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DEPARTMENT: MECHANICAL ENGINEERING

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ASSIGNMENT 1

FEASIBLITY STUDY ON THE SET UP OF A FACE MASK FIRM FOR USE AT THE ABUAD COMMUNITY

**SUMMARY OF THE PROJECT**

1. Name of the firm: ADL Face Mask Production Company Ltd
2. Location: km 8.5 Afe Babalola Way, Ado-Ekiti.
3. Project Description:

 A face mask is a medical equipment worn on the face to prevent from breathing bad air or from spreading germs or protection of the face in a serious situation.

 The face mask has been generally worn by the public all year in some countries such as China, Japan and South Korea etc. to reduce the spread of airborne diseases to others and also prevent breathing in dust particles created by air pollution. The face masks came into use since the early 1960s in developed countries but the present COVID-19 pandemic has been a subject of debate on the use of face masks as shortages of face masks has become a central issue. As regards the present COVID-19 pandemic, government and health officials recommend that people wear face masks when venturing out to public settings where social distancing may be difficult. The essence of this project is to produce face masks in the ABUAD community which be readily available and also easily accessible for everyone at a very affordable rate. This reduces the association for the purchase of face mask and also competition from other face mask production firms which may not be close to proximity, hence saving time. The presence of wonderful sewists and talented folks on board is held to a solid and consistent standard in order to assure you receive a high quality and protective mask.

Surgical masks vary by quality and levels of protection. Despite their name, not all surgical masks are appropriate to be used during surgery. Surgical masks may be labeled as surgical, isolation, dental, or medical procedure masks.[[9]](https://en.wikipedia.org/wiki/Surgical_mask#cite_note-9) Chinese health officials distinguish between medical (non-surgical) and surgical masks.

**GENERAL INFORMATION**

A. Project Management

1. During the pre-operating period, appropriate permissions and manufacturing licences would be acquired so as to ensure the smooth running of the operation on commencement. Workers & Operators would mainly be sourced from within the ABUAD community.

2. During the operating period, unit heads will be assigned over group of workers to relay information to the plant manager for quick action. Flow charts and process diagrams would be employed so as to ensure the continuous and smooth operation.

3. The employed workers will undergo rigid On-The-Job training g from higher qualified personnel so as to quickly raise their skill level. Incentives would also be available for extra hours and high risk jobs around the facility.

**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. has the responsibility to ensure almost every aspect of how hospitals perform is working efficiently. They need to find a balance in managing the day-to-day operations while leading strategic development initiatives required for long-term success

1. **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.

1. **Factory Manager**
2. Responsible for overseeing the smooth running of the face mask production factory
3. Part of the team that determines the types, quantities and quality of face masks that are to be produced.
4. Maps out strategies that will lead to efficiency amongst workers in the plant
5. Responsible for training, evaluation and assessment of factory workers
6. Ensures that the steady flow of both raw materials and other packaging materials to the factory and easy flow of finished products through wholesale distributors to the market
7. Ensures operation of equipment by completing preventive maintenance requirements; calling for repairs.
8. Ensures that the factory meets the expected safety and health standard at all times.
9. **Human Resources and Admin Manager**
10. Responsible for overseeing the smooth running of HR and administrative tasks for the organization
11. Enhances department and organization reputation by accepting ownership for accomplishing new and different requests; exploring opportunities to add value to job accomplishments.
12. Defines job positions for recruitment and managing interviewing process
13. Carries out staff induction for new team members
14. Responsible for training, evaluation and assessment of employees
15. Oversees the smooth running of the daily office and factory activities.
16. **Merchandize Manager**
17. Manages vendor relations, market visits, and the ongoing education and development of the organizations’ buying teams
18. Responsible for the purchase of raw materials and packaging materials
19. Responsible for planning sales, monitoring inventory, selecting the merchandise, and writing and pricing orders to vendors
20. **Marketing**: They are in charge of market prediction and management of all advertisement related to the face mask 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.
21. **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 face mask as their goal is to achieve maximum profit with minimum cost.
22. **Accountant/Cashier**
23. Responsible for preparing financial reports, budgets, and financial statements for the organization
24. Provides managements with financial analyses, development budgets, and accounting reports
25. Responsible for financial forecasting and risks analysis.
26. Performs cash management, general ledger accounting, and financial reporting
27. Responsible for developing and managing financial systems and policies
28. Responsible for administering payrolls
29. Ensuring compliance with taxation legislation
30. Handles all financial transactions for the organization
31. Serves as internal auditor for the organization
32. 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.
33. **Distribution Truck Drivers**
34. Assists in loading and unloading face masks meant for distribution
35. Maintains a logbook of their driving activities to ensure compliance with federal regulations governing the rest and work periods for operators.
36. Keeps a record of vehicle inspections and make sure the truck is equipped with safety equipment
37. Assists the transport and logistics manager in planning their route according to a delivery schedule.
38. Local-delivery drivers may be required to sell products to stores and businesses on their route, obtain signatures from recipients and collect cash.
39. Transports finished goods and raw materials over land to and from manufacturing plants or retail and distribution centers
40. Inspects vehicles for mechanical items and safety issues and perform preventative maintenance
41. Comply with truck driving rules and regulations (size, weight, route designations, parking, break periods etc.) as well as with company policies and procedures
42. Collects and verifies delivery instructions
43. Reports defects, accidents or violation

**ECONOMIC ASPECTS**

**Market Study**

According to the latest trends as released by IBISWorld, their analysts constantly monitor industry impacts of current events in real-time – here is an update of how this industry is likely to be impacted as a result of the global COVID-19 pandemic:

Revenue growth for the Surgical Apparel Manufacturing industry has been adjusted from 1.9 percent to 16.6 percent in 2020 due to rapidly surging demand. Since a huge percentage of face masks are currently manufactured in China, the industry’s purchase costs are expected to fluctuate, leading to unsteady profit margins.

1. Demand:

The demand for face masks is influenced by several related factors. As the face masks are consumed by surgeons during surgeries, the demand is influenced by the following factors:

1. Prevalence of diseases requiring surgery
2. Development in health care, hospital facilities and operation theatres.
3. Medical education and growth of surgeons in society.
4. The demand goes up when medical facilities, number of surgeons and surgeries taken place show improvement.

The main factors that drive the medical drive market is the growing awareness of health and safety measures that have to be employed in order to stop spread of diseases. Patients and health medics have recognized the increasing need for gloves globally. The healthcare and the medical industry is growing at a fast rate thus increasing the growth of face mask market as it is the staple product required in this industry.

 Face masks may be disposable, but in the operating room they are indispensable. Despite lingering effects of a down economy and declining medical equipment and supply sales, the market for face masks continues to grow. There exists immense opportunities for growth in the global surgical face masks market the fact that dozens of face masks are utilized in a single day in hospitals and laboratorial settings, and the inherent intrinsic indispensability of the product among surgeons, practitioners, and healthcare workers.

2. Supply

The company will be able to tap into the already existing demand by the ABUAD community and effectively meet this demand. Since it is locally manufactured, there will be little or no competition allowing domination of the market with our product. The face masks will be handed out free of charge and we will also encourage once mask is used they should all be disposed properly.

**Marketing Program**

After choosing a location to start ADL Face Mask Production Company, and also the types of face mask to produce, we conducted a thorough market survey and feasibility studies in order for us to be able to penetrate the available market in our target market locations.

We have detailed information and data that we were able to utilize to structure our business to attract the number of customers we want to attract per time and also for our products to favorable compete with other leading face mask brands in Nigeria.

We will hire experts who have good understanding of the Surgical Apparel Manufacturing industry to help us develop marketing strategies that will help us achieve our business goal of winning a larger percentage of the available market in Ekiti state and throughout Nigeria.

In summary, ADL Face Mask Production Company, will adopt the following sales and marketing approach to sell our face masks;

1. Introduce our face mask brand by sending introductory letters to hospitals, residents, merchants, retailers and other stakeholders in Ekiti State.
2. Engage in roadshow in targeted communities from time to time to sell our products
3. Advertise our products in community –based newspapers, local TV and radio stations
4. List our business and products on newspapers ads (local directories)
5. Leverage on the internet to promote our face mask brands
6. Engage in direct marketing and sales
7. Encourage the use of word of mouth marketing (referrals)
8. No pre-existing practice or competitors exist in this space (ABUAD). The company is a pioneer in this field.
9. For ease of access to the face masks, they will be sold and distributed in highly active areas with large number of people.
10. The university will be responsible for sensitizing its students about the use and the need of the face masks.

**TECHNICAL FEASIBILITY**

 A. Product (s)

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

The face mask is a loose-fitting, disposable device that creates a physical barrier between the mouth and nose of the wearer and potential contaminants in the immediate environment. They are effective barriers for retaining large droplets from the mouth and nose by the wearer in public. They help in reducing the exposure of the wearer’s saliva and respiratory secretions to others.

**Physical form**

The design of the face mask depends on the mode; usually, the masks are three-ply (three layers). This three-ply material is made of a melt-blown polymer, most commonly polypropylene, placed between non-woven fabrics. The melt-blown material acts as the filter that stops microbes from entering or exiting the mask. Pleats are commonly used to allow the user to expand the mask such that it covers the area from the nose to the chin. The masks are secured to the head with ear loops, head ties, or elastic straps. Performance of surgical masks is evaluated based on such parameters as [filtration](https://en.wikipedia.org/wiki/Filtration)(mask capture of exhaled aerosols), exposure (transfer of aerosols from outside), mask airflow resistance (pressure difference during breathing, ΔP, also known as [breathability](https://en.wikipedia.org/wiki/Breathability)),[[43]](https://en.wikipedia.org/wiki/Surgical_mask#cite_note-43) liquid penetration resistance, air and water vapor permeability, water repellency (for outer and inner surfaces)

2. **Uses of the product(s)**

For Health care workers

A face mask is intended to be worn by [health professionals](https://en.wikipedia.org/wiki/Health_professional) during surgery and certain health care proceduresto catch microorganisms shed in [liquid droplets](https://en.wikipedia.org/wiki/Respiratory_droplet) and aerosols from the wearer's mouth and nose.

For General public

In community and home settings, the use of facemasks and respirators generally are not recommended, with other measures preferred such as avoiding close contact and maintaining good [hand hygiene](https://en.wikipedia.org/wiki/Hand_washing). Surgical masks are popularly worn by the general public all year round in East Asian countries like China, Japan, South Korea and [Taiwan](https://en.wikipedia.org/wiki/Taiwan) to reduce the chance of spreading [airborne diseases](https://en.wikipedia.org/wiki/Airborne_disease) to others, and to prevent the breathing in of airborne dust particles created by [air pollution](https://en.wikipedia.org/wiki/Air_pollution). In Japan and Taiwan, it is common to see these masks worn during the [flu season](https://en.wikipedia.org/wiki/Flu_season), as a show of consideration for others and [social responsibility](https://en.wikipedia.org/wiki/Social_responsibility). Surgical masks provide some protection against the spread of diseases, and improvised masks provide about half as much protection. More recently, due to the rising issue of [smog](https://en.wikipedia.org/wiki/Smog) in [South](https://en.wikipedia.org/wiki/South_Asia) and [Southeast Asia](https://en.wikipedia.org/wiki/Southeast_Asia), surgical masks and [air filtering face masks](https://en.wikipedia.org/wiki/Dust_mask) are now frequently used in major cities in India, Nepal and Thailand when [air quality](https://en.wikipedia.org/wiki/Air_pollution) deteriorates to toxic levels.[[28]](https://en.wikipedia.org/wiki/Surgical_mask#cite_note-28)[[29]](https://en.wikipedia.org/wiki/Surgical_mask#cite_note-29)[[30]](https://en.wikipedia.org/wiki/Surgical_mask#cite_note-30) Additionally, face masks are used in Indonesia, Malaysia and Singapore during the [Southeast Asian haze season](https://en.wikipedia.org/wiki/Southeast_Asian_haze).[[31]](https://en.wikipedia.org/wiki/Surgical_mask#cite_note-31)[[32]](https://en.wikipedia.org/wiki/Surgical_mask#cite_note-32) Air filtering surgical-style[[*citation needed*](https://en.wikipedia.org/wiki/Wikipedia%3ACitation_needed)] masks are quite popular across Asia and as a result, many companies have released masks that not only prevent the breathing in of airborne dust particles but are also fashionable

**B. Manufacturing Process**

1. Description of the process

The production: The face masks are made with non-woven fabric, which has better bacteria filtration and air permeability while remaining less slippery than woven cloth. The material most commonly used to make them is polypropylene, either 20 or 25 grams per square meter (gsm) in density. Masks can also be made of polystyrene, polycarbonate, polyethylene, or polyester.

20 gsm mask material is made in a spun bond process, which involves extruding melted plastic onto a conveyor. The material is extruded in a web, in which strands bond with each other as they cool. 25 gsm fabric is made through melt blown technology, which is a similar process where plastic is extruded through a die with hundreds of small nozzles and blown by hot air to become tiny fibers, again cooling and binding on a conveyor. These fibers are less than a micron in diameter. The masks are made up of a multi-layered structure, generally by covering a layer of textile with non-woven bonded fabric on both sides. Non-wovens, which are cheaper to make and cleaner thanks to their disposable nature, are made with three or four layers. These disposable masks are often made with two filter layers effective at filtering out particles such as bacteria above 1 micron. The filtration level of a mask, however, depends on the fiber, the way it’s manufactured, the web’s structure, and the fiber’s cross-sectional shape. Masks are made on a machine line that assembles the nonwovens from bobbins, ultrasonically welds the layers together, and stamps the masks with nose strip, ear loops, and other pieces. Completed masks are then sterilized before being sent out to the factory.

 **FINANCIAL FEASIBILITY**

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

It has an estimated cost of about 300 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 90 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

Projected income statements for 10 years Business has been looking good and it is projected to rise over the next couple of years.