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Olatunji O.

Federal Institute of Industrial Research (FIRO), Lagos.

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INVESTMENT IN SOAP PRODUCTION

BY

DR. O. OLATUNJI*



Dr. O. Olatunji

INTRODUCTION

Soap is a popular washing and cleansing product. It is commonly used for hygienic purposes especially in the cleaning of both domestic and industrial materials. Soap is an indispensable product in day-to-day living which has made its demand compulsory and constantly high in homes and industrial environments. Hence, this emphasizes its importance to the human community in particular.

Soap production business is in the group of industrial ventures that could easily be operated on a small scale to boost the country's economic development. The relatively low capital outlay, when compared with other production ventures, simplicity of production technology and its enormous usefulness has endeared the project to prospective investors. Currently, established soap businesses have contributed to the entrepreneurial capabilities of Nigerians, enhanced income

generation, reduced unemployment and upgraded living standard (Koleoso, 1990).

The present democratic government, in its efforts to encourage local production has prohibited the importation of soap products. Also, soap production business is one of the major projects proposed for sponsorship through the skill acquisition scheme of the Federal Government's National Poverty Eradication Programme. Other current relevant policies put in place by the government include: the establishment of Nigerian Bank of Industry (BOI) charged to make loanable funds available to the industrial sector and the Small and Medium Industries Equity Investment Scheme (SMIEIS). These are to ensure that Nigerians reap greater dividends of democracy through industrial development.

THE PRODUCT

Soap, a metallic salt of high molecular fatty acids, is obtained from the chemical reaction of fats and oils with caustic alkalis called Saponification (Nwosah, 1986).

In the past, Soap was produced by traditional methods. Though crude, the resultant product serves the same purpose as modern

soap. Unlike the traditional methods which use unrefined palm oil and ash, the modern methods use refined fats and oils, caustic alkalis (for better finishing) and additives such as dye and perfume, which are added to improve the appearance and odour of the soap.

Soap can be broadly classified based on the uses to which it is to be put, hence, we have toilet and laundry soap. This implies there are soaps specifically for washing / laundry purposes while some others are for bathing / toilet purposes. The toilet soaps can be further grouped into ordinary toilet soap, medicated and black soaps. Unlike detergents which are in powder and liquid forms and are produced from petro-chemical products, soap is produced from natural fats and oils and are generally in solid form. These characteristics of soap make it possible for it to be used in cleaning the skin and for other purposes for which detergents are unsuitable.

It is important to note that the technology of soap production varies from one class to another. For example, toilet soaps are produced with more ingredients suitable for skin care and have attractive shapes, colours and packaging. Consumers appreciate their worth in spite of their higher prices compared with laundry soaps. On the

**Dr. O. Olatunji is the Director General, Federal Institute of Industrial Research FIIRO Oshodi, Lagos.*

other hand, laundry soap is relatively easier to produce, needs little finishing and has cheap and simple packaging.

MARKET INFORMATION

Generally, of all the consumables commonly purchased for use, soap occupies a prime position since it is put into uses in everyday activities. A normal daily routine starts by taking a bath with soap, putting on clothes washed with soap, going to places of work or businesses where one use or the other would be found for soap. Soap is used in homes, schools, hospitals, hotels, offices, industrial set-ups, e.t.c.

There are strong and obvious indications that a large domestic market for soap exists within the country. The country's teeming population, estimated at 120 million, lends credence to this facts. A past survey revealed that the average family of 8 members uses four and two tablets of soap for washing and bathing per week, respectively. This gives an estimated yearly national demand of 3,120 million tablets of laundry soaps and 1,560 million tablets of toilet soaps (Adeyemo, 2002).

In the early 80's, soap was majorly supplied into the Nigerian market by the multinationals such as PZ, Lever Brothers, etc. which produce brands like 'Lux', 'Canoe', 'Key soap', 'Premier'; and detergents such as 'Elephant', 'Omo', 'Tempo', e.t.c. Aside from the multinationals there are currently various local producers and suppliers of both laundry and toilet soaps

all over the country. Hence, the presence of 'ST', 'Okin', 'Happy day', e.t.c. of laundry soaps and 'Mojees', 'Enkalon', 'BBB' etc. of toilet soaps in the market (Oyeku and Kupoluyi, 2001). This results largely from the breakthrough recorded by the Federal Institute of Industrial Research, Oshodi (FIIRO) in the formulation of laundry and toilet soaps and development of machinery for them. The technology has been transferred to numerous Nigerians till date. Between 1986 and 1999, 830 prospective investors had acquired the technology from the Institute (Kupoluyi, et. al. 2004)

The recent ban on soap importation into the country is to curtail the flooding of the market with imported brands such as 'Medisoft', 'Movet', 'Glitze', all from Indonesia and 'Narce' from England, etc. (Oyeku and Kupoluyi, 2001). Before this ban, 14,726,028 tonnes of soaps (toilet and laundry) were imported into the country in year 2000 alone, at a staggering value of =N=1,358,692,860 from countries such as Chad, Benin, Ghana, Jordan, Japan, Thailand, United Kingdom, United States, Italy, China, Spain, e.t.c. (FOS, 2001). The importation of soap into the country shows a supply-demand gap which could be filled by new entrants into the business, while the ban on importation of the product would ensure the survival of local industries. Prevalent colours among toilet soaps are brown, pink, purple, green and white for some imported ones, while blue and green colours are very common among

locally produced brands. The laundry soaps are generally green and yellow in colour. The shapes take various forms such as ovals, round, rectangular for toilet soaps, while laundry is generally rectangular. Toilet soap brands have sizes ranging from small (90-100g), medium (120-140g) to big (200-250g) (Oyeku and Kupoluyi, 2001).

Usually, toilet soaps are attractively packaged, especially multinational and imported brands, while the packaging employed by local producers are generally of lower quality than the former.

Export potential for soaps is very high, as the ECOWAS sub-region serves as a ready market for locally produced soaps. Hence, indigenous entrepreneurs are hereby encouraged to invest in soap production both for the domestic market and to earn foreign exchange.

The immediate outlets for soap (toilet and laundry) in the domestic market are major markets in towns and cities, supermarkets, departmental stores, schools, laundry houses, industries, catering centers, e.t.c.

RAW MATERIALS FOR SOAPMAKING

The raw materials for soap making are common and are generally available on the shelves in chemical stores. The principal raw materials are: saponification oils, caustic soda, soda ash, sodium silicate, sodium sulphate, colourants, perfumes and some other additives, depending on the type of soap to be produced and also on the

method to be used, either cold or hot process.

The Oil

Both vegetable oils (e.g. Palm Kernel Oil [PKO], Palm Oil, Coconut Oil) and animal oils (e.g. Lard, Tallow, etc.) are used in soap making. Good laundry and toilet soaps can be made from vegetable oils, but in some cases especially for toilet soap, a mixture of both vegetable and animal oils are used to obtain soap of better quality. In Nigeria, the most common oil used in soap making is PKO, which is produced locally but large quantities are still being imported to compliment local production (Table 1).

An oil with good taste and odour is considered good for soap making rather than a rancid oil with unpleasant odour. Rancidity is a chemical reaction that takes place when the oil is over-exposed to atmospheric oxygen (air) due to long storage. It is an oxidation reaction that leads to reduction in the fatty acid content of the oil, thereby leading to incomplete reaction between the oil and the caustic soda. Due to insufficient fatty acid, the soap produced from rancid oil retains unreacted caustic soda, making the soap unfriendly to the skin and even fabrics. A good oil must be free of unpleasant odour, water and dirt. Some chemical tests useful in determining the quality of oil for soap making include: free fatty acid or acid value test, saponification value, peroxide value and iodine value. Palm Kernel Oil is available for instance at Real Vegetable Oil Limited, Ojota, Lagos and many other oil mills

across the country.

Caustic Soda

Caustic soda is the common trade name for Sodium Hydroxide (NaOH). It is an important raw material for soap making. Currently, the local demand for caustic soda is met through importation, as there is no local production (Table 1). Caustic soda must be added in the right proportion in accordance with the soap formulation, as excess or insufficient quantity mars the quality of the soap produced. Excess quantity leaves unreacted caustic soda on the soap, while insufficient quantity leaves excess oil on the soap, thereby reducing the foaming ability of the soap.

Soda Ash

Soda Ash, otherwise called "Washing Soda," is a common foam booster used in soap making. Although commercial production of Soda Ash has not started in Nigeria, a great potential exists for its local production from "Trona" a mineral deposit found in large quantities especially in Borno State. Both dense and light soda ash could be used in soap production depending on the type of soap to be produced. Insufficient soda ash in soap production produces soap of little foam, while excess of it will make soap brittle and harsh on the skin and fabrics. A quick test to determine good soda ash is to dissolve it in water. A good one dissolves slowly, while the bad one dissolves instantly. Local demand for soda ash is met through importation (Table 1).

Sodium Silicate

Sodium Silicate is also called "Water Glass". When used in soap making, it functions as a hardener and cleanser. Sodium Silicate is produced locally from silica sand and soda ash. The local production is complemented by importation (Table 1). Sodium Silicate can be obtained in both solid and liquid forms, but the latter form is commonly used for soap making. A good Sodium Silicate is transparent to bluish in colour, has a biting sour taste, sticky to touch, dissolves unready in cold water, but dries fast within minutes when the solution is dropped on the floor. Excess sodium silicate makes the soap brittle, soft and harsh.

Sodium Sulphate

Sodium Sulphate also functions as a hardener in soap making. It helps to absorb excess water in the soap. Sodium Sulphate is not produced locally, as such it is imported. It also improves soap appearance, making it to shine. Some local soap makers use table sugar instead of Sodium Sulphate to achieve the same effect. Excess Sodium Sulphate will also make soap brittle, soft and harsh.

Perfumes

Perfumes are added to soap to give it good odour. Perfumes with long lasting odour, which are rather expensive, are normally used for toilet soaps, while cheap perfumes are used for laundry soaps. Common perfumes used for soap making found in the markets are: citronella,

lavendar, lemon, rose, jasmine, avon, H&R, etc. These are imported and are readily available in chemical stores.

Colourants

Colours are improvers which enhance the appearance of the end product. Various colours such as: blue, brown, green, white, yellow and red are added to soaps depending on the type of soap produced. Colourants are imported and are available in chemical stores and the open market.

Others

Many other materials can be added to soaps mainly as fillers and extenders. The function of fillers and extenders

is to increase output, thereby bringing down the cost of production. For any material to qualify as soap filler and extender, it must be chemically inert i.e. it must not react chemically during the course of production, it must be cheap and readily available and must be easy to apply or use. Common examples of soap fillers and extenders are Kaolin, CMC (Carboxymethyl Cellulose), clay, starch, and recently introduced is "garri". It should be noted that for production of high quality soap, fillers and extenders might not

be necessary. Fillers and extenders cannot be used for cold process, but rather for semi-hot or hot processes.

Water

The water to be used in soap production must be chemically and microbiologically clean. Chemical impurities in water could affect soap quality, while some bacteria that survive during soap reaction can be harmful to human body. Physical impurities like clay could impart colour on the soap, thereby marring the desired colour.

Table 1: Importation Figures for Soap Raw Materials

Raw Materials	Year	Quantity (Tonnes)	Value N'000
P K O	2000	44.40	2,435.00
	2001	30.84	2,633.46
	2002	313.34	7,066.01
	2003	12.23	12,054.61
Caustic Soda	2000	147,607.85	2,425,290.34
	2001	1,326.69	108.48
	2002	46,749.98	2,513,684.67
Sodium Silicate	2000	325.76	8,008.00
	2001	3,595.32	126,696.19
	2002	1,893.95	126,106.02
	2003	12,777.39	251,240.52
Soda Ash	2000	61.80	751.00
	2001	14,642.18	759,694.59
	2002	17,473.64	832,998.10
	2003	221,468.05	948,594.90

SOURCE: FOS Trade Summary.

STANDARD ORGANIZATION OF NIGERIA'S (SON) REGULATIONS FOR SOAP

Laundry Soap

The standards for soaps are set by SON. According to SON laundry soap shall be well made, stabilized, uniformly mixed and thoroughly saponified using soda or a mixture of soda and potash, prepared from suitable fats and oils. It shall be white or coloured, compressed in bars or cakes and shall have good lathering and cleaning properties. The following are SON's general requirements for laundry soap (excluding built and filled soap):

- i. Hard laundry soap shall be in bars or cake form.
- ii. It shall be free from objectionable odour both as received and in water solution.
- iii. It shall not have active chlorine or oxygen.
- iv. It shall not contain any visible foreign matter.

- v. It shall possess good lathering and cleansing properties.
- vi. It shall have no injurious effect on the skin.
- vii. It shall comply with the specifications on Table 2

Toilet Soap

According to SON, toilet soap shall be of a high grade, well made, uniformly mixed, stabilized and thoroughly saponified using soda or a mixture of soda and potash prepared from suitable fats and oils. It shall be white or coloured, perfumed and or cakes and shall have good lathering and cleaning properties. The following are SON's general requirements for laundry soap (excluding built and filled soap): compressed in cake form and shall possess good lathering properties. The general requirements for toilet soap are:

- (i) Toilet soap shall be in cake form.

- (ii) The soap shall be free from objectionable odour both as received and in water solution.
- (iii) It shall not contain any visible foreign matter.
- (iv) It shall not break on drying after immersion for one hour at 23°-30°C in distilled water. It shall have good lathering and cleansing properties.
- (v) It shall have no injurious effect on skin.
- (vi) It shall have no injuries effect on skin.
- (vii) The soap shall conform to the requirements of Table 3 when stored under normal storage condition for period of six months.

Table 2: Specifications for Laundry Soap

Characteristics	Requirements (% by Wt.)
Total Fatty Acid	62 min.
Rosin acid of TFM	3 max
Unsaponified Matter	0.2 max
Matter insoluble in water	0.5 max
Free Caustic Alkali	0.1 max
Chlorides as NaCl	1.0 max
Matter insoluble in ethanol	1.0 max
Total Free Alkali as Na ₂ O	0.25 max

The laundry soap shall conform to the requirement above when stored under normal storage condition for a period of six months

Table 3: Specifications for Toilet Soap

Characteristics	Requirements
Total Fatty Acid	76.5 min
Matter Insoluble in ethanol	2.0 min
Free Caustic Alkalis as Na ₂ O	0.05 max
Chlorides as NaCl	0.75 max
Unsaponified matter	0.50 max
Rosin Acid of TFM	3.00 max
Total Free Alkali content as Na ₂ O	0.20 max

PRODUCTION PROCESS

FIRO has developed a simple cold process technology for Soap production. The basic unit operations involved in this process are summarised below:-

1. Weighing

The raw materials are weighed as required

2. Preparation of solutions

Caustic Soda and other solutions are prepared as required

3. Saponification

The soap forming reaction takes place in a reactor by appropriate and timely mixing of the raw materials and soap "off Cut" (if necessary/available).

4. Moulding

The molten soap from the reactor is poured into moulds and allowed to solidify.

5. Cutting

The mould soap is cut into bars and tablets as desired.

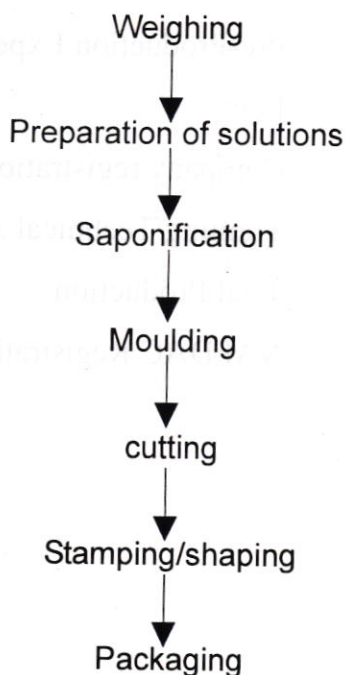
6. Stamping/Shaping

The soap bars or tablets are stamped as required.

7. Packaging

The soap is properly packaged and packed ready for sale.

The process flow chart is shown below:-



MACHINERY AND EQUIPMENT REQUIREMENT

The machinery and equipment required are locally available. They are simple and can be fabricated at FIRO on request. The list of items and the costs is presented on Table 4:

PROPOSED PRODUCTION PROGRAMME

Production Days / Week: 5

Production Weeks/Annum: 50

Production Days / Annum: 250

Production Volume /Day: 15,000 Tabs

Production Volume / Annum: 3,750,000 Tablets

Table 4. List of Machineries and equipments for Soap Production

MACHINERY AND EQUIPMENT	SPECIFICATION	COST (# 000)
Industrial type Motorised soap reactor	500 Litres stainless steel	300.00
Special shape motorised soap cutting machine	Stainless steel	260.00
Special shape motorised (toilet) Soap stamping machine	1200 Tablets/ hour Stainless steel	375.00
Laundry soap motorised stamping machine	1200 Tablets/hour Mild steel	170.00
Laundry soap motorised cutting machine	500kg/Hr Mild Steel	170.00
Soap Plodder	500 kg/hour	450.00
Packaging machine		75.00
Others (including metal moulds and accessories)		50.00
TOTAL		1,850.00

MANPOWER REQUIREMENT

The project requires the services of both skilled and unskilled labour. For the capacity recommended, the following labour force is required: one Production Manager, six Production Assistants, twelve Factory Operators, two Marketing Assistants, one Account Clerk, one Administrative Assistant, one Cashier, one Secretary/Typist and two Security men. The production crew takes charge of administrative and accounting functions of the project. The marketing personnel are strictly in-charge of the product marketing.

SPACE REQUIREMENT

About 10m x 20m space is required for the project. This will accommodate production/factory facilities, storage (Raw

materials and finished products) facilities and sales/administrative office.

ESTIMATED TOTAL CAPITAL REQUIREMENT

A. Pre-Production Expenses

<u>Item</u>	<u>Cost N 000</u>
Company registration	15.00
Training/Technical Assistance	15.00
Trial Production	56.78
NAFDAC Registration	<u>70.00</u>
TOTAL:	156.78

B. ESTIMATED FIXED CAPITAL COSTS

<u>Item</u>	<u>Cost N 000</u>
Land and Building	1,250.00
Machinery and Equipment (Including 10% Installation)	2,035.00
Distribution Van (Fairly used Pick-up Van)	450.00
Generator (12.5 KVA)	220.00
Office furniture and equipment	<u>75.00</u>
TOTAL	= 4,030.00

C. Estimated Working Capital

Item	Coverage Period	Cost N 000
A. Current Asset:		2,588.19
I. Account Receivable		
II. Inventory		
Raw materials stock	1 week	263.62
Supplies	1 month	249.94
Utilities	1 month	39.10
Finished Product Stock	1 week	400.38
Cash in Hand	1 week	71.89
B. Current Liabilities		
Accounts Payable	1 week	1,387.45
C. Working Capital (A - B)		1,200.75

TOTAL INVESTMENT COST

<u>ITEM</u>	<u>COST N'000</u>
Pre-Production Expenses	156.78
Estimated Fixed Capital Cost	4,030.00
Estimated Working Capital Cost	<u>1,200.74</u>
TOTAL	= 5,387.52

PROFITABILITY

Total sales (1.8m tablets of toilet soap at N25 and 1.2m of laundry soap at N8.00)	45,000,000.00
Total Production Cost	36,957,070.00
Gross Profit	8,042,930.00
Corporate Tax @ 30%	2,412,879.00
Net Profit	5,630,051.00

SERVICES AVAILABLE AT FIIRO

- Training on Soap production process
- Soap machinery and Equipment Fabrication
- Preparation of detailed feasibility report
- Quality control and Product analysis

These services are available under our Technical Assistance Services (including machine and equipment installation, Commissioning and personnel training on installed machines and equipment).

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