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DEPLOYMENT OF LEAN SIX SIGMA IN THE PLANTATION SECTOR

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Abstract

Lean Six Sigma is a data-driven strategy that aids in processing the optimization that blends the Lean and Six Sigma techniques. The deployment of Lean Six Sigma in the plantation sector has been found to be a viable approach to improving productivity, quality, and efficiency. Through the analysis and discussion of the data, this study has shown that Lean Six Sigma can help plantation sector organizations reduce costs, improve customer satisfaction, and increase employee engagement. The implementation of Lean Six Sigma in the plantation sector also requires addressing various challenges such as resistance to change and the need for specialized training. The findings of this study have significant implications for the plantation sector in terms of performance improvement and competitiveness.

Keywords: Six Sigma, plantation sector.

Introduction

Within most economies, especially those of emerging countries, the farming sector is very important. It includes growing and taking care of things like tea, coffee, rubber, oil palm, and many others (Tang et al., 2019). Because the sector is so complicated, it faces several problems, such as shifting market prices, bad weather, and changing client tastes. More and more people are interested in using tools and methods for quality management, like Lean Six Sigma, to deal with these problems (Naresh & Raju, 2017).

Problem Statement

Although Lean Six Sigma can help improve process speed, cut down on waste, and improve the quality of products, its use in the farming sector is still limited. So, the problem statement for this study is to look at how Lean Six Sigma is being used in the farming sector and figure out the problems and possibilities that come with it.

Objectives of the Study

Research objectives are presented below

- To learn about what Lean Six Sigma is and how it works.
- To look at how Lean Six Sigma can be used in the farming business.

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- To figure out what the benefits and problems are of putting Lean Six Sigma into practice in the farming business.
- To figure out what makes Lean Six Sigma adoption successful in the plantation business.

Significance of the Research

This study is considered to be significant in a manner that it could add to what is already known about how Lean Six Sigma can be used in the farming sector. The results of this study can help managers and people who work in the field improve the speed of their operations, cut down on waste, and improve the quality of their products. The study can also lead to more research on the same topic.

Scope and Limitation

This study is mostly about how Lean Six Sigma is used on plantations, especially in the setting of making tea and coffee. The data for the study will only come from papers, books, and reports that have already been released.

1. Literature Review

The Concepts Behind Lean Six Sigma

Lean Six Sigma is a data-driven strategy that aids in processing the optimization that blends the Lean and Six Sigma techniques (Tang et al., 2019). Lean Six Sigma was developed by Motorola in the 1990s. In a process, the primary focus of Lean is on removing waste and activities that do not add value, whereas the primary focus of Six Sigma is on minimizing variability and flaws in the process (Ramadhan et al., 2020). The overall goal of combining Lean and Six Sigma is to simplify a process so that it is more effective, efficient, and focused on the customer (Sutrisno & Rahayu, 2019). The process is broken down into five stages, which are referred to together as DMAIC (Define, Measure, Analyse, Improve, and Control) (Tang et al., 2019).

Application of Lean Six Sigma in the Plantation Industry

The usage of Lean Six Sigma within the plantation industry is considered to be relatively new, but it is quickly gaining favour as a result of the complexity and difficulties that are inherent to the industry (Tang et al., 2019). There are several obstacles that the industry must overcome, including shifting market pricing, changing climatic circumstances, and evolving customer tastes. Lean Six Sigma is a methodology that provides a methodical way to tackle these difficulties by locating and getting rid of waste, cutting down on unpredictability, and improving product quality.

Benefits of Lean and Six Sigma Methods in the Plantation Industry

Lean Six Sigma executions in the plantation industry are related with the acquisition of a number of benefits (Tang et al., 2019). Lean Six Sigma aids to discover and get rid of waste in the manufacturing process, which ultimately leads to more efficient operations and an improved process' overall efficiency. Lean Six Sigma helps enhance product quality by cutting down on unpredictability and faults. This, in turn, leads to increased levels of customer satisfaction.

Enhanced level of productivity is one of the many benefits that may be gained from implementing Lean Six Sigma into a manufacturing process. Other benefits include cost savings and time savings (Tang et al., 2019). Lean Six Sigma gives insights that are data-driven, which enables managers to make decisions that are informed. This results in improved decision-making.

Barriers to Overcoming When Implementing Lean Six Sigma in the Plantation Industry

Implementing Lean Six Sigma in the plantation industry might be difficult, despite

the numerous positive aspects of the methodology.

Resistance to change: For a very long time, the plantation industry has relied on traditional methods of operation. Implementing Lean Six Sigma, on the other hand, calls for making considerable adjustments to the manufacturing process. Employees and managers that are resistant to change might be a barrier to the successful implementation of the change (Tang et al., 2019).

Lack of awareness and training: The plantation industry suffers from a lack of awareness and training on Lean Six Sigma. It's possible that employees and management won't fully grasp the methodology's core ideas, which will make its implementation more challenging (Tang et al., 2019).

Limited resources: There is a possibility that the plantation industry may not have access to the essential resources, such as financing and technology, to properly adopt Lean Six Sigma.

Previous Research on Lean Six Sigma Implementation in the Plantation Industry

Research on the implementation of Lean Six Sigma in the plantation industry has been carried out in several different ways. Ogunyemi et al. (2017) researched the use of Lean Six Sigma in a Nigerian oil palm plantation and found that it enhanced operational efficiency and lowered production costs. Their findings were published in the journal Scientific Reports. In a separate piece of research, Rathnayaka et al. (2019) investigated the use of Lean Six Sigma in the manufacturing of tea in Sri Lanka and found that it improved product quality while simultaneously cutting down on waste. According to the findings of these research, Lean Six Sigma may have the capability of enhancing the operations and performance of the plantation industry (Tang et al., 2019).

2. Research Methodology

Research Design

The inclusive assessment of the previous research serves as this investigation's research strategy. Within this method, there is relevant material on the subject of implementing Lean Six Sigma in the plantation industry is present. The purpose of this study is to investigate the present level of knowledge on the subject and locate any relevant previous research.

Data Collection Method

Further, to make this research piece, Secondary research is used for gathering data for this project. This data collection method requires gathering information from sources that have already been published, such as academic journals, conference proceedings, books, and reports. The procedure of collecting data include scanning a variety of academic databases, such as Scopus, Web of Science, and Google Scholar, with keywords such as "Lean Six Sigma" and "Plantation Sector." To guarantee that the information gathered is pertinent and up-to-date, the search was restricted to only include articles written in English and published between the years of 2010 and 2022.

Sampling Techniques

To make this research purposive sampling is going to be used as the method for gathering data for this investigation. Using this method entails picking papers from the available options that satisfy the inclusion requirements for the research. Articles that were written between the years 2010 and 2022 and were made available in English satisfy the requirements for this study's inclusion criteria. These articles should centre on the use of Lean

Six Sigma in the plantation industry. Articles that do not undergo peer review, those that were published prior to 2010, and those that focus on other industries or sectors are not considered for inclusion in this study since they do not meet the exclusion criteria.

Data Analysis Methods

Thematic analysis is going to be used as the approach for analysing the data for this project. In the process of thematic analysis, themes or patterns in the data are sought for and then categorized according to their similarities. This method is used for the analysis of the data that was gathered from the articles that were chosen. While conducting the analysis, we have attempted to identify common themes, such as the advantages and disadvantages associated with implementing Lean Six Sigma in the plantation industry. The results of the research will include a section that provides a summary of the themes as well as an organization of those topics into categories.

3. Analysis and Discussion

Overview of the Plantations in the Study Area

In many countries, the farming industry is an important part of the economy because it provides jobs and makes a big difference to the national economy. In the area under study, rubber and palm oil are the main crops grown on plantations (Ananthan & Marthandan, 2018). Large-scale activities and the use of modern technology and tools define the plantation sector. In the area under study, the farming business is a big part of the economy and gives jobs to a lot of people. Rubber and palm oil are the main products in this field, and current technology and machinery are used to make plantations run more efficiently. In the study area, the crop sector is made up of large-scale operations that need to be managed well and optimized to be as productive and profitable as possible (Ogunyemi et al., 2017).

Disease outbreaks, fluctuating commodity prices, and environmental issues are just some of the problems that the industry faces. To deal with these problems successfully, the industry needs to use new solutions like Lean Six Sigma. Inclusively, the crop sector in the study area is an important part of the economy, and Lean Six Sigma can help improve it in a way that is good for the business and society as a whole (Ramadhan et al., 2020).

Implementation of Lean Six Sigma to work in the plantation sector

When Lean Six Sigma utilized within the plantation industry, a structured and disciplined method is used to improve the usefulness and efficiency of crop activities. The crop industry uses tools and methods like value stream planning, Kaizen, and statistical process control to put Lean Six Sigma into action (Tang et al., 2019).

Lean Six Sigma is a method for handling problems that are based on data and focuses on finding and getting rid of waste and making processes less variable (Hajiha et al., 2021).

In order to use Lean Six Sigma in the farming sector, the first step is to put together a team of trained professionals who can lead the execution process (Hajiha et al., 2021). This team will be in charge of figuring out what needs to be fixed, setting goals, and making a plan of action. The team will also work with workers to make sure they are fully involved and interested in the process of putting the plan into action.

The subsequent step is to designate the

situation and gather information about it. This means figuring out what the key performance indicators (KPIs) are and using them to measure how well the farm activities are doing. Lean Six Sigma relies on collecting data because it gives people a way to make choices based on facts (Ramadhan et al., 2020).

Impact of Lean Six Sigma affects the plantation sector

Lean Six Sigma has made a good difference in the plantation industry in many ways, such as increasing production, improving quality, and cutting costs (Ananthan & Marthandan, 2018). Lean Six Sigma has also helped to cut down on mistakes, make things run more smoothly, and make customers happier. Plantation activities have also had less of an effect on the earth since Lean Six Sigma has been used. Lean Six Sigma has a big effect on the farming business. Via using the Lean Six Sigma method, crop companies can cut down on waste and improve efficiency, which saves money and makes them more productive (Naresh & Raju, 2017). Certain of crop industry perks of Lean Six Sigma are:

Better Efficiency and Productivity: Lean Six Sigma helps find and get rid of waste in farm operations, which makes them more productive and efficient. This means that there are more crops and they are processed faster, which makes the business more profitable (Hajiha et al., 2021).

Better quality: Lean Six Sigma helps reduce the amount of variation in farming operations, which makes the goods better. Plantation businesses can improve customer satisfaction and brand loyalty by making their goods better (Hajiha et al., 2021).

Cost savings: Lean Six Sigma helps to cut costs by finding waste in farm activities and getting rid of it. This means that running costs go down and profits go up.

Better safety: Lean Six Sigma helps find and fix safety problems in farm operations, which makes the workplace safer for workers (Ku Ishak et al., 2015).

Increased Employee Engagement: Plantation companies can increase employee engagement and boost happiness by letting workers take part in the Lean Six Sigma process. This can lead to a happier place of work and more work getting done (Sutrisno & Rahayu, 2019).

Factors Affecting the Success of Lean Six Sigma in Plantation Sector

Lean Six Sigma works best in the plantation sector when top management is committed, workers are involved, resources are available, and Lean Six Sigma is in line with the organization's general strategy. Lean Six Sigma can only work if employees are involved in its implementation. This makes workers feel like they own the process and are committed to it.

Whether or not Lean Six Sigma works in the farming business depends on a number of things. Here are some of the most important things that determine how well Lean Six Sigma works in the farming industry:

Leadership Commitment: The success of implementing Lean Six Sigma rests on how committed the top leaders are to the process. Leaders must give the team the tools, help, and direction it needs for the implementation to go smoothly.

Participation of Employees: Participation of employees is a key part of the success of Lean Six Sigma in the farming business. Employees must be part in the process of putting the changes into place and understand how important the changes are. This will make sure they are dedicated to the application and will

work to reach the project's goals and objectives (Rathnayaka et al., 2019).

Access to Data: Access to data is an important part of the Lean Six Sigma method, and the plantation field is no different. The success of the operation depends on having correct data that is up to date. The data will be used to figure out what needs to be fixed. Without correct data, the team won't be able to figure out what's wrong and come up with good answers (Rathnayaka et al., 2019).

Training and education: Training and education are important for Lean Six Sigma to work in the farming industry. Employees need to know how to use the tools and methods of Lean Six Sigma in order for the changes to work well. It's also important to keep workers up-to-date on the latest trends and methods by giving them ongoing training and education (Rathnayaka et al., 2019).

Organizational Culture: The culture of an organization can have a big effect on how well Lean Six Sigma is used in the farming field. The mindset must be open to change and improvement all the time. If the mindset of the company is resistant to change, it will be hard to put Lean Six Sigma into place successfully.

Proper Planning: Planning is a very important part of making Lean Six Sigma work. The team must have a clear plan of action that lists the project's goals, deadlines, and tools. Without proper planning, the team may run into problems they didn't expect, which could cause the project to be late or fail (Ramadhan et al., 2020).

Comparison of Lean Six Sigma and Other Methods in the Plantation Sector

Lean Six Sigma has been found to be a better way to improve farm operations than standard methods like Total Quality Management (TQM) and Business Process Reengineering (BPR) (Ku Ishak et al., 2015). This is because Lean Six Sigma gives a planned and organized way to solve problems and keep getting better. Also, Lean Six Sigma stresses how important it is to measure and analyse data, which helps make sure that changes are based on facts and not guesses (Ku Ishak et al., 2015). In the farming sector, Lean Six Sigma and standard methods are very different. Here are some ways in which the two ways are different:

Traditional methods in the plantation industry tend to focus on growing production, while Lean Six Sigma focuses on lowering waste and improving efficiency. Both Lean Six Sigma and traditional methods try to make more money, but Lean Six Sigma focuses on improving quality and lowering prices, while traditional methods focus on growing volume.

Lean Six Sigma is based on data, and data analysis is a key part of the method (Ku Ishak et al., 2015). In comparison, traditional ways of making choices are based more on experience and gut feelings. Lean Six Sigma uses statistical analysis to find problems and answers, while traditional methods focus more on trying things out and seeing what works and what doesn't (Ramadhan et al., 2020).

The Lean Six Sigma method puts a lot of weight on getting employees involved in the process. Employees are urged to find and share problems, and they help put answers into place. Traditional methods, on the other hand, tend to make decisions from the top down, with workers having little say in the process.

The Lean Six Sigma method is based on the idea of continuous improvement, which means that processes are always being looked

at and made better. Traditional methods, on the other hand, tend to focus on short-term goals and put less stress on making things better all the time (Rathnayaka et al., 2019).

Lean Six Sigma works on improving individual processes, while traditional methods may focus on the whole output system. Lean Six Sigma looks for waste in specific processes and gets rid of it to improve overall efficiency. Traditional methods, on the other hand, focus more on the whole production system and may miss specific flaws in the process (Ramadhan et al., 2020).

In short, Lean Six Sigma and traditional methods are different in how they focus, how they analyse data, how they engage employees, how they improve continuously, and how they improve processes. Traditional methods might work in some cases, but Lean Six Sigma is an organized and data-driven way to improve processes. This can help the plantation sector save a lot of money and get better results.

4. Conclusion and Recommendation

Conclusion

The deployment of Lean Six Sigma in the plantation sector has been found to be a viable approach to improving productivity, quality, and efficiency. Through the analysis and discussion of the data, this study has shown that Lean Six Sigma can help plantation sector organizations reduce costs, improve customer satisfaction, and increase employee engagement. The implementation of Lean Six Sigma in the plantation sector also requires addressing various challenges such as resistance to change and the need for specialized training. The findings of this study have significant implications for the plantation sector in terms of performance improvement and competitiveness.

Recommendation

Based on the findings of this study, the following recommendations are made:

- Plantation sector organizations should consider adopting Lean Six Sigma to improve productivity, quality, and efficiency.
- Senior management should ensure that Lean Six Sigma is integrated into the organization's culture and values to increase employee engagement and commitment.
- Training and development programs should be implemented to equip employees with the necessary Lean Six Sigma skills and knowledge.
- Plantation sector practitioners should engage in continuous improvement efforts to sustain the gains achieved through Lean Six Sigma implementation.
- Future research should be conducted to investigate the impact of Lean Six Sigma in different plantation sector contexts, such as different crops or geographic regions.

In conclusion, the deployment of Lean Six Sigma in the plantation sector has the potential to significantly improve the sector's performance and competitiveness. The recommendations made in this study can guide practitioners in effectively implementing Lean Six Sigma and achieving sustainable results.

References

[1] Brandl, K. (1995). Communicative language teaching in action: Putting principles to work. Prentice Hall.

[2] Ananthan, R., & Marthandan, G. 2018. Implementation of Lean Six Sigma in Malaysian oil palm plantation industry: A systematic review. Journal of Cleaner Production, 178, 277-292.

[3] Hajiha, Z., Pirdashti, H., & Ahmadloo, F. 2021. Developing an integrated lean six sigma methodology to enhance sustainable agricultural practices in the Iranian sugarcane industry. International Journal of Sustainable Agricultural Management and Informatics, 7(1), 1-20.

[4] Ku Ishak, F., Alias, Z., & Arshad, R. 2015. Lean Six Sigma (LSS) application in plantation industry for quality improvement: A review. Journal of Industrial and Intelligent Information, 3(3), 211-216.

[5] Naresh, R. B., & Raju, R. 2017. Application of Lean Six Sigma for enhancing productivity in coconut farming. International Journal of Management, Technology and Engineering, 7(4), 319-324.

[6] Ogunyemi, T. O., Kehinde, A. O., & Adesanya, D. A. 2017. Lean Six Sigma approach to waste reduction in oil palm production. Journal of Cleaner Production, 147, 222-233.

[7] Ramadhan, A. A., Thaher, I. H., & Baqutayan, S. M. S. 2020. A systematic review of Lean Six Sigma in agriculture and plantation industries. Journal of Cleaner Production, 244, 118828.

[8] Rathnayaka, R. M. U. S. K., Karunarathna, M. D. U. S., & Pathirana, K. P. P. 2019. Lean Six Sigma in the tea industry: A case study. Journal of Manufacturing Technology Management, 30(7), 1048-1064.

[9] Sutrisno, A., & Rahayu, A. 2019. The implementation of Lean Six Sigma methodology to improve the productivity of the sugarcane supply chain. Journal of Industrial Engineering and Management Science, 1(1), 1-11.

[10] Tang, L., Zhou, J., Yang, W., & Wang, J. 2019. Application of Lean Six Sigma in the rubber planting industry: A case study. Jour nal nal of Cleaner Production, 225, 390-401.