Understanding & Integrating Lean 6 Sigma for Continuous Improvement in Technical Sales

An Internship Report for

Course code and Course Title: MGA-652 Final Internship Report

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MBA in Marketing

by

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Under the Mentorship of

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Goa Business School

Master of Business Administration

GOA UNIVERSITY/GOA BUSINESS SCHOOL

DATE: MAY 2024

Examined by:

Seal of the School/Dept

Goa Business School

DECLARATION BY STUDENT

I Sourabh Naik Khandolkar hereby declare that the data presented in this Internship report entitled, "Understanding & Integrating Lean 6 Sigma for Continuous Improvement in Technical Sales" is based on the results of investigations carried out by me in the (Marketing Department) at the Goa Business School, Goa University/Packaging Industry, under the mentorship of Prof. Nirmala Rajanala and the same has not been submitted elsewhere for the award of a degree or diploma by me. Further, I understand that Goa University or its authorities/College will be not be responsible for the correctness of observations / experimental or other findings given the internship report/work.

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Signature and Name of Student

Seat no: 22P0280038

Date: 3/5/2024

Place: Goa University

COMPLETION CERTIFICATE

This is to certify that the Internship report, "**Understanding & Integrating Lean 6 Sigma for Continuous Improvement in Technical Sales**" is a bonafide work carried out by Mr. Sourabh Shanu Naik Khandolkar under my mentorship in partial fulfilment of the requirements for the award of the degree of Master of Business Administration in the Discipline Marketing at the Goa Business School, Goa University.

Signature and Name of Mentor

Date: 3/5/2024

Signature of Dean of School/HOD

Date: 3/5/2024
Place: Goa University/Goa Business School

School/Department Stamp

Goa Business School
Goa University

OFFER LETTER

SYNTEGON
PROCESSING & PACKAGING

Programme Director
Management Discipline
Goa Business School, Goa University
Taleigao Plateau,Goa-403206

PA/HRL-IN 15.01.2024

Dear Sir/Ma'am,

Sub: Approval to undergo Internship Training for Sourabh Naik Khandolkar

With reference to your letter dated 08.01.2024, please note that your student Sourabh Naik Khandolkar has been accorded permission to undergo internship in our organization from 16.01.2024 to 04.05.2024.

Mr. Shrishail Basavaraj Amati, Manager (Projects), would be the internal guide during the internship.

Canteen facility would be extended to your student; the student will have to commute on his own to the Factory. The student will have to make his own arrangements for PPE's like safety shoes, etc. which is mandatory.

We wish Sourabh Naik Khandolkar, a fruitful learning experience in our Plant.

Thanking you,

For **Syntegon Technology India Private Limited,**

Derek Dsouza
Manager
Human Resources

Raghuvir E Harish Damodar Shirodkar
Assistant Manager
Human Resources

Syntegon Technology India Pvt. Ltd.

CIN: U29309GA2019FTC014014

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INTERNSHIP COMPLETION CERTIFICATE

SYNTEGON
PROCESSING & PACKAGING

HRO-IN 03.05.2024

TO WHOM IT MAY CONCERN

This is to certify that Sourabh Naik Khandolkar student of Goa Business School, Goa University had undertaken his internship/training in our organization from 16.01.2024 to 03.05.2024.

Sourabh Naik Khandolkar has completed his internship in the Product Management department at Syntegon Technology India Private Limited, according to given guidelines.

Syntegon Technology India Private Limited, being leader in the Packaging Technology, Sourabh Naik Khandolkar was at advantage of getting to know some of the latest aspects in Product Management, which are followed in an organization of International repute.

We wish him the very best in all his future endeavors.

Thanking You
For Syntegon Technology India Private Limited,

Shrishail Basavaraj Amati
Manager
(Technical Sales)

Derek D'souza
Manager
(Human Resources)

Syntegon Technology India Pvt. Ltd.

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Formerly known as 'Robert Bosch Packaging Technology India Private Limited'

Syntegon Technology India Private Limited
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Verna, Goa-403722
INDIA

ACKNOWLEDGEMENT

This First and foremost, I would like to extend my heartfelt appreciation to Syntegon for providing me with the opportunity to be a part of this esteemed organization, particularly the Technical Sales HOD, **Mr. Shrishail Amati** for the trust and confidence placed in me to contribute during my internship.

I would also like to express my deepest gratitude to the entire department for their invaluable guidance, support and mentorship throughout the duration of my internship. A special thanks to **Mr. Abhinay Khandeparkar** who was instrumental to my learning experience with his expertise, constructive feedback, and willingness to share knowledge. I am also grateful to the rest of the Technical Sales department for extending their support and coordination.

Finally, I would like to thank my institution and my mentor **Dr. Nirmala Rajanala** for providing this opportunity to apply the theoretical knowledge gained during my MBA studies in a real business setting. My internship experience at Syntegon has been enriching and has provided me with practical insights into the operations and dynamics of an organization.

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EXECUTIVE SUMMARY

This report is based on the summer internship project which is a study conducted at Syntegon Technologies Pvt Ltd, Verna - Goa. This report explores the integration of Lean 6 Sigma principles into the Technical Sales department at Syntegon, a project-based company in the Packaging Industry. The study aims to address the challenges faced by the Technical Sales team through the implementation of Lean 6 Sigma initiatives. Through a comprehensive analysis, the study evaluates the impact and benefits of Lean 6 Sigma initiatives on process efficiency and operational performance. The research findings highlight the effectiveness of Lean 6 Sigma in driving continuous improvement to achieve operational excellence within the Technical Sales department at Syntegon. The internship is aimed to provide valuable learning opportunities, practical experience, and exposure to the industry for me. It served as a bridge between academic learning and real-world application, offering a platform to develop skills, network with professionals, and gain insights into the business environment.

1 PROFILE OF THE COMPANY

1.1 Company Overview

Syntegon Technology is a leading global processing & packaging technology provider. The company headquartered in Waiblingen, Germany has been offering complete processing & packaging solutions for food & pharma industries for over 50 years. More than 6100 employees at 30 locations in more than 15 countries generated a total revenue of 1.3 billion euros in 2018. The portfolio of intelligent and sustainable technologies includes standalone machines, as well as complete systems and services.

In the food industry, the portfolio includes process technology for confectionery as well as packaging solutions for dry foods (Eg: bars, bakery products and coffee), frozen foods and dairy products. In 1995, they started with its' India operations in Bangalore, India. It was relocated to Verna, Goa in 2007 just 5 years later, a new state of the art manufacturing and development facility was inaugurated in Goa, intending to fullfill capacity expansion and to meet the increasing demand of domestic and international markets.

Syntegon Technology India offers customized packaging solutions for domestic & international markets in food and non-food segment. The ISO certified unit designs, manufactures vertical form, fill and seal machines and horizontal flow wrap machines.

Syntegon was founded in 1969 as Robert Bosch Apparatebau GmbH. In 2020, they left the Bosch Group and are now known as Syntegon. Over the decades they have acquired extensive know how in various technology segments. Syntegon's technological innovations have always put us one step ahead.

1.2 Vision Statement

Intelligent and sustainable solution for everyone.

1.3 Mission Statement

Processing and packaging for a better life.

1.4 Values

- Ensure quality, performance and commitments made to customers are fulfilled.
- Achieve operational excellence through lean and continuous improvement drives.
- Achieve operational excellence through lean and continuous improvement drives.
- Strict adherence to statutory, regulatory & safety requirements.
- Encourage innovation in the org. & provide affordable technology meets global standards.

1.2 Industry Overview

The packaging technology industry traditionally includes the production of a variety of equipment for both food/pharma processing & packaging tasks. Packaging Technology is a system specially designed for providing protection for the good/item from chemical, biological & physical alterations. The main goal of food packaging is to provide a practical means of protecting and delivering goods at a reasonable cost while meeting the needs and expectations of clients as well as end consumers. Additionally, current trends like sustainability, environmental impact reduction, and shelf-life extension have gradually become among the most important aspects in designing a packaging system.

Packaging lines can have a variety of equipment types: integration of automated systems can be challenge. All aspects of food/pharma production including packaging are tightly controlled and have regulatory requirements. Uniformity, cleanliness and other requirements are needed to maintain Good Manufacturing Practices. Although processing & packaging solution providers operate largely independently of each other. Many suppliers now consider a comprehensive transformation of their business model, from selling new machinery and services as and when necessary to selling service solutions across the entire product lifecycle.

The packaging industry in India is predicted to grow at 18% annually with flexible packaging growing at 25% and rigid packaging at 15%. In recent years, India has seen sustainable packaging growth due to the increase of packaged food consumption and awareness, and demand for quality for quality products. Consumer awareness surrounding packaged food has heightened. Earlier this year, the Food Safety and Standards Authority of India (FSSAI) announced new packaging regulations to replace the former 2011 provisions. New labelling regulations were also revised.

1.3 Products

Syntegon has 3 segments in processing and packaging manufacturing unit that is Food division Vertical (FDV), Food division horizontal (FDH) and secondary packaging sector(2P). Some of the specific products within each category are:

1.3.1 FDV (Food Division Vertical)

Syntegon offers a range of vertical form fill seal (VFFS) machines designed specifically for the food industry. Having a mechanical output of 80 bags per minute with bag styles of pillow bags, gusseted bags etc. these machines are capable of efficiently packaging various food products, including snacks, confectionery, frozen foods etc. They provide reliable and hygienic packaging solutions to ensure product freshness and shelf appeal.

1.3.2 FDH (Food Division Horizontal)

In the FDH category, Syntegon provides horizontal flow wrapping machines tailored to the food industry's needs. With a mechanical output of 450 packs per minute these machines are adept at wrapping a wide array of food products, such as bakery items, chocolates, cheese, and fresh produce. They offer flexibility, speed, and precision in packaging, catering to diverse product shapes and sizes.

1.3.3 2P (Secondary Packaging)

The Syntegon's secondary packaging solutions encompass equipment aimed at enhancing the efficiency and aesthetics of packaged goods. This includes cartoners, case packers, and wrap-around packers designed to handle finished primary packages, bundle them, and prepare them

for distribution and have mechanical output of 30 cartons per minute. Syntegon's 2P offerings ensure product integrity during transit while optimizing packaging processes for cost-effectiveness and sustainability.

1.3.4 Dosing Systems

Syntegon provides advanced dosing systems that ensure accurate and efficient filling of products into packaging. Dosing systems are precision equipment used to dispense specific quantities of materials into the containers or packaging. These systems are designed to handle a wide range of textures, sizes etc. Their dosing system play a crucial role in maintaining product consistency, minimising waste and maximizing production throughput in food packaging operations.

1.4 Services Offered

A comprehensive service portfolio lays the foundation for smooth production process. Their global network of experts supports you throughout the entire machine lifecycle, from spare parts management to line optimization. Some of the service offered by them are:

1.4.1 Stock Optimization

Improving the overall spare parts management requires detailed knowledge of your spare parts consumption and delivery times. Based on a detailed analysis and your individual profile, their stock optimization service helps their clients to achieve higher availability with minimal stock.

1.4.2 Maintenance

Professional maintenance is essential to ensure trouble-free operation of the client's packaging machines and thus preventing costly production stoppages. Due to their global presence, their field service engineers are available to support with client's maintenance needs.

1.4.3 Remote Services

For immediate support when traveling is not an option, our remote services and helpline have you covered. Together, we can correct potential faults remotely before they result in major production disruptions. This minimizes unexpected downtimes & saves their clients resources.

1.4.4 Training

They offer their clients a customized training programs covering all aspects of maintenance and ongoing operations. In addition to onsite training, they provide various virtual formats accessible anytime and anywhere. By continuously qualifying their client's employees in line with their needs, they can ensure smooth production operations.

1.5 Sections within the organization

Syntegon has various sections and departments that contribute to it's operations and functions:

1.5.1 Marketing Department

Tasked with developing marketing strategies and creating promotional materials they aim to enhance brand visibility and achieve marketing objectives.

1.5.2 Sales & Technical Sales Department

Responsible for identifying and pursuing sales opportunities, maintaining client relationships and coordinating with clients to understand their requirements and offer tailored solutions.

1.5.3 Project Management Department

Oversee projects from initiation to completion, ensuring they are delivered on time, within budget and according to specifications. They also track progress and communicate with stakeholders by scheduling meetings, documenting project updates and keep projects on track.

1.5.4 Mechanical & Electrical Design Department

Focuses on designing mechanical and electrical aspects of the machines to meet customer needs. They also laison with production, technical sales and project management department.

1.5.5 Production Department

Responsible for actual production of the machines, ensuring quality, efficiency and adherence to production schedules. They maintain production standards and monitors product quality throughout the manufacturing process and identify areas of improvement and implement corrective actions when needed.

1.5.6 Procurement & Logistics Department

They manage sourcing and acquisition of raw materials, components and equipment necessary for production. They also negotiate contracts with suppliers, optimize procurement processes and ensure timely delivery of materials. They also handle transportation, warehousing and delivery of finished products to customer. They coordinate shipping schedules, manages inventory levels and optimize logistics networks for cost effective and efficient operations.

1.5.7 Customer Service & Support Department

They serve as primary point of contact for customer queries, issues and complaints. They provide technical assistance, troubleshooting and maintenance services to clients experiencing product related issues. They also facilitate repairs and replacements when necessary.

1.5.8 Finance Department

They manage financial operations, including budgeting, accounting, invoicing and financial reporting. They oversee cashflow and ensure compliance with regulatory requirements.

1.5.9 HR Department

They handle recruitment onboarding, training, performance management and employee relations. They also develop HR policies, administer benefits and foster a positive work environment conductive to employee growth and satisfaction.

1.5.10 IT Department

This department provides technical assistance and troubleshooting for hardware, software and network issues. They maintain IT infrastructure, ensure data security and support the organization’s technical needs.

2 INTRODUCTION TO RESEARCH TOPIC

"Understanding & Integrating Lean 6 Sigma for Continuous Improvement in Technical Sales"

2.1 Introduction

In today's ever changing and competitive business environment, organizations across various industries are continuously seeking ways to optimize their operations, streamline processes,and improve efficiency. Within this context, the adoption of Lean Six Sigma principles has emerged as an acclaimed method for operational excellence and continuous-improvement.

Lean is a systematic approach to identifying and eliminating waste within processes, aiming to maximize value delivery while minimizing resources, time, and effort. It emphasizes the creation of streamlined processes, efficient workflows, and a culture of continuous improvement. While Six Sigma is a data-driven methodology focused on reducing variation and defects in processes, thereby enhancing quality and efficiency. It utilizes techniques to analyse processes, identify root causes of defects, and implement targeted improvements to achieve near-perfect performance levels.

While traditionally applied in manufacturing and production settings, the principles of Lean Six Sigma hold significant potential for enhancing performanceand driving value creation in non-traditional areas such as Technical Sales. The complexity of technical sales workflow, the ever-changing rangeof individual customer requirements, and the fast-paced nature of the sales environment pose unique challenges for Syntegon's Tech Sales team. The integration of Lean principles, focusing on eliminating waste and optimizing processes, with Six Sigma methodologies, emphasizing data-driven decision-making and defect reduction, offers a comprehensive approach to improving operations. By leveraging these methodologies,

Syntegon's Tech Sales team aims to address challenges such as inaccurate cost estimation, inconsistent pricing strategies, and manual processes reliant on individual judgment.

Despite the potential benefits of Lean Six Sigma, limited research has been conducted specifically on its integration into technical sales functions. Therefore, there is a need for empirical research to explore the unique challenges, opportunities, and implications of implementing Lean Six Sigma initiatives in the Technical Sales department. This research aims to address this gap by investigating the integration of Lean Six Sigma principles into the Technical Sales department of Syntegon, a leading provider of packaging technology solutions. By examining the current state of Technical Sales processes, identifying opportunities for improvement, and assessing the impact of Lean Six Sigma initiatives, this study seeks to provide valuable insights and practical recommendations for achieving continuous improvement and delivering enhanced value in the technical sales domain.

This research will investigate the implementation of Lean Six Sigma initiatives, including process mapping, root cause analysis, and performance metrics tracking. By identifying opportunities for improvement and implementing targeted interventions, the research aims to drive tangible outcomes such as reduced lead times, improved pricing accuracy, streamline processes,and enhance overall performance. It focuses on identifying and eliminating non-value-added activities and aim to reduce variability and defects in processes, leading to improved quality and consistency.

2.2 Literature Review

(Monroe et al., 2012) highlights the difficulties faced by experts in proving that ergonomics procedures are in line with more general continuous improvement theories. Ergonomics processes place a strong emphasis on the necessity of dismantling organizational silos and combining ergonomics with Six Sigma, Lean, and other programmes to increase worker safety, lower injury rates, and streamline industrial procedures. illustrating how programmes for ergonomics naturally mesh with concepts of continual improvement. Initiatives for continuous improvement have the potential to increase worker safety, lower the number of injuries, and improve design for manufacturing.

(Desai, 2022) explores the application of Six Sigma methodology in manufacturing industries, focusing on quality and productivity enhancement. The DMAIC methodology (Define, Measure, Analyze, Improve, Control) is discussed. The study highlights the importance of reducing defects and improving process performance through statistical tools and continuous improvement initiatives inherent in Six Sigma. Through the DMAIC approach, the process was optimized, leading to an increase in process yield and Sigma level. The results showed significant improvements in cost savings, customer satisfaction, productivity, and overall process performance. The study recommends further enhancements and integration of Six Sigma practices for sustained success in manufacturing operations

(Rose et al., n.d.) explores how small and medium-sized businesses (SMEs) might improve manufacturing performance by implementing lean manufacturing principles. Lean practices are grouped into three categories according to investment requirements and viability.The report provides a list of suggested lean practices for implementation and emphasises the significance of SMEs implementing workable lean methods. The study also recommends additional research using a survey questionnaire to validate the findings.

(Čiarnienė & Vienažindienė, 2012) This paper explores the implementation of Lean production, a management philosophy rooted in the Toyota Production System, within organizations. The study delves into the key factors involved in Lean implementation, such as preparing and motivating employees, defining roles in the change process, utilizing change methodologies, and fostering an environment conducive to change. Success factors in Lean Implementation, including customer satisfaction, increased productivity, and improved quality, are examined alongside challenges like high implementation costs and resistance from employees. The importance of monitoring progress, measuring success, and addressing common behaviours that may impede progress in Lean implementation is highlighted. The paper emphasizes the necessity of a cultural shift within organizations and a sustained commitment to continuous improvement for successful Lean production.

(Diego, 2015) This research paper presents a comparative critical analysis of Theory of Constraints (TOC), Lean Manufacturing, and Six Sigma within manufacturing systems. The study aims to understand the fundamental principles, similarities, and differences between these methodologies, with a focus on continuous improvement and scientific problem-solving methods. It highlights the complementary elements and points of overlap among TOC, Lean Manufacturing, and Six Sigma, emphasizing the potential for integrating these approaches to enhance productivity in manufacturing processes. Key considerations for successful integration include selecting the appropriate elements from each methodology, defining organizational priorities, and aligning with company strategy. Further research is recommended to explore the construction of an integrated continuous improvement system that leverages the strengths of TOC, Lean Manufacturing, and Six Sigma for optimal outcomes in manufacturing systems.

(Revelle, n.d.) The literature on integrating Six Sigma methodology with occupational safety and health (SH&E) processes highlights the potential for improving workplace safety through

structured problem-solving approaches. Various organizations have successfully implemented Six Sigma to reduce accidents and health hazards, emphasizing the importance of SH&E professionals acquiring Six Sigma skills. The concept of Six Sigma, with its focus on quality assessment and improvement, has been applied effectively in assessing safety levels in the workplace. Key tools and techniques of Six Sigma, such as cause-and-effect diagrams, control charts, and scatter analysis, have been instrumental in identifying and addressing safety issues.

(Chinvigai et al., 2010) This paper explores the integration of ISO 9001, Lean Six Sigma, and CMMI-DEV for process improvement in enterprises. It discusses the similarities and differences between these methodologies, providing a framework and model for their implementation. It demonstrates the effectiveness of this integrated approach in enhancing productivity and driving continuous improvement. It highlights the importance of aligning quality management systems with project management practices to achieve sustainable results in today's competitive business environment.

(Sokovic et al., 2009) The paper delves into the pivotal role of the seven basic quality tools (7QC tools) within continuous improvement methodologies like PDCA, DMAIC, DMADV, and Lean Six Sigma. It underscores the indispensable nature of these tools for tasks ranging from data collection to decision-making in quality enhancement initiatives. Emphasizing the systematic utilization of the 7QC tools as a linchpin for successful quality improvement endeavors, the paper advocates for their active integration to propel continuous enhancement efforts. Additionally, it draws connections between the 7QC tools and the PDCA-cycle, as well as their application within the DMAIC methodology of Six Sigma, highlighting their versatility and applicability across various improvement frameworks.

The paper describes a Six Sigma project conducted in a semiconductor company to address electrical failures in circuit cartridges. By implementing Six Sigma methodologies, the project

successfully identified key factors contributing to defects and implemented improvements that led to a 50% reduction in electrical failures. The analysis of factors affecting electrical performance in semiconductor wafers highlighted the importance offactors like pressure, tool height, and cycle time in the grit blast process. (Implementation of 6Sigma in a manufacturing process: A case study – Adan Valles, Jaime Sanchez, Salvador Noreiga).

(Lattner et al., 2001) The paper focuses on improving knowledge exchange between technical sales, design, and process planning departments to enhance product quality through context-based knowledge management. The paper emphasizes user input from the beginning to ensure acceptance and usability, with a system architecture that includes meta data management, work flow components, and information management. This paper underscores the importance of sharing knowledge within a company, the need for user involvement in development, and acknowledges the funding and support for the project. Various sources on knowledge management and information retrieval are referenced to support the project's objectives.

(Akmal Hanafi et al., 2019) The paper delves into the categorization of Lean Six Sigma tools and techniques within the DMAIC framework, tracing the evolution of Lean and Six Sigma concepts and their amalgamation. It specifically focuses on the Define and Measure phases, elucidating the tools employed in diverse industries. Building on this foundation, the study extends its analysis to the Analyse, Improve, and Control phases, shedding light on the tools and practices utilized in each stage. By exploring various industries, the research underscores the versatility and applicability of Lean Six Sigma methodologies. It underscores the significance of tailoring process improvement strategies to industry-specific requirements, emphasizing the absence of a one-size-fits-all approach. Through a comprehensive examination of tools, techniques, and industry applications, the paper offers valuable insights for organizations seeking to enhance their operational efficiency and performance.

(Muralidharan & Raval, 2018) This research paper explores the integration of Lean and Six Sigma in marketing, known as Six Sigma Marketing (SSM), with a focus on improving marketing efficiency and effectiveness. The paper discusses the implementation of SSM in a marketing environment, highlighting strategies such as keyword optimization, social media engagement, and ad campaigns to increase website traffic and reduce bounce rates. The paper provides valuable insights for marketing managers to enhance customer satisfaction and productivity through the application of SSM principles.

(Larteb et al., n.d.)The study delves into the successful implementation of Lean Manufacturing practices in multinational companies, emphasizing the significance of incorporating both hard and soft practices. While hard lean practices are more prevalent, soft practices like employee development and communication systems are found to be lacking. Critical success factors identified are top management engagement, resource allocation, and employee development. Continuous improvement and performance management are well implemented. Further research is recommended to develop tools for effective lean deployment. The references cited in the study cover lean management, total quality management, and organizational culture in manufacturing industries, providing insights into lean production implementation.

(Muralidharan & Raval, n.d.) This paper explores the concept of Six Sigma marketing as a data-driven approach to enhancing market share through targeted products of superior value. It discusses the integration of marketing and quality improvement processes, emphasizing the DMAIC philosophy of Six Sigma marketing. The paper highlights the importance of focusing on critical quality parameters, utilizing quality tools for analysis, implementing improvements, and controlling processes within the Six Sigma marketing framework. Additionally, it underscores the significance of supply chain metrics in tracking performance and optimizing operations to drive performance improvements and achieve excellence.

(Purba et al., 2021) The paper emphasizes the importance of organizational readiness, management commitment, and consistency in the DMAIC phase of Six Sigma for enhancing productivity, reducing defects, and promoting industrial sustainability. It discusses the application of Six Sigma methodology in various industries to enhance productivity, reduce defects, and improve sustainability. It emphasizes the importance of quality improvement, customer loyalty, and operational efficiency through Six Sigma, particularly focusing on the DMAIC cycle. It also highlighted the benefits of implementing Six Sigma in manufacturing industries, showcasing how it can lead to reduced defects, improved productivity, cost savings, increased profits, and enhanced competitiveness.

(Shah & Ward, 2007) The research paper by Shah and Ward (2007) delves into the realm of lean production, aiming to address the semantic confusion and lack of clear definitions surrounding this management approach. The paper traces the evolution of lean production from its roots in Japanese manufacturing systems to its modern-day interpretations. They highlight the need for precise conceptual definitions and operational measures to advance empirical research in this area. The study emphasizes the importance of clarifying the concept of lean production to avoid ambiguity and promote a unified understanding within the academic community. Through scale development and validation processes, the researchers identified and refined a multi-dimensional measure of lean production, encompassing critical factors of this management approach.

2.3 Research Gaps

While Lean 6 Sigma methodologies have been widely adopted in various industries,there is a noticeable gap in understanding its application and effectiveness within the context of Tech Sales of a Project-based company in the Packaging Industry. Limited research has been conducted on how Lean 6 Sigma principles can be integrated into Tech Sales processes to drive continuous improvement and enhance efficiency.

2.4 Research Questions

- What challenges are faced by the Technical Sales team at Syntegon, and how can Lean 6 Sigma principles help the team in improving their process?
- What specific Lean 6 Sigma tools and techniques are most relevant and effective for improving processes and performance in Technical Sales at Syntegon?
- What are the impacts of implementing Lean 6 Sigma initiatives in the TS department?

2.5 Research Objectives

- To examine the existing processes and associated activities involved within the Technical Sales department at Syntegon and identify the areas of inefficiency,waste, and opportunities for improvement.
- To explore how Lean Six Sigma can be effectively integrated into the Technical Sales department to drive continuous improvement. This involves identifying specific methods and initiatives that are most relevant/applicable to thetechnical sales processes at Syntegon & tailor to suit their characteristics.

2.6 Research Methodology

- Baseline Measurement: Understand the current workflow, state of performance and challenges within Tech Sales team at Syntegon and establish benchmarks to compare.
- Identify and Implement Lean 6 Sigma Projects: Identification of Lean 6 Sigma initiatives aimed at improving Technical Sales processes at Syntegon.
- Post-Implementation Assessment: Conducting comparative analysis of pre and post implementation of Lean Six Sigma initiatives to measure its' impact and cost benefits.

3 DATA ANALYSIS & RESULTS

3.1 Baseline Measurement

Baseline Measurement: Two of the most prominent challenges that the Technical Sales team at Syntegon faces are:

- Lengthy quote preparation process.
- Inaccurate Quote Pricing.

3.1.1 Lengthy quote preparation process

Technical Sales team at Syntegon faces a significant challenge with a lengthy workflow for quote generation after customer inquiries. This process involves multiple manual steps, including customizing quotations based on individual customer product specifications and selecting machine specifications and layouts from AutoCad files and preparation of Ballpark Price Indication (Pre-Quotation Process). The following steps were followed for quote preparation:

- Receives Inquiry from customer.
- Team prepares custom quotation based on individual customer product specification.
- TS team select machines specification & also the layout from AutoCad file.
- Layout file is converted to PDF.
- Screenshot of this PDF is taken & pasted in the quotation.
- This layout along with the Price Indication is sent to the customer.

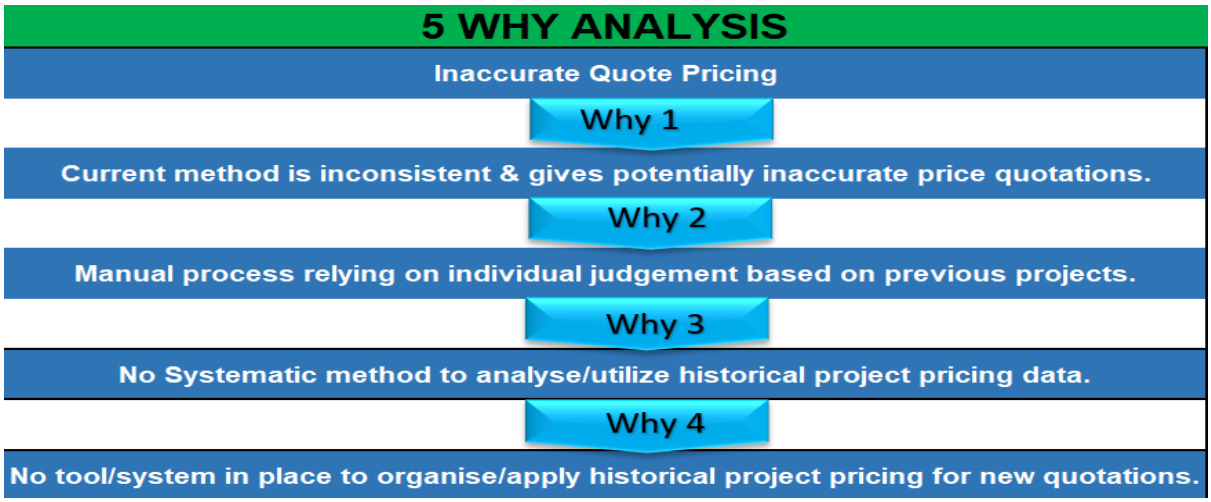
This entire process is highly time consuming and takes approximately 0.5 days depending on the machine configuration and requires substantial efforts from the Techa Sales team.

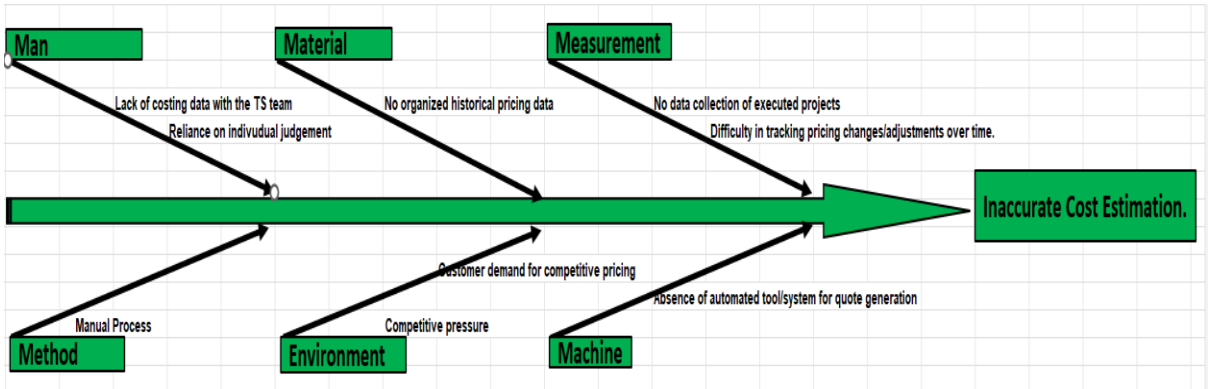
3.1.2 Inaccurate Quote Pricing

Another prominent challenge is the inaccurate quote pricing method employed by the Technical Sales team at Syntegon. The process for price quotation for new projects relies on vague estimations of previous project prices, often resulting in quoted prices much higher than actual figures incurred. This wrong estimation can cause serious problems. The following steps are followed for preparing price quotation for new projects:

- Receives Inquiry from customer.
- Team prepares price quotation based on vague estimation of previous project prices.
- Most often it the quoted price turns out to be much different than actual figures incurred.
- This leads to a large amount of difference between the actual cost and anticipated cost.

RCA and Cause Effect Diagram for Inaccurate Cost estimation for Quotation is as follows:





3.2 Identification & Implementation of Lean 6 Sigma Initiatives:

The Lean 6 Sigma initiatives identified and implemented are as follows:

3.2.1 Layout Template & Ball Park Price Indication

To address the challenge of lengthy quote preparation, a Lean 6 Sigma initiative was implemented to develop standard machine layout for different machine configurations. This template streamlines the process by allowing the Tech Sales team to select the required layout and integrate it into the Ballpark Price Indication. This enhances process efficiency and responsiveness to customer inquiries:

- Receives Inquiry from customer.
- TS team enters required data in the standardized template of BPP Indication.
- Scaled models present in the template are directly imported to the BPP Indication.
- Ballpark Price Indication is sent to the customer.

This led to reduction in manual process and helped in faster turnaround time.

3.2.2 Automated Tool based Costing for CDS

In response to the challenges of non-competitive pricing, an automated CDS tool is developed using asp.net in collaboration with the IT department. This tool utilizes historical project pricing data to accurately calculate the costing of individual components and segregate engineering manufacturing hours:

- Receives Inquiry from customer.
- Team prepares price quotation using CDS tool prepared.
- Gives accurate pricing based on sub-assemblies.
- This quotation is sent to customer.

3.3 Post Implementation Assessment

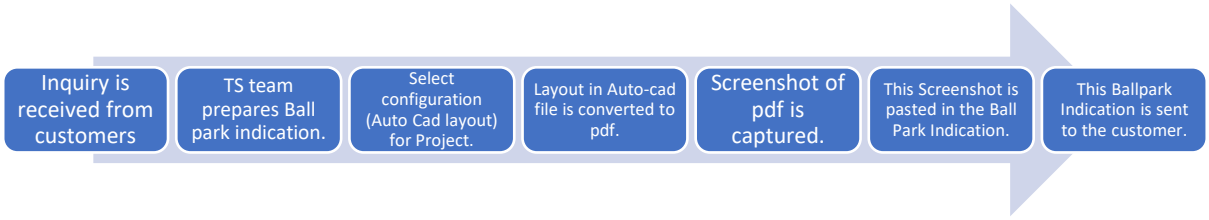
Following the implementation of Lean and 6 Sigma initiatives in the Technical Sales department at Syntegon, a detailed post-implementation assessment was conducted to evaluate the impact and benefits of these initiatives. The assessment involved a comparative analysis of post implementation performance metrics to quantify the impact of the initiatives.

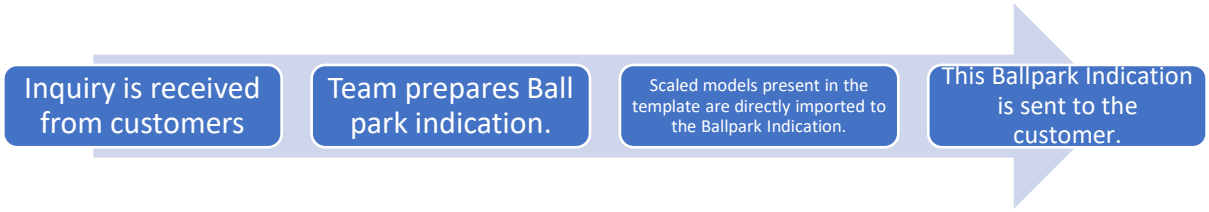
3.3.1 Reduced Process Flow

Technical Sales team at Syntegon preparation:

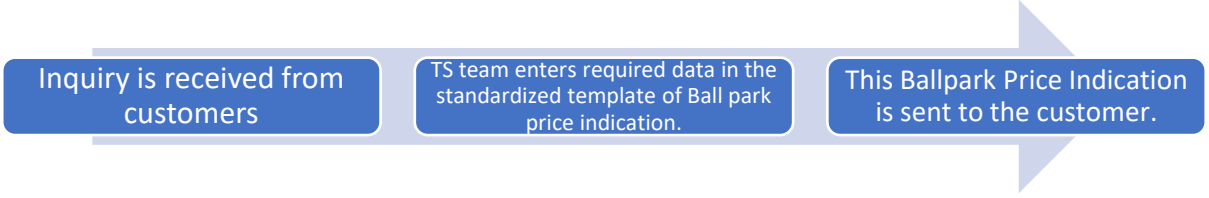
a) Layout Template & Ballpark Price Indication.

- Pre & Post Implementation of Layout Template Workflow.





- Pre & Post Implementation of Ball Park Price Indication Workflow.



This lean initiative achieved us 50% reduction in manual efforts every time for a new inquiry.

b) Automated CDS Tool.

- Pre & Post Implementation of CDS tool for Material Price.

CDS Tool

PART NO	DESCRIPTION	FINAL PRICE	GROUP
COMM BM 1F	Mechanical commisioning of basic mc with 1 format	-	COMMISSIONING
COMM AD F	Mechanical commisioning for additional format	-	COMMISSIONING
COMM ELEC	Electrical commisioning of basic mc with 1 format	-	COMMISSIONING
INTFAT TTME	INTERNAL FAT	-	FAT
CUSTFAT TT	CUSTOMER FAT	-	FAT
SOFT TTME	Software preparation charges	-	SOFTWARE
8-114-891-059	CLO1_Closure_Elect	3,47,946.49	Mandatory - Electrical
8-114-891-061	FOR1_Former_Elect_W/o PLd	3,07,949.91	Mandatory - Electrical
8-114-891-062	GEN1_General_Elect	9,28,934.78	Mandatory - Electrical
8-114-891-063	INF1_Infeed_PWL_Elect	2,62,736.54	Mandatory - Electrical
8-114-891-064	THF1_Tray Handling Fix_Elect	4,81,990.98	Mandatory - Electrical
8-114-891-065	LOD1_Loader_Elect	5,04,167.31	Mandatory - Electrical
8-114-891-068	TTME CABLES	61,546.45	Mandatory - Electrical
MACWIR	Machine wiring (for supplier)	1,40,000.00	Mandatory - Electrical
TESTING	PE/IS Testing	-	Mandatory - Electrical
8-168-085-161	Assembly GEN1 General	23,33,046.37	Mandatory BM
8-168-085-155	Assembly INF1 Infeed	20,57,608.40	Mandatory BM
8-168-085-163	Assembly LOD1 Loader	11,89,723.56	Mandatory BM
8-168-085-170	Assembly THF1 Tray Handling Fixed	11,20,234.12	Mandatory BM
8-168-085-164	Assembly FOR1 Former	20,35,325.42	Mandatory BM
8-168-085-165	Assembly CLO1 Closer	13,71,564.83	Mandatory BM
8-168-085-169	Assembly DSC1 Discharge	1,29,623.88	Mandatory BM
8-153-484-268	Assembly Infeed Guide A 26310/26320	13,482.08	Mandatory Format - Product
8-153-484-267	Assembly Topguide A 26410/26420 27410/27	4,669.70	Mandatory Format - Product
8-153-484-265	Assembly Product pockets A 26mm/27mm (One set	2,33,002.32	Mandatory Format - Product
8-153-484-269	Assembly Suction head A 26520 27520	27,245.68	Mandatory Format - Product
8-153-432-233	Blind plug low	5,248.02	Mandatory Format - Product
8-168-085-773	GRL a (Option to choose qty)	2,76,135.34	Mandatory Format - Product
8-168-085-681	Carton Format a (RH)	8,09,121.83	Mandatory Format - Product
8-114-892-129	Fixture HMI	5,500.00	Optional
8-153-364-664	Setting gauge THU	5,000.00	Optional
8-153-352-815	Transporting support	5,000.00	PACKING
DOMPAK TT	DOMESTIC PACKING COST	2,25,000.00	PACKING
	Total	₹ 1,48,81,804.01	

Difference	₹ 3,99,404.01

Manual CDS

Testing of formats- FAT	0.00
Customer FAT (3 days)	0.00
Electricals	27,00,000.00
TTME basic machine	72,88,000.00
Carton width less than 100	0.00
4th gluing lane	1,75,000.00
Extended carton magazine	2,00,000.00
Basic machine END hrs (250+50+250)	0.00
Warrenty extension for 12 months (total 24)	10,00,000.00
Infeed- PWL	18,00,000.00
Product format+PWL Arm	3,40,000.00
Carton format	5,22,600.00
PGR Pockets	1,56,800.00
Format design hrs-Mc 1 & 2(2 formats) (290+250+50)	0.00
Format design hrs- Mc 3 (2 formats) (150+125)	0.00
Packing TTME	3,00,000.00
Total	₹ 1,44,82,400.00

- Pre & Post Implementation of CDS tool for Manufacturing Hours Cost

CDS Tool

PART NO	DESCRIPTION	TOTAL HOURS			GROUP
		END	ECS	ASLY	
COMM BM 1F	Mechanical commisioning of basic mc with one forr	0	0	322400	COMMISSIONING
COMM AD F	Mechanical commisioning for additional format	0	0	114400	COMMISSIONING
COMM ELEC	Electrical commisioning of basic mc with one forma	0	104000	7800	COMMISSIONING
INTFAT TTME	INTERNAL FAT	0	0	20800	FAT
CUSTFAT TTN	CUSTOMER FAT	0	0	20800	FAT
SOFT TTME	Software preparation charges	0	650000	0	SOFTWARE
8-114-891-059	CLO1_Closure_Elect	0	520000	52000	Mandatory - Electrical
8-114-891-061	FOR1_Former_Elect_W/o PLd	0	0	41600	Mandatory - Electrical
8-114-891-062	GEN1_General_Elect	0	0	62400	Mandatory - Electrical
8-114-891-063	INF1_Infeed_PWL_Elect	0	0	15600	Mandatory - Electrical
8-114-891-064	THF1_Tray Handling Fix_Elect	0	0	41600	Mandatory - Electrical
8-114-891-065	LOD1_Loader_Elect	0	0	62400	Mandatory - Electrical
8-114-891-068	TTME CABLES	0	0	83200	Mandatory - Electrical
MACWIR	Machine wiring (for supplier)	0	0	0	Mandatory - Electrical
TESTING	PE/IS Testing	0	0	7800	Mandatory - Electrical
8-168-085-161	Assembly GEN1 General	104000	0	114400	Mandatory BM
8-168-085-155	Assembly INF1 Infeed	104000	0	213200	Mandatory BM
8-168-085-163	Assembly LOD1 Loader	91000	0	72800	Mandatory BM
8-168-085-170	Assembly THF1 Tray Handling Fixed	78000	0	208000	Mandatory BM
8-168-085-164	Assembly FOR1 Former	130000	0	208000	Mandatory BM
8-168-085-165	Assembly CLO1 Closer	65000	0	135200	Mandatory BM
8-168-085-169	Assembly DSC1 Discharge	26000	0	41600	Mandatory BM
8-153-484-268	Assembly Infeed Guide A 26310/26320	343200	0	15600	Mandatory Format - Product
8-153-484-267	Assembly Topguide A 26410/26420 27410/27	0	0	5200	Mandatory Format - Product
8-153-484-265	Assembly Product pockets A 26mm/27mm (One set	0	0	15600	Mandatory Format - Product
8-153-484-269	Assembly Suction head A 26520 27520	0	0	2600	Mandatory Format - Product
8-153-432-233	Blind plug low	0	0	2600	Mandatory Format - Product
8-168-085-773	GRL a (Option to choose qty)	0	0	41600	Mandatory Format - Product
8-168-085-681	Carton Format a (RH)	345800	0	228800	Mandatory Format - Product
8-114-892-129	Fixture HMI	0	0	1300	Optional
8-153-364-664	Setting gauge THU	0	0	1300	Optional
8-153-352-815	Transporting support	1300	0	3900	PACKING
DOMPAK TTN	DOMESTIC PACKING COST	0	0	0	PACKING
		₹ 12,88,300.00	₹ 12,74,000.00	₹ 21,64,500.00	₹ 47,26,800.00

Difference		
END	ECS	ASLY
-₹ 17,40,700.00	₹ 2,34,000.00	₹ 1,20,900.00

Manual CDS

	END	ECS	ASLY
Testing of formats- FAT	0	0	124800
Customer FAT (3 days)	0	0	41600
Electricals	0	0	0
TTME basic machine	0	1040000	1409200
Carton width less than 100	130000	0	0
4th gluing lane	0	0	0
Extended carton magazine	26000	0	0
Basic machine END hrs (250+50+250)	1430000	0	0
Warrenty extension for 12 months (total 24)	0	0	0
Infeed- PWL	156000	0	83200
Product format+PWL Arm	0	0	104000
Carton format	0	0	218400
PGR Pockets	0	0	62400
Format design hrs-Mc 1 & 2(2 formats) (290+250+50	1287000	0	0
Format design hrs- Mc 3 (2 formats) (150+125)	0	0	0
Packing TTME	0	0	0
Total	₹ 30,29,000.00	₹ 10,40,000.00	₹ 20,43,600.00

- Final Cost (Material Cost + Manufacturing Hours Cost)

Total (Mat. Cost + Hrs) - Manual CDS	₹ 2,05,95,000.00
Total (Mat. Cost + Hrs) - CDS Tool	₹ 1,96,08,604.01
Difference	₹ 9,86,395.99

After Implementing CDS tool it was found that the manual price generation by Technical Sales team was not precise and gave a difference of approximately Rs.9,00,000 for 1 project alone. Whereas tool-based costing precisely divided the cost based on individual sub-assemblies i.e. machine components and generated accurate pricing.

3.3.2 Quotation Turnaround Time

- Pre-Implementation:
  - The Quote preparation process took approximately 4 hours depending on the machine configuration.
- Post-Implementation:
  - After introducing the layout template and Ballpark Price Indication, the quote preparation time was reduced to just 1 hour, representing a significant reduction by 75% in turnaround time. Leading to faster response to customer inquiries.

3.3.3 Pricing Data Accuracy & Reliability

- Pre-Implementation:
  - The pricing strategy relied on vague estimation of previous project prices, often resulting in inflated quote prices.
- Post-Implementation:
  - The implementation of automated CDS tool improved price accuracy and reliability in pricing estimates. By leveraging historical project data and sub-

assembly costing, the tool provided precise and consistent pricing, reduced errors and discrepancies by around 7%.

3.3.4 Reduced Error Rate

- Pre-Implementation:
    - Before implementing Lean Six Sigma initiatives, the Tech Sales team likely experienced a higher frequency of errors stemmed from factors like manual data entry, reliance on subjective judgment for pricing estimates, and lack of standardized procedures.
- Post-Implementation:
    - With standardized processes and automated tools in place, the team experienced a reduction in error rates in quote preparation. By minimizing manual intervention and leveraging data-driven approaches, the likelihood of errors and inaccuracies in pricing estimates was reduced led and to improved credibility.

4 FINDINGS & CONCLUSION

4.1 Research Findings & Discussion

The implementation of Lean 6 Sigma initiatives in the Tech Sales department at Syntegon has yielded significant findings & implications for the organization. Through a structured approach to process improvement and waste reduction, Lean 6 Sigma has demonstrated it's importance and effectiveness in driving continuous improvement and enhancing operational performance. Some of the insights derived from this research are:

4.1.1 Improved Process Efficiency

The primary finding of this research is the substantial improvement in process efficiency achieved through Lean 6 Sigma Projects. By streamlining workflows, eliminating non-value-added activities and standardizing procedures, the Technical Sales department has experienced notable reductions in lead times and overall process complexity.

4.1.2 Enhanced Accuracy & Reliability

Lean 6 Sigma projects have also contributed to improved accuracy and reliability in critical areas such as pricing estimates and quotation preparation. Through the implementation of standardized tools, data driven decision-making processes, the Technical Sales team at Syntegon is able to deliver more precise and consistent outcomes to customers.

4.1.3 Streamlined Workflows

The Lean 6 Sigma initiative have led to identification and elimination of non value-added activities, leading to streamlined workflows. By mapping out existing processes, identifying bottlenecks and redesigning workflows to minimize waste and optimize resource utilization, the Technical Sales team has been able to achieve smoother and more efficient operations.

4.1.4 Reduced Lead Times

Through the implementation of Lean 6 Sigma principles such as standardization, automation and continuous improvement, the Technical Sales team has experienced significant reduction in lead times, allowing the team to respond more quickly to customer inquiries.

These research findings demonstrate the critical importance of Lean 6 Sigma in addressing operational challenges and improving process efficiency.

4.2 Conclusion

The implementation of Lean 6 Sigma initiatives in the Technical Sales department at Syntegon has proven to be very transformative, yielding significant benefits and driving continuous improvement across the Tech Sales department. Through a systematic approach to process optimization, waste reduction and data-driven decision making, the Technical Sales team has been able to enhance its efficiency. By streamlining workflows, standardizing procedures and leveraging technology driven solutions, the Technical Sales team at Syntegon has achieved notable reductions in lead times, improved accuracy in pricing estimates and enhanced responsiveness to customer inquiries. By optimizing resource utilization, minimizing waste and enhancing operational efficiencies, the team has achieved tangible improvements.

5 TASKS, LEARNINGS & CHALLENGES

5.1 Tasks Handled

a) Primarily worked in the Technical Sales department at Syntegon, focussing on lean initiatives and process improvement projects.

b) Adhered to a regular working schedule from Monday to Friday, starting at 9:00 AM and ending at 6:00 PM.

c) Collaborating within the Technical Sales team for workflow mapping.

d) Conducting root cause analysis using tools like fishbone diagram, 5 WHY analysis to identify underlying issues.

e) Conducting weekly CIP meeting with stakeholders to gather feedback and track KPIs.

f) Spearheading the implementation of Lean 6 Sigma initiatives within the Technical Sales department and devising process improvement solutions.

g) Tasks handled were closely aligned with the concepts I studied during my MBA program particularly Marketing & Operations Management which provided me a solid foundation.

5.2 Learnings

Implementing Lean 6 Sigma initiatives in the Technical Sales department at Syntegon has provided following learnings:

a) Data Driven Decision Making: Leveraging data for decision making enables informed and strategic choices.

b) Root Cause Analysis: Understanding root causes of issues is essential for implementing effective solutions. By conducting thorough root cause analysis using tools such as 5 Whys, Fishbone diagram etc. we can identify underlying problems and address them at their source.

c) Feedback Loop: Establishing feedback mechanism and a continuous improvement loop enables ongoing refinement and optimization. By soliciting feedback from stakeholders, we can identify opportunities for improvement, implement corrective actions and drive continuous enhancement of processes.

5.3 Challenges:

Two major challenges that I encountered at Syntegon are:

5.3.1 Cross Functional Collaboration:

Collaboration with cross functional team presented it's own set of challenges. The tasks involved stakeholders from various departments like production, engineering, procurement etc. each having it's own set of objectives. Also, each department had varying decision making processes. Aligning diverse perspectives, priorities required interpersonal skills and diplomacy.

5.3.2 Time Constraints & Deadlines:

Meeting deadlines and managing priorities was a challenge. Balancing multiple projects required effective time management and prioritization. Also, dependencies on other team members often led to bottlenecks.

The challenges provided me with valuable learnings and helped me develop resilience and problem-solving capabilities.

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APPENDIX I

Samples of Work Done.

Sub project: Tool Based costing

Problem definition: Costing data not available for TTME.

Goals of the project: 1.Streamlined quote pricing for new enquiry. 2. Reduce CDS error for material cost. 3. Costing avaliable in centralised data. 4. Cost reduction next year.

Project leader: Sourabh Naik Khandolkar

Main team members: Nitin Bhosle, Shrishail Amati, Mandar, Abhinash, Abhinay Khandeparkar, Senthil Kumar

In scope: TTME

Out of scope: Rest of the machine portfolio

Quantified business benefits: At actual costing, we'll have competitive pricing in market. Winning probability is higher.

Not quantified business benefits: Process Improvement, Productivity improvement, reduced scope for error.

2

KPI's

= Original Plan x = Complete

Phase	Sr.No	Sub-project	Project Lead	Target	wk25	wk26	wk27	wk28	wk29	wk30	wk31	wk32	wk33	wk34	wk35	wk36
D	1	Identification of executed projects.	Abhinay/Shrishail	Mondelez Induri/ Sri City		x										
M	1	Gathering CDS of executed project / Request for master BOM	Shrishail/Senthil	Mondelez Induri/ Sri City			x									
	2	Data gathering from SAP for material cost, Mfg Hrs from Engg. Hrs (BOM Receipt)	Senthil					x								
	3	Data Segragation based on sub assemblies	Senthil											x		
A	1	Cost Analysis & Alignment & Identification of groups for CDS	Senthil													x
	2	Compare common sub assemblies for different projects. (using tools) (Price Verification)	Sourabh/Abhinay													
I	1	Prepare CDS tool data (make dummy CDS) (Formating for CDS Upload)	Senthil													
	2	CDS Upload	Senthil	Web based tool platform used ASP.net												
C	1	Prepare quotation	Abhinay	Via New CDS tool												
	2	Margin Slippage report review	CTG													

Automation for Tech Sales

Sl.Nr	Process	Time Comsumed	Action Plan to reduce	Benefit	Response	When
1	Ball Park Price PPT	2days	Create Template with required informations	50% Reduction. 1day	FDH-Shubham, FDV-Amol, FDS-Abhinay	23-02-2024 (Closed)
2	Price details for PDS	2days	CDS for PDS Parts	75% Reduction. 0.5day	T Saravanan / Senthil	30-Apr
3	Layout for BPP	3days	Tentative layout	Reduction 0.5day	Nitin / Abhinay	23-02-2024 (Closed)

Continuous Improvement Process - Tech Sales

Sr.n	Improvement points	Points raised	Owner	Start date	End date	Notes & To do list	Status
8	SO preparation to be easy	Mahesh	Abhinay-Mahesh	28-Jun	28-Mar	Updated document is placed in server, this will be ongoing activity	In progress
12	Efficency and wastages percentage to be defined for all portfolio	Mahesh	Shrishail/Shajish/Abhinay	15-Oct	30-Dec	HFFS and 2P (To be dissucsed with PACB will be reviewd during Mndlz Brownfeild projects- Urs Visit on Jan 24 last week (Planned)	In progress
26	Learning of Domino printer feature	Mahesh	External	06-Dec	TBC	Know how sharing	In progress
27	Knowledge sharing session on HFFS, 2P	Mahesh	Abhinay (2P)	08-Dec	28-Mar	28th Feb Introduction on TTME	Open
28	Lean Rating 3 to be implement for Tech sales	Shrishail	Abhinay/Sourabh	08-Jan	15-Apr	data collected from Prateek	In progress
29	KPS training for Sales	Abhinay	Abhinay	07-Mar-24	14-Mar-24		Open

CDS: PRJ-2024-02279

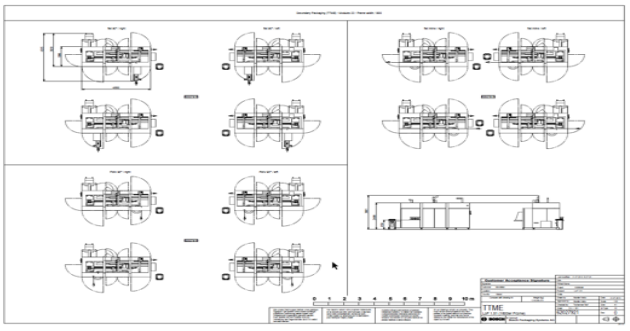
V.2024/2 - COST SHEET FOR QUOTATIONS AND ORDERS

Mode Type: **Edit**
Status: **Not Saved**

Bagwrap Doserinfed Customer Specific

REGION	CUSTOMER NAME	ORDER TYPE	CRM Project No.	CUR
West	Mars International Pvt Ltd.	Domestic	PRJ-2024-02279	INR
CRM Account No	**CUSTOMER DETAILS**	**BASIC MACHINE**	**REV**	**QUOTATION No.**
0005119588	Pune, India	TTME FDW 1800	Q02	PRJ-2024-02279
Date	**Remark**			
3/19/2024				

TTME-1800



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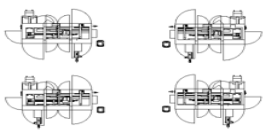

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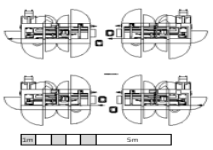
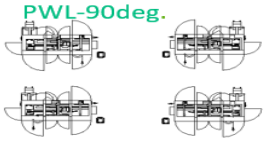


PWL-90deg.



APPENDIX II

Photos While at Work.