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THE METALWORKING INDUSTRY IN KENYA ^{1/}

by

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1. INTRODUCTION

Industrialization in many developing countries has begun with servicing and fabrication, processing of agricultural produce, import substitution of consumer goods and simpler types of intermediate and capital goods. At the launching of the Development Plans, Kenya's emphasis had been placed on the development of the agricultural sector. The first plan thus aimed at the agrarian revolution to ensure a better standard of living for the Kenyans. The second plan, however, placed more emphasis on rural development, and the third plan on redistribution through growth.

This shifting of emphasis from one area to another is a result of experience gained on the techniques and approaches of planning as well as the attainment of the previous targets and hence the necessity to place emphasis elsewhere. Kenya has thus come to learn that import substitution cannot improve the imbalances in international trade, create enough employment opportunities commensurate with the magnitude of investments and create a technological base for the adoption and adaption of imported technology. Kenya is now at the take-off stage from the servicing, repairing and fabrication activities to the production of capital goods and services.

Hitherto the industrial activities have been predominantly dominated by fabrication and repairs of bicycles, motor vehicles, railway rolling stock, aircraft, shipbuilding and the manufacture of electrical equipment and construction structures.

Recently the assembly of commercial vehicles has been started and it is envisaged that some component parts will be manufactured locally. Also, there are plans to set up local manufacture of diesel engines, water pumps, electrical motors and machine tools. Once these projects have come up, the engineering industry and the economy as a whole is going to take a completely different pattern of growth.

Whereas agriculture has hitherto been contributing about 14% to total GDP, and manufacturing and repairing 1%, it is envisaged in the present Plan (1977-78) that manufacturing will now contribute 14% as against 12.5% for agriculture. Capital formation in the manufacturing sector is expected to increase by 13.8% in 1978, from 11.5% in 1970.

The need to accelerate the growth of the industrial sector has therefore been identified, as also the policy measures to achieve the objective of accelerated economic growth through emphasis on the manufacturing sector.

This paper, therefore, presents the role played by the metal working industry. It is hoped that before the end of the next plan the contribution by the metal working industry would have increased many fold as new projects in this sector come up.

Note:

As from 1975 the old three digit ISIC code was replaced by the four digit ISIC code. Some items which used to fall under Manufacturing e.g. repair services for railway, road vehicles, electrical equipment, footwear, etc. were transferred from Manufacturing to Services. The figures for 1974 and 1975 are therefore not comparable. Also, items on the trade list which were for trade within the community were not considered as export but rather as transfers or re-exports. These are classified under exports.

All figures for 1976 are provisional.

2. METAL WORKING INDUSTRY IN THE ECONOMY

Engineering Industries not only supply a wide range of non-productive goods for final consumption, but also the larger part of the machinery and equipment that constitute the productive assets of all other industries. As such, they are the tools for production¹. By absorbing new technical and scientific knowledge, the engineering industry creates improved machinery to produce technological transformation and at the same time raise the level of production in other respects. The level of advancement of the engineering industry will thus determine the magnitude and direction of the growth of an economy for it can also be shown that countries with high rates of investment in machinery and equipment, are at the same time those which produce high rates of growth of their national products.

The engineering industry in Kenya has so far been dominated by repairs and servicing, and fabrication. The present plan however anticipated that out of total value added by manufacturing, 30% would be from the engineering industries. Total investment in the engineering industry was to be 20% of the investment in industries. With such ambitious targets it is hoped that the impact of the engineering industry is to be felt more in the form of capital goods production rather than in servicing and repairs.

(1) The Gopa Report on Engineering Industries in East Africa

Looked at from the point of view of the pattern of the growth of the engineering industry, Kenya is now between the second and third stages of industrial development. These stages are broadly:

- i) assembly and maintenance;
- ii) fabrication;
- iii) production of intermediate goods;
- iv) production of capital goods.

The pattern of growth is influenced first by the volume of demand in the local market, and secondly by the supply of raw materials mainly (iron and steel). With the increased standard of living since Independence, the demand for engineering goods has steadily increased. However, the supply of the raw material has not caught up fast enough since Kenya imports all her steel requirements. This has thus dampened the growth of the industry and is reflected in the contribution of the metal working industry to GDP.

Out of the total of K.f 1,029 million GDP or value added in the whole of the economy in 1975, industry contributed about K.f 626 million, while the metal working industry contributed about K.f 25 million (see Tables A,B,C,D)

As percentage values, the contribution to GDP by industry and the metal working industry has been as under:

	1973	1974	1975	1976
Industry	13.4%	14.4%	13.3%	12.9%
Metal working	2.6%	2.9%	2.4%	2.3%

The drop in the output in 1975 is attributed mainly to the fact that some of the activities which formerly fell under Manufacturing and also under the metal working industry were switched over to services as explained in the note under the introductory chapter. It can be seen, however, that as a manufacturing activity, the metal working industry is expanding.

TABLE A

Totals for Economy ('000)

ITEM	1973	1974	1975	1976
Value added GNP	750,000.0	900,000.0	1,030,000	1,300,000.0
Employment *	860.0	960.0	950.0	1,009.0
Imports K/£	230,600.0	390,000.0	360,000.0	41,000.0
Exports K/£	181,000.0	240,000.0	240,000.0	250,000.0
Capital Formation K/£	NA	204,000.0	240,000.0	300,000.0

Sources: Statistical Abstract and Economic Survey 1977

* Persons engaged

TABLE B

Totals for Industry ('000)

ITEM	1973	1974	1975	1976
Gross output K/£	370,000.0	500,000.0	630,000.0	760,000.0
GDP K/£	99,600.0	130,000.0	137,000.0	160,000.0
Employment *	74.0	82.0	83.0	88.0
Imports K/£	29,000.0	49,000.0	33,000.0	490,000.0
Exports K/£ **	28,000.0	39,000.0	35,000.0	44,000.0
Capital Formation K/£	N/A	30,000.0	31,000.0	44,000.0

Sources: Statistical Abstract and Economic Survey 1977

* Wage employment

** Processed

TABLE C

Totals for Metal Working Industry (£'000)

ITEM	1973	1974	1975	1976
Gross Output K/£	50,000.0	60,000.0	75,000.0	83,000.0
GDP K/£	20,000.0	27,000.0	25,000.0	28,000.0
Employment *	25,000.0	27,000.0	25,000	26,000
Imports K/£	28,000.0	47,000.0	34,000.0	50,000.0
Exports K/£	1,200.00	9,800.0	6,900.0	19,700.0
Capital Formation K/£	2,200.0	3,000.0	2,600.0	3,000.0
No. of Establishments **	N/A	N/A	324	247

* The figures given here are not in thousands

** Of which about 1,200 is by Leyland (K) Ltd.

TABLE D

Metal Product Based Industries (K/£'000)

Item/Industry	1973	1974	1975	1976
Metal Working machinery	813	1,198	1,342	1,291
Railway rolling stock	2,737	585	1,095	503
Buses, trucks, lorries	3,499	7,168	9,540	10,404
Bicycles	47	579	37	45
Iron and steel	14,681	27,766	15,026	27,538
Non-ferrous metals	2,403	4,677	2,565	3,224
Nails, nuts, rivets, screws	367	516	782	1,265
Hand tools	949	1,574	2,011	2,641
Domestic utensils of base metals	92	132	132	222
Locksmiths ware	150	521	146	596
Metal containers	596	1,366	200	886
Wire products	1,131	548	531	818
Total Imports	27,174	46,630	33,407	49,433
Total Exports	1,174	9,745	6,876	19,159

.....

Contribution to GDP was therefore K.f. 25 million in 1975 and is expected to be K.f. 28 million in 1976, which is about 10% of the total capital formation in the whole economy. The growth rate between these two years is about 13.4%.

Employment

One of the major problems facing developing economies is that of employment. Kenya experiences both unemployment and under-employment problems caused mainly by the high rates of population growth which have outstripped the rate of employment creation. Out of a total population of about 13 million, Kenya's economically active population is estimated at 6.6 million (1976). 14% of these or about 914,700 were engaged in the modern sector while a further 306,000 were receiving secondary or higher education, and the remainder were either in urban areas seeking employment, working in the rural areas on small agricultural holdings or engaged in informal sector activities.

In 1975, there was a 1% decrease in numbers in paid employment. However, in 1976, paid employment in the private sector increased by 5.1% and 4.1% in the public sector. Table 1 below gives wage employment by major sector. In 1975 total people receiving wage employment were about 819,100. Of these 25,287 were engaged in the metal working industry. This industry thus employed about 3.1% of the total wage employees in the economy or about 30.5% of the total number of people employed by industry (industry employs about 8.7% of the total wage employment).

Imports and Exports

As mentioned earlier, most developing countries started industrialization by import substitution and this has been the case with Kenya. As output increased the percentage increase in imports decreased. Imports with the metal working industry as a percentage of total imports by the economy has been about 12%. Exports have been about 4% of total exports by the economy.

In terms of foreign trade therefore, the performance of the metal working industry has been rather poor. The important role to be played by this industry assumes even greater significance when one considers that this industry is the basis on which industrialization depends. No country can become industrialized without first developing her engineering industry.

Table 1 Manpower Employment in Major Sectors 1973/76 (1000)

	1973	1974	1975	1976	Annual percentage change	
					1974/1975	1975/1976
PRIVATE SECTOR						
Agricultural and Forestry	220.6	213.7	199.8	197.7	-8.4	1.0
Rest of private sector	241.8	282.5	280.9	301.1	-0.6	7.9
Total	462.4	496.2	476.7	500.8	-3.9	5.1
PUBLIC SECTOR						
Total	298.9	330.1	342.4	356.4	3.7	4.1
Total	761.4	826.3	819.1	857.2	-0.9	4.7

Source: Economic Survey 1976

3. PRESENT STRUCTURE OF THE METAL WORKING INDUSTRY

The metal working industry is studied under the following headings:

- A. Metal products excluding machinery and transport equipment;
- B. Electrical and non-electrical machinery;
- C. Transport equipment.

A. Metal Products

In this group is included the following activities:-

- Basic metal industries;
- Manufacture of cutlery, handtools and general hardware;
- Furniture and fixtures of steel;
- Structural metal products;
- Fabricated metal products.

(a) Output

The output by the above five activities totalled some K.f 25.9 million in 1973 and this grew to K.f 41.6 million in 1975. As can be seen from Table 2, the largest activity was fabricated metal products which contributed about 54.1% in output by these activities. Most of these activities are discussed in Annexure 1-IV 1973/74 and from the way they are performing now, much is to be admired in their rapid progress. As far as the metal products (A) is thus concerned, Kenya is soon going to be self-sufficient. Apart from the basic metals whose development lags behind mainly because of the absence of ore in Kenya, the strides taken by the manufacture of cutlery, handtools, and general hardware, furniture and fixtures of steel, structural metal products and fabricated metal products, have been quite impressive. Kenya has now reached a stage where she has become an exporter of these items. Tanzania and Uganda are her main markets and will still remain so. There is also exports of these items to Ethiopia, Zaire, Rwanda, Sudan etc. as most of the manufacturers revealed during the survey.

This picture would have been even more attractive if there did not exist problems of marketing, financing, policies technology etc. which are discussed later. These have tended to keep the progress of the metal working industry and indeed that of the whole economy behind.

Table 2: Output of metal based activities (K.f. '000)

	1973	1974	1975	1976 *
Basic metal industries	7,820.7	11,622.7	11,999.4	17,188.4
	(400.2)	(485.9)	(333.2)	(382.5)
Cutlery, handtools etc.	435.2	537.9	348.3	399.4
Metal furniture	2,132.6	2,646.0	3,132.6	3,434.9
Structural steel	1,401.1	3,073.1	2,628.1	2,700.3
Fabricated metal products	14,004.1	21,978.6	23,649.7	27,754.8
Total	25,863.7	39,859.3	41,758.1	51,477.8

* Provisional

Source: Central Bureau of Statistics

Note: Figures in parenthesis represent public sector contribution

B. Electrical and Mechanical Machinery

a. Output

This group alone contributes over 24% of the total output of the engineering and transport industry (excluding the related metal works industry). In this group are included the following whose outputs are shown below:

- Electrical machinery
- Non-electrical machinery

Table 3: Output of Machinery Manufacture (K.1'000)

	1972	1974	1975	1976*
Electrical machinery	8,566.8	15,439.3	15,201.6	17,156.1
Non-electrical machinery	5,802.6	5,885.7	4,196.8	4,433.9
Total	14,369.4	21,325.0	19,398.4	21,590.0

* Provisional

Source: Statistical Abstract.

The electrical machinery has contributed the higher proportion in output in this subgroup. This is typical of a developing country since electrical machinery requires relatively lower technical skills than non-electrical machinery, and the investment in electrical machinery is lower.

Electrical Machinery

The sector study on electrical machinery, apparatus, appliances and supplies for Kenya was carried out and a report published by ISPC in 1974. The report states that a large variety of products under this heading are mainly designed to meet the needs of the producer as well as the consumer, especially the consumer living in the relatively advanced agglomerations and in the urban centre.

Four broad groups of industry in this activity are distinguished below:

- Manufacture of electrical industrial machinery and apparatus (e.e. electric motors, transformers, switch gear and switch board apparatus);

- Manufacture of radio, TV, and communication equipment and apparatus (e.g. radio, television receiving sets, wire and wireless and telephone and telegraph equipment);
- Manufacture of electrical appliances and housewares (e.g. fans, vacuum cleaners, floor waxes and polishers, hair dryers and hot water heaters);
- Manufacture of other electrical apparatus and supplies (e.g. insulated wires, cables, storage and primary batteries, wet and dry coils, electric lamps and shades).

To quote from the report, a UNIDO report in summation concludes " the electrical engineering industry as a whole is not an easy one to establish in a developing country". In view of Kenya's commitment to early and rapid industrialisation, meaningful growth of the electrical sector will depend, among others, on how many of the country's limited supply of senior level technical and managerial leaders can be spared from other higher priority national development responsibilities. Then will also follow how soon such co-ordinators and their staff can assimilate the highly sophisticated know-how to compete on the international scene in planning, financing, and implementation of export generating operations. Here is where research and development comes into play for it forms the basis for effective international competitiveness.

Following the usual trend of developing countries, Kenya began the electrical activity on the basis of import substitution. Since the basic need was therefore, that of substitution, this industry did not start an engineering industry and is even now in the initial stages of assembly of items from imported components. The main activities are in the assembly of switchgear, switchboard apparatus, radio and TV and telephone and telegraph equipment.

There is now facility in Kenya for the manufacture of cable wire, from imported copper rod from Zambia which is drawn into various sizes. Heavy insulated wire is also produced. After ten years of operation now, this industry can compete with international firms for wire and cable requirements.

About eighteen units are engaged in this activity. By 1971 (the latest figures available) - employment by electrical machinery industry was 6448. Of these 950 were employed in the private sector i.e. in real activities of manufacture. Public sector activities were mainly services e.g. telephone extensions, or repairs with the Ministry of Works.

By 1974, the number had reached about 1200, it might still be around the same figure now..

Most of the establishments are small size and only one employs between 200-449 employees. Among the smallest are those employing 5-19 employees, and there are 12 of these. The rest (i.e. 5 establishments) are medium scale employing each 50-100 employees.

The activity carried out in this sector is mainly that of servicing. However there are a few units which have now started local assembly and also manufacture of some of the parts for this sector, the major activities are mentioned below by product.

- Manufacture of electrical industrial machinery and apparatus. There is no local manufacture of electric motors. There are plans on the way, however, for manufacturing these. As for transforming equipment Wessot and Company Ltd. of Nairobi manufacture welding transformers. Tai manufacturing Co. Ltd is also manufacturing amplifiers.
- Manufacture of radio, and TV and communication equipment and apparatus is however done by several firms, on assembly basis. These are ARMCO, Allied Electronics, Musicraft, Technical Engineering Services, East African Cables, International Aeradio etc.
- Manufacture of electric appliances and houseware is done to a small scale. ARMCO produces some of the domestic appliances, most of the appliances are however imported.
- Electric apparatus and supplies are also merely assembled. Welrods Limited however, manufacture welding rods for welding applications.

Imports and Exports

Imports of electrical machinery, apparatus and appliances account for a very small proportion of total imports of all commodities into Kenya, about 5-6% between 1970 and 1973 showed a marked increase over the former three years. There was an increase of about 50% in 1973 alone. The largest item was "Telephone and Telegraph Equipment" which was about one fourth of the imported items under this division. Four fifths of the imports of Telephone and Telegraph Equipment was made by Government. Kenya has expressed keen interest to develop the telecommunication system in the country and further increases in imports is thus expected.

There is therefore a case for the studying of local manufacture of these items.

For exports, the largest items are insulated wire and cable, electrical insulating equipment and batteries for flash lights and radio. Exports to Uganda and Tanzania account for about 90% of Kenya's total exports of electrical machinery, a situation which will be altering now.

In terms of electrical machinery and appliances therefore, Kenya is ready to cooperate with any other country to help her in developing this industry. As one readily realizes this is an industry requiring relatively high levels of skills than is now readily available in Kenya. However, most of the firms in this industry have connections with some of the most reputable firms in electrical engineering. There has not, however, been a tangible gesture by any of these multinationals, in establishing local manufacture of the product they offer now for local assembly. The main hinderance is ofcourse the size of the market. There are definitely other African countries who can form a joint community to take up the manufacture of different components in different countries and thus enjoy economies of scale, whose absence now makes it uneconomical for any one country to set up manufacturing all the required electrical equipment. The same case is applicable to non-electrical machinery.

2. Non-Electrical Machinery

Almost all machinery requirement in Kenya is imported. The manufacture of machinery that is carried is mainly in the form of welded fabricated structures on which an imported driver is attached to complete the production process. In such cases therefore, the amount of local content in the final product is mainly very low in terms of value. There is thus facility for manufacturing coffee and tea machinery to the customers' requirement. These tailor-made machinery may require very little in terms of technological skills and sophistication.

Kenya's consumption of machinery is big enough to warrant the studying of the viability of starting up local assembly and probably later on, the manufacture of simple machinery e.g. lathes, drills, grinders, hacksaws etc.

As the saying goes, it takes a machine to produce a machine so will it remain that if Kenya, or for that matter, if any country wants to become industrialised, it requires that it produces the machines which will aid in the transformation

of the economy from the traditional methods of production to the advanced and mechanized methods of production. Cooperation on this activity is much needed. This is an industry which is 'capital shy' and as such private interest is thus low. The Government must thus initiate and take up such projects. Due to the limited market in any one country, cooperation among countries is probably the best way to implementing such projects. For example, there has started the manufacturing of tractors in one of the African countries. These tractors have been tested and proved attractive although some difficulties are experienced in their performance. An agreement, if drawn between the African states will, for example, assist this African country by an assured market. Duplicating a similar project in another country will only result in high costs due to low sales turnover, and thus scraping off the industry.

This is where UNIDO needs to come in and aid the particular country concerned. More conventions like the ACP should be forced to allow the export of products from the African continent to developed countries and the free entry of engineering goods to other African countries.

It is often the case that the product from African countries is generally inferior in quality and yet more expensive. In several instances machinery that is imported to carry out a particular job is not the appropriate one, and several machines where only one was required, are imported at very high costs. This has held back the development of the engineering industry as a whole.

Due to the poor machines used, the product is poor and most of the industrialists do not thus buy locally manufactured goods.

Machine Tools (example)

The population of machine tools in Kenya was found to be about 596. The distribution being as under:

<u>Family</u>	<u>No. of machines</u>	<u>% of total No. of machines</u>
lathes	245	41.0
Milling machines	57	9.5
Drilling	91	15.2
Grinders	80	13.5
Hacksaw	37	6.2
Shapers	41	6.8
Presses	45	7.2

With a woodworking machinery population of about 160, the total machinery population is about 756. The demand for metalworking machines by 1984 would be about 345 and about 115 for woodworking.

If Kenya would thus contemplate the manufacture of machine tools her own market is not large enough to warrant the setting up of a full-fledged manufacturing plant. Now that the Community has broken down, it is not expected that purchase of machinery from Kenya would be encouraged by other former Partner States. How do economic considerations over-rule political aspirations to salvage such situations? It is hoped that in seminars like this ways and means of overcoming these problems are suggested.

Training

I am discussing this aspect under the machinery topic because it is more relevant to the setting up of an engineering industry especially so the manufacturing of machinery. From a survey conducted by the ISPC for the feasibility of establishing a machine tools project in Kenya, it was found out that the skills are not available. Since the role of human skills cannot be eliminated till the country goes for full automation which is not possible in the beginning and which is not desirable for both social and political reasons the human factor is very important in the development of this industry. An attempt is made below to quantify the available skills by giving a rating on an eleven (11) point scale with ten (10) as the optimum required and (0) as no skills.

The rating has been estimated for various trades as given below:

a) Skills

<u>Job</u>	<u>Rating score</u>	<u>Optimum</u>
1. Fitting	4	10
2. Turning	4	10
3. Shaping	5	10
4. Milling	3	10
5. Drilling/Tapping	5	10
6. Boring	4	10
7. Cylindrical grinding	2	10
8. Surface grinding	4	10
9. Pedestal/Bench grinding	7	10
10. Pattern making	4	10
11. Welding	8	10
12. Fitting	5	10
13. Sheet metal working	8	10
14. Lapping/Honning (N/o)	5	10
	<u>Total score</u>	<u>68</u>
		<u>140</u>

b) Knowledge

<u>Area</u>	<u>Rating scored</u>	<u>Optimum score</u>
1. Job knowledge	4	10
2. Machine features, facilities, capacities	6	10
3. Operation, cutting, parameters, specification etc.	3	10
4. Inspection and quality control	4	10
5. General engineering and workshop practice	3	10
	<u>20</u>	<u>50</u>
 Grand Total	 88	 190
	<u>---</u>	<u>-----</u>

or 88/190 = 46%

Availability of skills works to 46% against the optimum desirable for running this particular industry. The gap i.e. 54% has to be bridged and this requires intensive training. There has yet to be developed an industrial mentality in the minds of the Kenyan labour force before the engineering industry can be expected to produce more output to the national economy.

Kenya is taking this opportunity to present before UNIDO the specific request for a training centre to train the local people on engineering and workshop practice, a practical oriented centre which should incorporate a research and development (R/D) wing.

C. Transport Equipment

This group consists of the following activities:

	<u>ISIC</u>
- Shipbuilding	3841
- Railway rolling stock	3842
- Motor vehicles and bodies	3843
- Motor cycles and bicycles	3844
- Aircraft repairs	3845

(a) Output

Below is a table showing the outputs of these activities:

Table 7: Output (£'000)

	1973	1974	1975	1976
Ship building	2,158.0	3,851.1	6,561.8	5,681.1
Railway rolling stock	3,339.2	5,880.0	6,150.0	6,455.0
Motor vehicles and bodies	4,400.4	4,410.8	8,838.2	10,138.4
Motor cycles and bicycles	683.2	1,103.4	1,409.1	1,109.1
Aircraft repairs	2,872.4	2,117.4	2,842.6	3,476.4
Total	13,453.2	17,562.7	25,801.7	26,860.0

* Provisional

Source: Statistical Abstract

The repair activities that hitherto had been classified in this category, viz. repair services for railway, road vehicles, and electrical equipment now fall under services and are therefore not included here. Motor vehicles and bodies comprise the higher percentage in this group, i.e. about 34% of the total. This unfortunately is not manufacture of motor vehicles, but mere fabrication of bodies for trucks. However, with the setting up of the three motor vehicle assembly plants, this activity should increase its output considerably.

Growth in output has been as under:

Table 8: Growth in Output%

	1973/74	1974/75	1975/76	1973/76
Shipbuilding	72.7	73.7	-13.6	37.0
Railway rolling stock	78.8	5.1	4.8	24.0
Motor vehicles and bodies	0.2	1.0	14.8	33.0
Motor cycles and bicycles	61.5	27.7	-21.3	17.5
Aircraft repairs	-28.3	33.3	22.0	6.5
Total	28.9	48.3	4.3	25.0

Only one activity in this group is now expanding and this is the motor vehicle and bodies activity. In the agreement drawn between the Government and the three commercial vehicle assemblers a gradual increase in local content added was formulated. By July 1977 importation of certain commercial vehicles was prohibited. Now these come in SKD and some in CKD form. Trucks, landrovers, land cruisers, and vans are now locally assembled from SKD or CKD form and some of the parts that are available locally are used. It is planned that local manufacture of the complete vehicle should be effected after about ten years from now.

There are also plans to start the assembly now being undertaken to assess the viability of assembling selected passenger cars. With the collapse of the Community it is feared that aircraft, shipbuilding and railway rolling stock activities which were done on a community basis, might drop in their output. These have now been taken up by the Government and their performance is yet to be assessed.

PART II

PROBLEMS FACING THE DEVELOPMENT OF THE METAL WORKING INDUSTRY

In Part I, I dealt mainly with the present status of the metal working industry in Kenya and highlighted the development that the different activities in this industry have achieved. In terms of output, the metal working industry has achieved quite attractive rates of growth. In 1974/75, the rate was about 32%. Contribution to GDP also has been growing. It grew from K.£ 19 million in 1973 to K.£ 28 million in 1976, a growth of about 47.4%. Exports achieved the highest growth rate. In 1973 exports amounted to about K.£ 1 million and by 1976, they amounted to about K.£ 19 million or about 1800%.

In spite of such attractive performance, this industry has been faced with, and is still faced with several problems which have to be reckoned with. These problems are broadly divided to fall under:

- Inputs
- Market...refer to Machine Tools example page 16

A. Inputs

Under inputs are those items which are combined to produce the final product. These are:

- human resources
- raw materials
- finance
- technology

1) Human Resources

Labour as a factor of production assumes two roles, first as a co-ordinator of the other factors of production in such a manner as to receive maximum returns at the lowest cost, and secondly as a factor of production itself. Output will thus depend on how the co-ordination or the entrepreneur combines labour and capital in the production process, and on how efficient that labour is.

There is a scarcity of human resources of the managerial cadre as well as other forms of labour that is required in this production process. The engineering industry requires fairly skilled labour in almost all stages of production.

These are in very short supply and this situation exists mainly because first, the African was never trusted with any activity involving precious work, and secondly because the industry in Kenya is still predominated by services and fabrication.

Although this state of affairs is changing now, there is still the problem that the entrepreneur is not managerial material himself and cannot thus combine the other resources at his disposal to optimal use.

After independence, the Asian who had hitherto been a shopkeeper a marketing man - was asked to move from mere commerce to industry. He had never been exposed to managing industry and thus had to start learning by experience, an experience which has been very expensive to the Kenyan economy. Realising that the returns in his new line now were taking longer to materialise and that these returns were not as high as in his former business, he was not prepared to train anyone for this meant extra cost. He thus looked elsewhere for his skilled employees or took up a form of manufacture requiring low levels of skills or which utilised as little labour as possible. The end result was that the local man never got the necessary training, and was employed as a watchman, a messenger, a packaging man, or at best a maintenance and servicing man or a welder.

In a survey conducted by the author, it was found that even until today, most, actually all of the jobs involving precision and accuracy are carried out by foreigners. Since there is a scarcity of skilled personnel everywhere, to have a skilled foreigner here means that he is given an incentive to make him want to work in Kenya than working in his own country, and this is, in most cases a higher pay. This higher pay reflects on the profits which will reflect on the investment. Since the profits are lower, the rate of investment is lower and so is the growth of the whole industry.

The highest skills that have therefore so far been developed by the local people are on fabrication and allied activities and this is especially the case in the welding activity. However, where intricate machining and finishing are concerned, the story is quite different. Most of the machine operators do not understand what is involved and in many cases use wrong machines for the wrong type of job.

The main problem here therefore, is that of training. There is need for a national training centre for the polytechnics and the industrial vocational institutes that are there are not enough to supply the required number of personnel required by this industry. Although I have seemed to imply that the servicing activity is well taken care of, in terms of trouble - shooting however, the local people are generally unable to cope with this problem. One can therefore safely say that the servicing and repairing activities have not been perfected as yet. This should not however undermine the fact that technicians and indeed the metalworking industry in Kenya is one of the best in developing Africa.

ii) Raw Materials

For a country to develop an industry whose raw material inputs is not a natural local resource is a very expensive exercise. However, countries like Japan which offer the lowest prices for steel and yet have no iron ore do throw a challenge to developing countries and to the validity of the argument of natural comparative advantage. Kenya has no exploitable ores and she depends on imports for all her steel requirement. The ore deposits at her coastal region have not been tested, and as such, Kenya will remain an importer of her steel requirements for some time.

In Part I of this paper I brought out the fact that the metal working industry has developed quite appreciably except for the Basic Metal activities. This is an activity which needs to be developed so as to feed other activities with the necessary inputs in the form of steel. Kenya is therefore now considering to enter into a regional cooperation with a sister African country with ore, to set up an integrated steel project to feed the ready market in Kenya. The problem of other ferrous raw materials like Ferro Manganese, Ferro Silicon etc. will however, persist and due to the high costs of importing these, the industry as a whole becomes as expensive one to set up.

iii) Finance

Probably one of the major factors contributing to low rates of investment and hence low rates of growth of the economy is finance. Given the multiplicity of demand for financial resources and the limited availability of finance, there arises a problem of allocation of resources. Priorities are therefore set and these are in most cases those that meet the basic human demands. Given the limited availability of resources and the numerous projects competing for these resources, it is only those industries with high rates of economic returns that are considered and are thus given funds. Soft loans and probably grants for development could be made available for the engineering industry for although its rate of return is low the social benefits and the consequent multiplier effects are very high. Such funds could be also utilised for carrying out studies to identify potential areas of investment, a normally expensive exercise for developing countries.

iv) Technology

Much has been written and talked about with respect to technology. Several international forums have been organized by UNCTAD/SIDA and UNIDO to discuss this very fundamental tool for development. The transfer of technology is a subject most developed countries do not want to discuss and it remains for the developing countries to take the initiative in seeing to it that the transfer is effected.

The problem here is not availability of technology. There is technology available in most developed countries, and it is there for the asking. But the main problem is the identifying of the appropriate technology, a technology that can be adopted and adapted to suit the conditions and requirements of a particular country.

The services provided by the UNIDO Industrial Enquiry Service have been of great significance to Kenya. Further the centre in which this paper was prepared is sponsored by UNIDO. Expertise facility is thus provided to aid the country in industrial and other related matters, but a centre to break down a package and offer the necessary advice on the choice of technology is nowhere, and this is what is most needed.

Faced with the problem of employment and scarcity of funds it becomes of great significance that the best methods of production are used. I refer to the recently constructed weighbridge stations in Kenya which cost the country a lot of money. Recently it came to our attention that a cheaper and easier to use device had been constructed in some country. Had this information been available surely, it would have meant great savings in money to the country.

To sum up, the following are suggestions made for the consideration of UNIDO in assistance in developing this industry.

Suggestions

- (a) A training centre for the development of technical and engineering skills. This centre should be set in a country to train the people on the engineering and workshop practice. Personnel to run such a centre could be provided through the services of UNIDO.
- (b) A central information centre for collection and dissemination of information on technology. African and developing countries for that matter could thus be able to get information on the alternative available technologies and also be advised on the best appropriate technology on request. This centre should also collect information on the availability of technology in developing countries themselves. Participating countries could be encouraged to have a small centre in their own country to make available to the central information centre what is available in the particular country, and this centre could work hand-in-hand with the training centre for research and development of local skills.

- (c) Assistance in the form of grants in aid in developing the engineering industry. Aiding in the setting up of industrial engineering estates and encouraging of precision work and quality consciousness in the minds of those that take up such projects in these estates.

ANNEXURE I

1. BASIC METAL INDUSTRIES

1.1 Kenya Railways

With an installed capacity of 5,000 tonnes per annum for ferrous casting, the Kenya Railways has one of the best foundry and machine shops in Africa. There is also available facility for brass casting of 820 tonnes and 60 tonnes of aluminium per year. Most of the activity carried out here is for the Railways' use. For ferrous casting the following is undertaken:-

- about 925 tonnes of brake block quality cast iron
- about 289 tonnes of cylinder quality cast iron
- about 59 tonnes of ring quality cast iron
- about 28 tonnes of steel

The foundry is a general jobbing foundry divided into the following two main areas:-

- i) Non-ferrous section capable of producing non-ferrous castings in a variety of specified bronzes, brasses and aluminium of up to a weight of 100 kg.
- ii) Centre bay section; this is a ferrous section capable of producing cast iron in various grades of castings of upto 9 tonnes in weight. There is also a Tropanas converter capable of producing low quality steel castings of upto a weight of 0.6 tonnes
- iii) Mechanical section; a cast iron section capable of producing repetitive items of identical items of upto a weight of about 20 kg.

The second section is for moulding and this comprises the following:-

- i) Green sand moulding;
- ii) Shell moulding produced on three pattern moulding machines and one core machine used in good quality finishing;
- iii) Synthetic sand moulding for large castings which also require a good finish.

1.2 E.A. Foundry Works

With a capacity to produce 850 tonnes of cast iron, about 4 tonnes of bronze and about 2.5 tonnes aluminium per annum, E.A. Foundry works specialises in cast iron, brass and aluminium moulding works, and undertake the castings for heavy duty man-hole covers and other heavy duty engineering activities, like the casting of gears and pulleys for customers who might need them.

1.3 Enco Steel Works (K) Ltd.

Using 100% scrap, this company has a 5 ton per day electric arc furnace and makes their own billets for hot rolling in their rolling mill.

1.4 KUSCO

Kenya United Steel Company have a 4 ton oil fired arch furnace and use both scrap and imported billets.

1.5 Rubani Engineering

Equipped with a cupola and a small non-ferrous furnace, Rubani Engineering undertake quality diecasting of aluminium and brass

1.6 Kenya Castings

Kenya Castings have a small but very good foundry equipped with an oil fired rotary furnace with pre-heated blast of air. They also have two pneumatic moulding machines wherein they use aluminium patterns for jobs requiring good finishes.

1.7 Steel Foundry (K) Ltd.

Using about 50% scrap and 50% imported billets SFL are equipped with a casting capacity of about 1200 tons of cast iron.

Most of the activities undertaken in the basic metal industries are ferrous. The non-ferrous activities have however to be developed and the possibility of setting up a non-ferrous plant for the manufacture of fittings is being studied. The total number of people employed by the basic metal industries is about 2,000. The work they do does not require high standards of skill, and most of those employed are local people and possess primary and intermediate levels of education; the supervisors are in most cases of Asian origin. Skills are easily acquired and there is growing up a class of people with foundry practice and skills who would be very useful when the engineering industry is in full swing.

2. MANUFACTURE OF CUTLERY, HANDTOOLS AND GENERAL HARDWARE

This is one group of items whose production has progressed well in Kenya. There is however scope for developing this activity further. The Directory of Industries (1974) lists the following major firms under this heading.

2.1 Interproducts Kenya Ltd.

Owned by Nacet, Interproducts manufactures stainless steel razor blades as well as carbon razors. They have an installed capacity to produce about 50 million pieces a year but due to the small size of the market, they produce about 15 million pieces a year. The steel coils are imported and what is done is the punching, sharpening and packaging of the razors. The activity is highly mechanised and about 15 people are employed.

2.2 Wilkinson Sword Ltd

A subsidiary of Wilkinson Sword (Britain) this firm undertakes the same activity as Messrs. Interproducts and produce about 18 million pieces a year though they have an installed capacity to produce about 26 million pieces which is about the size of the local market at present. About 40 people are employed and production is both for the local and export market.

2.3 Kipchorian Farmers Co-op Society

Currently under the K.I.E. Nakuru, this firm produces cutlery items. Table and bread knives, forks and spoons are produced in this factory employing about 50 people. Most of the clientele have been hoteliers whose need for an item that is cleaned with much ease has caused some problem to this firm which started off with the production of cutlery with engravings. However, these lead to the lodging of food particles which require careful and long washing to keep clean. A reduction in turnover could be experienced by this firm, explained primarily by this as also by the fact that most people prefer imported items to locally manufactured ones; an attitude which will take time to change.

2.4 Sansows Kenya Ltd.

Owned partially by Sandvik East Africa (Ltd) this firm manufactures circular saws under the Kenyan Industrial Estates. This firm imports spring steel which it tooths and if required sharpens. Only three people are employed in this firm.

2.5 Kenya Engineering Industries

This is a firm under the Kenya Industrial Estates (Nairobi) which produces both hardware and hand tools. For tools, they produce pangas, shovels, screw drivers (both plain and starred). They also have started the manufacture of padlocks and mortis locks for doors and cabinets. The output of this firm is about 1.5 million locks, 1 million pangas, 1/2 million shovels and about the same number of rakes.

2.6 Datini Mercantile Ltd

Formerly owned by Italians, this firm makes about 100 wheelbarrows a day. The wheels are now made from rubber while the other body is of a metal base. About 150 people are now employed in their new factory. Another line wherein Datini have entered is the manufacture of gas cookers. They make about 300 units of table cookers and about 100 units of cabinet cookers per month. All the parts are made locally except for the knobs, the thermostat and the burners.

ANNEXURE III

3. METAL FURNITURE AND FIXTURES OF STEEL

Apart from several units which operate according to the seasonal market requirements, there are about five major units which undertake the manufacture of metal furniture and metal beds.

3.1 Silentnight (K) Ltd

Employing about 50 people, this firm makes about 3,000 mattresses per month. They import wire coils and have machines for mesh making and spring making. They also make metal beds. With the setting up of local assembly of commercial motor vehicles, Silentnight is now supplying the three factories with seats for the motor vehicles.

3.2 Victoria Industries

Perhaps the largest manufacturers of metal beds in Kenya, this firm manufactures about 10 different types of beds of all shapes and sizes. They also make spring mattresses for both single and double beds. The input is in the form of wire rods and angles. These are then processed in the factory into meshes, springs etc and the angles cut to size and welded to form the beds.

Also, Victoria makes metal chairs and garden furniture and is at present supplying the tourism industry with these.

The other activity undertaken by this firm is that of making sofa sets, wardrobes and dressing tables.

3.3 Pan Africa

Turning out about 400 metal cabinets a month, this firm ranks second after Mecol in the manufacture of office equipment. They also make wheelbarrows on a small scale and have a wooden section where they make beds, dressing tables and wardrobes. They also make safes for customers.

Pan Africa also manufactures metal furniture and hopes to increase their output by about $1\frac{1}{2}$ times in the next two years. The number of people employed is about 150 of which about 50 are on the metal working section.

3.4 Ideal Casement

Employing about 150 people, this firm manufactures window casements, covers for air-conditioners, jembes (hoes) and animal drawn ploughs. This firm employs about 250 people and is one of the largest producers of agricultural implements for small scale farming.

3.5 Mecol Ltd

This is the largest manufacturer of office equipment. They manufacture desks, tables and chairs of metal plastic and wood. It is hard to take out what portion is metal for in many cases a desk for example might be made of metal, wood and plastic, the amounts of each differing from one type to another.

For standard types of office furniture, they make about 2,000 desks, 300 sidetables, 600 cupboards, 2,000 filing cabinets of three different types and two sizes, 2,000 clothing lockers, 4,500 office chairs and a number of utility chairs and tables for schools and offices.

3.6 Kenya Casements

Situated in Mombasa, this firm makes window frames, doors and nuts, springs, pressed steel doors and door frames, rivets, metal beds and furniture, aluminium anodised shop fronts. They recently acquired an extrusion machine of 1,000 tons capacity for window sections which is the first of its kind in East Africa.

ANNEXURE IV

4. STRUCTURAL METAL PRODUCTS

Under this heading is produced a number of varied items and only those industries employing over 100 people are mentioned. There are about 35 units doing the activity falling under this heading:

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|-----|---------------------------------|--|
| 4.1 | Beeth Manufacturing Africa Ltd. | Fire fighting equipment, styropor products, pre-fabricated buildings, system housing. |
| 4.2 | Harts and Bell | Light and heavy steel structure, steel ingots and pellets. |
| 4.3 | Industrial Plant (E.A.) Ltd | Stainless steel and aluminium tanks, vats pressure vessels, tankers, fabrication of plant and vessels. |

Other products falling under this heading and which are locally produced include petrol tanks, road tankers, iron sheets, trunks, silencers, exhaust pipes, gutters, storage tankers, buckets, drums, buglar proofing, trusses.

ANNEXURE V

5. FABRICATED METAL PRODUCTS

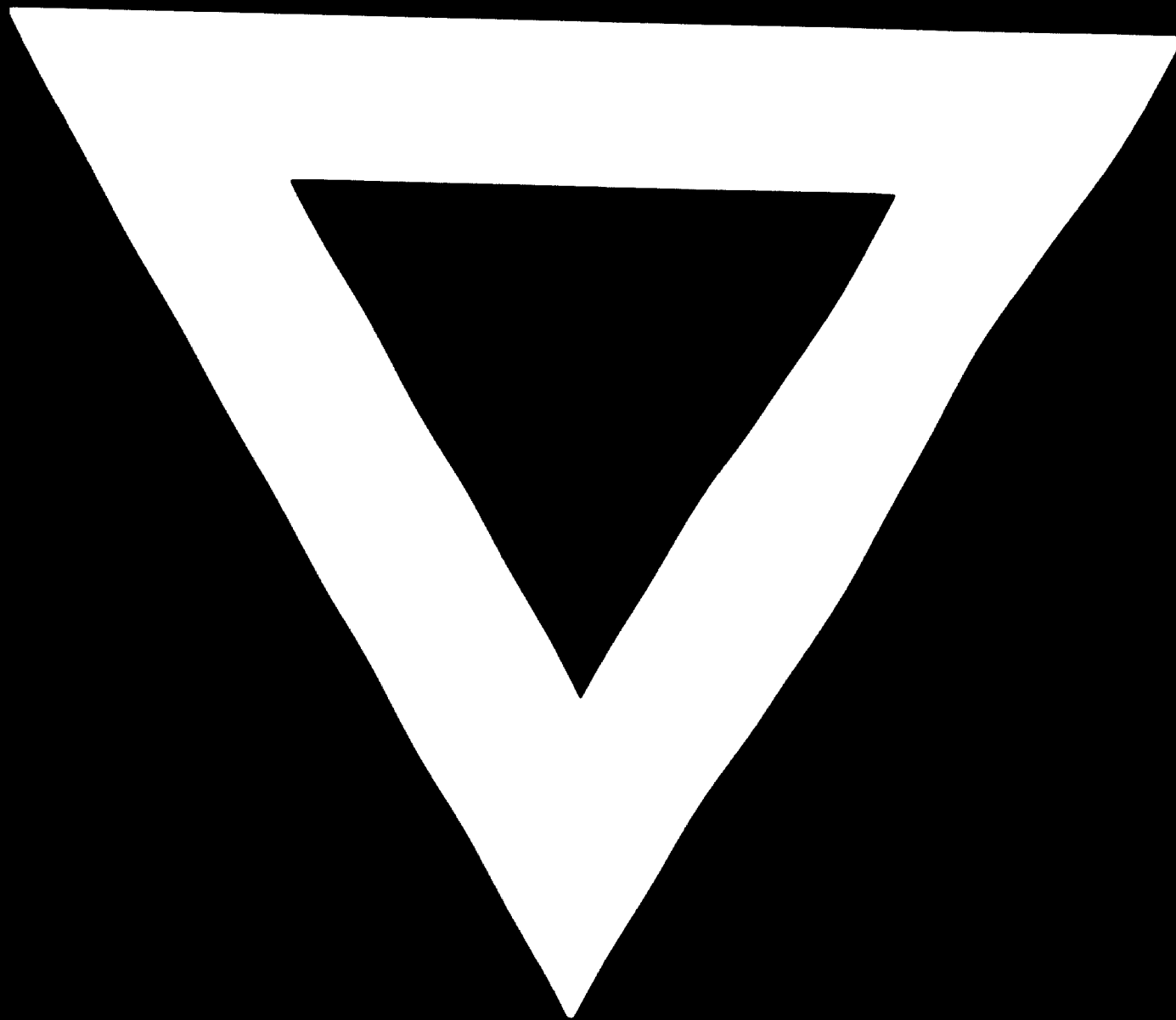
This heading includes also other metal products which have not been mentioned elsewhere. A total of about 60 units existed in 1974. Some of these have ceased production while others have come up. Here also it is only those units which employ more than 100 people that are mentioned.

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|-----|------------------------|--|
| 5.1 | City Engineering Works | Dustbins storage tanks, hot water cylinders, buckets, street light columns, angles and sections. |
| 5.2 | Kalwerks Ltd | Alluminium holloware, enamel holloware, steel karais, electric kettles, pressure cookers. |
| 5.3 | KUSCO | Iron bars, nails, nail wire, welded mesh, roofing nails, barbed wire, panel pins. |

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|-----|--|---|
| 5.4 | Main A.J. and Co.Ltd | Steel (for aeroplane shades) bridges, steel roofs. |
| 5.5 | Steel Construction and Petroleum Engineers (E.A) Ltd | Storage tanks, pressure vessels, pipe works, bridges, steel structures, castings. |
| 5.6 | Van Leer Containers (E.A) Ltd | Steel drums, pails, kegs, cylinders. |



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