



COVER PAGE AND DECLARATION

	Master of Business Administration (M.B.A.)
Specialisation:	Finance
Affiliated Center:	CEO Business school
Module Code & Module Title:	MGT550: Managing Operation
Student's Full Name:	Amer abdel – Karim ahmad Judeh

Student ID:	EIU 2021050
Word Count:	3802
Date of Submission:	09/12/2022

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E-SIGNATURE: Amer Judeh

DATE: 09/12/2022

EIU Paris City Campus

Address: 59 Rue Lamarck, 75018 Paris, France | **Tel:** +33 144 857 317 | **Mobile/WhatsApp:** +33607591197 | **Email:** paris@eiu.ac

EIU Corporate Strategy & Operations Headquarter

Address: 12th Fl. Amarin Tower, 496-502 Ploenchit Rd., Bangkok 10330, Thailand | **Tel:** +66(2)256923 & +66(2)2569908 | **Mobile/WhatsApp:** +33607591197 | **Email:** info@eiu.ac

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Introduction:

Operations management refers to directing and controlling the processes of converting inputs into products and services.

An operational process is any activity or group of activities that takes one or more inputs, transforms them, adds value to them, and provides its customers with one or more outputs.

However, there are many non-manufacturing operations in the factory, for example, fulfilling orders, fulfilling promises made to customers, and controlling inventory.

Main Body:

Case Scenario

The Big Green Tractor is an industrial tractor company based in Palembang, Indonesia. The company has been facing declining growth in the recent years and would like to streamline its operations to be more efficient.

The Big Green Tractor has hired you to help them with the streamlining of their operation. The company would also like for you to make recommendations on an environmentally friendly way to cut down on pollutants from the company's production processes

Assignment Instructions

1. Create an operational industrial streamline procedural guide that will help the Big Green Tractor from start to finish with their productions. The recommendation report must include the following:

- a. The recommendation should include more cost-efficient manufacturing processes.
- b. A through plan to minimise defects throughout the manufacturing process.
- c. The use of 21st century tools to create a greener process.

- 2.** Develop a socially responsible operational guide for the Big Green Tractor for their pollutants. The guide must include the following:
- a. Industrial standards on disposal of chemical waste.
 - b. Green alternatives to traditional manufacturing process.

The answers:

Operational Procedures & Guide for Big Green Tractor

1) The guide operational industrial procedural for Big Green Tractor company:

a. Cost efficient:

Cost efficiency is defined as the ability to provide products and services at the lowest possible price without compromising quality, as it is about reducing costs while maintaining a high level of service, quality and innovation, so a comprehensive audit process must be conducted for the company to identify how to reduce manufacturing / operational costs and track them for a period Below we can summarize the cost reduction methods and evaluate what can be disposed of as follows:

- 1- Design of industrial products (tractors): The design process is very important as the product will be built on it, so the design must be free of defects and problems, otherwise the company will face problems during implementation, which will lead to a waste of time and money. Since the purpose is to reach the product manufacturing process by simplifying the components to reach easy manufacturing without compromising the quality of the products, the company must also, according to the proposed design, determine whether it can manufacture using existing equipment or whether the factory should purchase or develop new tools.

2- Reducing waste: According to research and the theory of Lean Six Sigma, the waste of resources is (time, effort, people, processes, inventory, and production). Monitor waste and reduce it. We will divide the types of waste as follows:

1) Over-production It is represented by manufacturing more than required, or earlier than required, which leads to a surplus product in the store, so this must be considered and produced appropriately according to market indicators.

2) Waiting for the next step of production, parts, information, instructions and equipment leads to a loss of time and money, as it is necessary to work in a consistent manner in the production processes.

3) transportation Transfers that do not add value to the products and moving products beyond what is required is a waste of time, money, and effort, and therefore the transportation cost must be considered when selling. As for the production process, purchasing materials from suppliers available in nearby areas must be considered to reduce cost and time.

4) the process If it is not designed efficiently, it may contain processes that take longer or complex processes, and this refers to the initial design of the manufacturing system.

5) inventory Excess inventory of products is not only costly, but may generate defective products from excessive handling, so the company must establish an efficient warehouse system and constantly monitor it.

6) motion Unnecessary excess movement of the worker leads to stress, which leads to defects in the product or the occurrence of injuries. Therefore, this must be considered, and an effective system should be put in place to reduce working times for workers and give them adequate rest.

7) Defective goods The effort spent in inspecting and repairing defects, remanufacturing and scrap, as the process of inspecting and repairing defects requires a lot of time, effort and additional costs, so this must be taken into account during the manufacturing process, and scrap must also be used in the remanufacturing process. It should also be noted that the types of waste are not independent of each other, for example, excess production leads to a surplus in stock, and excess product transportation leads to more movement of workers, and so on.

3- Fixed costs: Fixed costs are defined as expenses that do not depend on the level of production, that is, they do not change by increasing or decreasing production, and the company is obligated to pay them, and they are usually time-related, and as we know, the company's growth does not depend on the amount of its products or services generated only, It also depends on how much you spend, the company can sell a lot and satisfy its customers, but if its costs exceed (or are very close to) the amounts collected, then it will not grow and it must plan enough to reduce costs and consider the following points:

1/ Lower office space costs by taking advantage of lower office space prices to move your business to less expensive premises or negotiating with your current landlord for better lease terms, and better yet, if you don't really need to run your business from commercial premises. Why not work from your home and start taking telecommuting as a business strategy.

2/ Reducing recruitment costs using acquaintances and family in employment or relying on hiring contracted or independent workers, which saves taxes and other expenses related to employees.

3/ Bartering of commercial goods and services to reduce production costs
Where bartering can be used for some other products or services that you need for bartering to succeed, both parties must fulfill their obligations.

Service-to-service exchanges can be problematic unless specific timetables are put in place for service delivery and it should be noted that business bartering is treated as a normal business transaction.

4/ Reducing transportation expenses for the company, reducing fuel consumption is very important, but diesel vehicles and hybrid vehicles are more expensive when purchased at the beginning, but they can pay off in the long run by saving fuel and maintenance. It can also be beneficial to replace the fuel economy device with a more fuel-efficient vehicle. If your business is just starting up or finances are tight, leasing a car has a number of advantages, including fixed monthly costs, the ability to return the car at the end of the lease period, and freedom from depreciation and maintenance costs.

5/ Lower Supply Costs Getting the best deal on supplies can make a huge difference to your bottom line, and that means you need to constantly monitor your supply costs by checking discounts and investigating alternative sources. It is also possible to conclude long-term deals with suppliers in exchange for discounts and privileges.

6/ Reducing Advertising Costs create a website and use social media to reach your market. Email is a very effective low-cost marketing solution. You can send news, discounts, tips, and other information to build rapport and keep the market informed about your business.

7/ Reducing Insurance Costs, Insurance is an expense that no business can avoid without it, an accident or a lawsuit may put you out of business. For this reason, it is best to get as much business insurance as possible. You must ensure that you cover all important areas of your business including workers' compensation, disability, property insurance, and unemployment policies. Industry insurance needs must also be considered, as well as location, such

as places that need flood or earthquake insurance. Therefore, you should look for ways to reduce risks, including having your site assessed for issues such as fire risks or natural disasters. Note that installing fire alarms, sprinkler systems, security systems or guards makes you eligible for insurance discounts. The lower your risk from an insurance company's perspective, the lower your premiums are likely to be.

8/ Make the most of time Business owners care about time in an attempt to save money, but it is important to know the value of your time and make sure that you use it efficiently as efficiency leads to more productivity and profit. Have a daily schedule that you stick to and have time management tricks to keep you productive and efficient. Delegating or outsourcing, as well as using applications and other automation tools, can help you meet business needs while focusing on what you do best in your business.

9/ Using Computational Computing For most companies, cloud computing is an excellent way to reduce capital costs and ongoing expenses related to IT services. With cloud computing, the need to purchase and maintain expensive on-site servers, in addition to paying for ongoing software upgrades, is gone, as it is by using the cloud. Plus, your cloud storage provider will also take care of most data recovery issues, freeing your business from the requirements of maintaining a complex IT disaster recovery plan. Another advantage is the ability to access your business data across different platforms, such as a tablet or laptop, in addition to the ease of collaborative work with your team.

- 4- **Standardization of spare parts:** The process of standardizing spare parts for the manufacture of types and models of tractors, such as unifying (the engine or safety systems ... etc.) will affect several axes, including (warehouses and suppliers ... etc.) and will lead to ease of monitoring the stores and thus reducing costs.

- 5- Manufacturing the most profitable products: Most of the time, the management has to make strategic decisions related to a product or a group of products, as the management believes that these products ultimately lead to a burden on the company's profits, and they are the ones that mainly contribute to the decline in the company's profits or a large part of it, so it must For the company to focus on the most profitable products, as each company has a product that is considered the star of sales or production, and it is the product that achieves high profitability. There are also products of other types, such as cash cow products, which are defined as products or services that have achieved a leading position in the market, and provide cash flows Positive and return on assets (ROA) exceeding market growth. The idea is that such products turn a profit long after the initial investment has been recouped.

Before addressing the different aspects of the product, these are the most important characteristics that must be available in it:

- Provides a solution to the customer's problems, needs and desires.
- The product should be easy to use for customers.
- It has an acceptable and attractive design.
- Low cost to reach a better profit margin.

Therefore, the company must achieve the factors that help to develop a successful product and increase the chances of success of its new product. According to various studies, the secret of a successful new product depends on several factors, including:

- Developing a unique and superior product with new advantages, focusing on value and high quality.
- Defining and studying the concept of the new product, in terms of the objective, the market, and the advantages, accurately and specifically before starting its development. This, of course, places the burden on the company's development team to evaluate the target product markets, their requirements, and their benefits.

- Senior management commitment to innovation and efficiency when implementing new product development.

6- Automation: Automation provides efficiency, whether in terms of productivity or costs, and thus saves time and money by reducing manual processes and controls, which will provide more accurate and reliable data, allow better decision-making, and streamline workflow for complex tasks. There are many benefits to automation that are of great benefit to the company, the most important of which are:

- Define and automate all possible business processes at breakneck speed.
- Enhancing the use of robots with smart technologies in certain tasks to reduce human errors to a minimum, which leads to increased accuracy in work and great efficiency.
- Work in an integrated manner between the human workforce and robots to save time and effort, increase productivity, and allow human forces to focus on high-value work.
- It contributes to the presence of powerful analytical tools that track and evaluate job performance, identify tasks and areas that need improvement, in addition to measuring and evaluating the processes performed by robots.

b. Minimize defects

Manufacturing defects are among the most common problems facing companies, as they negatively affect the company's brand and reputation, which leads to reduced sales and lower company profits. Therefore, defects can be classified into three main categories:

Design defects: Design is considered the first stage of production, as design defects result from wrong designs, so every possible outcome of the design must be thought of before starting production.

Manufacturing defects: They occur during the manufacturing process itself and are usually unplanned and unintended. These defects commonly result from defects in operations resulting from machine failure or human error. Therefore, the production process must be monitored step by step to ensure the manufacturing process.

Marketing defects: The marketing process is considered one of the most important operations for companies, as marketing defects are not related to products, but are directly related to how the product is marketed to the consumer.

There are several strategies to reduce defects, which we list as follows:

Early stage strategies: which are expressed as strategies that are in the early stages and depend on removing defects before the start of the manufacturing process, including:

- Product Design: Bad product design leads to defects in the product, so manufacturing engineers must be involved as much as possible from the beginning. Involving a multidisciplinary team of engineers during the product development process is one way to reduce future manufacturing defects.
- Flexibility in the production process: The production process must obtain the right amount of flexibility in the production process, as it is considered one of the ways to reduce defects.
- The use of technology (intelligent manufacturing): The use of technology in manufacturing will provide a realistic test for real production scenarios and help to identify and solve problems early.

Late-stage strategies: They are late-stage strategies where scientific methods are used to reduce manufacturing defects during the production process, including:

- **Preventive Measures:** Taking preventive actions can be such as replacing old equipment and machinery that requires repair and ensuring that all operating machinery is in perfect working order.

- **Inspection:** The manufacturing process must be inspected regularly to determine the root cause of defects.

- **Quality control:** The production line should be checked regularly, and a quality control team should be set up at each stage of production, which can track and be responsible for ensuring the production at each stage.
Communication: Maintaining regular contact between production staff and other product design staff, engineers, and marketing officials, which helps in quickly identifying and resolving problems.

c. Greener process

The accelerated pace of development witnessed by the world in the last decades of the twentieth century, and despite what this development provided of economic advantages and high levels of well-being, it produced many negative effects that were reflected in the emergence and exacerbation of many environmental problems such as climate change, pollution, and loss of diversity. Therefore, everyone should pay attention to sustainability, as sustainability is defined as a set of measures to reduce environmental impacts on society to reach a less polluted or pollution-free environment. This is done through the application of three important indicators (environmental protection, commitment, and role in society). This is done with a set of green tools, which is defined as an inclusive term

for all different digital solutions, with the common denominator being that they contribute to more environmentally friendly activities.

The technological development that man has reached in the twenty-first century facilitates the process of sustainability and the application of green measures, through some well-known and widely accepted practices that we list as follows:

- 1- Rationalizing energy consumption and relying more on clean and renewable energy in the stages of design, production and transportation to reach a clean manufacturing system or supply chain, through the use of factory roofs equipped with photovoltaic panels installations and relying on clean solar energy or replacing large engines (of various types, pumps, air compressors, and lighting equipment) that consume a lot of fuel with smaller, more efficient, and smarter equipment.
- 2- Rationalizing water consumption with a focus on water recycling and treatment processes. Fast, flexible, and effective management and operating practices that are used in conjunction with systematic and continuous training programs and applications include the theory of six diffraction, methods of organizing workplaces, and effective manufacturing techniques.
- 3- 3D manufacturing, an innovative approach to producing full-sized 3D materials from computer aided design offering the potential for huge savings in material use when compared to traditional manufacturing technology. For example, a product designed on one continent can be manufactured immediately on two remote continents with the same Specifications but for different customers, which reduces the time, expensive and wasteful tooling consumption, material processing process and logistics.

- 4- The use of automation, which is an important part of manufacturing operations in all sectors, except for specific sectors such as the construction sector. Automation has helped increase productivity and reduce costs. Automation provides efficiencies in time, energy, and resources, thus ensuring sustainable manufacturing conditions.

- 5- Education, as it is considered the most obvious mechanism to properly shape the social pillar of sustainability, starting with parents, family, and schools at the end. With the advent of the Internet and digital and social media, young or old individuals are accepting learning more from social media because it has become the medium that we use most Greater in interaction and communication, perhaps in a way that exceeds our communication with the individuals surrounding us in our daily lives. Hence, the design, development, and implementation of smart education principles to achieve sustainability.

2) The socially responsible operational guide for the Big Green Tractor company for their pollutants:

a. Standard on disposal of chemical waste

Chemical waste is defined as a group of waste resulting from industrial, medical, or agricultural activities, which, due to their quantity, concentration, or chemical, physical, or biological properties, pose risks to human health and the environment through handling, storage, transportation, and treatment, as chemicals and waste are considered an integral part of all sectors. society, and its proper management is essential to protect human health and the environment. Note that the Environmental Protection Agency, the Occupational Safety and Health Administration, and governmental and local regulations regulate the use and disposal of chemicals. The waste must be placed in metal drums / containers lined with non-interacting materials, and a label must be placed on it showing all

information about the product in accordance with APA standards. It must also verify the absence of any leaks from it and making sure that it is not filled to a large extent or that it is not filled more than the required capacity. There are several ways to get rid of chemical waste based on ensuring that this waste does not reach any of the components of the environment that we list as follows:

- 1- Incineration: Most of the waste that is disposed of in this way is medical waste, as it is burned at high temperatures in tightly closed incinerators, and is equipped with a system to control emission emissions in order to ensure the elimination of any type of virus present in it. It can also be used for highly inflammable waste. Re-energy generated from burning.
- 2- Safe burial or burial in capsules: This type is often used for radioactive waste, as it is buried in sealed barrels at a great depth below the surface of the earth, provided that monitoring of the increase in radiation in the area begins, so that procedures for repackaging and burial are taken.
- 3- Injection into deep underground wells so that these wells are far from groundwater sources and isolated from each other.

Note that the best way to get rid of chemical waste is to dispense with or reduce those materials or technologies that produce hazardous waste and look for alternatives to those materials.

b. Green alternatives to traditional manufacturing process.

In light of the increase in environmental pollution taking place in our world, we must find alternatives to reduce and limit the phenomenon of environmental pollution, as manufacturing, along with other industrial processes, is one of the primary sectors targeted for the use of green technology. Therefore, we present some of the most important points for the transition from the traditional method to environmentally friendly methods as follows:

- 1) Energy: None of the manufacturing companies can dispense with energy, as it is the most important element in the production process. Therefore, traditional methods of generating energy must be dispensed with and replaced by other methods (renewable energy) through generating electricity, heating or fuel from renewable sources and using them within the company. For example, wind sources, geothermal energy, solar energy, hydroelectric energy, landfill gas, and municipal solid waste, taking into account the replacement of machines and devices that consume large energy with energy-saving ones in all departments of the company and the factory, which will necessarily reduce radiation and smoke emissions ... etc.
- 2) Recycling: relying on waste reduction through the reduction of wasted components and the reuse and recycling of raw materials dumped in containers, such as recycling wood and aluminum by-products and reusing them by donating sawdust to farms or reusing cardboard boxes and converting waste papers into packaging materials Environmentally friendly, as it requires little energy for manufacturing, knowing that environmentally friendly products are manufactured with the least possible amount of harmful chemicals and toxic compounds.
- 3) Establishing a team of environmentally friendly work crews is crucial to establishing environmentally healthy business practices for the company and being able to apply this concept effectively and productively, bearing in mind that the work team did not provide you with the maximum value of the sustainability approach without their understanding of the positive implications of it and the reform results based on that, so it must Training the work team and giving them training courses and practical lectures to learn about the benefits and advantages of using technology and its impact on the environment in order to reach full awareness of sustainability practices.

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