185
Local components	115
Total	915

$$\frac{\text{Value added}}{\text{Turnover}} \times 100 = \frac{185 + 115}{915} \times 100$$

Local value added = 54 %

---

1) Calculated with 5 percent price increase

2) Wheels, hub caps, exhaustsystems aluminium profils, tail-light covers, various plastic and rubber parts

The break-even point between BU and CKD takes place at an about 28 percent incorporation of local components.

The conclusions to be drawn from the above calculations and Figure No. 5 are that the 15 percent customs duty relief granted by the Government for CKD packs together with the freight reduction due to CKD condition should make the locally assembled cars competitive with the same type of imported BU cars until about 28 percent local components are reached. Above this local component level, a 15 percent customs relief will become insufficient.

With increasing number of assembled passenger cars, however, the local component industries will be developed accordingly. On account of this, several components not yet mentioned under Section 9 could possibly be produced economically after 1980. The break-even point will then shift accordingly in favour of the volume of the local components above the presently estimated deletion of 28 percent, e.g. the share of components could be increased after 1980 without influencing the end price.

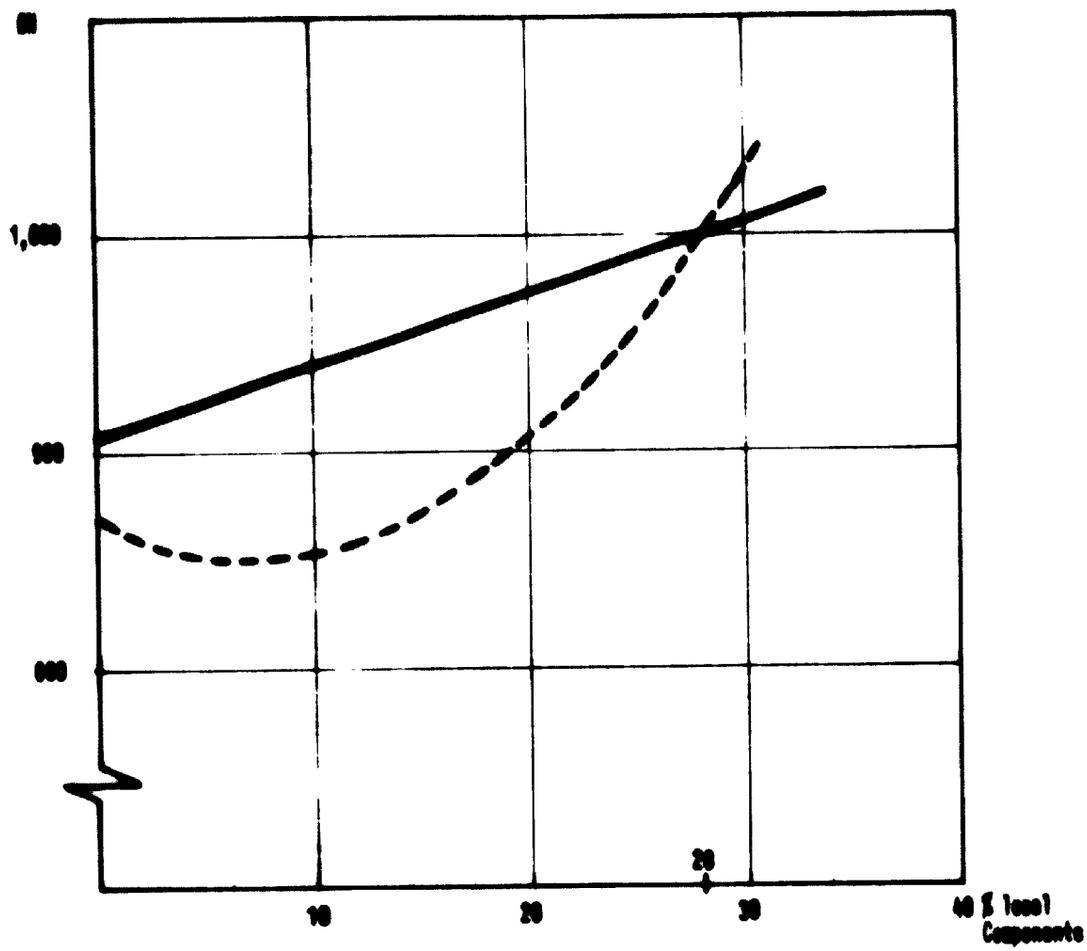


Figure Nr. 5: Break Even Point of Assembled Core with BU Core (price increase considered)

5. Capital Requirements and Financial Analysis (Model Calculation)[1)]

It is assumed that the assembly plant can be erected within 18 months after signing of contract, approval of building plans and bringing the infrastructure to the site (Figure No. 6). After this period production could be started, i.e. during the second half of the second year (in this study 1973), if the construction of the building commences early in 1972.

The utilisation during the year 1973 will amount to six months only with a capacity of 65 percent of an annual average of 7,500 passenger cars. In the following years the production volume will be raised accordingly and adapted to the demand. The capacity of the plant is laid out for 10,000 passenger cars. Should the demand rise above this number which according to the trend calculation should happen in the year 1980 a second shift will take care of this.

Thus the average number of passenger cars to be assembled in Lagos by one of the two planned assembly plants over a period of 10 years has been assessed as follows:

- starting period (1973) 2,500 passenger cars
- 1976 7,500 passenger cars
- 1980/81 10,000 passenger cars

---

1) On account of the floating of exchange rates started during the time of writing this report, the increase in cost and prices is not considered in order to simplify the calculation in this section.

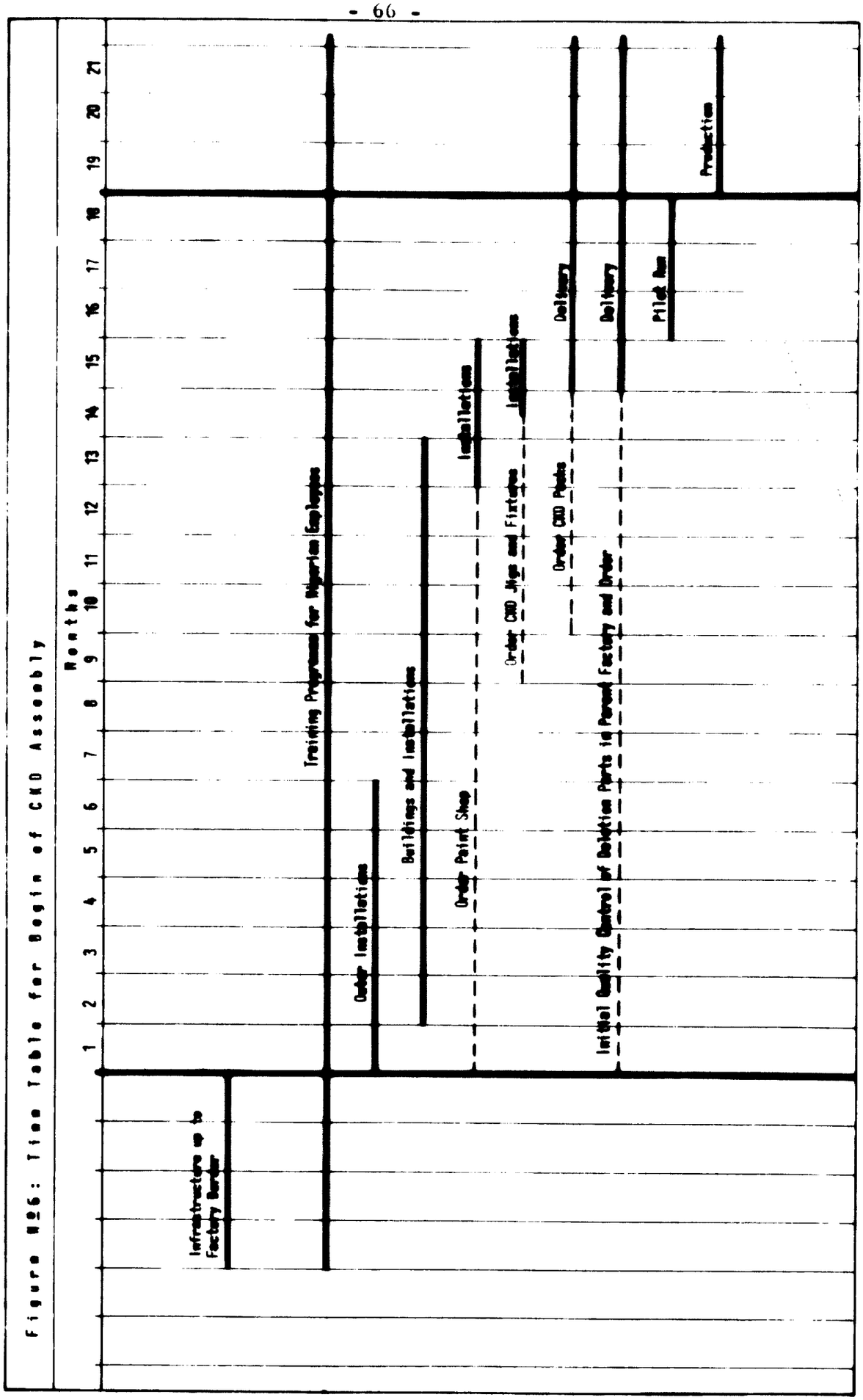


Figure 826: Time Table for Begin of CKD Assembly
Months
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
Infrastructure up to Factory Border
Training Programme for Nigerian Employee
Order Installations
Buildings and Installations
Order Paint Shop
Installations
Order CKD Jigs and Fixtures
Installations
Order CKD Packs
Delivery
Initial Quality Control of Delivered Parts in Parent Factory and Order
Delivery
Pilot Run
Production

5.1 Development of Cost and Expenses[1)]

The development of cost and expenses is indicated and itemised in Table No. 19 as follows:

- cost of materials including duty
- maintenance and repairs
- wages and salaries
- general expenses

Cost of materials

The breakdown of the cost of materials is shown in Table No. 20 as follows:

- raw materials (CKD packs at a price of £N 540 cif for an average car with a stroke volume not exceeding 1,750 cc)
- auxiliaries
- utilities
- import duty and CKD packs

The import duty has been calculated with an average fictitious rate of 44 percent for an average car with a stroke volume not exceeding 1,750 cc. Of this rate 15 points were deducted. Thus a rate of 29 percent results for CKD packs for an average car (Sekction 6.3). On account of this, the import duty amounts to

£N 156.6 per CKD pack.

---

1) For better perspicuity the CKD packs have been calculated without local components.

Table No. 19: Development of Costs and Expenses (1972 to 1981) in 1,000 £ M

Year	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Number of cars	-	2,500	6,500	6,500	7,500	7,500	7,500	7,500	10,000	10,000
Items:										
Materials (duty paid)	-	1,784.5	4,635	4,635	5,299.5	5,299.5	5,299.5	5,299.5	7,134	7,134
Maintenance, repairs	29	64.5	64.5	64.5	64.5	64.5	64.5	64.5	65.5	65.5
Wages, salaries	-	117.5	276	276	306	306	306	306	366	366
General expenses	-	68	167.5	167.5	191	191	191	191	246	246
Total costs and expenses before depreciation and interest	29	2,034.5	5,143	5,143	5,861	5,861	5,861	5,861	7,811.5	7,811.5

Table No. 20: Cost of Materials (1972 to 1981) in 1,000 £ M

Year	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Number of cars	-	2,500	6,500	6,500	7,500	7,500	7,500	7,500	10,000	10,000
Material:										
CKD Packs	-	1,350	3,510	3,510	4,050	4,050	4,050	4,050	5,400	5,400
Auxiliaries	-	18	46.5	46.5	53.5	53.5	53.5	53.5	71.5	71.5
Utilities	-	25	60.5	60.5	71.5	71.5	71.5	71.5	96.5	96.5
Total before duty	-	1,393	3,617	3,617	4,125	4,125	4,125	4,125	5,568	5,568
Duty	-	391.5	1,018	1,018	1,174.5	1,174.5	1,174.5	1,174.5	1,566	1,566
Total cost of materials	-	1,784.5	4,635	4,635	5,299.5	5,299.5	5,299.5	5,299.5	7,134	7,134

Table No.21: Wages and Salaries (1972 to 1981) in 1,000 £ M

Year	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Number of cars	-	2,500	6,500	6,500	7,500	7,500	7,500	7,500	10,000	10,000
Position:										
Executives	-	29.5	58.5	58.5	58.5	58.5	58.5	58.5	58.5	58.5
Administration	-	18	43	43	48	48	48	48	55.5	55.5
Productive labour	-	44.5	110.5	110.5	125.5	125.5	125.5	125.5	154.5	154.5
Unproductive labour	-	21.5	53.5	53.5	62	62	62	62	83	83
Social benefits	-	4	10.5	10.5	12	12	12	12	14.5	14.5
Total wages and salaries	-	117.5	276	276	306	306	306	306	366	366

Maintenance and repairs[1)]

5 percent of the cost of installation and equipment and 3 percent of the building cost are assumed for maintenance and repairs of plant and buildings. The resultant amounts are listed in Table No. 22.

The expenditures for installation and equipment (£N 712,000) and for buildings (£N 968,000) including erection are indicated in Table No. 24.

Wages and salaries

The assembly plant will work on 250 days per year. The expenditures for wages and salaries have been estimated and are indicated in Table No. 21.

5 percent for social benefits have been added to the amounts of the following items:

- administration
- productive labour
- unproductive labour

It is stated in the foregoing that in the first production year (1973) the assembly plant will only operate during a period of six months.

General expenses

The general expenses include the cost of administration, e.g., office supplies, office maintenance, insurance, telephone, documentation, etc., together which miscellaneous and unforeseen expenses (Table No. 23).

---

1) Empirical values from similar studies

Table No. 22: Maintenance and Repairs (1972 to 1981) in 1,000 $M

Year	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Number of cars	-	2,500	6,500	6,500	7,500	7,500	7,500	7,500	10,000	10,000
Item:										
Buildings (3 %)	29	29	29	29	29	29	29	29	29	29
Installation equipment (5 %)	-	35.5	35.5	35.5	35.5	35.5	35.5	35.5	36.5	36.5
Total maintenance and repairs	29	64.5	64.5	64.5	64.5	64.5	64.5	64.5	65.5	65.5

Table No. 23: General Expenses (1972 to 1981) in 1,000 $M

Year	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Number of cars	-	2,500	6,500	6,500	7,500	7,500	7,500	7,500	10,000	10,000
Item:										
Administrative expenses	-	32	78.5	78.5	89	89	89	89	110.5	110.5
Miscellaneous expenses	-	36	89	89	102	102	102	102	135.5	135.5
Total general expenses	-	68	167.5	167.5	191	191	191	191	246	246

Table No. 24: Capital Expenditures for Fixed and Current Assets (1972 to 1981) in 1,000 £ M

Year	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Number of cars	-	2,500	6,500	6,500	7,500	7,500	7,500	7,500	10,000	10,000
Fixed assets:										
Land	-	-	-	-	-	-	-	-	-	-
Buildings	968	-	-	-	-	-	-	-	-	-
Installation, equipment	-	483	-	-	-	-	-	-	23	-
Special tooling	-	229	-	-	-	229	-	-	-	229
Total fixed assets	968	712	-	-	-	229	-	-	23	229
Current assets:										
Starting capital	-	107	-	-	-	-	-	-	-	-
Working capital 1)	-	36	36	-	18	-	-	-	30	-
Working capital 2)	-	240	354	-	114	-	-	-	242	-
Total current assets	-	383	390	-	132	-	-	-	272	-
Total capital expenditure	968	1,095	390	-	132	229	-	-	295	229

1) one month assembly

2) two months CKD importations, one month storage in bonded warehouse

The following expenses have been omitted:

- Import duty on installation, plant equipment, and special tooling owing to the application of the Approved User's Scheme (Section 6.1)

- Reconstruction surcharge and capital duty, owing to the application of the Approved User's Scheme (Section 6.5)

- Excise tax (Section 6.4)

- Royalties probably will be due only if the rate of deleted car components rises above 30 percent, which will be achieved merely after about ten years of operation of the plant. At that time royalties may be subject to negotiations betweem the parent company in Europe and the assembly plant in Nigeria.

Cost of distribution

Cost of distribution will not be incurred as the sales of the passenger cars most probably will be carried out by an independent sales organisation.

5.2 Capital Expenditure for Fixed and Current Assets

The expenditures for fixed and current assets over a period of ten years for an assembly plant with an average annual capacity of 7,500 to 10,000 passenger cars are indicated in Table No. 24.

5.2.1 Fixed Assets

Cost of land

It is supposed that the necessary area for the assembly plant, about 25 acres, will be provided by the Government against payment of a lease. As a decision on the site of the plant has not yet been taken, the amount of the lease which varies with the location could not be determined at the time of writing this study and has therefore been omitted in the calculation. It is assumed that the lease will be covered by the amount reserved for general expenses.

Cost of buildings

For the production of up to 10,000 vehicles, the covered area has been assessed at about 220,000 sq.ft. The expenditure for the buildings has been estimated at about £N 968,000, including 10 percent for miscellaneous and unforeseen expenses.

Cost of installation, plant equipment and specific tooling

The following capital investment will be required. The various sums include 10 percent for miscellaneous and unforeseen expenses and cost of installation.

Cars to be produced / Machinery	7,500	10,000
Installations and equipment	£N 483,000	£N 23,000
Specific tooling	£N 229,000	-

The specific tooling has to be written off within every four years and replaced accordingly in the years 1977 and 1981.

5.2.2 Current Assets

Starting capital

A starting capital of about 5 percent of the production cost of the first half year (1973) amounting to

about £N 107,000

should be provided. In addition, one of the manufacturers[1)] of passenger cars offers free of charge, except daily allowances, the service of engineers during the first three months after starting the assembly plant in order to overcome the starting difficulties.

The starting capital will be written off over six years beginning in 1973.

---

1) Peugeot proposal

Working capital 1)

Under the assumption that the finished cars are paid immediately cash against delivery ex factory by the distributing company, the working capital has been calculated to cover the cost of about one month of assembly operations for an average of 7,500 passenger cars including:

- plant operation
- auxiliaries and utilities
- local components
- financial charges

equivalent to about

£N 90,000.

This amount has been adapted to the annual production volume. In the year 1980 an additional amount of £N 30,000 will have to be provided.

Working capital 2)

The cost of the quantity of imported CKD packs in stock in Nigeria corresponding to the requirements for one months operation and the permanent stock for one month's production is calculated in the following. As indicated in Section 4.) the price of one CKD pack is estimated at

£N 540 cif for an average car

with a stroke volume not exceeding 1,750 cc.

Thus the supply of CKD packs for two months for an average annual production of 7,500 passenger cars will amount to:

$$2 \times 625 \times 540 = £N\ 675,000$$

An additional amount of £N 50,000 has been included for one month's storage in bonded warehouse distributed according to production.

Expenditures for import duty have not been considered. It is suggested that by special arrangements import duty could be paid after delivery of the CKD packs from the bonded warehouse to the assembly plant (Section 6.6).

At different stages of production volume the quantity of CKD packs will vary accordingly.

5.3 Sales Forecast

The sales forecast is indicated in Table No. 25. The annual sales volume has been calculated with the help of the assumed sales prices of £N 895 net ex assembly plant for an average passenger car with a stroke volume below 1,750 cc.

The number of cars produced has been adapted to the trend calculation (Section 3.5) as well as to the capacity of the assembly plant.

5.4 Profit and Loss Forecast

The profit and loss forecast is indicated in Table No. 26. The excess of sales over cost and expenses shows the gross profit before depreciation, interest, and taxes. After deduction of these three items the net profit is obtained. But for the first year a loss results on account of maintenance, repairs, and interest expenses while production has not yet started. In the second year the production volume is not adequate to cover the expenses. Only the third year shows a profit.

Table No. 25: Sales forecast (1972 to 1981)

Item \ Year	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Number of cars	-	2,500	6,500	6,500	7,500	7,500	7,500	7,500	10,000	10,000
Estimated sales price *) per car in £ N	-	895	895	895	895	895	895	895	895	895
Sales volume in 1,000 £ N	-	2,237.5	5,817.5	5,817.5	6,712.5	6,712.5	6,712.5	6,712.5	8,950	8,950

*) Net ex assembly plant. Average price of a passenger car not exc. 1,750 cc stroke volume

Table No. 26: Profit and Loss Forecast (1972 to 1981) in 1,000 £ N

Year	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Number of cars	-	2,500	6,500	6,500	7,500	7,500	7,500	7,500	10,000	10,000
Sales net ex factory	-	2,237.5	5,817.5	5,817.5	6,712.5	6,712.5	6,712.5	6,712.5	8,950	8,950
Cost and expenses	29	2,034.5	5,143	5,143	5,861	5,861	5,861	5,861	7,811.5	7,811.5
Gross profit before depreciation, interest and taxes	·/. 29	203	674.5	674.5	851.5	851.5	851.5	851.5	1,138.5	1,138.5
Depreciation	-	171.5	171.5	171.5	171.5	171.5	170.5	153.5	156	156
Gross profit before interest and taxes	·/. 29	31.5	503	503	680	680	681	698	982.5	982.5
Interest expenses	16	106	106	106	90	74	57.5	41.5	25	9
Gross profit before taxes	·/. 45	·/. 74.5	397	397	570	606	623.5	656.5	957.5	973.5
Income tax (50 %)	-	-	138.5	198.5	285	303	311.5	328	478.5	486.5
Net profit	·/. 45	·/. 74.5	258.5	198.5	285	303	312	328.5	479	487

Depreciation

The linear depreciation rate for buildings is 5 percent p.a.; the remaining fixed and starting capital is written off at a rate of 10 percent p.a. and the special tooling at 25 percent p.a. of the initial value. This corresponds to an economic life of 20, 10 and 4 years, respectively. The special tooling has to be replaced continually every four years.

The resultant costs are indicated in Table No. 27.

Interest expenses

An interest of 9 percent p.a. has been assumed on the loans. The annual interest payments due have been calculated on the basis of the repayment schedule as shown in Section 5.5.1.

Company tax and super tax on profits

In order to facilitate the calculation of taxes, an average rate of 50 percent on profit has been assumed. This includes also the super tax.

The first two years show a loss which is balanced against the profit of the third year 1974, so that there is no tax payment in the first two years and a tax deduction in the third year.

5.5 Cash Forecast

Table No. 28 indicates the excess of cash receipts over payments, by year and accumulated, as well as the balance of the loan.

Table No. 22: Annual depreciation (1972 to 1981) in 1,000 F.F

Year	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Number of cars	-	2,500	6,500	6,500	7,500	7,500	7,500	7,500	10,000	10,000
Items:										
Buildings (5 %)	-	48,5	48,5	48,5	48,5	48,5	48,5	48,5	48,5	48,5
Installation equipment (10 %)	-	48	48	48	48	48	48	48	50,5	50,5
Special tooling (25 %)	-	57	57	57	57	57	57	57	57	57
Starting capital	-	18	18	18	18	18	17	-	-	-
Total depreciation	-	171,5	171,5	171,5	171,5	171,5	170,5	153,5	156	156

Table No. 20: Cash Forecast (1972 to 1981) in 1,000 $ U

Year	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Number of cars	-	2,500	6,500	6,500	7,500	7,500	7,500	7,500	10,000	10,000
Cash receipts:										
Sales	-	2,237.5	5,817.5	5,817.5	6,712.5	6,712.5	6,712.5	6,712.5	8,950	8,950
Equity capital	840	-	-	-	-	-	-	-	-	-
Loans (local and foreign suppliers)	180	1,000	-	-	-	-	-	-	-	-
Total cash receipts	1,020	3,237.5	5,817.5	5,817.5	6,712.5	6,712.5	6,712.5	6,712.5	8,950	8,950
Payments:										
Assets	968	1,095	390	-	132	229	-	-	295	229
Cost and expenses without depreciation and interest	29	2,034.5	5,143	5,143	5,861	5,861	5,861	5,861	7,811.5	7,811.5
Interest (9 %)	16	106	106	106	90	74	57.5	41.5	25	9
Repayment of loans	-	-	-	180	180	180	180	180	180	100
Dividends	-	-	-	84	84	84	84	84	84	84
Taxes	-	-	138.5	198.5	285	303	311.5	328	478.5	486.5
Total payments	1,013	3,235.5	5,777.5	5,711.5	6,632	6,731	6,494	6,494.5	8,874	8,720
Excess of cash receipts over payments:										
Per year	7	2	40	106	80.5	*/. 18.5	218.5	218	76	230
Cumulative	7	9	49	155	235.5	217	435.5	653.5	629.5	859.5
Balance of loans	180	1,180	1,180	1,000	820	640	460	280	100	-

5.5.1 Cash Receipts

The sales have been discussed in Section 5.3.

Equity capital

The amount of the equity capital of

DM 840,000

is calculated as follows (Table No. 24):

- capital expenditure for buildings	DM	968,000
- capital expenditure for equipment etc.	DM	712,000
Total	DM	1,680,000

The equity capital equal to half of this amount will be DM 840,000 (Table No. 28).

Loans

The following loans (Table No. 28) have to be supplied partly by the parent plant in Europe and partly by local sources. These amounts appear necessary and appropriate.

1972	DM	180,000
1973	DM	1,000,000
Total loans required	DM	1,180,000

An annual repayment of

£N 180,000

will start in 1975. The final repayment of

£N 100,000

will take place in 1981.

The interest due for these loans has been assumed to be 9 percent p.a.

5.5.2 Payments

Some of the items are indicated in the foregoing and the following tables:

- assets:	Table No. 24
- cost and expenses:	Table No. 19
- interest:	Table No. 28
- taxes:	Table No. 28

Dividends

It is suggested that an annual dividend of 10 percent on the equity capital of £N 840,000 should be paid beginning in 1975.

The distribution of the dividends will be realised according to the participation in the equity capital.

Participation in the equity capital is suggested as follows:

- manufacturer	51 %
- Government	49 %
- Nigerian public	
	100 %

According to experiences generally made in other development countries it would be desirable that the participation of the assembly company in the equity capital would amount to 51 percent. This majority would assist the company in their endeavours to assure full responsibility and to guarantee the technical quality as well as the on time delivery of the cars.

The balance of 49 percent could be divided between the Government and the Nigerian public.

5.5.3 Excess of Cash Receipts over Payments

Excess of cash receipts over payments will be accumulated for building up a reserve. The reason for this is to make provision for the case that the cost and expenditures or the capital expenditures have been estimated at a too low level or that the prices of the passenger cars have to be reduced in the future.

The percentage of the reserve accumulated in the ten-year period up to 1981 (Table No. 28) will amount to

about 1.8 %

of the accumulated payments (cost and expenses) and to

about 1.5 %

of the total sales.

5.6 Return on Investment

The capital investment (the equity capital) of DM 840,000 will be paid off as follows:

- According to Table No. 26 the net profit after taxes is as follows:

	by year	accumulated
	- EN 1,000 -	
1972	./. 45	./. 45
1973	./. 74.5	./. 119.5
1974	258.5	139
1975	198.5	337.5
1976	285	622.5
1977	303	925.5
1978	312	1,237.5
1979	328.5	1,566
1980	479	2,045
1981	487	2,532

- The capital investment will be paid off by net profits in 1977. The pay-off period is six years.

5.7 Savings of Foreign Currency

Savings of foreign currency achieved by local assembly of an average passenger car with a stroke volume not exceeding 1,750 cc is shown in the following tables.

Table No. 29 : Gross Savings in Foreign Currency per Average Passenger Car on Account of CKD Importation

	Beginning Period £N	1975/76 £N	1980/81 £N
Price of BU car cif[1)]	630	665	695
Price of CKD pack cif[1)]	540	565	595
Gross savings in foreign currency	90	100	100

Table No. 30 : Total Gross Savings in Foreign Currency per year with Increasing Production

Year	Annual Production of Passenger Cars	Gross Savings per Year £N
Beginning Period	13,000	1,170,000
1975/76	15,500	1,550,000
1980/81	22,500	2,250,000

The above figures are based on the assumption that complete CKD packs are imported during the whole period under review and nothing but assembly work is done in Nigeria. Since, however, an increasing portion of the components will be produced locally[2)] the actual gross savings will be higher, particularly so in the later years when the percentage of locally produced components rises. This statement holds true even if allowance is made for the fact that many or perhaps even most sub- components or raw materials for the locally produced parts will have to be imported. However, these additional foreign exchange savings would be very difficult to determine and are therefore left out of account here.

1) Section 4.3 2) Section 4.1

If, in addition the effect of capital expenditures is to be taken into account the break-down of investment costs into foreign exchange and local currency components and the amounts of foreign exchange and local currency available for financing the investments either by way of equity or loans must be determined. The following computation is based on the assumption that all the foreign exchange costs of the investments can be financed by those portions of the equity and loans which are available in foreign exchange. It is further assumed that installation and equipment must be paid for in full in foreign currency whereas the building costs are in local currency. In the latter item again a foreign exchange portion is included which, however, can be hardly determined and is therefore left out of account in this connection.

As indicated above[1] the initial cost of installation and equipment amounts to £N 712,000. Since it is recommended that 51 % of the equity should be raised by the parent company[2], which would be equal to £N 428,000 in foreign currency, anothe £N 284,000 would have to be mobilized in foreign currency by way of loans.
Inasmuch as the initial equipment is partly financed by the foreign exchange portion of the equity the Nigerian foreign exchange position is not affected - apart from future dividend payments which are transferred abroad. To the extent the initial equipment is financed by means of a foreign currency loan the future repayments as well as the interest payments will reduce the Nigerian foreign exchange reserves.

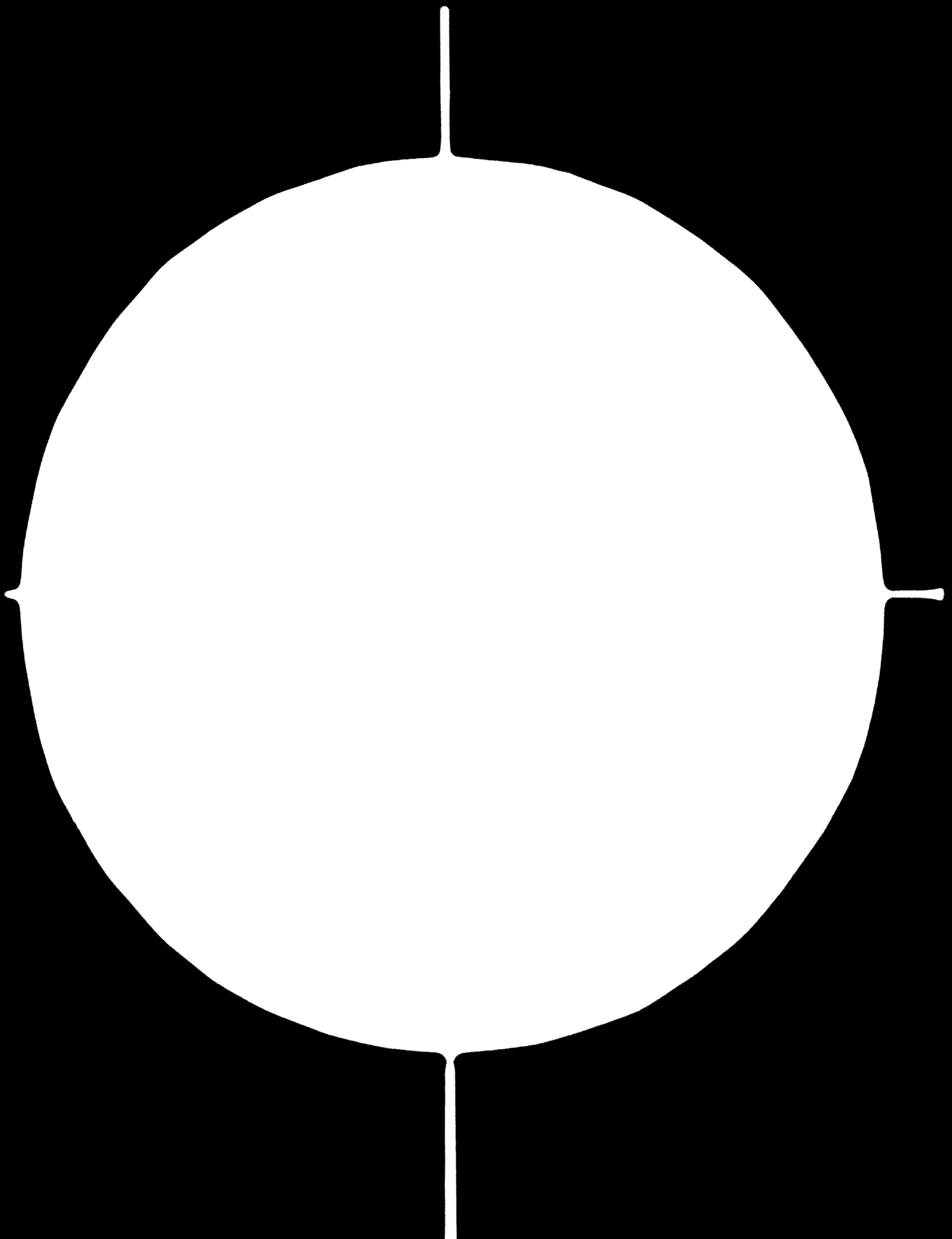
---

[1] Table 24

[2] Section 5.5.8

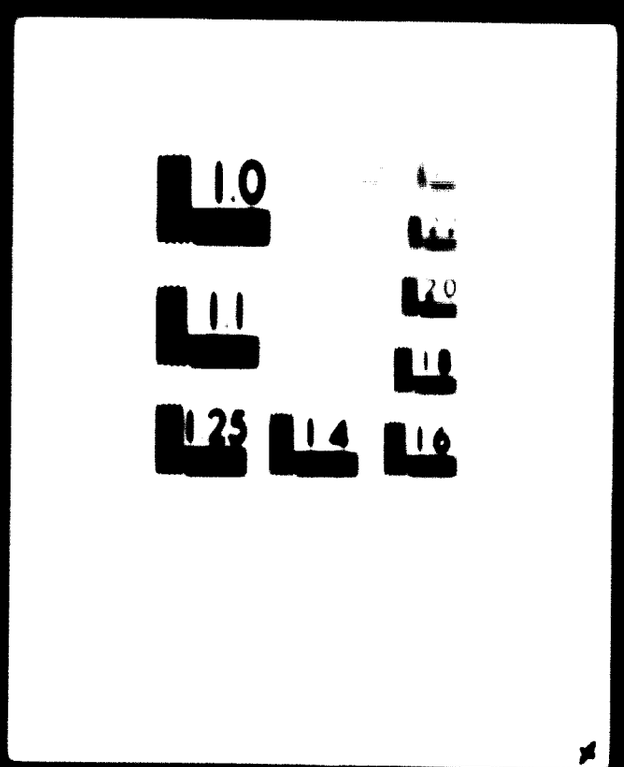
I-513

81.06.10



2 OF 2

02564



24×

D

As indicated above[1] the equipment - apart from special tooling - is written off during a 10 year period and must not be replaced until 1982 since the cash flow forecast[2] covers the period up to 1981 only these replacement costs (DM 58,000) could not be taken into consideration. Special tooling however must be replaced every four years. As appears from the cash flow forecast[3] these costs (DM 229,000) will be financed out of the company's own resources, i.e. every four years a foreign currency amount equal to DM 229,000 must be raised. However, in this case no allowance must be made for interest or dividend payments in foreign currency.

In 1980 additional equipment in the amount of DM 21,000[1] will have to be installed to take care of the increased production. Again this amount will be financed out of the company's own resources[2]

The total capital expenditures in foreign exchange are indicated in Table No. 11.

On the average capital expenditures in foreign exchange amount to DM 136,000 p.a. during the period under review. Since it may be assumed that the capital expenditures in foreign currency are roughly the same both for Volkswagen and Peugeot the average of total capital expenditures in foreign currency is estimated at DM 272,000 p.a.

If this average figure is subtracted from the gross savings per year as indicated in Table No. 30 the following foreign exchange savings per year are arrived at :

Beginning Period	DM 898,000
1975/76	DM 1,278,000
1980/81	DM 1,978,000

---

1) Section 5.4

2) Table No. 28

3) Table No. 24

Table No. 71 [illegible]

Year	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Repayment of Foreign Exchange Loans	-	-	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Interest Payments ([illegible]) on Foreign Exchange Loans	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Dividend (10%) on Foreign Exchange Portion of Equity	-	-	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Replacement + Special Tooling	-	-	-	-	-	[illegible]	-	-	-	[illegible]
Costs of Additional Equipment for Increasing Plant Capacity	-	-	-	-	-	-	-	-	[illegible]	-
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

6 Recommendations on Government Action and Support for the Establishment and Development of the Automotive Assembly Industry

6.1 Recommendation of Total Exemption of Import Duty for all Production Equipment, Special Tooling, Installations

Usually the import duty to which this kind of equipment is subjected generally amounts to 5 percent ad valorem cif (Customs Tariff (No. 2) Order 1971 in Official Gazette No. 16, dated 1st April 1971). The average value of the production equipment is estimated at £N 235,000 and the import duty, if collected, would amount to £N 12,000 at an estimated rate of 5 percent for the assembly plant.

As the erection of passenger car assembly plants is a new venture in Nigeria, it is suggested to apply to the two assembly plants the Approved User's Scheme.

Under this scheme manufacturers approved by the Government may be permitted to import various inputs either duty free or at concessionary rates of duty which are lower than the normal rates for a period not exceeding three years. Applications for the Approved User's Scheme may be submitted to the Federal Ministry of Industries on forms mentioned in the Industrial Directory, 4th Edition, 1967 page 42.

Another reason for granting this privilege is the fact that this project is not only attempted by private initiative but is also influenced to a large extent by Government action and that it greatly affects the development of industries which are well suited for Nigeria.

In addition, it is suggested to delete together with the import duty for the above production equipment the reconstruction surcharge amounting to 5 percent of the import duty.

6.0 [redacted]

Additional costs will arise to this manufacturer on account of the

- extra transportation expenses for imported CKD packs and local components as most of the manufacturers of these products are situated in the Lagos area There will be an extra transportation charges for CKD packs if only sea ports will be considered as alternative sites for the passenger assembly plant

- additional expenses arising from the transportation of part of the assembled passenger cars to the main sales markets The assembled car may be transported by the manufacturer s own trucks or railway

- risks of damage and loss as a result of accidents and pilferage during transportation of both components and assembled cars

To compensate for these additional cost resulting from the fact that the assembly plant is situated far away from the Lagos area it is suggested

- to grant exemption from IncomeTax, applying the Pioneer Industries Exemptions, described in the Companies IncomeTax Act of 1961[1] and

- to grant exemption from the Supertax[2]

---

1) Official Gazette No. 85, Vol. 98

2) Official Gazette No. 97, Vol. 54

6.1 [redacted]

An additional surcharge on customs duty for BU cars is recommended to partially compensate for perceptible losses in customs revenue on account of the imports of CKD packs with 15 points duty relief instead of importing BU cars only. Tables No. 32 and 33 show that the loss of customs revenue would amount

- to about EN 2.9 million in 1975 (Table No. 32) based on 65 percent assembled cars and 35 percent imported cars, and

- to about EN 4.1 million in 1980 (Table No. 33) based on 80 percent assembled cars and 20 percent imported cars.

The percentage of assembled and imported BU cars has been estimated according to the trend calculation (Section 3.4).

To adapt as far as possible the level of customs duty mainly achieved by imports of CKD packs to the level attained by imports of BU cars only, it is recommended to add to the present rate of customs duty an additional protection surcharge of 50 percent on the customs duty of all imported BU cars. Tables No. 34b and 35b show that the 50 percent increase in the present duty on BU cars reduces the revenue losses considerably.

This revenue will amount to

EN 2.3 million in 1975 and (Table No. 37b)
EN 2.1 million in 1980 (Table No. 38b)

Table No. 32: Estimated Loss of Customs Revenue for VW and Peugeot Passenger Cars Assembly, 1975

				BU Cars *)				CKD Packs *) **)			
Make	Assessed Quota %	Type of Cars	Number of Cars	Price/Car Cif £M	Total Car Value Million £M	Customs Duties %	Customs Value Million £M	Price/CKD Cif £M	Total CKD Value Million £M	Customs Duties %	Customs Value Million £M
VW	30	Beetle	5,500	505	2.80	33 1/3	0.95	350	1.90	18 1/3	0.35
		411	1,500	760	1.10	50	0.55	520	0.80	35	0.30
Peugeot	35	204	2,000	650	1.30	33 1/3	0.45	440	0.85	18 1/3	0.15
		404	6,500	790	5.15	50	2.55	540	3.50	35	1.20
Total	65	-	15,500	-	10.35	-	4.50	-	7.05	-	2.00

Customs Revenue from BU Cars in 1975 = about £M 4.50 Million

Customs Revenue from CKD Packs in 1975 = about £M 2.00 Million

Loss of Customs Revenue in 1975 = about £M 2.50 Million

*) Value based on 5 % price increase from 1970

**) CKD Value less 20 % local components

Table No. 33: Estimated Loss of Customs Revenue for VW and Peugeot Passenger Cars Assembly, 1980

				BU Cars *)				CKD Packs *) **)			
Make	Assessed Quota %	Type of Cars	Number of Cars	Price/Car Cif £M	Total Car Value Million £M	Customs Duties %	Customs Value Million £M	Price/CKD Cif £M	Total CKD Value Million £M	Customs Duties %	Customs Value Million £M
VW	35	Beetle	8,000	530	4.25	33 1/3	1.40	310	2.5	18 1/3	0.45
		411	2,000	795	1.60	50	0.80	470	1.0	35	0.35
Peugeot	45	204	2,500	680	1.70	33 1/3	0.55	410	1.0	18 1/3	0.20
		404	10,000	830	8.30	50	4.15	500	5.0	35	1.80
Total	80	-	22,500	-	15.85	-	6.90	-	9.5	-	2.80

Customs Revenue from BU Cars in 1980 = about £M 6.90 Million

Customs Revenue from CKD Packs in 1980 = about £M 2.80 Million

Loss of Customs Revenue in 1980 = about £M 4.10 Million

*) Value based on 5 % price increase from 1975

**) CKD value less 30 % local components

It is advisable to give the additional duty of 90 percent for BU cars a special designation, e g "protection sur charge" to prevent an unintended simultaneous increase of the duty on the CKD packs, as the reduction of 15 percent is based on the rate applicable to a similar BU vehicle imported (Tariff No. 870[illegible], Customs Tariff (amended) (No 2) 1968 No. 55).

In addition to the compensation of the customs revenue, the additional protection surcharge will protect the assembly plant against imports of BU cars, which are calculated on lower or dumping prices.

According to the Import Statistics compiled by the Ministry of Trade between 1963 and 1968, the following number of passenger cars has been imported. Table No. 34 also states cif value and customs revenue.

Table No. 34: <u>Number of Passenger Cars Imported 1963 to 1968, Classified by Stroke Volume, cif Value and Customs Revenue</u>

Stroke Volume cc	Number of Cars	% of Total	Value cif Million £N	Customs Revenue Million £N
Not exc. 1,200	28,253	-	15.3	5.4
Not exc. 1,750	35,624	-	22.7	11.3
Sub-total	63,877	91.5	38.0	16.7
Exc. 1,750	4,769	-	3.5	2.9
Exc. 2,750	630	-	1.5	1.5
Exc. 3,500	506	-	1.2	1.8
Sub-total	5,905	8.5	6.2	6.2
Total	69,782	100.0	44.2	22.9

As a result, the nearly average price for new passenger car not exceeding 1,750 cc stroke volume amounts to

[redacted] = £N new

and the customs revenue comes to

[redacted] x 100 = 54 percent

For a passenger car with a stroke volume exceeding 1 750 cc the following figures are obtained

- nearly average price

[redacted] = £N 1,090

- customs revenue

[redacted] x 100 = 100 percent

To estimate the future development of the customs revenue the general increase in prices for passenger cars has been estimated at 5 percent over periods of 5 years each. For the subsequent calculation the following cif prices have been used:

Table No. 35: Average Price of a Passenger Car cif in £N for the Years 1970, 1975, 1980

Year / Stroke Volume in cc	1963 to 1968	1970	1975	1980
Not exc. 1,750	600	630	665	700
exc. 1,750	1,050	1,100	1,210	1,320

The number of passenger cars to be imported in future with a stroke volume not exceeding and exceeding 1 ltr. has been calculated from the data stated in the following table here. The imported number of assembled passenger cars has been deducted from the imported number (round figures) of new registrations according to the trend calculation[1]

Table No. 16 [illegible]

[illegible]	[illegible]	[illegible]		[illegible]		[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Using the figures of the above Table for the future additional imports of passenger cars, it is possible to calculate the future customs revenue for 1975 and 1980 by multiplication with the percentage of customs duty assessed above. The results have been summarized for 1975 and 1980 in Tables No. 17a, b and 18a, b.

---

1) Battelle computer calculation, Table No. 16

[redacted]

[redacted] Customs Revenue Impact for 1983

[redacted] the customs revenue from imports of DD passenger cars only in 1983 (Table No. 17a) with the imports of 600 parts combined with DD passenger cars (Table No. 17b) the loss of customs revenue is estimated at

DD 2.0 million DD 2.7 million DD 0.7 million

This loss of DD 0.7 million can be almost compensated by the suggested additional protective surcharge of 5% percent on the customs duty for DD cars which amounts to DD 0.6 million (Table No. 17b).

Table No. 17a Customs Revenue Loss Impacts of DD Passenger Car Imports, Impact for 1983

[redacted]	[redacted]	[redacted]	[redacted]	
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Table No. 17b Customs Revenue Loss Impacts of 600 Parts Combined with DD Passenger Cars, Impact for 1983

[redacted]	[redacted]	[redacted]	[redacted]		
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

1) [redacted]

2) [redacted]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Table [illegible] [illegible]

[illegible]	[illegible]	[illegible]	[illegible]	
				[illegible]
[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]		[illegible]	
[illegible]	[illegible]			

Table [illegible] [illegible]

[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
			[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]

[illegible]

[illegible]

6.4 Recommendation on Excise Tax on Assembled Cars

The Excise Tax is levied on a range of goods manufactured in Nigeria and based on the selling price ex factory. Exemptions are arranged in individual cases with the manufacturers.

To support the new industry engaged in the complete assembly of passenger cars and to avoid any discrimination of this industry the full duty relief is recommended.

6.5 Recommendation on Reconstruction Surcharge on CKD Packs and Capital Duty on Nominal Capital

Full exemption of the Reconstruction Surcharge representing an additional 5 percent of the Import Duty and the Capital Duty (1/4 % of nominal capital) should be considered while granting the Approved User's Scheme.

6.6 Recommendation on the Establishment of a Free Port or Bonded Storage

Taking into account that a sufficient stock of CKD packs is necessary for a period of one month at least to ensure continuous uninterrupted assembly of e.g. 10,000 vehicles p.a., an amount of about ₦ 130,500 has to be advanced for expenditure on customs duty. As the import duty is usually payable at arrival of the goods interest has to be calculated for one month at a rate of 9 percent p.a. on ₦ 130,500, which corresponds to about ₦ 11,750.

To save this expenditure on interest it is recommended to establish a free port or bonded storage facilities for the storage of the CKD packs after their arrival. In this case, the customs duty would not be due immediately after arrival of the goods (Government Notice No. 1989 dated March 1, 1971, Board of Customs and Excise Notice), but could be cleared when picked up by the manufacturers.

6.7 Allocation of Foreign Currency

Owing to new directives with regard to the allocation of foreign currency issued by the Central Bank of Nigeria, dated 21^{et} April, 1971, there is a delay of 180 days after clearance for the conversion of foreign currency payable for vehicles and CKD (category C) The allocation concerning raw materials is limited to 90 days (category B).

This rule would lead to the investment of large sums of capital together with the spending of the necessary interest, which will increase the net endprice for cars ex factory by about 3 percent.

For this reason, it is suggested to make sufficient convertible foreign exchange regularly available to the two assembly plants by special arrangements to pay for the imports of continuously arriving CKD packs.

7. Site of Assembly Plant

The selection of the site of a factory mainly depends on the following factors:

- Favourable situation in relation to the supply market
- Favourable situation in relation to the sales market
- Supply of labour
- Traffic and communication systems

7.1 Supply Market

The main proportion of raw materials necessary for the assembly of passenger cars in Nigeria has to be imported in the form of CKD packs. In view of the quantity, this can only take place by ship and therefore a seaport offers good opportunities. Furthermore, since the industrial development took place in the same region, most manufacturers of car components are to be found in the seaports of Nigeria. Thus, Lagos became the main centre of these industries.

7.2 Sales Market

Due to the general historical development, almost exclusively the coastal region of Nigeria has been industrialised. Consequently, the amount of traffic flow in this part of the country is much higher than in the inland, i.e. the main sales market for the automotive industries is to be found near the coast-line in the South of the country. Table No. 14 does not provide a sufficiently clear picture, as a car is not necessarily used in the same region where it is registered (Section 3.1). Thus, the traffic conditions have been demonstrated figuratively by the traffic flow map, Figure No. 7.

7.3 Labour Market

While untrained labour is available everywhere in the country, skilled labour as well as employees are obtainable mainly in the Lagos area, the principal industrial centre of Nigeria.

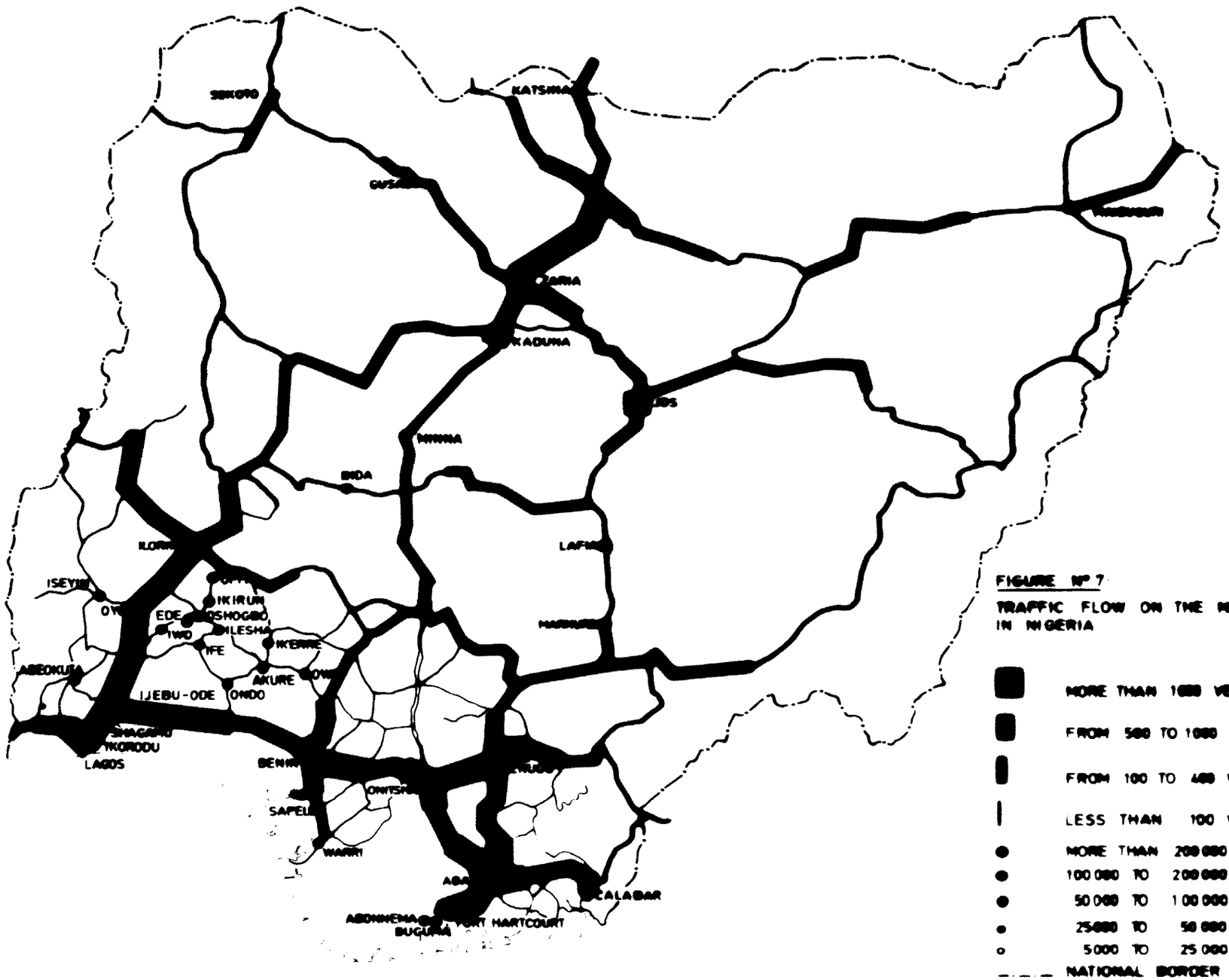


FIGURE Nº 7

TRAFFIC FLOW ON THE MAJOR ROADS IN NIGERIA

- MORE THAN 1000 VEHICLES PER DAY
- FROM 500 TO 1000 VEHICLES PER DAY
- FROM 100 TO 400 VEHICLES PER DAY
- LESS THAN 100 VEHICLES PER DAY
- MORE THAN 200 000 INHABITANTS
- 100 000 TO 200 000 INHABITANTS
- 50 000 TO 100 000 INHABITANTS
- 25 000 TO 50 000 INHABITANTS
- 5000 TO 25 000 INHABITANTS
- NATIONAL BORDER

7.4 Site Proposed by the Government

The decision taken by the Government with regard to the selection of the site has solely political motives. Thus, one assembly plant will be situated in Kaduna and one in Lagos, the latter having all economic advantages.

7.4.1 Lagos

The decision to choose Lagos as site for the assembly plant is justified on account of the fact that this city as the main seaport, is the centre of the supply market. In addition, this site is situated in the Capital of the country and in the centre of the industry and consequently in the centre of the sales market. Owing to the heavy agglomeration of industries in the port area Apapa, it is not possible to establish the assembly plant in the vicinity of the port.

A new highway still under construction from Apapa to Ikeja, however, will facilitate delivery, if the factory will be established in one of the planned industrial regions along this highway.

7.4.2 Kaduna

The Government has taken the right decision in supporting the development of industries in the Northern States. However, the selection of the industries to be established should be made from a different point of view. Only such industries should be situated in the interior of the country, which are not dependent on imports, and on punctual and continuous as well as complete delivery.

All material for the assembly plant either imported or locally produced has to be transported 563 miles from Lagos to Kaduna and for the most part back again over the same distance to the main sales market after completion of the assembly. This would mean a high increase in the price of the finished product or a heavy subsidy by the Government to keep the price on a competitive level.

7.4.2.1 Cost of Railway Transportation

Owing to this long time-wasting transportation, the assembly plant in Kaduna suffers the following additional expenditure in comparison to that in Lagos, as the working capital based on annual production of 10,000 passenger cars has to be increased:

- Blocking of an average demand of half a month, or 450 complete CKD packs, on the rails at a price of £N 695.- each	£N	312,750
- Blocking of about 70 percent[1] of an average half-month's production of 450 assembled passenger cars on the rails at a price of £N 895.- each	£N	281,925
- Owing to the remote location, compulsorily enlarged stores of a half-month's demand, or 450 complete CKD packs at a price of £N 695.- each	£N	312,750
- Appropriately enlarged stock of 450 assembled passenger cars at a price of £N 895.- each	£N	402,750
Total	£N	1,310,175

1) The balance of 30 percent to be sold in the Northern Region

At an annual interest of 9 percent this sum leads to additional costs of

£N 118,000

or at a production of 10,000 passenger cars per year, additional costs per car of

about £N 12.-

The weight of plant equipment, general installation, machinery etc. for a passenger car assembly plant with an annual capacity of 10,000 cars is estimated at about 1,000 tons. According to Tariff No. 7 of the NRC transportation of the above goods to Kaduna by railway would about amount to

£N 1,200.

In comparison with the total sum to be invested this amount could be neglected.

However, the running expenses for the transportation, of CKD packs including locally made components to Kaduna and assembled cars back to the main sales centres in the South are decisive for the price calculation.

Since the weight of a complete CKD pack comes to about one ton, and since two assembled passenger cars can be loaded on one railway wagon on their return trip, the following calculation may be made:

- transportation of one complete CKD pack by railway to Kaduna 204/- sh

- transportation of one assembled car by railway to Lagos at a price of 422 sh, considering that two cars are loaded on the same railway wagon and that 70 percent[1] of the total production are sent to the South (70 percent of 422 sh) 296/- sh

500/- sh

This leads to additional costs of

£N 25 per passenger car.

On account of the very poor financial position of the NRC a considerable increase of tariffs is expected for 1972.

7.4.2.2 Cost of Road Transportation

Although road transportation is much more expensive than the railway, the expenses for road transportation have been calculated for comparison.

The CKD packs for passenger cars assembly usually arrive in lots for 12 cars packed in 15 cases with a volume of about 75 cub. m.

As the cases of different sizes occupy a rather large volume in comparison with their weight, three semi-trailers are necessary.

According to information received from transport companies, the expenses for a semi-trailer of the required size for a trip from Apapa to Kaduna amount to £N 13 per ton loading capacity:

---

1) The balance of 30 percent to be sold in the Northern Region

1 semi-trailer from Apapa to Kaduna 25 tons for £N 13 each	£N 325
3 semi-trailers for 12 CKD packs	£N 975
proportion for one CKD pack	£N 81

In case the same semi-trailers are used for the transportation of the assembled cars to Lagos a reduced price of £N 10 is applicable per ton capacity

- 1 semi-trailer from Kaduna to Lagos 25 tons for £N 10 each	£N 250
- considering that 70 percent[1] of the total production are sent to the South and that two cars are loaded on the same semi-trailer the proportionate price for the transportation of one passenger car will be (70 percent of £N 125)	£N 88

7.4.2.3 Compilation

Besides the increase of the working capital, the transportation expenses would amount to:

for railway transportation	£N 25
for road transportation	£N 169

1) The balance of 30 percent to be sold in the Northern Region

It should be noted that road transportation only requires half of the time compared with railway transportation. For this reason, the load on the increased working capital is only 50 percent.

Altogether the following increase in price results for one passenger car assembled in Kaduna:

- transportation by railway 25 + 12 = £N 37
- transportation by road 169 + 6 = £N 175

Due to the very high proportion of pilferage during railway transportation, it is not possible to make a realistic comparison of the two transportation rates.

Owing to the additional expenses, the remoteness of Kaduna as well as the shortage of skilled labour and foremen available, this place has to be rejected as a site for the assembly plant because it is uneconomical and risky.

However, should Kaduna be selected as site for the assembly plant it is suggested that the Government not only provides adequate subsidy but also guarantees that:

- clearance from the bonded warehouse in the port of Apapa takes place in such a short time that the CKD packs could be delivered without delay
- all CKD packs arrive in Kaduna punctually and in complete condition
- the return transportation of the assembled cars takes place without damage

because no insurance company would accept the risk at normal conditions. The premium had to be raised to such an extent that it might be unacceptable to the assembly plant.

7.5 Alternative Suggestions

7.5.1 Port Warri

Port Warri vehemently expanding on account of the exportation of oil is situated half way between Lagos and Port Harcourt and can admit ships drawing 16 ft. of water. A new well-constructed highway connects the port with Benin City. Owing to its favourable situation between the two main sales markets in the West as well as in the East of Nigeria, Warri can be singled out as the best alternative to Kaduna.

The disadvantage that it is difficult to obtain labour on account of the large oil-producing firms could be overcome by special incentives, e.g. a low-cost housing scheme supported by the Government.

7.5.2 Port Harcourt

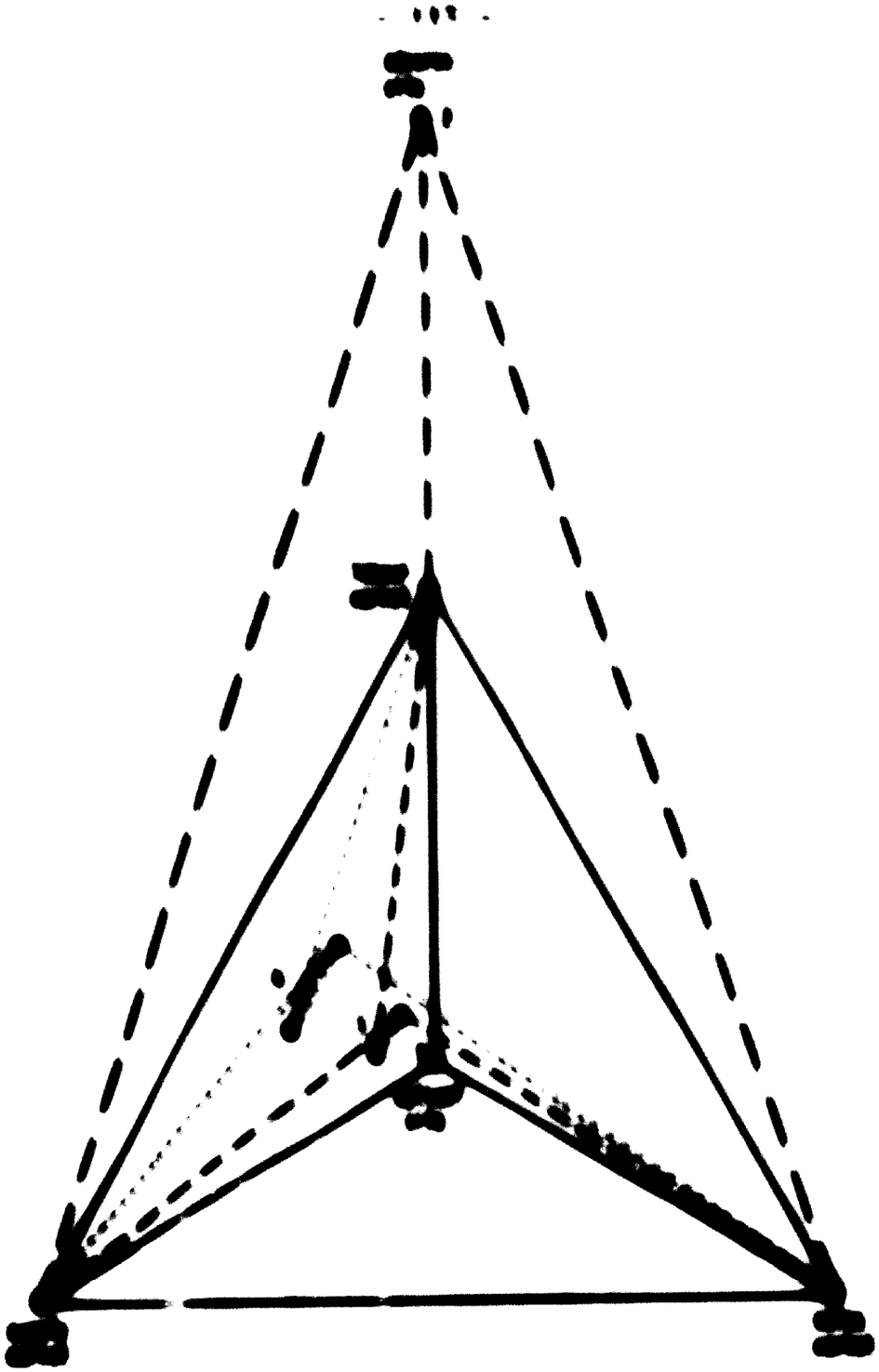
Port Harcourt which can be considered as second alternative to Kaduna has been destroyed to a large extent during the civil war and still requires rebuilding. By establishing new industries and reopening the existing, but at present destroyed and closed-down industries, this city, the second largest port of Nigeria, could receive a new impetus. There is enough labour available but the local tribal feuds have to be settled by Governmental surveillance.

Port Harcourt is, as a seaport, favoured with regard to the supply market. Also being situated in the Eastern Region it is close to a large sales market in the Eastern States. On the other hand, it is 550 miles away from Lagos and the Western States, the principal sales market. This distance

would mean a slight increase in the car price caused by the transportation of the components manufactured in Lagos with the exception of tyres, which are produced locally

The transportation costs of the finished cars to the East will be compensated by the nearness of the sales market to the East and Mid West.

In order to demonstrate the distance of supply, sales and labour markets for the four discussed locations of the sites the Figure No. 8 has been attached



8. [redacted]

8.1 [redacted]

The assembly plant will comprise the following sections:

- assembly section
- finance and administrative section

which will be co-ordinated by the general management.

The assembly section responsible for the complete production process will maintain continuous production to utilize capacity to the most economic way and to guarantee at any time the availability of assembled vehicles for the distribution organisation.

The combined responsibilities will be:

- importation of CKD packs
- purchase of locally manufactured components
- assembly of passenger cars

Attached is a condensed chart (figure No. 9) of a suggested organisation and structure of the assembly plant including production and administration division. The estimated total number of personnel employed will amount to about 484.

In addition, a marketing section is indicated with dotted lines. As mentioned before, this sector is not part of this study.

The marketing section would be responsible for a constant delivery of assembled passenger cars and spare parts to the sales organisation. It would set up and develop new dealers and advise existing dealers on business management, advertising, sales promotion, staff training, and all technical matters to take full advantage of the market potential and to maintain a high standard of aftersales service.

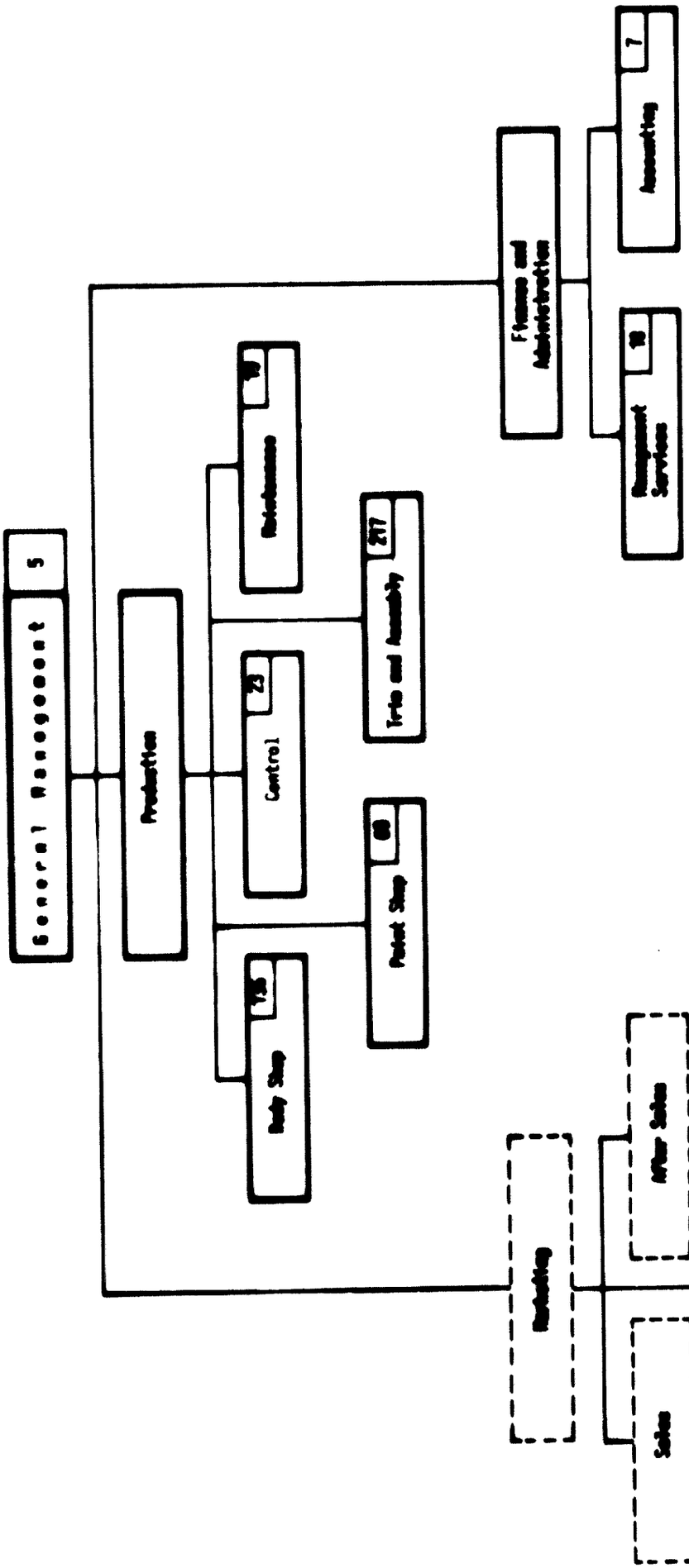


Figure 02.9: Organisation Chart

8.2 Training

To implement the Nigerianisation of the assembly plant as far as possible and to become independent of expatriate personnel it is suggested to start training of labour and administrative staff as early and thoroughly as possible in the repair shop of Volkswagen and the assembly plant of Peugeot both situated in Lagos and in the parent factories in Europe.

To avoid ruining of the future assembly and ancillary industry it is strongly recommended not to precipitate the Nigerianisation especially in the high-ranking positions. Only those Nigerians who have proved their capability should be placed in top level positions.

Recruitment should begin immediately after signing of the contract for the assembly plant with the help of the Government and advertising in Nigerian newspapers. Appropriate and qualified personnel with technical education and background should be selected from the graduates of Technical Trade Centres, Technical Colleges and Universities in Nigeria.

It is suggested to give in-plant training to these graduates and also to otherwise employed personnel according to their qualifications and the position they should attain in the future. The following specific training programmes are suggested, carried out by specialised expatriates in Nigeria as well as Overseas.

Management training

It is proposed to make this training programme available for such candidates who appear to have managerial qualities. They should be trained not only in the new plant in Nigeria, but

also in the parent-factories in Europe in co-operation with suitable institutes specialised in the field of business management training. These specific training programmes should qualify the candidates for middle management in the line of the following operations:

production, quality control and maintenance
administration, finance, also accounting,
marketing, sales and services.

The time required for these programmes is expected to range between one and four years.

Training of assembly plant personnel

It is suggested that several expatriates, specialists from the corresponding parent-factory, should be in charge of training the candidates for an intervening time in the following fields:

- fitters
- welders
- maintenance mechanics
- machine operators
- spray painters
- trimmers
- electricians
- controllers

After termination of these training programmes the personnel should be in a position to take over the assembly operations without supervision by expatriates and to train further personnel independently of expatriate specialists.

It is proposed that candidates supposed to obtain lateron positions as charge hands, supervisors and eventually foremen should begin with an apprentice training in an apprentice workshop of a centralised training centre in the following lines:

- fitters
- turners
- millers

In the centralised training centre, personnel for the assembly plant as well as for the service organisation should be trained. The personnel for the latter will be employed by the distribution and sales organisation servicing the cars after sales. The centralised training centre should be planned and established by the assembly plant. The costs for building, equipment and salaries for expatriate teachers are not included in the cost calculation of the assembly plant (Section 5.1). The analysis of the distribution and sales organisation is not part of this study.

Apprentice training

It is proposed that apprentices should be trained for a period of three years in a fully equipped apprentice workshop of the central training centre with an annual capacity of 50 apprentices. After completion of the training the apprentices should be employed either in the assembly plant or in the service organisation, depending on their specialisation.

It is suggested that upon passing an examination the selected junior tradesmen should be given the opportunity to join a two-year training in the corresponding parent-factory to obtain a master craftsman certificate and to take over a position as crewleader, foreman or instructor in Nigeria. This ad-

vanced training programme could also provide a basis for the development of Nigerian personnel for employment in administrative and managerial positions within the assembly project.

Apprentice training programme

As mentioned above the training programme should last over a period of 3 years including a basic training period of 12 months for all candidates. This period should comprise the following training activity:

basic training	6 months
welding	2 months
turning or planning	1 months
special training according to trade	3 months
	12 months

It is proposed that during the second and third year of their training fitters should be engaged with constructive tasks in the line of maintenance and repair work within the assembly line, while mechanics should work in various workshops and have theoretical training in the training centre.

It is suggested to conduct the training for the following trade groups:

- assembly plant

  fitters at the beginning 10 apprentices
  turners at a later date
  millers at a later date

- service organisation (at the beginning 40 apprentices)
  vehicle mechanics
  vehicle electricians
  vehicle panel beaters

Equipment for the workshop for an annual training of 50 apprentices

For the workshop the following dimensions are proposed:

100' x 65' = 6,500 sq.ft.

The following preliminary equipment is suggested:

52 working benches (working places) for basic training
2 levelling plates
2 column-type drilling machines
3 table drilling machines
1 wheel stand
2 turning laths
4 gaswelding equipments
4 arcwelding equipments
2 orientation plates
1 leaver shear
3 offices
1 toolroom

After-sales personnel 1)

It is proposed that the technical and organisational workshop personnel for the distribution and sales organisation should be trained at the centralised training centre mentioned above. The training programme should cover the following subjects:

- technical:
  - maintenance and general repairs
  - testing and diagnosis
  - unit repairs (engine, gear box, front axle, rear axle)
  - repair of electrical units and installations
  - appliance of electronic test equipment and instruments
  - body and paint repairs
  - introduction of technical and model changes
  - refresher courses of key service personnel
- organisational:
  - training for workshop management
  - service advisors and reception personnel
  - workshop accountants

In addition, all personnel occupied in the spare-part ordering and selling departments and the spare-part stores should receive special training on the following subjects:

- part ordering
- planning and stocking
- store organisation
- sales promotion
- management of the spare-part sector

---

1) As mentioned before, not in the program of this study

Instructors

It is suggested that in the beginning about six to eight expatriates, highly qualified instructors, should be employed in the centralised training centre, i.e. apprentice workshop combined with after-sales training centre. These instructors should be able to give practical and theoretical instructions on all technical subjects. As mentioned above some of the master craftsmen, returning after two years of senior training in the parent-factory, should be capable of gradually replacing most of the expatriate training instructors.

Investment for a combined training centre

The investment for an after-sales training centre combined with separate apprentice workshop has been estimated as follows:

- After-sales service centre

buildings	£N 38,000
equipment	£N 12,000

- Apprentice workshop

building	£N 13,000
equipment	£N 25,000
Total	£N 88,000

Recommendation on training programs

As a recommendation it is pointed out that the United Nations could procure training programs as further possible technical assistance.

9. Ancillary Industry

9.1 General Outline

The establishment of two assembly plants for passenger cars in Nigeria have a strong stimulative influence on the existing local industries already producing car components as well as on such local and new industries which have to be developed and enabled to adapt their program to the need of the assembly plants with the help of capital investments.

Among these industries the metal working plants will be in a position to enlarge their programs and to manufacture new products due to their linkage to the assembly plants. The expansion of the metal working sector which is considered a.o. a basic factor for the industrialization of a country gains importance on account of the fact that the Second National Development Plan provides with priority the establishment of an iron and steel basic complex. This will stimulate the production of car components for the assembly plants as well as other materials as e.g. agricultural tools, metal tools, construction material, for buildings, pipes, wires, nails etc.

Often the opinion exists that the ancillary industry of the respective developing country raises the price of the assembly of motor vehicles considerably, and that in some cases the prices of the local components are many times higher than the imported ones. This is not the fault of the industries but only a consequence of the low production volume of the article in question. Thus a factory might be able without any difficulty to supply motor vehicle components at the same price or even cheaper than the cif price plus duty of the same imported part, if the production volume could be raised. This could be achieved in some cases by producing not only components for the car assembly plant but also spare-parts

for the cars on the road, e.g. tyres and batteries, or by utilising the same machines, such as power presses, punching machines, or injection moulding presses, also for other articles of general use.

It is therefore of utmost importance that the industry for motor vehicle components in a developing country produces as far as possible only such parts which suit the general working programme in order to ensure that the price of the assembled cars rises under no circumstances above that of the imported BU cars including import duty.

As an example of the adverse effects of uneconomic planning, protective duty and import embargo the countries Chile and Argentine should be mentioned, where the locally assembled cars were so expensive that many of the class of buyers for whom the cars were intended could not afford to purchase them. On account of this, only about 50 percent of the planned production volume could be reached[1]).

---

[1]) International Bank for Reconstruction and Development

The Nigerian industry, as an ancillary industry to the assembly of paesenger cars, can produce many componente of satisfactory quality.

As the neceeeary raw materials are generally not available in Nigeria they have to be imported and then processed to the final product by the local industry Thue, the basic material being of European quality, it is only a question of training the workers, of supervising the actual working proceee and of the sfficiency of the management of the respective plant that the quality of the final products complias with the quality of the imported goods. The old prejudice that imported goods are always superior to local products with reapect to their quality does not prove correct in all casea.

Components manufactured in Nigeria and aupplied to the aeembly plant ehould not be distinguishable from imported ones, if necaeeary care has been taken. However, strict continuous superviaion of the quality has to be carried out before dslivery.

A quality control by the proposed Technical Standing Committee would only create unnecessary difficultias and thereby needlass delays in the delivery of the articles from the manufacturer to the assembly plant. Such an authority would on the one hand release the manufacturer of the components from a strict quality control in his own factory and on the other hand lead to the supply of a quality to the aesembly plant which is not in conformity with its standard requiremente. The procedure of a poesible complaint on the part of the assembly plant would unnecessarily be prolonged and complicated after the particular article has passed the quality control of the Committse but still does not conform to the requirements of the assembly planta which have to protect their namee "Volkawagen" and "Peugeot".

For this reason, it is suggested to leave it to the assembly plants to judge the quality and prestations of the articles bought by them, to order them in the future or to reject them

Thus each of the two assembly plants will have to install its own special quality control department in order to examine the locally manufactured parts and to decide how to make use of them

Samples of the passenger car components will be examined in Europe by the parent plants, Volkswagen and Peugeot before a contract for delivery of these parts will be signed with local manufacturers The quality control of the single components for passenger cars is of special importance as such a car is composed of 5,000 different parts which have to be technically faultless in order to guarantee the safety of the passenger

The existing industries at present produce the following items:

- tyres and tubes
- batteries
- paints

In order to assist the component industries in their establishment and further development there should exist even after 1984 only two passenger car assembly plants in Nigeria A third plant, as suggested, would demand new and different components to be manufactured and thus not only impede the development but also the establishment of the ancillary industries due to the reduced production volume, as the share of the market cannot rise fast enough.

As an example of inefficient planning the assembly of trucks in Nigeria should be mentioned. The number of makes and types of trucks assembled is so large that local ancillary industries could not be developed even for the delivery of tyres and tubes on account of the differences in size.

In order to permit economical production of local car components which are manufactured at first in small quantities only, one manufacturer should be selected for each type of component after the respective quotations for these parts have been received. If more than one manufacturer produces the same part, the quantity which is already rather small for economical production will be reduced even further.

At a later date when the production of the car assembly plant will be raised, the manufacture of car components will be more economical and therefore more interesting for the manufacturers. Therefore, more competitive quotations are to be expected from the component industry in future.

The difficulties resulting from the establishment of a car component industry can also be explained by the fact that the planned annual production of VW in Nigeria collides with the daily output of the parent factory in Wolfsburg.

The following 18 well-known manufacturers of passenger car components and machine tools for this purpose have been approached in order to analyse the extent of foreign participation and the conditions under which a joint venture would be feasible:

5 factories manufacturing electric components for cars

8 metal-processing firms

9 factories processing rubber, plastics and petrol

7 radiator producers

9 firms manufacturing rims and wheels as well as machines for the production of these articles

1 factory producing moulds for cars

11 firms producing different types of components for passenger cars

Few of these manufacturers are seriously interested in participating in a joint venture. The main reason for this is to be seen in the limited number of the individual components required for the small production volume, which makes the manufacture uneconomical. This attitude might change in the future as soon as the assembly of passenger cars will achieve higher outputs.

In most of the cases the manufacture of car components begins to be economical with car numbers of about 60,000 to 100,000 and more p.a. In some cases, only especially if four or more components of the same type are used per car, an economical manufacture is possible, e.g. in the case of wheels and hub caps, as will be discussed in the following.

Occasionally, e.g. in the case of electric components for cars the assembly but not the production of components is feasible. The firm

Robert Bosch GmbH
7 Stuttgart/Germany

is eventually interested to assemble electrical equipment for Volkswagen and, if possible, also for Peugeot passenger cars in Nigeria if economical presuppositions should exist.

If the sales price of locally produced car components is substantially above the cif price including cutoms duty for the same importsd articls, it is recommended to establish an appropriate surcharge on the customs duty for the part concerned.

Generally in the cass of sstablishing ancillary industries with foreign participation the following points among othsrs have to bs granted:

- free transfer of capital, intsrest, dividend, royalties and licensss
- free transfsr of personnel's savings
- free transfer of personnel's propsrty
- equity capital of 51 percent for the foreign firm

9.2 Rubber Industry

The following components for cars are made among others from rubber:

- car tyres and tubes
- various items, e.g, tubes, hoses, gaskets, mats, stripping, washers, slseves

9.2.1 Car Tyres and Tubes

In Nigeria the following two factories produce new car tyres and tubes using natural rubber obtained in Nigeria:

Michelin Nigeria Ltd.,
Port Harcourt.

Dunlop Nigerian Industries Ltd.,
Oba Akran Avenue, Ikeja.

Michelin has closed down its factory in Port Harcourt at the beginning of the civil war, and has not taken up production again until now. But it is generally hoped that after settlement of the existing difficulties it will be possible to start production before the end of 1971, however, no firm promises were made. But it was assured that the price of a locally produced set of tyres would be lower than the cif price including customs duty for imported tyres of the same quality.

The statements made by Michelin have been confirmed by Dunlop. After the shut down of the Michelin factory, this firm has supplied the Nigerian market to an increasing extent with its constantly growing production.

At present Dunlop produces with 1,000 workmen employed in three shifts, among others,

115,000 tyres and tubes for passenger cars per year.

With a capital expenditure of £N 145,000 and the resulting extension of the plant the total annual production will be raised in 1972 to

175,000 tyres and tubes for passenger cars.

Further increases in the production during the following years are planned.

In the following the present £N prices for imported duty-paid Dunlop tyres are compared with the possible OE prices for the assembly plant:

- for Volkswagen
  size 560-15, cross ply with tube:

imported, duty paid	= £N 6.10.08
locally manufactured, OE prices	= £N 5.18.04

- for Peugeot 404
  size 165-15, radial ply with tube:

imported, duty paid	= £N 8.05.10
locally manufactured, OE prices	= £N 7.08.06

Besides tyres and tubes, Dunlop could produce at a very reasonable price rubber mattings which are used as a floor cover in passenger cars. As no special qualities are expected of the material for those mats, they could be made cheaply of reclaimed rubber. The desired sizes and shapes could be cut or stamped out of the extruded rubber band.

Dunlop also produces adhesives which are used for car assembly, however, in small amounts.

9.2.2 Rubber Parts

In the manufacture of small rubber components a distinction has to be made between parts that have to be

- extruded, e.g. door and window seals,
- injected into a mould, e.g. plugs and sleeves,
- reinforced with cord or nylon, e.g. connecting hoses, or
- vulcanised on metals, e.g. vibration dampers.

List No. 2 Rubber Profiles for the VW - Beetle

Item	Number of Parts	Denomination	Piece/car
1	111 701 611 C	Seeling front	1
2	111 701 615 C	Sealing left	1
3	111 701 616 C	Sealing right	1
4	111 701 617 C	Seeling rear	1
5	111 813 705 D	Weatherstrip - Engine Cover Plate	1
6	111 813 741 G	Weatherstrip - Engine Cover Plate	1
7	111 823 731 B	Weatherstrip - Front Hood	1
8	111 827 705 A	Weatherstrip - Front Hood	1
9	111 831 721 C	Weatherstrip Door left	1
10	111 831 722 C	Weatherstrip Door right	1
11	111 837 465 C	Weatherstrip rear - Vent Wing	1
12	111 837 466 A	Weatherstrip rear - Vent Wing	1
13	111 837 475 B	Assembly Weatherstrip	1
14	111 837 476 A	Assembly Weatherstrip	1
15	111 837 477 C	Weatherstrip	1
16	111 837 478	Weatherstrip	1
17	111 837 565 A	Weatherstrip - Liftchannel	1
18	111 837 565 A	Weatherstrip - Liftchannel	1
19	111 837 625 B	Weatherstrip - Vent Wing	1
20	111 837 626 B	Weatherstrip - Vent Wing	1
21	113 845 121 E	Weatherstrip - Windshield	1
22	111 845 271 A	Beading - Trim Window	1
23	111 845 271 A	Beading - Trim Window	1
24	113 845 321 D	Weatherstrip left	1
25	113 845 322 D	Weatherstrip right	1
26	113 845 521 F	Weatherstrip - Rear View Window	1

All these parts not only require a separate process but also special rubber mixtures or even special base materials according to their application, i.e. depending on the material or liquid with which they come into contact.

The extruders required for the fabrication of rubber profiles used for the sealing of windows, doors, luggage compartments etc. are rather small units and can be installed without high expenditures. These machines can also be used for processing other rubber parts required for the truck assembly, general industry, or housing industry. List No. 2 indicates the large veriety of rubber profiles which are required e.g. for the Volkswagen Beetle and the quantities necessary for each vehicle.

Contrary to the plastics processing industry, the rubber industry in Nigeria has not yet installed any injection moulding machines as the demand for such parts has been too low up to now.

But with the start of operation of the passenger car assembly plants the situation will change. With the same injection press it will be possible only by changing the injection mould to produce many sleeves, plugs and other rubber parts required for the passenger car assembly and other industries.

The model calculation for a plastic article indicated in Table No. 39 is also applicable to the rubber industry.

Connecting hoses reinforced with cord or nylon, usually bent into a certain shape, could be locally produced for passenger cars and trucks if demand for these parts should arise. But on account of the various different types of cars the numbers of the individual parts remain so small that the price for the locally produced parts would be about three times as high as that for imported parts.

List No. 3: Rubber Moulded Parts for the VW - Beetle

Item	Number of Parts	Denomination	Piece/car
1	N 020 004 1	Plug (Rubber) A 16,5	1
2	N 020 022 3	Plug (Rubber) A 8 x 1	2
3	N 020 022 3	Plug (Rubber) A 8 x 1	4
4	N 020 029 1	Plug B 7 x 0,8 x 14	2
5	N 020 092 1	Grommet	1
6	N 020 092 1	Grommet	1
7	113 109 449 B	Sealing Washer	4
8	211 115 535	Hose	1
9	113 127 511	Fuel Line	1
10	113 127 511 A	Fuel Line	1
11	311 127 511 B	Connecting Fuel Line	1
12	111 127 591	Grommet	1
13	113 141 721	Rubber Bushing	1
14	311 201 163 D	Breather Pipe	1
15	113 201 153 E	Breather Pipe	1
16	113 201 215	Seal - Fuel Filler Hose	3
17	113 201 219 B	Hose - Fuel Filler Neck	2
18	111 209 189 A	Grommet	2
19	113 209 193	Hose	1
20	113 255 529 C	Assy. Flap left - Heating Rear	1
21	113 255 530 C	Assy. Flap right - Heating Rear	1
22	141 261 651	Hose	1
23	111 301 209 B	Gasket	1
24	131 411 313	Rubber Bearing	2
25	131 411 317	Rubber Bearing	2
26	111 413 381 A	Rubber Sleeve	2
27	131 413 449 B	Rubber Key	2
28	311 415 535 A	Sealing Plug	1
29	111 501 151	Dust Sleeve	1
30	111 501 151	Dust Sleeve	1
31	311 501 191	Rubber Stop	2
32	111 501 291	Gasket, Bearing Cover	2
33	111 501 296	Gasket	2
34	113 501 737 A	Rubber Stop	2
35	113 501 813	Rubber Bush	2

List No. 3, continued

Item	Number of Parts	Denomination	Piece/car
36	113 501 815	Rubber Tubing	1
37	111 511 245 E	Rubber Bush	2
38	311 511 245	Rubber Bush left	1
39	311 511 246	Rubber Bush right	1
40	311 609 163 A	Locking Bow	4
41	113 611 751	Grommet	2
42	211 611 751	Grommet for Brake Line	1
43	113 611 801 B	Connecting Hose	1
44	211 611 801 A	Connecting Hose	4
45	113 701 293 A	Grommet	1
46	131 701 571	Gasket - Frame front	1
47	111 701 621	Sealing Strip	1
48	111 707 197 B	Grommet - Bumper	4
49	111 711 335	Washer	1
50	113 711 691	Grommet	2
51	311 721 173 A	Rubber Pad	2
52	113 721 647 A	Rubber Pad	1
53	111 801 177	Rubber Valve	4
54	111 821 545	Rubber Washer	4
55	311 823 499 A	Rubber Buffer	1
56	111 831 451	Gasket - Door Check Rod	4
57	111 837 267 A	Cover - Check Rod	2
58	111 857 145 A	Rubber Stop	2
59	113 857 219 B	Packing - Grille, Loudspeaker	23
60	111 857 779	Sealing Washer	2
61	111 867 147 C	Protective Foil	1
62	111 885 553 C	Buffer - R.S. Backrest	2
63	111 885 661	Cap - Locking Hood left	1
64	111 885 662	Cap - Locking Hood right	1
65	111 899 115 A	Rubber Pad - Body Fasten.	2
66	111 899 119 B	Rubber Buffer - Support	2
67	111 899 123 A	Rubber Pad - Body Fasten.	2
68	111 903 137 D	Belt	1
69	111 903 137 D	Belt	1
70	111 905 261	Sealing Ring - Distributor	1

List No. 3, continued

Item	Number of Parts	Domination	Piece/car
71	111 941 129	Sealing Ring	2
72	141 941 147	Rubber Mounting Headlight	2
73	111 943 191 D	Gasket - Licence Plate	1
74	111 945 191 G	Gasket - Brake Light	1
75	111 945 192 A	Gasket - Brake Light	1
76	111 947 565	Sealing - Door Contact	2
77	111 951 195 A	Grommet - Horn	2
78	311 955 261 A	Ferrule - Windshield Wiper	2
79	111 957 375 A	Gasket - Speedometer	1
80	111 957 855 B	Grommet	1
81	111 957 861	Grommet	1
82	111 971 909 A	Grommet - Main Wiring Harness	1
83	111 971 911	Grommet - Cross Member	2

The rubber parts vulcanised on metal used, e.g., as vibration dampers for the suspension of the engine or the exhaust could easily be produced locally without large investment even in small numbers.

List No. 3 indicates the large variety of small rubber parts which are required e.g. for the Volkswagen Beetle and the quantities necessary for each vehicle.

9.3 Battery Industry

The only manufacturer of car batteries in Nigeria is the firm

Associated Battery Manufacturers (Nigeria) Ltd. (ABM)
Sapara Street, Ikeja.

This company resulted from the merger of the three firms Lukas (British), Bosch (German), and CFAO (French).

The production of ABM is hampered by the multitude of different types of cars existing in Nigeria of which only very few have batteries of the same size, voltage, and capacity.

As soon as the passenger car assembly plant will start to work, ABM will be in a position to manufacture batteries much more economically on account of the increasing quantity of batteries of the same type as well as the constantly growing number of replacement batteries. In addition, the original-equipment (OE) batteries will be supplied which now are imported together with the vehicle.

At present the raw materials as well as the complete battery boxes have to be imported. However, with the help of the investment of about

£N 200,000

the battery boxes together with the covers will be produced locally from plastics; thus, assuming steady economic conditions, the battery price will be reduced.

The present prices per battery are as follows:

for Volkswagen, cif, duty paid	sh 144
for Volkswagen, produced by ABM, OE price	sh 130
for Peugeot, cif, duty paid	sh 144
for Peugeot, produced by ABM, OE price	sh 136

Consumers of batteries, questioned thoroughly, emphasised that in their opinion the quality of both the locally manufactured and the imported batteries is equal.

9.4 Paint Industry

The production of car paint in Nigeria is based on imported raw materials. This fact and adequate supervision of the manufacturing process ensure a satisfactory quality. This was confirmed by truck assembly plants and repair workshops questioned by the Battelle team.

The manufacturers of paint in Nigeria are, among others, the following firms:

ICI (Nigeria) Ltd.,
24 Commercial Road, Apapa.

Pinchin Johnson (W.A.) Ltd.,
Industrial Estate, Ikeja.

Although the production costs in Nigeria are lower than in Europe, the final sales prices are 15 to 20 percent higher than those of paints of the same quality imported from Europe on account of the additional 15 percent excise tax on the sales price:

Sales prices of car finish

1 gallon container paint produced locally		sh 65/6
plus excise tax		sh 9/10
	end price:	sh 75/4
5 gallons container paint produced locally		sh 319/6
plus excise tax		sh 47/11
	end price:	sh 367/5

If, however, large quantities will be required by the passenger car assembly plant, the manufacturers are prepared to grant up to 20 percent discount. Thus the price for locally produced car paint will be on the same level as that for imported paint.

9.5 Glass Industry

There is only one glass factory in Nigeria:

Mid-Western Glass Industries, Ughelli

This factory has never overcome the initial difficulties and is at present completely closed down.

The company

Pilkinton Glass (Nigeria) Ltd.,
11, Creek Road, Apapa

is on the point to take over the firm in Ughelli and to modernise it with an expenditure of £N 500,000; thus it will also be in a position to produce safety glass.

On account of the present turbulent economic development in Nigeria, Pilkington Glass is not in a position to make an exact calculation for safety glass to be produced in the future. But it was confirmed in writing that on the basis of their long experience they assume that the price for safety glass produced in Nigeria will be 15 to 20 per cent below the cif price of imported safety glass of the same quality.

The glass produced by the Fourcault process practised in the Ughelli factory cannot be used for safety glass and therefore all the raw glass has to be imported. By modernising the plant and introducing the Pittsburgh process it will, however, be possible not only to enlarge the capacity and operate more economically but also to toughen the raw glass produced and obtain safety glass which can be bent in the required shape. In this case only 30 per cent of the raw glass will have to be imported and as a result the final price will be reduced substantially.

The safety glass factory equipped with two furnaces will be in a position to produce the glass for 30 mm passenger cars and 7 mm trucks per annum. 60 per cent of this amount is to be needed for original equipment and the balance for the replacement market. In case of rising demand the production could be increased accordingly by installation of a third furnace.

One furnace operating on three shifts per day would require a labour force of 81 skilled and 52 unskilled workers together with Nigerian foremen and graduate engineers. An experienced expatriate production manager would be essential for the plant and an initial number of six to eight experienced expatriate technicians would be required for a short period after the commencement of production. Complete Nigerianisation would be expected to be achieved within about five years.

The name of the new company would probably be

Triplex (Nigeria) ltd

This firm would be supported technologically financially and organizationally by the world wide Pilkington organization

9.0 Plastics Industry

The plastics processing industry in Nigeria possesses the most modern machines and is in a position to manufacture every required part with the desired quality and precision The plastics raw material has to be imported as there is at present no petrochemical industry in the country

While plastics foils plastics foam and artificial leather can be taken from the current local production in the required dimensions the production of intricate parts for which rather expensive injection moulds have to be used is very uneconomical on account of the low production volume and the diversity of the parts

Only if the car assembly plants guarantee to purchase the same article over a period of at least three years would it be worth while according to the local manufacturers to undertake the production as otherwise the rate of depreciation for the mould per piece produced would be too high

The model calculations in table No 19 indicates that the price of a finished plastics part produced with the locally existing injection moulding machines in different quantities at the same working rhythm and with the same depreciation period only depends on the price of the injection mould The cost of a part produced in small quantities will be about twice as high as that of the same part produced in large quantities even with a 15 percent quantity discount In the latter case the mould can be written off for a larger number of parts during the same depreciation period

Table No. 9b: Model Calculation for a Plastic Article

Number	200,000 pieces	10,000 pieces
Suggested weight (0.5 kg per piece	100,000 kg	5,000 kg
waste (2 % of the weight of the finished piece	2,000 kg	100 kg
Weight of necessary raw material	102,000 kg	5,100 kg
Production time (working rhythm: 2 pieces per minute	1,666 hours	83 hours
	200 days	10.5 days
=	7 months	0.3 months
Cost of raw material (£ 270 per ton)	27,420 £	1,377 £
Cost of labour (£ 0.5 per day)	104 £	5 £
Cost of injection machine (£ 12 per hour	20,000 £	996 £
Cost of injection mould (£ 3,000; depreciation within 2 years)	1,000 £	1,000 £
Rent for building (£ 50 per machine site and month)	350 £	17 £
Overhead (£ 90 per machine and month)	630 £	30 £
	43,504 £	3,118 £
Quantity discount (15 %)	6,494 £	-
Total cost	37,010 £	3,118 £
Price per piece	0.185 £	0.312 £

As the cost of the plastics parts for a passenger car has very little influence on the end price of the finished car, local production will be justified even if the price is twice as high as that of the same part imported

While questioning various manufacturers of plastics articles it became evident that none of the companies approached is at present willing to bear the high investment expenses for many different injection moulds On account of the uncertain economic situation most of the firms approached showed a certain reserve

It would be possible to rent the necessary injection moulds from Europe for a short period of time in order to produce a stock of the articles concerned in Nigeria But on account of the large variety of the injection moulds the long sea routes the slow clearance by the Nigerian Customs and the still existing high possibility of losses during transport in Nigeria the idea to lend the moulds has been refused by the European firms which were approached.

However should Volkswagen and Peugeot (Nigeria) be prepared to place their injection moulds at the disposal of the Nigerian companies approached the latter would be ready to produce the parts concerned at an acceptable price But this will not have any influence on the ex-factory price of the finished components as Volkswagen and Peugeot also have to calculate the depreciation of the injection moulds over a certain period of time and the transportation cost

To explain the above, the following tabulation has been drawn up (List No 4), which indicates the diverse plastics parts used in a passenger car according to the Volkswagen catalogue and also the quantities required of each item.

List No. 4: Plastic Moulded Parts for the VW - Beetle

Item	Number of Parts	Denomination	Piece/car
1	113 129 919	Twin Clamp for Cables	1
2	113 201 908 A	Hose	1
3	113 201 908 C	Hose	1
4	111 255 459 F	Heating Pipe	2
5	111 255 473 C	Defroster Ventilation Centre	1
6	111 255 483	Escutcheon	1
7	113 415 669 B	Assy. Emblem - Horn Ring	1
8	113 501 753	Guide - Operating Rod	1
9	113 501 753	Guide - Operating Rod	1
10	113 611 301 R	Assy. Reservoir - Brake Fluid	1
11	111 701 309	Water Drain Valve	1
12	111 711 115 A	Boot	1
13	113 711 333 A	Release Button	1
14	311 711 461 A	Assy. Boot	1
15	111 711 749 A	Friction Plate	4
16	111 721 365	Sleeve	1
17	111 819 189 A	Assy. Warm Air Outlet left	1
18	111 819 190 A	Assy. Warm Air Outlet right	1
19	113 819 607	Bush Knob	2
20	113 819 661 F	Knob	1
21	113 819 661 F	Assy. Knob	2
22	113 819 663	Cap - Knob	2
23	111 821 531 A	Cover - Sill Panel left	1
24	111 821 532 A	Cover - Sill Panel right	1
25	111 823 461	Assy. Loop Release Cable	1
26	113 823 579 A	Packing Lower Hood Handle	1
27	113 823 581 A	Packing Upper Hood Handle	1
28	411 823 665	Lever - Hood Release	1
29	311 831 439 A	Plug	4
30	111 831 449	Plug	4

List No. 4, continued

Item	Number of Parts	Donomination	Piece/car
31	211 831 449	Plug	1
32	111 837 111 C	Plug	2
33	111 837 187 B	Assy. Knob	1
34	111 837 187 B	Assy. Knob	1
35	111 837 209 B	Packing	1
36	111 837 209 B	Packing	1
37	111 837 211 C	Packing	1
38	111 837 211 C	Packing	1
39	111 837 355	Guide Knob	1
40	111 837 355	Guide Knob	1
41	111 837 595 A	Washer Handle	2
42	113 853 615 A	Seal VW Sign	3
43	113 857 489	Plug	1
44	113 857 490	Plug	1
45	113 857 490 A	Plug	1
46	111 857 499	Cap	1
47	113 857 643 E	Assy. Grab Handle	1
48	111 867 673	Sealing - Door Lining	1
49	111 867 673	Sealing - Door Lining	1
50	111 885 665	Loop Core - R.S.8.R.	1
51	311 904 451	Holder for Cable	2
52	111 905 429	Cap - Distributor and Coil	6
53	113 905 451 A	Holder for Cable	1
54	131 941 341	Guide Piece - Flat Terminal	2
55	111 941 523 A	Assy. Knob	1
56	111 941 537 B	Assy. Knob	1
57	211 955 275 A	Bearing Cover	2
58	111 955 453	Container - Washer Unit	1
59	111 955 467	Wedge	2
60	113 955 481	Securing Nut	1
61	111 955 549 J	Operating Button	1
62	311 971 921	Cap - Flat Terminal	9
63	111 971 977	Flat Terminal Insulator	3
64	111 971 977 A	Flat Terminal Insulator	2
65	111 971 977 B	Flat Terminal Insulator	2

9.7 Aluminium Industry

As no aluminium is produced in Nigeria kitchen utensils, corrugated sheets, boats, superstructures of trucks, etc. are manufactured from imported aluminium sheets. The quality or the final produce corresponds to the European standard. Swiss Aluminium Ltd., Zürich, Switzerland, one of the largest plants in the world producing and processing aluminium, has established in Nigeria the

Aluminium Manufacturing Company of Nigeria Ltd.,
(ALUMACO)
25, Burma Road Apapa.

By increasing the share capital the company intends to enlarge and to rationalise production. The installation of new extruder presses and a foundry are planned. The capital investment required will amount to

£N 800,000 to £N 900 000.

This new equipment could also be used for the manufacture of certain aluminium profiles for trucks and passenger cars, but production will not start before 1973. For this reason, a calculation for prices of parts suitable for passenger car assembly cannot be drawn up at present. It is assumed, however, that the price of the locally produced components will exceed the price of imported parts including duty at CKD conditions by about 30 to 50 percent.

As other branch establishments of the Swiss concern supply car assembly plants in Europa, North and South America with components, the Aluminium Manufacturing Company of Nigeria is regarded as suitable supplier also for the assembly plants in Nigeria.

The aluminium rolling mill

Alcan Aluminium of Nigeria Ltd.,
Port Harcourt

which was established at the beginning of the civil war has not yet taken up production.

The Flag Aluminium Company, Ikeja, also approached by the Battelle team was not interested in the manufacture of passenger car components.

9.8 Cable Industry

The Battelle team found out that the owners and managers of the Nigerian cable factories, producing at present telephone cables, lighting cables, and power cables are not interested in the production of electric cables for the passenger car assembly plants.

The uniform opinion was that on account of the low production volume, the multitude of different cross-sections, and different colours of the insulation, it is not possible to develop an economical production at favourable prices.

There is, however, the possibility to manufacture the various cable harnesses employing imported material and to equip them with cable sockets. In addition

Electrical and Mechanical Construction Co. Ltd.
(ELMEL)
20 Creek Road, Apapa

is interested in the importation of starters and generators for passenger cars at CKD conditions and the local assembly

of these components. The investment required for this purpose would amount to about £N 100,000. This new installation could also be used for repairing and assembling small and medium-size electric motors for industries in general.

However, no price calculation for these electric machines has been made yet, as it is preferable to wait until the passenger car assembly plants have started operation.

9.9 Sheet Metal Industry

The sheet metal industry in Nigeria is well installed, and has a very high rate of capacity utilisation. This industry supplies the whole Nigerian market with stamped, pressed and bent sheet metal parts, particularly all types of buckets, pots, and dishes.

Although presses with a table diameter of 600 mm and up to 300 tons pressure are available, it is generally not economical to produce metal stamping components for the car assembly plants at the starting period of the assembly plant. The number of parts to be supplied is too small compared with the high investment for the special tools and therefore the price for the finished articles would be several times higher than that for the same imported component. In addition, the renting of the special tools from Europe for a short period would not be economical on account of the size and weight as well as the time wasted on shipment in both ways (Section 9.6).

Assuming a rise of passenger car assembly in line with the trend (Section 3.4) a considerable supply of specific metal stamping components could be possible only after 1980.

9.9.1 Wheels for Passenger Cars

According to the well-known manufacturer of punching tools and dies

August Läpple,
71 Heilbronn/Germany,

it could be feasible to produce 100,000 wheels p.a. at a reasonable price. This figure would correspond to the number of 20,000 passenger cars assumed for the year 1980, as every vehicle will be equipped with four wheels and one spare wheel.

The price of the machinery for the production of car wheels is as follows:

machinery, fob	£N 215,000	without factory building and foundations
transportation equipment and racks	£N 5,000	
delivery cif and installation	£N 40,000	
total	£N 260,000	

A factory building of 35,000 to 40,000 sq.ft. will be needed in addition to a single-pole 500 KVA transformer for the butt-welding machine, and an additional 600 KVA transformer for the remaining plant including the necessary electric installations.

In order to keep the number of machines at a low level it will be necessary to work in two shifts.

Each shift will comprise 50 men; they will be trained and supervised by an expatriate who will be replaced by a Nigerian as soon as a suitable successor has been found.

According to A. Läpple, a car wheel produced at such small numbers will cost about 2 to 2.5 times more than a wheel manufactured in Europe at an average rate of one million p.a.

The leading sheet-metal-processing firm in Nigeria,

West African Metal and Chemicals Ltd. (WAMAC)
Henry Carr Street, Ikeja,

is interested in producing passenger car wheels.

The welding process needs very sophisticated equipment and highly skilled labour as the safety regulations for wheels are very severe.
In addition it must be mentioned that stringent safety measures must be applied to avoid accidents in the production process.

The equipment for the repair of tools and dies, is not quoted as it is assumed that this can be done in Nigeria. It must be mentioned that some of the special tooling are rather heavy and need heavy machine tools and heat treatment equipment.

9.9.2 Hub Caps

The presses used for the manufacture of car wheels can also be used for the production of hub caps. Thus the presses will be utilised at a better rate.

For producing 80,000 hub caps (4 per vehicle) p.a., an additional investment of

£N 8,500 cif (including installation)

has to be made in the above-described car-wheel manufacturing plant. The hub caps will be processed in the same factory building as the wheels. Two shifts will be necessary, each consisting of five men.

It is recommended to import filmcoated stainless steel discs in order to facilitate the production of the hub caps.

The hub caps will also cost about 2 to 2.5 times more than those manufactured in larger quantities in Europe.

9.9.3 Exhaust Systems

The production of 20,000 exhaust systems annually could be feasible but at overcost compared with imported parts due to the low quantity. This production would cover in the beginning the first equipment including replacements. At a later period a second shift has to be provided for the replacements.

The price of the machinery for the production of the exhaust systems amounts to:

machinery fob without factory building and foundations	£N	150,000
transportation equipment and racks	£N	8,000
delivery cif and installation	£N	30,000
	£N	188,000

A factory building of 20,000 sq.ft. will be needed.

Each shift will comprise 100 men; they will be trained and supervised by highly trained expatriates who will be replaced by Nigerians as soon as suitable successors have been found.

The production of exhaust systems should only be envisaged if from the very beginning a very high quality can be achieved. This would include a special surface treatment. The equipment necessary for this process is not included in the above price. As the quality of the exhaust system has a bearing on the efficiency and the smooth working of the engine the assembly plants possibly will insist on high quality exhaust systems.

In addition it must be mentioned that stringent safety measures must be applied to avoid accidents in the production process.

The equipment for the repair of tools and dies, is not quoted as it is assumed that this can be done in Nigeria. It must be mentioned that some of the special tooling are rather heavy and need heavy machine tools and heat treatment equipment.

9 10 Car Seats

The front single seats and the rear bench with the appropriate back can be produced in Nigeria without difficulty

Using highly modern automatic machines

Jarmakani Industries (Nig) Ltd
Ilupeju Industrial Estate

produces zigzag and spiral springs from imported steel wire in any dimensions required

Plastosheet Industries Ltd .
Agege Motor Road Mushin

manufactures artificial leather and can meet the required quality according to given specifications

The final fabrication of the seats with the necessary upholstery is effected by

Metal Furniture (Nig) Ltd
Airport Ikeja

Since at the time the report was written the two firms Volkswagen and Peugeot selected in this study have not received the official order for the passenger car assembly plants from the Government detailed drawings and descriptions of the seats were still not available For this reason a detailed price calculation for the seats could not be made at present However the above firms declared that the final price of the seats produced in Nigeria would be about the cif price including duty of these seats imported from Europe

The accuracy of the dimensions and the quality of the final product are guaranteed by the manufacturing company

The firm

Ne-Sag Drahtfedern GmbH
4811 Neuenkirchen/Germany

producing zigzag and spiral springs is interested in establishing a joint venture in Nigeria for the manufacture of spring and frame assemblies for car seats

9.11 Replacement Motors

Reconditioning of damaged car motors does not belong to the component industry. Since it is of great importance with regard to the durability and the driving safety of passenger cars, however, it is discussed in this study.

On account of the various types of passenger cars existing in Nigeria at present, an appropriate industry for this type of work could not be developed and reconditioned motors are unknown in Nigeria. To cut down the high expenses for a new motor, Volkswagen has started to send worn-out motors to Germany for a general overhaul. After this has been performed and the replacement motors returned to Nigeria they are installed in the vehicles of the corresponding type. The costs incurred are indicated in Table No. 40. At the beginning of passenger car assembly in Nigeria the types of cars prevailing will be standardised and it should therefore be possible to start overhauling of worn-out car motors locally. This would be more economical, particularly with regard to the inconveniences and the loss of time for obtaining the necessary export and import licenses as well as the secondary expenses for storage and packing and customs duty.

Table No. 40 **Price for a Reconditioned VW Motor Sent to Germany**

	Stroke Volume 1,200 cc £N	1,600 cc £N
Freight Lagos cif Bremen	20	20
Freight Bremen cif Kassel	3	3
Reconditioning and freight fob Bremen	63	97
Freight Bremen cif Lagos	80	80
Customs duty (33 1/3 % from cif value)	27	38
Reconstruction surcharge (5 % from customs duty)	2	2
Handling Cost	5	5
	140	185
Selling price in Nigeria:		
- reconditioned motor	215	270
- new motor	300	410
Labour for installation	2.10.-	2.10.-

Angus and Partners Ltd.,
46, Burma Road, Apapa

is the only firm in West Africa which is regrinding with increasing success crankshafts of all dimensions and is willing to recondition motors in Nigeria at a low cost if 1,000 motors of the same type are to be reconditioned.

Even if the necessary spare parts have to be imported, about £N 50 foreign exchange will be saved per motor.

10. Fibreglass-reinforced Plastic Bodies

Plastic bodywork

The question has been raised if there exists the possibility of manufacturing fibreglass-reinforced plastic bodies.

Steelbody cars have been manufactured in the industrial countries in huge numbers by various companies over several decades thus giving the designers and engineers the opportunity to gain an immense stock of experience and know-how. To the contrary only few firms have ventured since a rather short period on experimental work, prototype development or production of models in small series, usually special light sports cars, racing cars, small passenger cars (touring cars) and also three wheeled cars with fibreglass-reinforced bodies.

The chosen firms Volkswagen and Peugeot are not versed with the construction of fibreglass-reinforced plastic bodies as far as production is concerned. Due to this fact the use of these bodies cannot be advised.

11. General Forecast of Overall Long-term Benefits to the National Economy

Some of the most important overall long-term benefits to the National Economy resulting from the development of an automotive industry are as follows:

Creation of a main body of technically trained personnel

To permit establishment of an automotive industry together with a distribution organisation and repair work shops it will be necessary to train as early as possible a sufficient number of adequate personnel (Section 8). This will lead to a constantly growing number of qualified personnel with both technical skills and management capabilities, which have theoretical and practical in-plant training. These persons will be indispensable for the future of the industrial development in Nigeria and will thus form the nucleus for the establishment of the automotive and other general industries.

On the other hand, it should be noted that it takes a long time of theoretical training and personal practical experience to develop highly skilled production engineers and staff for top level management. Therfore, it is recommended not to precipitate Nigerianisation of high-ranking management positions.

Opportunities for employment

It is estimated that with the establishment of two passenger car assembly plants together with the necessary distribution and servicing organisations and the increase of the local component industries, about 3,000 to 4,000 additional opportunities, for employment of labour and administrative staff will be provided in the future.

Incentive to develop component and general industries

The promotion of assembly plants and component industries will also have a favourable effect on other industries in general, especially if capital investments for existing and to be newly established industries will be facilitated.

The metalworking industry being particularly connected with the assembling operations will receive an extensive impulse and thus constitute a nucleus for the development of the industrialization of the country.

In this connection it should be noted that it is also important to develop basic industries, e.g. iron, steel, chemical and petro-chemical industries.

Exchange saving

The amount of exchange saved by assembling passenger cars in Nigeria has been calculated in Section 5.7 and amounts to £N 1.97 million in 1981.

Investment possibilities for private capital

The development of the automotive industries will give the Nigerian people the opportunity to invest private capital.

Communication by passenger cars

Cheap passenger transport is an element in the development of a country. Therefore, it is necessary to produce cheap vehicles and to keep the assembly expenses at a low level by establishing as few assembly plants as possible to limit the types of vehicles. This will also reduce diversity in the production of car components and spare parts and facilitate maintenance and servicing of the cars. It has to be noted that Nigeria will change to right-hand traffic on April 2, 1972. This fact will facilitate the traffic flow between Nigeria and their neighbours with right-hand traffic (Annex 3).

Standing technical committee

One of the main functions of the Standing Technical Committee, proposed by the Government, will be the coordination of the assembly plants with the already existing Nigerian ancillary industries producing car components and with ancillary industries to be established in the near future. This ensures that these industries will be promoted in Nigeria, and that car components will be produced at a reasonable price and equal quality compared with the imported ones.

With the help of the Standing Technical Committee the development of the automotive industry will be initiated and supported.

As a recommendation it is mentioned that the United Nations could elaborate an expertise to be supplied to the Standing Technical Committee.

Literature References

Hogg/Roelandts, Oxford	Nigerian Motor Vehicle Traffic 1962
D. Little Inc., Washington	Government Policy and the Development of Motor Vehicle in Nigeria
Federal Office of Statistics, Lagos	Annual Abstract of Statistics, Nigeria, 1969
	Digest of Statistics, Vol. 19, October, 1970
	Motor Vehicle Statistics 1960 to 1968
	Economic Indicators, April 1970
	Economic and Functional Analysis of Government Accounts
Nigerian Railway Corporation, Lagos	Tariff No. 7, 1st November 1970
Federal Ministry of Trade, Lagos	Import of Motor Vehicles
UNIDO, Vienna	Establishment and Development of Automotive Industries in Developing Countries
Battelle Institute e.V., Frankfurt	African Transport Development Study, 1965
	Possibilities of Motor Vehicle Assembly in West Africa
Kampsax, Copenhagen	Highway Survey in Nigeria, 1967
Stanford Research Inst., California	The Economic Coordination of Transport Development in Nigeria, 1961
International Bureau of Fiscal Documentation, Amsterdam	African Tax Systems
Chamber of Commerce and Industry, Lagos	Commerce in Nigeria, Vol. II, 1969

Nigerian Ports Authority, Lagos	14th Annual Report
Udny Yule/Kendall, London	Advanced Theory of Statistics
Federal Ministry of Information, Lagos	Second National Development Plan, 1970 - 74
	Nigerian Customs and Exise Tariff
International Labour Office, Geneva	Year Book of Labour Statistics, 1970
International Bank of Reconstruction and Development, New York	The Economic Development of Nigeria
Birla Brothers Private Ltd., Calcutta	Report of Passenger Car Assembly Project
Battelle Institute e.V., Geneva	Plastic Materials in the Automobile

13 proposals for passenger car assembly submitted in response to the Government Notice No. 1619 from 9th October 1969

ANNEX 1

Definition of CKD

A CKD (completely knocked down) motor vehicle is defined as a motor vehicle imported in the conditions described below:

General

- For the purpose of this paragraph: 'part' shall mean an individual component fabricated or manufactured, from one piece of metal or other material and not joined or connected in any way to another component or material expect as outlined below: 'subassembly' shall mean a unit consisting of any two or more parts joined together by any means.

- Expect where otherwise specified each individual part or subassembly provided for in this paragraph shall be imported unattached to other parts or subassemblies.

- Notwithstanding anything to the contrary, brackets, anchor nuts and clips, captive nuts and clips, or clinch nuts and clips, may be attached to parts or subassemblies which otherwise confore to the provision of this paragraph.

- Subject to the provisions of this paragraph otherwise being complied with, parts or subassemblies on which the undermentioned processes have been performed shall, notwithstanding anything to the contrary, be allowed:

  The covering or bonding together of rubber or plastic to metal, bright metal plating, imitation wood graining and items covered in

- Parts or subassemblies, otherwise conforming to the provisions of this paragraph, shall, notwithstanding anything to the contrary, be allowed, if joined or attached by the undermentioned methods:

  Automatic electric arcwelding; flash butt welding; projection welding, high amp spotwelding; hydraulic pressure welding; and friction welding.

- Parts or subassemblies not specially mentioned in this paragraph may be imported in the condition supplied, provided they are not attached or joined to other parts or subassemblies.

Chassis

- When the frame, whether of box, channel, tubular or other construction, is in a fore consisting of side, cross, cruciform or other members, each individual member of such frame shall be imported as parts but may have welded brackets or supports attached.

- When the separate chassis frame consists of several members, themselves consisting of separate frame components to be welded together, such chassis frame may be imported assembled (riveted and welded).

- The engine may be imported assembled, complete with fan, generator, fan and generator pulleys, exhaust and inlet manifolds, carburetor, injection pumps, air filter or cleaner, sparking plugs, distributor, high tension cables, fuel, oil and water pumps, starter motor, gear box, clutch housing and other parts or subassemblies attached.

- The front axle or independent front axle suspension can be imported as a subassembly.

- The rear axle can be imported as an assembly.

- For the independent front suspensions:

  -- The front suspensions and steering gear should be adrift.

  -- Road springs and shock absorbers shall not be in position, but may be assembled.

  -- Notwithstanding anything to the contrary, the front axle or independent front suspension parts or assemblies for front wheel drive or multiple wheel drive may be imported assembled.

- The propeller shaft may have universal joints, brackets and supporting mechanism attached when imported.

- The steering gear may have the steering box and shaft and jacket assembled, but the steering wheel and horn ring shall be adrift.

- Coil or leaf springs for the rear axle may be complete with gaiters or other covering in position.

- The radiators, including the shell and mounting frame, may be assembled.

- Fenders and hood may be imported with holes made therein and reinforcements added, but shall not be surface-treated in any way except with a coat of anti-rust preparation.

- The cowl may be assembled, but shall not be surface-treated in any way except with a coat of anti-rust preparation.

- Chassis panels, pressings or stampings, not elsewhere provided for, shall be manufactured from one piece of metal and may be imported with holes made therein, but shall not be surface-treated in any way except with an anti-rust preparation.

- The windscreen frame may be imported with reinforcements or other attachments but shall be without glass.

- Toe and running boards may be imported with reinforcements attached, but shall not be surface-treated in any way except with anti-rust preparation.

- The dash unit or instrument boards may be imported with reinforcements attached, but shall be devoid of all instruments and controls.

- The glove box and doors may be imported assembled.

- The fuel tank may be complete, but the filler pipe shall be adrift therefrom unless permanently attached thereto.

- The petrol filler housing cover may be complete with hinges attached.

- The gas tank filler tube may be complete with cap.

- The horn may be imported with brackets attached.

- Speedometers and revolution counters (including their cables) may be clustered with other gauges.

- Exhaust pipes and mufflers may be assembled, but not fitted together unless permanently attached thereto.

- All controls, pedals and linkages may be subassembled.

- Anti-squeak and deadener material for chassis components may be cut to size.

- Rubber weatherstrips are not to be in the piece.

- The following and other fittings and accessories may be imported in the condition supplied:

  Hood catch subassemblies; hood ornaments; bolts; nails; nuts; screws; tacks; and washers; forgings; castings; anchor plate or nuts; metal brackets, braces, supports and reinforcements; rubber engine mountings; and rubber strips, step plates (running board); windscreen wipers; cowl ventilator subassembly; electrical sockets and fittings.

Bodies

- Metal panels, pressings and stampings, not elsewhere provided for, shall be manufactured from one piece of metal only and may be imported with holes made therein, but shall not be surface-treated in any way except with anti-rust preparation. Such panels, pressings or stampings may also have reinforcements attached, provided such reinforcements serve the purpose of preventing distortion during handling while in transit.

- Roof panels, pressings or stampings, provided otherwise conforming to the conditions set forth in paragraph (i) of this subparagraph, may have drip mouldings attached thereto.

- Rolled and extruded metal sections may be cut to size.

- Door pillars may be assembled and have the metal fittings therefore in position.

- Metal doors may be assembled with all internal fittings in position and may include sound-deadeners or anti-deadener material, but shall be devoid of glass or upholstery material and shall not be surface-treated in any way except with anti-rust preparation.

- Trunk lids may be assembled with fittings and sound-deadeners or anti-deadener material attached, but shall not be surface-treated in any way except with anti-rust preparation.

- Wood or plastic parts shall be manufactured from one piece of wood or plastic material.

- Upholstery springs may be loose or in frames.

- Seat frames may be assembled, but not upholstered.

- Carpeting, hood and headlining material may be cut and stitched.

- Rubber weatherstrips should not be assembled in place.

- Anti-drum materials may be cut to size for body components.

- Soft trim or upholstery can be imported cut and sewn but not installed in place.

- Materials not elsewhere provided for shall not be cut to shape or otherwise finished processed.

- The following and other fittings and accessories may be imported in the condition supplied:

  -- Door and window handles; window winding mechanism, window support frames, window fasteners, hinges and locks, bolts, nails, nuts, rivets, screws, tacks and washers; chains and hooks, ornamental mouldings and monograms, including window reveals or garnish moulding to imitate wood; robe rails; assist cords; door pulls; door arm rests, parcel nets; ventilator window frames and operating mechanism; window glass channels, guiding and lifting; adjustable seat lever, slides and locking devices, forgings, castings and anchor plates or nuts; metal brackets, braces, supports and reinforcements, mailing strips with nail inserted; wire stiffeners for upholstery; window sash weatherstrip, metal and felt; moulded rubber mats with felt; arm rest subassembly including hinges and supports or brackets therefore, but excluding upholstery, trunk lid hinge arm subassembly; door checkstraps, metal or other; tacking or trim strips not cut from cardboards or stereboards; direction indicators; electrical sockets and fittings; ashtrays; cigar or cigarette lighters; stone guards and dust shields, clock and safety belts, including fittings and anchorages.

ANNEX 2

Government Notice No. 1619

INVESTIGATION FOR PROPOSALS FOR THE ESTABLISHMENT OF A PASSENGER CAR ASSEMBLY INDUSTRY IN NIGERIA

In Government Notice No. 1042 in the Official Gazette of 9th June, 1966, the Federal Government published an invitation for proposals from motor car manufacturers of established reputation to assemble in Nigeria passenger cars from completely knocked down (CKD) packs to be imported. Well documented proposals were submitted by six manufacturers in response to the invitation. The Federal Government expresses its appreciation for the co-operation received from the manufacturers who presented proposals.

2. However, in view of the time that has elapsed since the submission of those proposals and further development in the Nigeria economy, the Government hereby invites proposals from all interested parties.

3. Manufacturers who previously submitted proposals may, if they wish, modify their old proposals, or present entirely new ones.

4. The Government considers that a passenger car assembly industry, properly constited, should be an active stimulus for much related industrial and economic development. The Government desires therefore to have the assembly industry established together, as early as possible with other industries for local parts manufacture and for cars destribution, in accordance with the following requirements:

(i) The car assembly industry should be economically viable within the 15 per cent duty concession already provided for in the Customs Tariff and the protection that the Government will give;

(ii) The car assembly industry should justify its establishment and the concessions and protection to be granted by the Government by guaranteeing satisfactory benefits to the economy;

(iii) The overseas manufacturer or manufacturers that will be responsible for the technical and economic performance of the proposed industry should have a sufficient stake in the assembly industry to ensure their continuing concerns for its sound economic performance;

(iv) Initially, at least 25 per cent of the equity share holding of each assembly plant should be reserved for indigeneous Nigerian participation, and some nominal shares in the enterprise will be required by the Government, in consideration of the concessions, protection and other support to be granted to the industry;

(v) Managerial and Technical personnel in the assembly industry should be predominantly Nigerian and adequate training schemes before and after commencement of operations should be established to ensure this;

(vi) The car assembly industry should be able to make use of, even at the initial stages, locally manufactured parts up to a reasonable level, and thereafter, more parts of the cars should be incorporated in the assembled cars in accordance with a local contents incorporation programme to be drawn up. Local parts manufacturers shall be assisted to set up and to operate by the overseas manufacturers;

(vii) The assembly industry should be able to operate uncommitted to any single distribution channel; but the availability of spare parts and adequate servicing facilities should be guaranteed;

(viii) The prices of the local assembled cars should not be unreasonably higher than the prevailing international market prices for comparable cars, and the qualities should be of the same standard as those of comparable imported cars. As a controle measure an agreed proportion of the Nigerian car market will be met by imported built-up cars for as long as the Government considers it necessary.

5. In support of the passenger car assembly and of related local parts manufacture industries, the Federal Government will provide the following concessions, protection, and other support as may from time to time be required:

(i) a percentage points duty relief on such components of cars to be imported for local assembly from overseas manufacturers, which components are not included in the programme for local manufactures incorporation;

(ii) duty reliefs on the raw materials that will need to be imported for the local manufacture of parts, where the provision in the Tariff may not be satisfactory.

(iii) an import restriction on the imported built-up cars equivalent to, or substitutable for, those being locally assembled, subject to the stipulation in paragraph 4 above and to the extent that will not cause undue scarcity of passenger cars in the country.

(iv) the establishment of a Technical Standing Committee with necessary power to liaise with the assembly industry and initiate and supervise policies and programmes for local manufactures incorporation, concessions, and protection required by the car assembly and local parts manufacture industries, and other relevant matters including pricing of local products.

6. Passenger car manufacturers who are interested in establishing an assembly plant in Nigeria for their particular makes of cars and in assisting in the development of a local parts manufacture industry in the manner described above, and who are

(i) experienced in the manufacture of passenger cars including the assembly, the manufacturing and the procuring of parts.

(ii) experienced in managerial and technical training of personnel of car assembly and parts manufacture industries, and willing to train Nigerians even for the initial operations of the assembly and allied industries.

(iii) capable of training personnel for independent car distribution organisations.

(iv) experienced in the supply of spare parts and servicing facilities,

are hereby invited to present proposals to the Federal Government.

7. The detailed proposals, which should be based on the requirements as at paragraph 6 (i) to (iv) above should include details of

(i) the makes and models of cars proposed for assembly, the proposed assembly operations, investments involved, plant capacity based on the most economic conditions, production costs, personnel requirements, expatriate and Nigerian, and such other details that will enable the viability of the project, the import and foreign exchange savings and other national benefits, to be readily evaluated;

(ii) the [illegible] parts of the cars proposed to be assembled, and the values of the essential individual parts;

(iii) programmes of possible expansion, and estimates of additional investments;

(iv) the parts of the cars that could be procured, or arranged to be manufactured, locally at the initial stages of assembly operation, and a realistic programme of local manufacture incorporation;

(v) the contractual obligations that will exist between the overseas manufacturers or the suppliers of parts or materials, and the Nigerian car assembly plant, such as royalties, technical fees, and management fees;

(vi) any additional Government concessions or assistance required for the rapid orderly development of the assembly and the allied industries.

8. It is appreciated that interested manufacturers will need time to study the various aspects of the project and to work out the required details for their proposals, especially on the question of local parts manufacture which is vital to the acceptance of any of the proposals. Accordingly, the detailed proposals should be submitted in six copies to the Permanent Secretary, Federal Ministry of Industries, Lagos, not later than [illegible] February, 19[illegible]. However, the manufacturers desiring to submit detailed proposals in accordance with the requirements and provisions above should, in the first instance, give indications of their intention in a letter, addressed to the Permanent Secretary, Federal Ministry of Industries, P.O.B. [illegible], Lagos, Nigeria, to reach him not later than [illegible] December, 19[illegible]. The letter should include evidence of the proposer's capacity and status as indicated in paragraph 6 (i) to (iv) above.

P. C. [illegible],
Permanent Secretary,
Federal Ministry of Industries

Annex -

Change to Right-Hand-Traffic [1]

Of all the countries along the West Coast of Africa, Nigeria is the only extensive country with the left-hand system. She is surrounded by neighbours whose traffic flows along the right-hand side of the road. This situation will not last much longer for Nigeria will change to right-hand traffic on Sunday, April 2, 1972 at 6 a.m.

The West African Transport Conference held in Monrovia in October 1961 stressed the need for an effective Inter-African road transport network.

Further in 1964 the ninth session of the United Nations Economic Commission for Africa (ECA) resolved, at Addis Ababa, that transport links between African nations should be strengthened.

While planning the assembly plant, attention has to be paid to the change over to right-hand traffic.

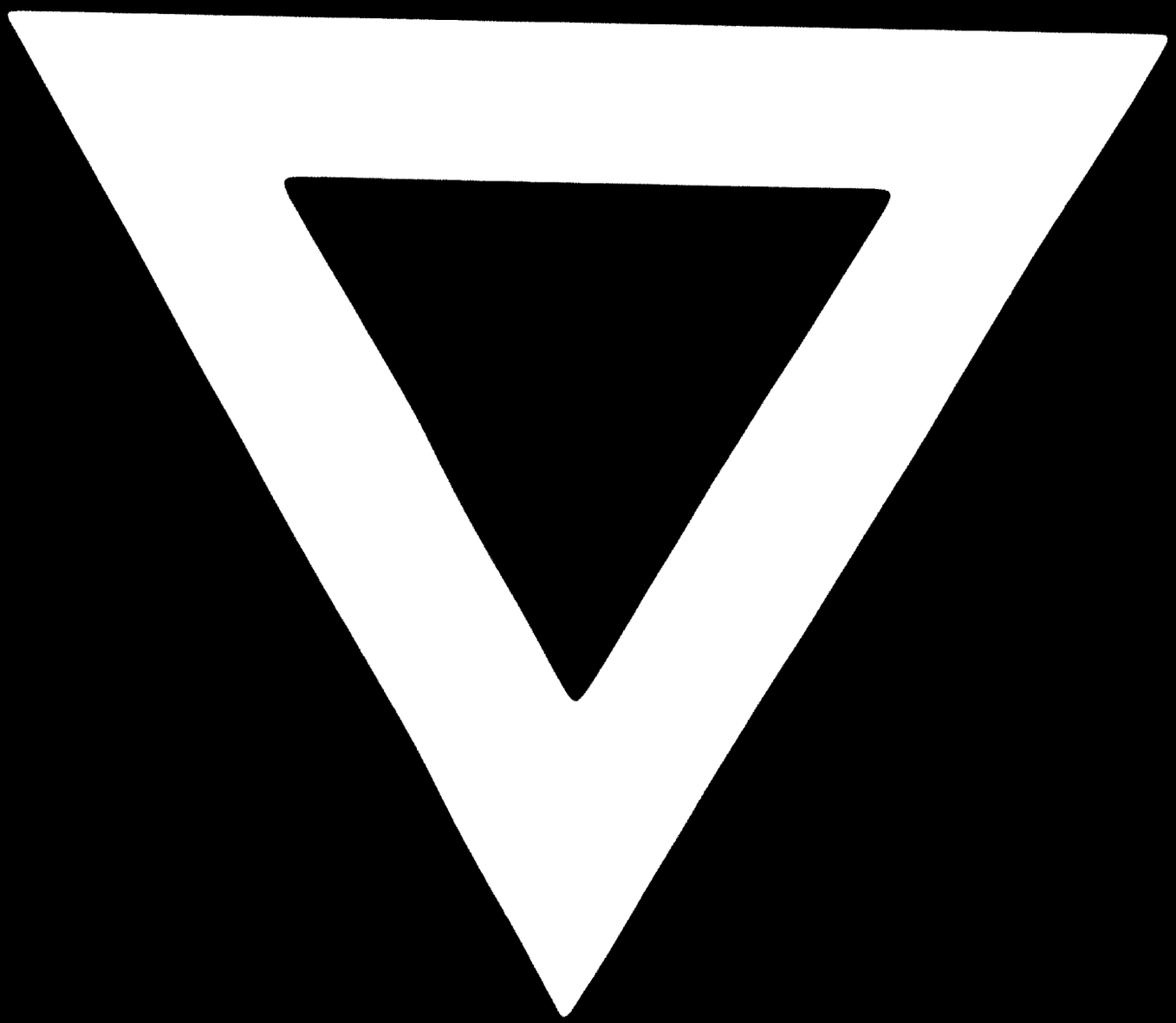
A sum of £N 1.5 million is being made available for necessary advance publicity and the minor road works that would be involved [2].

---

1) Nigerian Tribune, June 16, 1971

2) Second National Development Plan 1970-74

I-513



81.06.10