COVER PAGE AND DECLARATION

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1.1 Introduction:

Organizations create and provide services and items under the control of operations. The Operations Managers will help you organize the creation and implementation of your sports-related apparel, food, seating, equipment, usage, reading, and knocking needs. Operation generated services include anything from library loans to medical care to shopping expectations to college lectures. Organizational managers are in fact those who have supervised an organization's creation and distribution. Managers of operations have supplied the services and things upon which we all depend in this book's actions, issues, and choices.

Our discussion will cover the following topics: what operations management is, where it can be found, how it's similar and yet distinct, and what operations managers do. Agricultural equipment boosts output while reducing labor costs. (Nicholas,2016)

In order to be useful to customers, however, this equipment must be both affordable and lucrative for makers. In order to enhance our food production systems, productivity and efficiency of agricultural equipment are critical components of systems engineering. In 1989, at his Club of Bologna plenary session, Professor Renius offered a visual description of the agriculture sectors' product design processes. Using this matrix, you may create a product development timetable that incorporates the effects of R&D, manufacturing, distribution, operations and finance. The following elements are also found in this matrix: This is the system. New concepts included in the process have a significant impact on the manufacturer's ability to provide capabilities in new goods. The process yields finished goods that meet the demands of the target market.

1.2 Company Overview

Tractors were established by The Big Green Company, a manufacturing firm. Palembang, Indonesia's capital city of South Sumatra, is home to this business. The company's success has lately slowed due to its inability to run operations that are both more efficient and less harmful to the environment. In order to improve efficiency and reduce its impact on the environment, the corporation is restructuring its operations. This study's findings will provide a solution to the issues facing this business.

2. Operational Procedural Guide:

2.1. Recommendations for manufacturing processes

Agriculture equipment overheads are evident throughout the production process. New technology, huge equipment, greater energy prices, and higher component prices all contribute to the high expenses. The following approaches should be proposed to Indonesia's Big Green Tractor Company to adopt to make its production operations more cost-effective:

(A) Modular designs and standardization save costs.

The modular design of tractors may help the Big Green Tractor Company save money throughout the production process. The design that is individualized, refurbished, and advanced is known as modular design. (DebRoy,2015)

Using standardization and combination approaches, it will assist reduce costs and generate various goods. The modular manufacturing approach reduces order lead time, expands quickly, generates substantial economies of scale, preserves and repairs, and makes diagnostics simpler to manufacture. Thus, the equipment's usefulness will be improved due to its increased longevity.

Standardization and simplicity of the product may also contribute to lower production costs. It's not only about standardizing processes; it also involves identifying the greatest possible manufacturing equipment and determining which industrialized procedures are optimal. Design and engineering, procedures, resources, testing methodologies, provisions, and more must all meet the standard.

(B) Reduction of cost of the purchased materials

When it comes to purchasing supplies, Big Green Tractor Company must use a strategy known as diversification. As their supplier sources change, the business must reevaluate its whole sourcing strategy and supply chain system strategy. It is possible for the corporation to decide on an exact balance between off-shore and near-shore production by using diversification approaches. In order to acquire diverse intelligences, the company has to interact closely with a wide range of providers. Supply chain variety also improves flexibility in response to changing consumer needs and ensures high-quality service for clients. (Sabaghi,2015)

(C) Just in Time Approach in manufacturing processes

To boost efficiency and reduce waste, the organization must use a just-in-time manufacturing method, where products are produced just when they are needed throughout the production process. As a consequence, inventory will be less expensive. Using a JIT method, you may avoid the waste that comes from overproducing, waiting for supplies, and keeping extra inventory. This strategy will help manufacturers save costs by ensuring that the components they need to make their products are readily available.

(D) Automation in manufacturing processes

In order to manufacture their products at a lower cost, the Big Green Tractor Company has to automate its procedures. To automate, you must use certain machinery and equipment to carry

out and control production operations in a predetermined sequence without involving humans. For the manufacturing to work and be governed, it relies on computer and electronic-driven machine systems. The following are some of the advantages of automating industrial processes: Quality is improved because fewer faults occur, resulting in higher product standards. Automating operations helps the corporation replace labor-intensive ones, which lowers labor costs and reduces its dependency on labor scarcities. Product delivery times are shortened as a result of shorter production lead times. This helps customers get their orders more quickly.

2.2 Minimize Defects Throughout the Manufacturing Process

To make its own goods, every manufacturing company has its own set of regulations. Raw materials, components, and equipment go into the creation of a product. They've worked hard to perfect it. The quality of various products varies as well. For a variety of causes, there may be a few defective items among the many otherwise great ones. If a large quantity of faulty items is sent to customers, the company's reputation and trustworthiness may suffer. Instead, fewer people will be able to buy your products. This means that the manufacturer has an incentive to exercise caution when it comes to the production of faulty goods. (Wang,2015)

There are several ways to limit the number of errors. There are early-stage strategies and late-stage strategies. Early phase approaches focus on flaw elimination before the development process even starts. Eliminating production faults using scientific methods frequently necessitates the adoption of techniques developed at a later time.

Defect Reduction Early-Stage Strategies

Product design: When a product is poorly designed, it is possible that it will have flaws. Manufacturing engineers must be engaged as early in the process as feasible so that they can anticipate potential problems. The development team will benefit greatly from this production

knowledge, and the corporation will save both time and money as a result. These engineers' expertise. Involving a multidisciplinary team of engineers in the product development process may help reduce the likelihood of manufacturing errors.

Flexibility in Production: One strategy to decrease faults is to have the manufacturing process be as flexible as possible. An innovative approach to development may be both beneficial and invigorating for the firm. As an example, consider dividing production into outsourced and internal components. To ensure product uniformity and reduce flaws, it is common for a new manufacturing method to be required.

Use of Technology (Smart Manufacturing): Major industrial manufacturing organizations employ computer modelling, simulations, or other IT services to discover and manage product flaws early in the development process. A real-life test of genuine situations in development may be provided by such technology, and this can aid in the early detection of problems. (Castka,2003)

Defect Reduction Late-Stage Strategies

Take preventive measures: The implementation of preventative measures, such as the replacement of old equipment and machinery that is always in need of repair or maintenance, may be a wise decision. A prudent precautionary strategy is to check that all operational equipment is in proper working order before starting any new projects. (Jeong.2001)

Inspection: Businesses should assess their production processes on a regular basis in order to find the core cause of faults. Modern manufacturing processes may benefit from the application of defect-reduction technologies such as ultrasonic, particle, vibration, and resistor monitoring. These technologies are now easily accessible and can be utilized to remove faults in the production process.

Maintain strict control of quality: It becomes futile to be innovative in product design if the manufacturing line is not consistently reviewed. You may put up a quality management team that will guarantee that the manufacturing process follows tight guidelines at every stage. A quality management team may use the Six Sigma approach in order to reduce product defects and increase overall product quality.

Flow of Communication: In every well-functioning company, effective communication is a significant asset. The importance of daily interaction between the production team and other design staff and engineers are critical, as it allows for the fast discovery and resolution of problems. This collaborative effort may increase the effectiveness of the project while also lowering the number of errors.

Six Sigma Method: Since 1986, Motorola has used the Six Sigma philosophy to improve their manufacturing processes, using a number of instruments and methodologies. This word was coined by Jack Welch in 1995 as the key idea in General Electric's corporate strategy, and it is currently adopted by a wide range of sectors. Six Sigma is a technique for increasing the efficiency of production performance by identifying and eliminating defect-causing parts while also minimizing the changeability of the market and manufacturing processes. (Wang,2011) According to this strategy, a corporation has completed a certain number of phases in order to compute the goal value of the project. Six Sigma use in manufacturing may assist a company in decreasing emissions, shortening one or more process time cycles, and lowering production costs in order to increase the profitability and customer satisfaction levels of its customers and clients. The structures and procedures of organizations that use Six Sigma have been built to incorporate observable metrics into their output, operations, financial processes, and so forth. You may use this strategy to define projects that are more aligned with the objectives of the company.

Following the identification of a project or target, the company follows the disciplined Six Sigma Process, which is divided into four phases:

- This stage is concerned with studying the device in order to see how any defects may be corrected or eliminated. Many other approaches may be used to do this, including statistical analysis to determine the root of an issue.
- This phase involves testing present procedures in order to discover, among other things, what might be regarded a foundation or a baseline for the future.
- Improve: During this stage, project teams will look for the best alternatives, then develop and test an action plan to improve a process or an aim they have set out to achieve.
- Control: An organization has the ability to modify operating orders, rules, and procedures in order to prevent future failures. It is possible that the monitoring phase will continue indefinitely.

Total Quality Management (TQM): TQM is a continuing process of identifying and eliminating production errors. As a result, supply chain management is simplified, customer service is improved, and employees are kept up to date with their training requirements. Quality control at all levels of a manufacturing process is meant to ensure that all parties engaged in the production process are satisfied with the final product or service in terms of its overall quality.

TQM was invented by William Deming, a management consultant who had a significant impact on the development of Japanese society. TQM is quite similar to Six Sigma throughout the procedure; however, it is not the same as Six Sigma in all aspects. TQM strives to guarantee that internal instructions and requirements of processes are as error-free as possible, while Six Sigma aims to decrease the number of faults in the process.

2.3 The use of 21st century tools to create a greener process.

There are a number of tools and technologies that have evolved in the twenty-first century that may be of substantial assistance to Big Green Tractor in the development of more environmentally friendly procedures. The following sections provide an overview of these tools and technologies. (Yin,2003)

Process mass intensity calculator: One of the most essential tools in Big Green Tractor for building a more ecologically friendly manufacturing process is the process mass intensity calculator. This tool calculates how much less material is needed to create items inside production zones. It is quite good at this. Big Green Tractor may utilize this tool to recognize the need for resources such as tractor replacement components. The PMI value of this instrument might help a corporation decide whether or not to invest in an acquisition. An analysis can determine this. So, if the PMI value is low, an organization may opt to reduce the purchase price and modify the tractor specifications. It's understood that less raw material acquisition means less processing, which means less pollution and energy usage. Thus, the process mass intensity calculator is the most significant tool Big Green Tractors can give to help develop eco-friendlier processes in Indonesian production and manufacturing facilities.

Robotics and software: In the twenty-first century, robotics is one of the most essential technologies being used in global production methods. Several studies have revealed that organizations are increasingly dependent on sophisticated tools and software systems, which may be indicative of the firm's green practices. Robots and software combined with Big Green Tractor's production plans might be highly effective in analyzing carbon emissions. Also, clever software systems may suggest particular actions to cut emissions. Also, robots and automated technology and tools may help Big Green Tractor adopt greener procedures and increase

production. Using machines in production and assembly lines may assist the firm address issues like waste management and ecologically friendly procedures. Smart software can analyses cutting operations for materials like iron sheets and many others to decrease waste and save money. Robots and software technologies may be able to help Big Green Tractor overcome its current issues. (Cheng,2018)

Guides to reagents and instruments for selecting solvents: Big Green Tractor has a number of other tools that may be used in conjunction with one another to help companies adopt greener practices in their production facilities. As previously said, reagent guides and solvent selection tools may enable the company's research and development department to analyses the toxicity level of various chemicals used in the production of tractors, such as paints, acids, bases, and a variety of other substances. The outputs of these tools may be examined in order to identify the compounds that are likely to have the lowest toxicity levels and the least negative impacts on the environment and humans.

Big Green Tractor may employ numerous tools, such as solvent selection tools, a Process mass intensity calculator, as well as robotics and software, to produce greener processes while working in Indonesia, and this will help the company become more environmentally conscious.

3. Socially responsible pollutants plan

3.1. Industrial standards on disposal of chemical waste

In accordance with industrial regulations on chemical waste disposal, methods and guidelines that are acceptable for the process of managing manufacturing waste have been established. During the course of their production operations, the majority of the enterprises generate hazardous chemical waste. The Environmental Protection Agency (EPA) establishes rules for handling the disposal of chemical waste created by a corporation. (Zhang,2014)

The Environmental Protection Agency's industrial guidelines help to protect both human health and the environment's health. Furthermore, these principles are beneficial in encouraging environmentally thorough recycling and resource preservation, making the directions simpler to identify, allowing for greater flexibility in the way definite chemical waste is treated, and facilitating increased compliance. The following are the industry norms and recommendations for the proper disposal of chemical waste:

(A) Standard industrial practices for the disposal of chemical waste, such as methanol, acetone, Methylene Ethyl Ketone (MEK), hydrofluoric acid, xylene, and other substances (Vogel,2017). Make lucrative biochemical products for rehabilitation that are broken or not up to specification, and tag and package hazardous wastes for transfer to a TSDF that is not safe for hazardous wastes to be transported there.

(B) Standards for chemical waste such as liquids contaminated with heavyweight metals, heater glowing solutions, recycled oils, and recycled oil filters are set by the Industrial Standards Organization.

- Drain oil sieves sparingly, and collect and properly dispose of the oil.
- Radiator illuminating fluid may be recycled several times.
- Recycling oils that have been mixed together with other hazardous garbage should treated as hazardous waste.
- Collect motorized fluids and recovered oils for recycling.
- Hazardous wastes should be labelled and packaged before being transported to a TSDF in an unsafe manner utilizing a dangerous waste vehicle.
- In the case of chemical waste from rust removal and degreasing of components washing,

industrial standards apply, such as those for ammonium hydroxide, hydro bromic acid, benzene, and potassium hydroxide, among others.

- Use a clean water act-regulated wastewater management component to treat the wastes.
- To discover the status of dusters in your state, reach an agreement with an EPA agency at the national or local level.
- Get diluents off-site for recycling or arrange to have them delivered for re-use to an on-site purification division.

(C) Industrial standards for the replacement of parts-generated chemical waste, such as nickel, iron, carbonate, and so on ((Castka,2003)

- Making a reprocessing facility the recipient of the scrap metal.
- To reclaim your batteries, gather them all together in one place.
- Batteries may be reprocessed on-site by a contractor or at a local recycling facility.
- Retread or recycle the old tires. They may be reprocessed.

(D) Standards for chemical waste created by cleaning tank trucks, include acid cleaners, ethyl benzene, wastewater, and volatile organic emissions (VOCs).

- Recycling wastewater as a first wash for highly dirty containers.
- Recover commercial biochemical products' leftovers by selling them to a salvage company.
- Make use of the alkaline solution that was left behind to balance out the acidic waste.

3.2 Green alternatives to the traditional manufacturing process

In current times, there are several green alternatives to traditional manufacturing processes, which can be considered in Big Green Tractor. These alternatives are recommended and described in the following manner.

Green energy adoption: Big Green Tractor's most practical choice for replacing the company's present antiquated production method is to embrace green energy. Green energy may come from a variety of sources, including solar power, wind power, geothermal power, and others. Because they are made from renewable resources, these energy products are boundless in their usefulness.

At the same time, Big Green Tractor may save money on capital expenditures since the energy it generates is cost-effective. In addition, the government's foreign policies have resulted in abundant sources of green energy in Indonesia. As a result, the company's production unit can make better use of renewable energy sources. Big Green Tractor may place an emphasis on the utilization of this energy, allowing the company to become more sustainable while also being more cost-effective in its commercial operations. (Sabaghi,2015)

Biodegradable material

Additionally, Big Green Tractor may encourage the usage of biodegradable materials in its production process. Research shows that organizations must buy their supplies in plastic packaging that cannot disintegrate.

It's possible that the company may alter its supply chain strategy and begin seeking out vendors that provide products packaged in biodegradable materials. Big Green Tractor will be able to minimize trash generation and the harmful effects it has on the health and safety of its workers and residents in the community as a whole.

system of heating, ventilation, and air conditioning HVAC systems, for example, are available today and may be utilized to help organizations improve their production processes. This term refers to the systems that control the company's climate - the heating, ventilation, and air

conditioning systems. There is a large amount of time and money needed to be invested in ventilation and temperature control procedures by the company. (Nicholas,2016)

Big Green Tractor should pay attention to scenarios like energy loss and other issues that might reduce the tractor's overall efficiency. The firm may benefit from the installation of an HVAC system since it will increase sustainability.

An amazing practice in Big Green Tractor is the upgrading of the facility where tractors are built and assembled. Insulation and other methods that may be employed to reduce the possibility of energy loss can be regarded to be the emphasis of the organization. Big Green Tractor may reduce emissions by using less energy if the production plant is improved in this manner.

This analysis shows that Big Green Tractor has a number of green manufacturing alternatives to the standard approach.

4. Conclusion

Finally, it can be claimed that Big Green Tractor has a number of important sustainability and operating cost challenges. The company's main goal is to reduce operating costs by optimizing its processes. Strategic managers in the firm may concentrate on reducing material costs, automating processes, and reselling scrap to suppliers in order to achieve cost-effectiveness. Additionally, a quality management system, external and internal audits, customized training, and standardization may all be considered in order to reduce faults throughout the production process. Big Green Tractor may also benefit from tools like the process mass intensity calculator and the solvent selection tool, among others, when it comes to leveraging greener processes.

The research also reveals that Big Green Tractor may adopt a variety of CSR initiatives, such as reducing carbon emissions, electrifying, and purchasing energy-efficient machinery, amongst

other things. These methods may also relieve the company of some of its legal and regulatory responsibilities. Big Green Tractor may take into account a variety of industry regulations and protocols, such as safe landfills, recommendations for processing and treatment, and recycling operations, for example. A green alternative manufacturing method may replace Big Green Tractor's conventional manufacturing process, which may also be stated to be regarded for consideration inside the company the use of renewable energy sources like solar, geothermal, wind, and many more might be one of these possibilities. Big Green Tractor also considers HVAC systems and biodegradable materials as green alternatives.

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