COVER PAGE AND DECLARATION

	Master of Business Administration (M.B.A.)
Specialisation:	MBA in Strategy
Affiliated Center:	CEO Business School
Module Code & Module Title:	MGT550 Managing Operations
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Student ID:	EIU2020836
Word Count:	
Date of Submission:	20-04-2023

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MGT 550: Managing operations

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1. Introduction

The process through which a company transforms raw resources into completed products falls under the purview of a business's operating system. Hitt, Carnes, and Xu (2016) define "operations management" as "the method by which all resources, within a specified arrangement, are integrated and converted in a well-ordered manner, adding value by management's strategies or rules." This definition is taken from the book "Operations Management." The generation of hazardous waste from chemical processes is a contemporary problem for businesses. The term "chemical waste" refers to any waste material, whether liquid, gaseous, or solid, that presents significant hazards to both the natural environment and human health. There is a danger to both humans and the environment posed by the chemical waste that is produced by enterprises. According to Gutberlet and Uddin (2017), the production of industrial tractors involves the utilization of oils, pesticides, and other commercial chemicals, all of which contribute to the discharge of hazardous waste. The majority of these emissions are composed of nitrogen oxides and nitrogen dioxide. Because an excessive amount of nitrogen in the soil can disrupt plant growth, emissions of nitrogenous gas are detrimental to the health of plants. Diesel engines are a major contributor to air pollution because they are frequently used in heavy-duty trucks and create more harmful pollutants than gasoline engines do (Brack, 2019). Diesel engines are also more expensive than gasoline engines. The key objective of this study is to draft an extensive operational industrial streamlining procedure guide that may be utilized by the Big Green Tractor Company, which is headquartered in Indonesia, to optimize its manufacturing procedures from the very beginning to the very end. In addition, ideas for making the manufacturing procedure used by the corporation less polluting and therefore less damaging to the natural environment will be included in the report. The discussion will center on contemporary approaches that can be used to develop an operation that is friendlier to the environment. Second, the findings of this research will be used to compile a guide for the non-polluting operations of Big Green Tractor. In addition to this, it offers advice on the proper disposal of chemical waste by businesses and offers information on environmentally friendly production techniques that can be used instead of traditional ways.

2. About Company

The Big Green Company is an Indonesian tractor manufacturer with headquarters in Palembang. The company's operations are not very efficient or environmentally friendly, which has led to a decline in recent years. This business plans to reorganize to become more competitive.

3. Operational Procedural Guide

3.1. Recommendations for manufacturing processes

Costs associated with agricultural machinery are visible throughout the production process. New technology, massive pieces of machinery, rising energy prices, greater pricing for parts, and other factors all contribute to astronomical price tags. To reduce production costs, the following strategies should be suggested to the Indonesian firm Big Green Tractor.

Reduction of cost by modular designs and standardization

The modular construction of the tractors allows the Big Green Tractor Company to reduce production costs. Modular design is tailor-made, updated, and cutting-edge. Combining and standardizing production methods will help bring down prices and increase product variety. Order lead times can be reduced, expansion times can be compressed, economies of scale can be realized, maintenance and repairs can be made with greater ease and production diagnostics can be simplified with a modular design. As a result, the tools will last longer, and the equipment will be more desirable (Mutingi et al.,2017). Manufacturing expenses can be cut if products are simplified and standardized. When a product is standardized, it is evaluated to find the best possible industrialized procedures, associated methods, and manufacturing tools. Design and engineering, practices, resources, testing methods, provisions, and more must all be up to snuff to meet the standard (Kuhl and Krause, 2019).

Reduction of cost of the purchased materials

The Big Green Tractor Company needs to start using a more diversified approach to material buying. Because of the diversity in the company's supply sources, the sourcing strategy and supply chain system must be evaluated as a whole (Kshetri, 2018). The company's ability to choose the optimal mix of off-shore and near-shore production is facilitated by diversification strategies. To gain access to a wide range of intelligence, businesses need to cultivate tight relationships with a wide variety of providers. Additionally, supply chain diversity results in improved flexibility in meeting the ever-evolving needs of clients, and this in turn will guarantee high-quality service (Chu et al., 2017).

Just in Time Approach in manufacturing processes

The company has to implement a just-in-time strategy in its production line to boost efficiency and cut down on waste by stocking up on materials and supplies as they are needed. The total cost of stockpiling will go down as a result of this. With a JIT strategy, you won't have to waste time or money on things like unnecessary manufacturing, waiting around for materials, or keeping unnecessary stock on hand. By using this route, factories will be able to cut costs without sacrificing quality by ensuring enough supplies of necessary components (Chiu et al., 2017)

Automation in manufacturing processes

The Big Green Tractor Company needs to implement automation to make their production more efficient and affordable. Automating a manufacturing process is carrying out those steps in a specific order using machines and instruments that do not require human intervention. It's a method of production management that relies on mechanized, electronic, and computerized systems to run and regulate operations (Wolfram et al., 2017). Here are some of how automation in production helps:

• Superior workmanship: It leads to fewer defects overall, guaranteeing a high standard of quality in the final product.

• Lower labor costs and less reliance on labor shortages as a result of automation of previously labor-intensive processes.

The period between a client placing an order and receiving the product is shortened thanks to the shorter manufacturing lead time.

3.2. Plan to minimize defects in the entire manufacturing process

It is common knowledge that a product has a low defect rate when it has been manufactured successfully. It takes more time and money to fix a product if there are more flaws in it (Ford and Despeisse, 2016).

Method of Six Sigma

The efficiency of production operations has been enhanced because of this method. The primary goal of the Six Sigma approach is quality control of manufacturing processes and, by extension, the

reduction of faults. As Six Sigma identifies and produces higher-quality goods by removing the sources of flaws and increasing consistency in production (Gijo and Scaria, 2014).

The Kaizen Method

It's a method that aids production facilities in their quest for constant advancement. It's a strategy for implementing new ideas generated during brainstorming sessions to improve existing procedures in an ongoing manner. The primary objective of this method is to increase productivity by eliminating waste from existing consistent procedures and programs in industrial processes. Defect reduction is essential in today's business climate, where competition, product innovation, high customer expectations, and efficient supply chain management are all on the rise. Kaizen is a six-stage process that involves identifying areas for improvement, analyzing existing practices, coming up with new ideas, creating a plan for putting those ideas into action, and assessing the results.

The following is an example of an effective strategy for lowering failure rates throughout the production cycle:

- **Product design:** The first method for reducing manufacturing flaws is to have a well-thought-out product design. Defects in the manufactured item may be the result of sloppy design. It's best to include manufacturing engineers in the design process from day one. They can assist the organization saves both time and money thanks to their expertise in the production process. As a result, manufacturing errors can be reduced by incorporating an engineering team during the product development phase (Tao et al, 2018).

- **Flexibility during production**: Flexibility in the manufacturing process is one method for decreasing error rates. It will necessitate a transparent approach to manufacturing that can be useful for the business in the long run. Sometimes, new production methods are needed to establish product quality and reduce flaws.

- **Usage of technology:** Technology can aid the organization in finding manufacturing flaws, thus it's important to use it. IT services, computer modeling, and other forms of technology utilization are essential at the beginning of the manufacturing process so that problems can be solved promptly (Abrahams et al, 2015).

- **Take precautionary actions:** This plan will be used towards the end of the production process and entails taking preventative measures. The company must check the quality of its

machinery and make sure everything is running well.

- **Inspection:** The production process must be inspected regularly for the company to identify the root cause of the faults. In a 2015 study (Newman et al.
- **Sustain severe quality control:** A quality team must be involved at every level of production to ensure that the company's precise instructions and guidelines are being adhered to.
- **Communication flow:** Effective communication is one of the strongest ways for lowering the failure rate. Problems in manufacturing can be more easily identified if production workers, engineers, and others involved in the design process can talk to one another. As a result, the production process will become more efficient and have fewer errors.

3.3. Use of 21st-Century Tools for a greener process

- **Gemba:** Gemba is a tool of the 21st century that can be utilized to create more sustainable operations. It's a philosophy that instructs us to ignore our desks and focus instead on the ground floor, where all the action is. By engaging in in-the-moment reflection and conducting interviews with plant-level employees, the corporation can gain a more in-depth and nuanced grasp of genuine industrial concerns (Karam et al, 2018).
- **Hoshin kanri:** Hoshin kanri is another process-based technique for ensuring that a company's strategy is implemented at all levels of the organization. It aids in getting rid of the waste caused by poor communication and unclear leadership (Nicholas, 2016).
- **Heijunka:** This tool is the best instrument of the 21st century that helps businesses normalize the unpredictable patterns of customer demand and reduce industrial waste by evening out the volume of manufactured output over a stable time. Both lead time and stockpiles can be trimmed with its assistance (Santos, 2020).
- **Kanban:** Kanban is a visual tool used in lean manufacturing and Just in time to control the flow of production. It relies on predetermined product rotation based on signal cards that indicate when more stock is needed. This tool is useful since it reduces stock-outs and surplus production (Sabaghi et al., 2015).

- **Poka Yoke:** Another 21st-century tool for greener production and less waste is Poka Yoke, a lean manufacturing technique. It fixes problems by noticing when people make mistakes and intervening to prevent or correct those mistakes. Due to the difficulty associated with finding all mistakes and defects through inspection, this method efficiently identifies them in a short amount of time (Zhang, 2014).

- **Overall Equipment Effectiveness (OEE):** One 21st-century instrument that contributes to making processes greener is Overall Equipment Effectiveness (OEE). It's a setup for tracking how much time and money an industrial process wastes. Availability, performance, and quality losses are the three main categories. It aids by giving a benchmark and a method to monitor progress in cleaning up an industrial process. Perfect output can be achieved at 100% OEE (Binti et al, 2016).

4. Socially responsible pollutants plan

4.1. Industrial standards on disposal of chemical waste

Chemical waste disposal best practices and guidelines are provided by industry standards in the context of industrial settings. During production, most businesses release harmful chemical waste. The Environmental Protection Agency (EPA) establishes guidelines for dealing with industrial chemical waste. The EPA's industrial rules protect not only people but the environment as well. Furthermore, these rules help encourage environmentally thorough recycling and preservation of resources; making the instructions easier to recognize; offering flexibility in how particular chemical waste is managed; allowing for enhanced compliance. The following are some of the chemical waste disposal standards and recommendations used in the industrial sector:

(A) industrial standards.

- Methanol, acetone, methyl ethyl ketone, hydrofluoric acid, xylene, and other chemical wastes must adhere to

- Reclaim and refurbish profitable biochemical goods that have fallen out of specification.

- Label and secure hazardous materials before transporting them in an unreliable garbage truck to an unreliable waste TSDF.

(B) Requirements for the treatment of chemical waste, such as metal-contaminated liquids, glowing solutions for heaters, recycled oils, and oil filters.

- Carefully collect used oil from sieves, then properly dispose of it.
- Keep the glowing fluid in the radiator for future use.
- Recycled oils that have been mixed in with other types of hazardous trash should be treated as hazardous waste and managed accordingly.
- Collect used motor oil and other automotive fluids for reuse.
- Label and secure hazardous materials before transporting them in an unreliable garbage truck to an unreliable waste TSDF.

(C) Industrial standards for the disposal of chemical waste from rust removal and components cleaning, including ammonium hydroxide, hydrobromic acid, benzene, potassium hydroxide, and more.

- Clean Water Act-mandated wastewater treatment facilities must be implemented.
- To ascertain the prevalence of dusters in your region, you must reach an agreement with a national or regional EPA agency.
- Recover diluents in an on-site purification department and either recycle them or negotiate to have them shipped off-site for reuse.

(D) Batteries contain compounds like nickel, iron, carbonate, etc., that are considered chemical waste according to industry standards.

- The scrap metal can be sold to a recycling center.
- Get the batteries together for the return.
- Recycle the batteries right there using an outside service or a community recycling center.
- Retread them or send them to be recycled.

(E) Requirements for commercial chemical waste from cleaning tank trucks, including but not limited to acid cleansers, ethyl benzene, wastewater, volatile organic pollutants, and more

- Utilizing reclaimed wastewater solutions for initial cleaning of very soiled storage containers.
- Have a recovery unit buy up any unsold commercial biochemical leftovers.
- Neutralize acid wastes with the remaining alkaline.

4.2. Green Alternatives to traditional manufacturing processes

Green manufacturing is an approach that lessens pollution and other negative effects on the environment. Only by making educated guesses about how customers will use your product can you hope to attain this goal. For green and environmentally friendly manufacturing operations, businesses should work toward reducing discharge, energy consumption, waste generation, and water use (Ashrafi, 2014). The following are some examples of potential new green alternate methods that can be developed throughout the production phase:

(A) Methods of Production that Use Lasers

It's a safer and more efficient alternative to conventional production methods that also reduces pollution. By reducing emissions during production, this method helps to have a positive effect on the natural world. Additionally, its non-contact nature aids in extending tool life (Manvatkar et al., 2015).

(B) Digitally fabricated products directly

Another environmentally friendly option, this one employ FDM technology to cut down on waste while increasing output. Additive manufacturing is used in a low-volume industrial application to create real-world items from digital 3D CAD models. Fewer toxic components are used, and production is done on demand, making this method more environmentally friendly. The use of FDM technology in production reduces wastage. Plastic was widely used in conventional production processes. But because of the little amount of plastic used in the manufacturing process of FDM industrial parts, the amount of waste structure material is negligible (Holmström et al, 2016).

(C) Sourcing eco-friendly materials

The strategy entails making purchases of environmentally friendly goods and resources with qualities such as high recycling and reusability rates and low reliance on potentially dangerous substances. Reduced product costs, enhanced business performance, and more environmentally friendly output are all possible with this supply chain strategy (Rashid and Aslam, 2018).

(D) Alternative fuels and energy sources

Sustainable economic and environmental growth requires the use of renewable energy in the company's supply chain activities. Using biofuels decreases a business's carbon footprint, which boosts the bottom line (Fontes and Freires, 2018).

(E) Eco-Friendly Supply Chain Management

It's the practice of using ecological methods and policies to lessen the negative effects of a company's operations on the environment. When compared to conventional production methods, green logistics is the clear winner. It's useful for putting a price on the environmental impact of logistics operations. In addition, it aids in lowering soil, air, noise, and water pollution by measuring the impact of each logistics sector. Waste management, as well as material processing, transportation, and packaging, are other areas of focus. Supply chain performance and product design can both benefit from the implementation of green logistics practices (Chhabra and Singh, 2016).

5. Summary and Conclusion

It is abundantly evident, in light of the pollution prevention plan and operational guidance that was discussed previously, that the concept of sustainability plays an essential part in each and every stage of production. Two of the most essential ideas for cutting production costs have been found, and these are modular designs and standardized processes. In addition to this, it has been demonstrated that process modification is beneficial for design allocation across product lines. If the company uses the just-in-time methodology, it will be able to reduce its stockpile, which will allow it to save additional money. Because of this, you shouldn't build up your supply of goods unless it's really required to do so. In addition, in order to automate its production processes, the Big Green Tractor Company can get by with fewer people working there and more machinery. As was previously said, a range of strategies, such as the kaizen approach and the six-sigma method, can be utilized to cut

down on the number of flaws that are produced during the manufacturing process. The operational plan also highlighted the incorporation of 21st-century tools such as kanban, heijunka, Gemba, hoshin kanri, poka yoke, and overall equipment effectiveness into the more environmentally friendly procedure. As a result, it follows that the industrial sector does not hold all forms of chemical waste generated during manufacturing to the same level. In conclusion, it can be stated that direct digital production, laser-assisted manufacturing, environmentally friendly procurement of materials, renewable energy, and biofuels are the green alternatives to conventional manufacturing processes.

References

Abrahams, A. S., Fan, W., Wang, G. A., Zhang, Z., and Jiao, J. 2015. An integrated text analytic framework for product defect discovery. *Production and Operations Management*, *24*(6), 975- 990.

Ashrafi, N. 2014. A review of current trend in design for sustainable manufacturing. *IOSR Journal of Mechanical and Civil Engineering*, *11*(4), 53-58.

Binti Aminuddin, N. A., Garza-Reyes, J. A., Kumar, V., Antony, J., and Rocha-Lona, L. 2016. An analysis of managerial factors affecting the implementation and use of overall equipment effectiveness. *International Journal of Production Research*, *54*(15), 4430-4447.

Brack, W., Hollender, J., de Alda, M. L., Müller, C., Schulze, T., Schymanski, E., ... and Krauss, M. 2019. High-resolution mass spectrometry to complement monitoring and track emerging chemicals and pollution trends in European water resources. *Environmental Sciences Europe*, *31*(1), 62.

Chhabra, D., and Singh, R. K. 2016. Justification of green logistic practices in Indian enterprises using analytic hierarchy process. *International Journal of Logistics Systems and Management*, *25*(3), 295-312

Chiu, Y., Yang, C. H., and Lin, P. C. 2017. A Just-in-Time Inventory Model with Preventive Maintenance and Defect Rate. *International Journal of Information Systems and Supply Chain Management (IJISSCM)*, *10*(4), 44-60.

Chu, S. H., Yang, H., Lee, M., and Park, S. 2017. The impact of institutional pressures on green supply chain management and firm performance: Top management roles and social capital. *Sustainability*, *9*(5), 764.

Fontes, C. H. D. O., and Freires, F. G. M. 2018. Sustainable and renewable energy supply chain: A system dynamics overview. *Renewable and Sustainable Energy Reviews*, *82*, 247-259.

Ford, S., and Despeisse, M. 2016. Additive manufacturing and sustainability: an exploratory study of the advantages and challenges. *Journal of Cleaner Production*, *137*, 1573-1587

Gijo, E. V., and Scaria, J. 2014. Process improvement through Six Sigma with Beta correction: a case study of manufacturing company. *The International Journal of Advanced Manufacturing Technology*, *71*(1-4), 717-730.

Gutberlet, J., and Uddin, S. M. N. 2017. Household waste and health risks affecting waste pickers and the environment in low-and middle-income countries. *International journal of occupational and environmental health*, *23*(4), 299-310.

Hitt, M. A., Carnes, C. M., and Xu, K. 2016. A current view of resource based theory in operations management: A response to Bromiley and Rau. *Journal of Operations Management*, *41*(10), 107-109.

Holmström, J., Holweg, M., Khajavi, S. H., and Partanen, J. 2016. The direct digital manufacturing (r) evolution: definition of a research agenda. *Operations Management Research*, *9*(1-2), 1-10.

Iravani, A., Akbari, M. H., and Zohoori, M. 2017. Advantages and disadvantages of green technology; goals, challenges and strengths. *Int J Sci Eng Appl*, *6*(9), 272-284.

Karam, A. A., Liviu, M., Cristina, V., and Radu, H. 2018. The contribution of lean manufacturing tools to change over time decrease in the pharmaceutical industry. A SMED project. *Procedia Manufacturing*, *22*, 886-892.

Kshetri, N. 2018. 1 Blockchain's roles in meeting key supply chain management objectives. *International Journal of Information Management*, *39*, 80-89.

Kuhl, J., and Krause, D. 2019. Strategies for customer satisfaction and customer requirenmnet fulfillment within the trend of individualization. *Procedia CIRP, 84,* 130-135.

Manvatkar, V., De, A., and DebRoy, T. 2015. Spatial variation of melt pool geometry, peak temperature and solidification parameters during laser assisted additive manufacturing process. *Materials Science and Technology*, *31*(8), 924-930.

Mutingi, M., Dube, P., and Mbohw, C. 2017. A modular poduct design approach for sustainable manufacturing in a fuzzy environment. *Procedia Manufacturing, 8,* 471-478.

Newman, S. T., Zhu, Z., Dhokia, V., and Shokrani, A. 2015. Process planning for additive and subtractive manufacturing technologies. *CIRP Annals*, *64*(1), 467-470.

Nicholas, J. 2016. Hoshin kanri and critical success factors in quality management and lean production. *Total Quality Management and Business Excellence*, *27*(3-4), 250-264.

Rashid, K., and Aslam, H. 2018. Does Green Matter? A Study of Perception of Manufacturers and Consumers of a Developing Country about Green Supply Chains. *Journal of Management and Research*, *5*(1), 1-26.

Sabaghi, M., Rostamzadeh, R., and Mascle, C. 2015. Kanban and value stream mapping analysisin lean manufacturing philosophy via simulation: a plastic fabrication (case study). *International Journal of Services and Operations Management*, *20*(1), 118-140.

Santos, P. V. S. 2020. Leveling of production through the application of the Heijunka method. *Journal of Lean Systems*, *5*(1), 126.

Siddh, M. M., Soni, G., Gadekar, G., and Jain, R. 2014. Integrating lean six sigma and supply chain approach for quality and business performance. In *2014 2nd International Conference on Business and Information Management (ICBIM)* (pp. 53-57).

Tao, F., Cheng, J., Qi, Q., Zhang, M., Zhang, H., and Sui, F. 2018. Digital twin-driven product design, manufacturing and service with big data. *The International Journal of Advanced Manufacturing Technology*, *94*(9-12), 3563-3576.

Vogel, C., Walter, C., and Elkmann, N. 2017. Safeguarding and supporting future human-robot cooperative manufacturing processes by a projection-and camera-based technology. *Procedia Manufacturing*, *11*, 39-46

Zhang, A. 2014. Quality improvement through Poka–Yoke: from engineering design to information system design. *International Journal of Six Sigma and Competitive Advantage*, *8*(2),147-159.