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ASSIGNMENT 1

FEASIBLITY STUDY ON THE SET UP OF SURGICAL HAND GLOVE PRODUCTION FIRM FOR THE USE WITHIN THE ABUAD COMMUNITY

I. SUMMARY OF THE PROJECT

A. Name of the firm: Medi-Aid Healthcare

B. Location: KM 64, Old Lagos-Ikorodu Road, Sagamu, Ogun State.

C. Project Description:

This project is aimed to set-up within the ABUAD community a surgical hand glove production firm in order to alleviate the never ending need for surgical gloves and to cut all associated cost that comes with the purchase of surgical gloves produced by exterior companies. The need to accomplish this project is of many importance and benefits as there is a mass flow of students into the College of Medicine and Health Sciences which are always in need of surgical gloves to carry out the practical aspect of their respective courses and as such the cost incurred from the purchases are always on a rise and this can be potentially solved if ABUAD undertakes this project. The university can make one readily available for students without the need to buy from any company. This also saves time of delivery in case the product being ordered is to be delivered from another state and it also eliminate the stress of searching for unadulterated surgical hand gloves as fakes can be produced.

D. Assumptions:

Market Projection

It is projected that the demand for surgical hand gloves during this pandemic would be on a rise as the demand outweighs the supply and hence there is a need to close the gap by producing more gloves.

Market Share

Worldwide, there is an increase in market share as the demand for surgical gloves grows yearly due to various factors such as the increase in number of surgical procedures across the globe along with the surge in the number of cases of several chronic and acute diseases. The increase in the ageing population prone to chronic diseases and their subsequent need to undergo surgery would drive the demand for surgical gloves hence increasing the market revenue and shares of major competitors. Rival companies keeps amplifying the production of the their products and even though they still struggle to meet up with the required demands and as a result there is more than enough demand to accommodate a new competitor like ABUAD. Market shares is fluctuating and is not being dominated by a particular firm as companies such as Mediline Industries and Alagomeji healthcare has 20%, Top faith healthcare has 35%, while other companies like Fadejo and sons have 5% and below. Also shares are being bought especially in the medical sector as that does not come as a surprise because investments are being made in companies that are believed to have the capacity of finding the cure for the corona virus hence securing a bigger ROI.

Prices

Due to the recent outbreak of the covid-19 virus there is a surge in the demand for gloves for the protection of medical practitioners but this has been made difficult as the prices of rubber has increased due to its increase in demand and hence affecting the prices of hand gloves.

Investment Costs

The investment cost such as construction cost, cost of land, equipment, processes and so on has been calculated and the project can be undertaken.

Source of Funding

i. Large donation from friends and associates.
ii. Loans from banks with attractive interest rates.
iii. Revenue from Abuad tuition fee
iv. Investors
v. Initial capital

E. Summary of Findings and conclusion

1. Market feasibility

   Since investors are mostly attracted to businesses with high ROI and lower risk this business fits the requirement as there is a higher demand for the product than ever and hence ABUAD can venture into this industry and thrive as there is excess demand over supply and there shall be competitive market position to obtain.

2. Technical feasibility

   After much research it has been verified that the project technical data has been sourced for and a large quantity of gloves can be produced at a minimum cost. The cost incurred from building the facilities, buying and renting some equipment, studying the process involved in the glove manufacture, observing the method and channels of distribution and quality of the product has been shouldered and can be financed adequately.

3. Financial feasibility

   This is also feasible as the initial capital requirements, sources of financing, the total project cost and the financial statement has all been guaranteed. Also the financing of the management team and qualifications has been looked into while at the same time offering attractive salaries as the rival competitors. In conclusion, the profit to be generated from the business outweighs the initial capital investment.

II. GENERAL INFORMATION

A. Management of the Project

Pre- operating period

It is necessary to fulfil the pre operating conditions necessary to make a plant fully functional before even looking at its processes. For the success of a company preparation is very vital as

it includes planning from little details to important stages. One must have a good decision making skills to determine if the scheduled activities to be carried out are feasible.

A group of engineers have been hired to determine the best and fastest course of action in order to complete the necessary facilities, an accounting firm Haywire limited has been hired to make sure the check books are balanced as this ensure that the adequate amount of funds go to the required department. The marketing team in charge of running ads are also in place in order to boost sales once the operation is fully functional, King David Security Company has been hired for protection against street hoodlums while construction is going on.

Management during the operating period

This organization is in form of a single proprietorship business organization

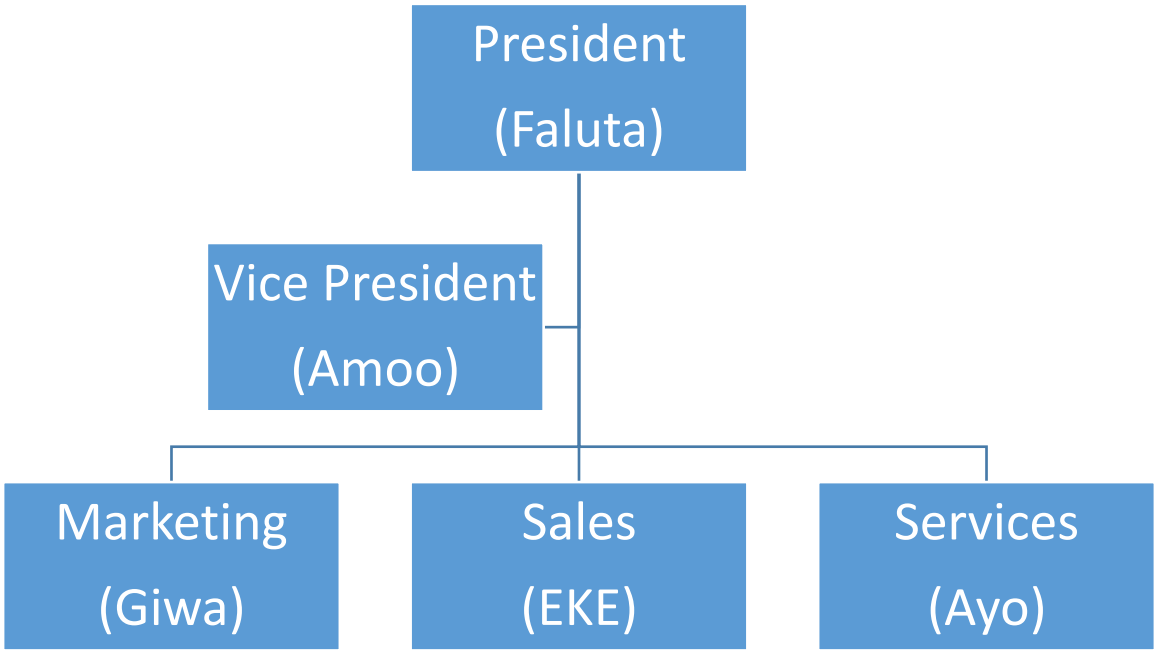

Figure 1: Organizational chart

Roles

1. President:

   He is in-charge of the overall company and his decision is final since he is solely in charge of the decision making.
2. Vice President:

   In charge of accessing all information before reaching the president and deem which ones are attention worthy or not. Supervision is often carried out and progress report is being submitted directly to him by the head of other departments.

3. Marketing:

   They are in charge of market prediction and management of all advertisement related to the hand gloves as they seek to push the product aggressively into the market. Price variation, demand and supply forecast, market analysis, advertisement are being controlled by the marketing team with the aim of maximizing sale and profit.
4. Sale:

   They are in charge of all the sales and they manage all the distribution channels. They ensure that the product is of standard quality through good quality control procedures. They control the price, demand and supply of the hand glove as their goal is to achieve maximum profit with minimum cost.
5. Services:

   They are in charge of goods, production and distribution and they strive to ensure that the customers stay happy at all times. They are in charge of producing high quality product while keeping good customer relations.

Labour

The labourers hired are highly skilled in the art of production which most finishing their education at a tertiary level. The recruitment program goes on every 2 years and trainees are recruited for 6

months while being drilled in the various field of application. The company has a good labour compensation such as paying for over time and health benefits.

Firms to be hired

Lead way insurance, Amaxx consultant, King David security

Status and timetable of project

The project is in progress as production is growing strong and workers work around the clock 8am-5pm. The tapping period and production of rubber is at its peak from September to January and that's when production is at its highest.

III. MARKET DEMANDS

A. Market Study

1. Demand

a) The consumption of surgical hand gloves has been on the rise for the last 10 years and the major consumers are Hospitals but they are also used by food industry, medical clinic, households for protection purposes, medical and chemical laboratories and chemical industry.

b) For the next 10 years surgical gloves consumption is projected to be on a rise as the valuation of the industry will exceed 4 billion USD by 2026 and this is due to the increase in the number of surgical procedures across the globe, the rise in research and development activities by major competitors to manufacture high quality and premium surgical gloves for medical practitioners being exposed to large number of pathogens, the emergence of some virus like H1N1 flu and SARS and the increase in the ageing population as they are more susceptible to chronic diseases.

2. Supply

a) The supply for the last 10 years has been on the rise due to the factors listed above

The surgical gloves are imported as finished goods and sold to major hospitals in Nigeria and the most common brand being Ansell surgical gloves.

For ABUAD producing surgical hand gloves locally

b) The supply is set to be increasing gradually as medical surgeries have seen a slight increase in Nigeria

c) The factors affecting the production would be adverse weather conditions slowing down the production of the rubber industry, unstable government policies and the emergence of deadly viruses would see the supply of the products increase.

1. Competitive position considering imported and/or substitute products
   a) The selling price would be around N10,000 per box considering the fact that import tariff would affect those importing the gloves and our product is at an affordable and bargain price.

B. Marketing Program

1. Description of the present marketing practice and competitors

Business to business marketing strategy is being used. Marketing practices and strategies have been put in place in order to be ahead of the market and such includes; Paid advertising, relationship marketing, internet marketing, transactional marketing.

The competition is high as every rival firm are striving to be the best but with the development of an R and D department and the creation and improvement of our products our firm is set to be a driving force in the industry.

2. The sales and marketing teams are in charge of the selling organization, terms of sale, channels of distribution, location of sales outlets, transportation and warehousing arrangements and their corresponding costs. The use of e-commerce has eliminated the need for middle men and as such reducing cost. Location of sales are in all major cities in Nigeria such as Kano, Lagos, FCT, Portharcourt, transportation can be arranged for delivery with a cash up-front delivery service. Warehousing costs N500,000 annually.
3. Promoting and advertising plan, including costs.

The marketing team is in charge of this aspect as they are driven towards increasing brand exposure and sales through targeted advertisement which costs about N1,000,000 annually. Promotions are carried out with discounts, sales clearance and so on.

4. Packaging

Table 1: Packaging Details

Wrapper	1 pair
Pouch	1 pair
Inner Box	50 pairs
Master Carton	500 pairs (10 inner boxes)
20 feet container	2,34,500 pairs (469 cartons)
40 feet HC container	5,69,500 pairs (1139 cartons)

C. Projected Sale

a. Expected annual volume of sales for the next ten (10) years considering the demand, supply, competitive position and marketing program.

Annual volume of sales is set to soar as demand and supply for the next 10 years would be on a rise because the nation would be preparing its medical sectors with all necessary equipment to combat the next wave of pandemic.

b. Sales contracts

Sales contract are in place with various hospitals, clinics, labs and food industries.

IV. TECHNICAL FEASIBILITY

A. Product (s)

1. Description of the product(s) including specifications relating to their physical, mechanical and chemical properties.

The gloves are blue in colour and are less likely to tear or rip as we avoid cost cutting and material reformulations that often leads to the production of inferior products or health risks. Our glove variable includes material, comfort, durability, fit and personal preference.

Latex gloves are made from rubber and it is our choice of material since they are very tactile and are therefore highly preferred for sensitive applications like surgery. Also, it offers durability, flexibility and comfort.

Table 2: Physical Property

Characteristics	Before Aging	After Ageing (70+/- 2^{o}C for 166 +/- 2hrs)
Tensile strength (Mpa) min	24 Mpa Min	18 Mpa Min
Ultimate elongation (%) min	750% Min	560% Min
Strenght at 500% elongation (Mpa) max	5.5 Mpa	NA
Force at break (N) min	12	9

Chemical composition: After rubber is being tapped from the trees because of its high water and non-rubber content about 70% is water, protein, sterol, glycosides, resins, ash and sugar. The latex is mixed with processing chemicals including Sulphur, zinc oxide, accelerators, pigment, stabilizers, a de-webbing agent and antioxidants. The latex matures for 24 to 36 hours to become a compound ready for dipping.

2. Uses of the product(s)

i. Used for surgical operations
ii. Used in the food industry to prevent chemical skin burns on their hands.
iii. Used in various homes for domestic purposes
iv. Used by all concerned medical staff during procedures like handling and dressing of wounds.
v. As a sterile container for surgical specimens to be sent to the pathology lab

B. Manufacturing Process

1. Description of the process

Rubber trees are usually ready to be tapped after about seven years of growth. A steel tapping knife is used to remove thin strips of bark from the tree at a downward curve. This directs the milky-white sap to a spile, or spigot, which channels it into a cup affixed to the tree. Tapping is done in the early morning, because sap coagulates faster later in the day, when temperatures are higher, and reduces the flow.

Figure 2: A rubber tree is tapped and liquid is slowly collected

After about six hours, the fluid stops flowing. In that six-hour period, a tree can usually fill a gallon bucket. The tree can be tapped again with another fresh cut, usually the next day. The latex is preserved with ammonia. Trees often are rested for a period after heavy tapping.

Because of its high water and non-rubber content about 70% is water, protein, sterol glycosides, resins, ash, and sugars the latex is concentrated and stabilized. The latex is mixed with processing chemicals including sulfur, zinc oxide, accelerators, pigments, stabilizers, a de-webbing agent, and antioxidants. The latex matures for 24 to 36 hours to become a compound ready for dipping.

The production line

Production uses ceramic or aluminum hand-shaped molds, or formers that are first extensively washed in hot water and chlorine to ensure there is no residue from previous batches. Next the formers, suspended on a continuous moving chain, are dipped into a mixture of calcium nitrate

solution and calcium carbonate nitrate is a coagulant, while the carbonate helps the gloves release from the formers.

After drying, the molds are dipped into the latex compound, with the duration of the dip determining the mil thickness of the gloves. The freshly molded gloves are next leached in a mixture of hot water and chlorine, which removes residual latex proteins and chemicals to help reduce the severity of any allergic reactions to latex.

The gloves are then dried and cured, which is where Charles Goodyear's enormously important discovery enters the process. Vulcanization converts the gloves to an elastic state by causing a reaction between rubber molecules in the latex and chemicals that have been added, and gives gloves their elasticity so they are less likely to tear.

After drying, the gloves are rinsed again to leach out more latex proteins, then the cuffs are beaded, or rolled, to make them easier to don and doff. After a dip into cornstarch and a final drying, pneumatic air jets strip the finished gloves from the formers, or workers remove them by hand. The gloves are hot-air tumbled to remove any remaining powder.

The molds are given another thorough chemical wash and rinse, and the process begins anew.

The quality-control phase

Gloves are tested to ensure quality and to ensire it meets up to the standards. The pinhole leak test is one of these methods. Workers fill the gloves with one liter of water, then close and hang the gloves to check for leaks.

The tests adhere to guidelines regarding acceptable quality limits (AQLs). These standards designate a percentage to evaluate a batch of gloves. An AQL of 2.5% means that statistically, only 2.5 gloves for every hundred will fail a quality test. If a batch's failed gloves exceed this percentage of the total batch, all the gloves in that batch fail. The results of these tests determine whether the gloves will be industrial or medical grade; the latter are subject to more rigorous testing.

C. Plant Location

KM 64, Old Lagos-Ikorodu Road, Sagamu , Ogun State.

Figure 3: Satellite location

2. Desirability of locations in terms of distance to sources of raw materials and markets and other factors.

As shown in figure 2 above the plant site is surrounded by rubber trees capable of producing a massive amount of white sap. The site location is perfect as it isn't too far from the Sagamu market and from Lagos. The only disadvantage are the bad roads.

D. Structure

1. Building and costs of creation, other structures and their respective costs, land and improvements such as road, drainage facilities

The estimated cost of the whole operation was around half a billion in order to get the business fully functional.

E. Utilities

Electricity, fuel, water, stream and supplies specifying the users, quantity required, balance of utilities, availability, sources and alternative sources and costs.

For production to be going on about 1 million is spent a year on electricity and fuel and since we produce our own rubber we do not need external supply of raw materials as the land is enriched with rubber trees.

F. Waste Disposal

A. Description of the waste to be disposed and the description of the waste disposal methods.

One of the challenges faced with the production of surgical gloves is the mitigating large amounts of waste generated during the glove production process. This waste is mainly generated from glove dipping tanks and is referred as dipping tank coagulum (DTC). It is considered as scheduled waste which requires mandatory disposal by incineration, in compliance to the Scheduled Waste Regulations set by the Department of Environment. Work described in this study showed, DTC samples with a polymer content of >40%, both ash and calcium carbonate content of <10% and curatives <2% (Sulphur, antioxidants, accelerators and ZnO) when blended with virgin rubbers (SMR 10 and SMR 20) were found to be suitable for manufacturing value-added rubber products. DTC samples with polymer contents of <40% and lower in curativescould still be considered for recycling, by adding higher portions of virgin rubber for manufacturing products like shoe soles, carpet underlay and thermoplastic elastomer products. Glove manufactures should ideally set up on-site DTC processing facilities at their factory premises equipped with crepers as well as space to ‘air dry’ the creped DTC samples. Creped samples could be sent for chemical analyses.

V. FINANCIAL FEASIBILITY

A. Total Project Cost- All items considered and assumptions made.

It has an estimated cost of about 500 million naira

B. Initial Capital Requirements- All items considered and assumptions made.

At least half the money was sourced for and the other half contributed by investors after stating the initial capital at hand which was about 150 million naira.

C. Sources of Financing

i. Large donation from friends and associates.
ii. Loans from banks with attractive interest rates.
iii. Revenue from Abuad tuition fee
iv. Investors
v. Initial capital

D. Financial statement

1. Projected income statements for 10 years

Business has been looking good and it is projected to rise over the next couple of years.