

Inventory layout Optimization & Digital Identification system in Milky Mist Dairy Food Private Limited

Summer Internship Project Report submitted in partial fulfilment of the
requirements for the award of the degree of
Master of Business Administration

By

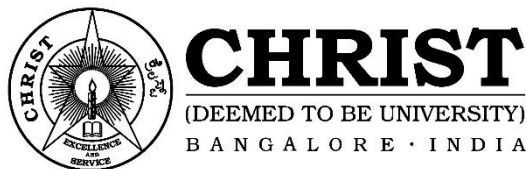
K MUGUNTHVENKAT

REGISTER NUMBER

2228615

Under the Guidance of

PROF SHRIKUMAR M



**School of Business and Management
CHRIST (Deemed to be University), Bangalore**

JULY 2023

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Declaration

I hereby declare that the Summer Internship Project report titled “Inventory layout Optimization & Digital Identification system at Milky Mist Dairy Food Private Limited has been undertaken by me in partial fulfilment of the requirements for the award of the degree of Master of Business Administration. I have completed this study under the guidance of Prof Shrikumar M.

I also declare that this Summer Internship Project report has not been submitted for the award of any Degree, Diploma, Associateship, Fellowship or any other title, in CHRIST (Deemed to be University) or in any other university.

Place: Bangalore

Date: 27 July 2023

K Mugunthvenkat

2228615



Certificate

This is to certify that the Summer Internship Project report submitted by K Mugunthvenkat on the title “Inventory layout Optimization & Digital Identification system in Milky Mist Dairy Food Private Limited” is a record of Summer Internship Project work done by him during the academic year 2022-23 under my guidance and supervision in partial fulfilment of the requirements for the award of the degree of Master of Business Administration.

Place: Bengaluru

Date: 27 July 2023

Prof Shrikumar M

Associate Professor

School of Business and Management

CHRIST (Deemed to be University)

Bengaluru

Acknowledgement

I am indebted to many people who helped me accomplish this Internship successfully.

First, I thank the Vice Chancellor, CHRIST (Deemed to be University), Dr Fr Joseph C C, for giving me the opportunity to do my project.

The leadership team at SBM (School of Business and Management), Bangalore Central Campus led by Dr. Jain Mathew, Dean, Dr. Mareena Mathew, Head of the Department and Dr N Ramakrishnan, Head of Lean Operations and Systems specialization ensures that all students gain relevant knowledge and skills through all courses especially courses like summer internship projects (SIP). The leadership team must be thanked for their efforts in guaranteeing quality internships for us.

I wish to express my sincere thanks to Milky Mist Dairy Food Private Limited and to my corporate mentor, Mr Karupparaj, Deputy Manager, Milky Mist Dairy Food Private Limited, Perundurai, for giving me an opportunity to work under his guidance and successfully complete my internship.

My academic mentor Prof Shrikumar, deserves a special mention of gratitude for guiding me throughout my internship. The inputs I received from my mentor during the weekly meetings helped me to get a deeper understanding of my project.

I thank my parents for their blessings and constant support, without which this internship project would not have seen the light of day.

K Mugunthvenkat

2228615

Placeholder for black and white photocopy of the certificate issued by the SIP
organization

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Executive Summary

This improvement project has been undertaken in the despatch department of the Milky Mist Dairy foods Pvt Ltd under the supply chain operations. Firstly the full details of the dairy industry of India has been learnt and understood. Then exploration about the company and its operations has been made. After the thorough understanding of the above, the project was finalized under the guidance of the corporate mentor. This project involves general observation, process mapping, problem identification, data analysis and recommendation of an optimal solution. It starts by capturing the requirements of the stock holders both internal and external. Then the requirements were transformed into measurable variables. From the collected variables it was found that the inventory team under the despatch department has been facing a problem involving inventory layout system and inventory visibility system. It was found by collecting the data on time taken by pickers to pick the SKU from the storage to the dock area and the percentage of ageing stock on daily basis. On further analysis, by using various analytics methods like the creation of control charts, finding out the potential causes using the Isikawa diagram(Fishbone diagram) and using Why-Why analysis for finding the root causes. The interpretations given for the analysis helped to get better clarity and the magnitude of the persisting problem. The final recommendations and conclusion was drawn with the help of ideas arriving after referring to research articles, case studies related to companies that has previously encountered and tackled similar issues, discussion with the stakeholders and the online course completed. The details about the implementation and functioning of the solutions arrived in the form of models, AS-IS and TO-BE process mapping has been mentioned. The final part of the project involves mentioning the learnings from this internship in terms of technical and soft skills. It also provides adequate details on the value added to the organization through the completion of this internship.

CHAPTER I

INTRODUCTION

The dairy industry is one of the largest and most important sectors of the Indian economy. It contributes significantly to the country's agricultural GDP and provides employment to millions of people. In recent years, the Indian dairy industry has undergone a major transformation, with a growing focus on value-added products.

Value-added dairy products are those that have been processed or modified in some way to improve their taste, nutritional value, or shelf life. They include a wide range of products, such as flavoured milks, yogurt, cheese, butter, and ice cream. Value-added dairy products are becoming increasingly popular in India, as consumers are looking for more convenient, nutritious, and flavourful options. With the increase in the disposable income of the Indians, the market requires more luxury products for differed needs and requirements for people belonging to different strata of the society.

Value-added dairy products are often more perishable than traditional dairy products, such as milk. This is because they may contain ingredients that are sensitive to temperature, such as fruit or vegetables. As a result, it is important to maintain a cold chain for these products throughout the entire supply chain, from the farm to the retail store. It is the company's collective strategy that involves all its department from production, quality, and supply chain, sales to improve its operations and gain the competitive advantage.

In the current value added dairy products market, the competition among companies does not depend on the cost factor but on the competency of their supply chain network. So a high supply chain performance is required from companies to obtain a competitive advantage in this sector. The manufacturers must work to improve their logistics process to support their company's overall supply chain strategy. In the global platform, it is absolutely required for the companies to adapt global supply chain strategies to compete in the international markets. The companies must be able to reach its distributors in the shortest time possible. It is the question of how the company can make the right product reach the right place at the right time. This requirement becomes more complex with the involvement of dairy products that has even lesser shelf life and also an increasing number of SKU's in the inventory.

The success of the company depends on the handling of the above issues and factors in a sensitive manner. Milky Mist Dairy foods Pvt Ltd is one such company that has the best of this knowledge and stands as a leader in the value added dairy products market.

CHAPTER II

PART- A INDUSTRY PROFILE

PART- B COMPANY PROFILE

PART – A

The milk production of India has registered 51 % increase during the last eight years i.e. during the year 2014-15 and 2021-22 and increased to 221.06 Million tonnes in the year 2021-22. The milk production has increased by 5.29% over the previous year 2020-21. India is highest milk producing nation in the world contributing to 24 % of the total global milk production in the year 2021-22. Among the Indian states, the top 5 milk producers are Rajasthan (15.05%), Uttar Pradesh (14.93%), Madhya Pradesh (8.6%), Gujarat (7.56%) and Andhra Pradesh (6.97%). They together contribute 53.11% of total Milk production in the country. The current valuation of Indian dairy and its related industry stands at 115.8 billion USD. It is expected to grow at the rate of 8.94% CAGR till the forecast period of 2023-2028. The Indian dairy industry also comprises of cold supply chain activities which play a very vital role in the development of this market. Cold supply chain refers to the facilities and services undertaken or provided by a company or an entity for the logistics purpose of the products. The cold supply chain includes temperature controlled cold storage, insulated transport vehicle, sensitive quality control equipment, etc. The valuation of cold supply chain is estimated to be around 2.7 billion USD. This is a highly fragmented and an unorganized sector that accounts for 80%-85% of the share capacity. The rest is shared by the organized and the recognized players in the market. The Indian dairy exports stands at 471 million USD and is forecasted to grow at the rate of 19.6% CAGR. The top 5 Indian dairy exporters are Mother Dairy, Britannia, Amul, Lactalis, and Groupe Serap

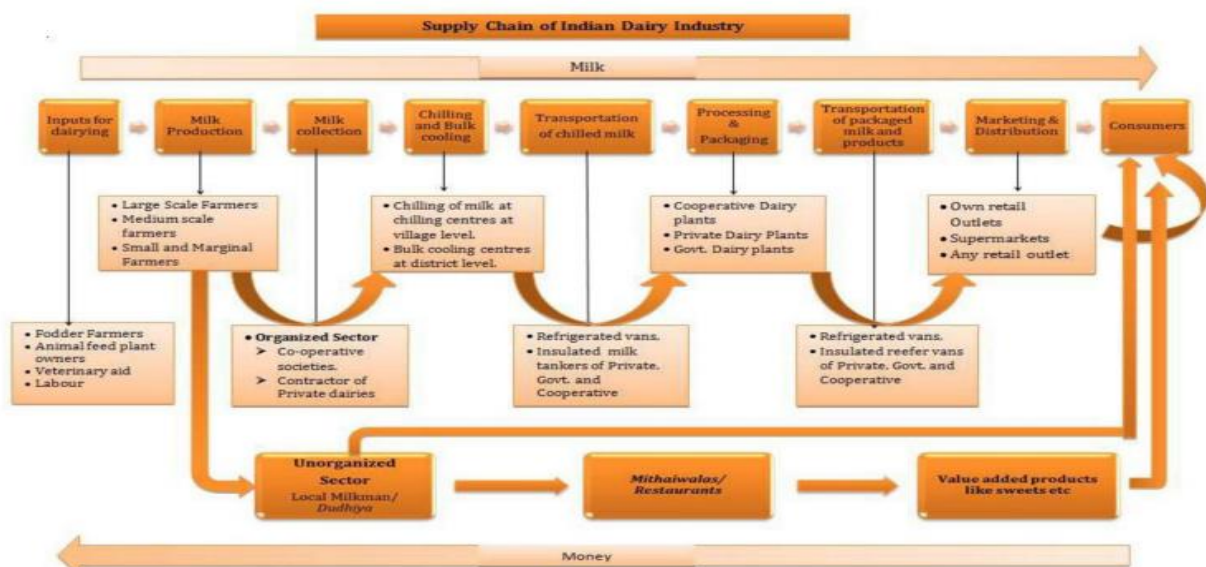


Figure 2: Supply Chain of Indian Dairy Industry

Source: Issues and Challenges of Supply Chain Management with perspective to Indian Dairy Industry. Mr. Purushottam A Petare.

PART – B

Milky Mist Dairy Food Private Limited (MMDFPL), Erode, is a leading manufacturer and distributor of dairy products in the Indian state of Tamil Nadu. The company converts milk into 120 varieties of value added products. They have a wide range of SKU's ranging up to 150 in numbers. Mr Sathish Kumar became the managing director of the company in the year 1992. He is a visionary with entrepreneurial skills and was instrumental in bringing-out milk-based products to the market. Every functional department in the organisation was professionally crafted with the best talents to achieve the company's vision. The company's vision is to make Milky Mist the country's premier dairy products producer, with excellent and hygienic manufacturing facilities and effective logistics that will lead the milk from the farmer in a cold chain to the consumer of the product to give them the best quality natural products of international standards in the perfect packing from the most modern factory, giving them value for money. The company has a capacity to process around 5.5 lakh litres of milk daily which is being procured directly procured from the 56000+ farmers present in and around the 8 nearby districts of the company. MMDFPL is committed to providing high-quality dairy products to its customers. The company has a team of experienced quality control professionals who ensure that all of its products meet strict quality standards. MMDFPL is also certified by FSSAI (Food Safety and Standards Authority of India) and HACCP (Hazard Analysis and Critical Control Point). It is a very technologically advanced company which has the following capabilities:

- 1000 slices/ minute high-speed cheese slice packing machine
- 60 MT/ day fully automatic paneer making plant with robotic packing
- 40 MT/ day fully automatic mozzarella cheese manufacturing plant
- 40 MT/ day cream cheese manufacturing plant.

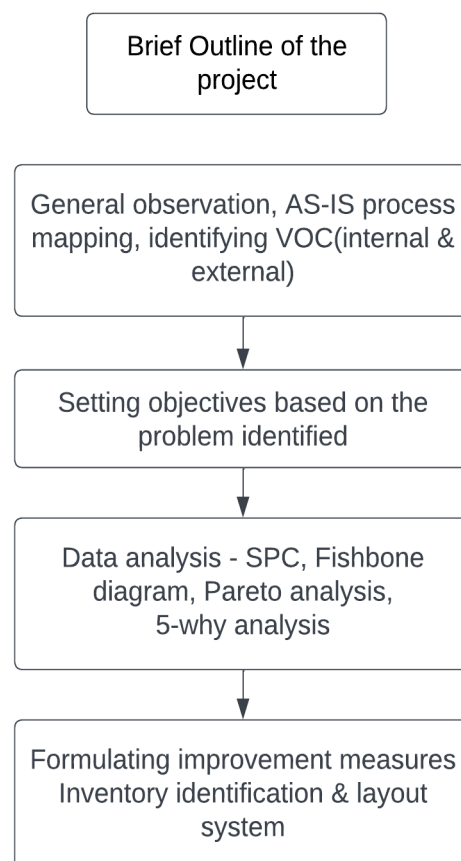
An Economic Times report says India-focussed investment fund WestBridge Capital is set to acquire a minority stake in Tamil Nadu-based dairy products brand Milky Mist worth Rs 800 crore (\$98 million). The investment in Milk Mist could be the largest by an institutional investor. The Erode-based company has a robust balance sheet with a Rs 1,300 crore revenue and operating revenue at over Rs 925 crore in FY 21, according to the latest available data on Entrackr.

CHAPTER III

PROJECT DESIGN AND METHODOLOGY

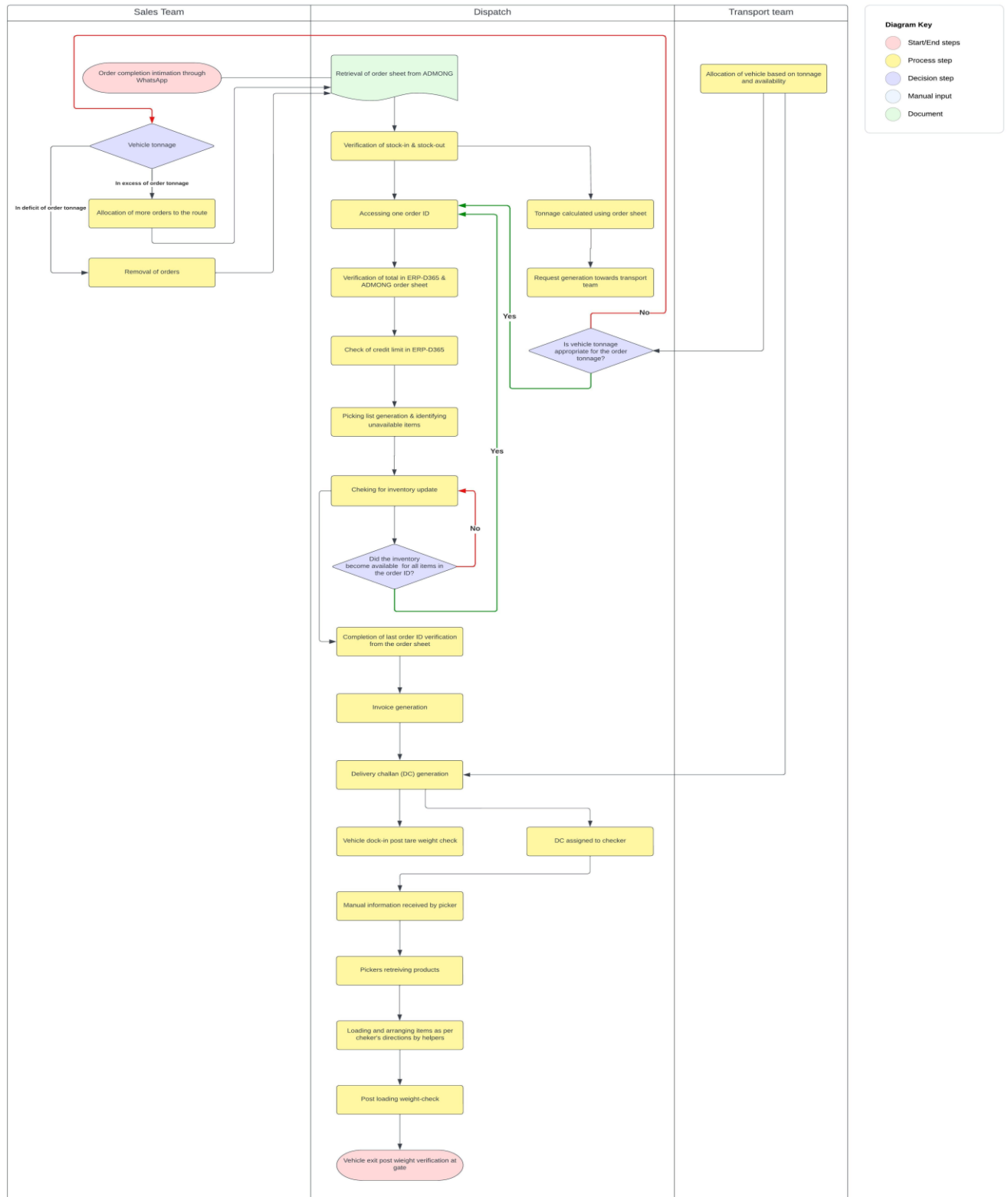
PROJECT OVERVIEW

The overview of the project involves general observation, mapping the AS-IS process of the area of the project, and identifying the voice of the customers. Identifying the voice of the customers gives us the idea about where the problem can exist and what is the expectations of the customers. The obtained voice of customers has to be converted to CTQ (Customer to Quality) which are the measurable variables that explain us the magnitude of the existing problem. From the CTQ, the objectives are set and the problem statement is arrived. Once the problem statement is obtained, the data collection begins for the measureable variables. With the collected data, analysis techniques like the statistical process control, root cause analysis can be made to draw conclusion on how the problem is statistically significant to arrive at the main reason for the problem. Then the appropriate solution is discussed and recommended to make necessary changes.



PROCESS MAPPING

AS-IS PROCES MAP FOR DISPATCH PROCESS



The above process map describes the work flow of the despatch process of Milky Mist Dairy Pvt Ltd. Despatch operations comes under the supply chain of the company. The main role of the despatch section is to ensure that the manufactured finished goods are transported to the distributors and the retailers on time with the optimum quality. To ensure this, the despatch team must work in co-ordination with the sales team to capture the orders, verify the stock availability with the inventory team using the WMS, then to check the credit eligibility of each customer, generate the order sheet for each order, ensure that the products that are going to be shipped are quality assured in terms of physical as well as the product values. They must also work in sync with the transport team for allotment of vehicle tonnage allotment, driver allotment. Their next role is to keep the checkers and the pickers informed about the order requirements and ensure that the right order reaches the right customer.

The key stakeholders involved in this process are the executives of the despatch section headed by a deputy manager, who executes and oversees the processes, the checkers who make sure that the right order is being loaded in the right trucks in the docking area, then the pickers who use BOPT's (Battery Operated Pallet Trucks) to pick the products from the storage and get it to the dock area for loading. The major responsibilities of the despatch section includes inventory maintenance, on time loading and delivery of finished goods.

The process is a complicated one on a daily basis as the number of orders received each day is increasing and it involves mixed range of SKU's. On a daily basis, the company gets around 150 to 200 orders spread around various states and regions. It is the responsibility of the despatch team to cut orders when there is excess and to include and make advance despatches in case of a shortage or an abundance of space available in the transport vehicles.

It is also required by the despatch team to have a single line of communication and computerised workplace as it involves in working together with multiple other departments like sales, transport, and quality control. So an optimized despatch operations process ensures direct effect on the company's profit margins and the overall functioning of the company.

CUSTOMERS & EMPLOYEES REQUIREMENTS

To start the improvement activities, the foremost thing needed is to capture the requirements of the stakeholders. Here the stakeholders involved are the despatch executives, the checkers, the pickers, and the customers who may be distributors or retailers. Detailed interviews have been conducted with the team to obtain the following requirements:

Employee's Problems:

1. Difficulty in product visibility (Discrepancy in WMS & physical inventory).
2. Increase in stocking of products with less product life percentage.
3. Delay in identification of product location inside the warehouse.
4. Extended working hours.

Customer Requirements:

1. Right time in delivery and receiving of the ordered consignments
2. Order fulfillment.

DEFINING THE CTQ

CTQ (Customer to quality) is the conversion of the voice of the customers to measurable variables. The customer requirements are words and qualitative in nature. They must be made quantitative so that data collection can be made easy and analysis can be made.

From the above customer and employees requirements, the CTQ's are as follows:

1. Number of times discrepancy arises between the availability of physical finished goods in the inventory and entry in the WMS while generating Delivery challan.
2. Number of SKU out of total production having expiry life less than 85%
3. Time taken for each picker to pick an SKU from the inventory and arrive at the dock area

SCOPE OF THE PROJECT

PROBLEM STATEMENT:

To provide an organized inventory layout system and to improve the inventory visibility.

PRIMARY OBJECTIVES:

1. To provide an inventory layout system for easy accessibility.
2. To digitalize the inventory entry system through the implementation of QR codes system.

SECONDARY OBJECTIVES:

1. To map and understand the dispatch process.
2. To identify root causes for the problem.
3. To provide feasible solutions that can eliminate the root causes.

DELIVERABLES:

1. An inventory layout model that is expected to reduce the time taken for the pickers to search and pick the finished goods from inside the inventory to the docking area.
2. To provide a digitalized inventory visibility system involving QR codes for automated system entry and updating.

CONSTRAINTS:

1. Budget constraints that must be kept note of while making changes in the existing process and implementing a new one.
2. This project is also time bound as the time taken to train the employees for the new process must be minimal.

DETAILS OF DATA ANALYSIS

DATA COLLECTED:

1. Percentage of the SKU's out of total production done that has shelf life of less than 85%
2. The exact time taken for each picker to pick an SKU from the inventory and arrive at the dock area.

DATA ANALYSIS:

Initially the process data must be checked if the process as a whole is statistically in control or it is out of control. For this purpose, control charts have been computed which is P-Chart and X-chart. We use the P-chart for the product life percentage as it involves the proportion of total production that has a reduced life. As time is a continuous variable and the average time can be obtained, X-chart is being used for the time taken by the pickers.

Once if the process is found to be out of control, we can conclude that there can be special causes for the deviation. We can find the causes through Ishikawa diagram popularly known as Fishbone diagram. The problems in this diagram are segregated into four categories namely Men, Materials, Machines and Methods.

Now each of the potential causes are taken down and we take the frequency of occurrence of these causes in the daily operations. The frequency is compiled and a Pareto diagram is created to find the vital few and trivial many causes using the 80-20 rule. By this we can address that 20% causes and solve the 80% of the problems.

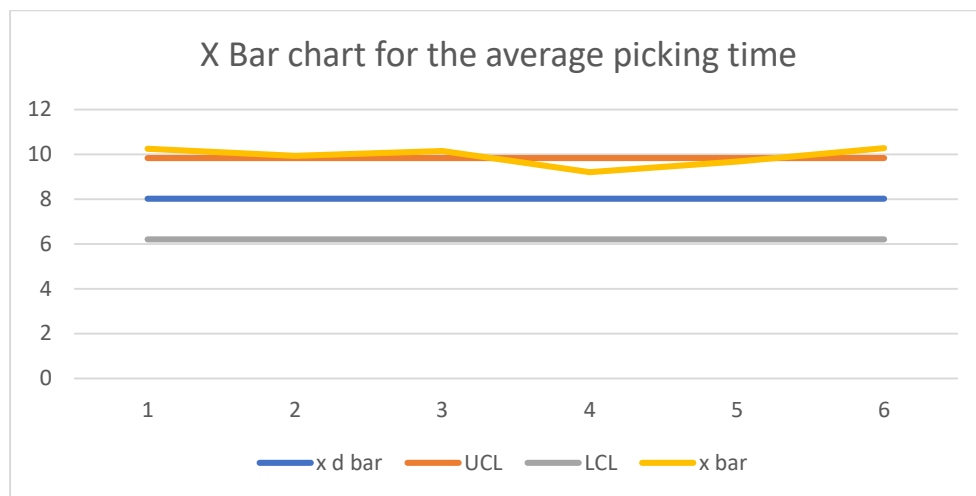
After arriving at the vital few causes, we now explore the root causes of these problems using the help of why-why analysis or the Root Cause Analysis (RCA). This intends to arrive at the root cause by asking why & why for 5 times to get to the core of the problem. Though there may not be any relevancy with the actual problem and the root cause obtained, but it ensures that addressing the root cause solves the persisting actual problem. Finally, the root cause is mapped with the problem and the solution.

With the above mentioned analysis techniques and the interpretations obtained, we can recommend appropriate solutions and improvement measures to improve the efficiency of the process.

CHAPTER IV

DATA ANALYSIS & INTERPRETATION

A. CONTROL CHARTS:



The above chart has been created using the data collected on the time taken by the pickers to pick a product from the inventory and arrive at the docking area.

Here, we have the following results:

Mean time: 8.01 minutes

UCL (Upper control limit): 9.82 minutes

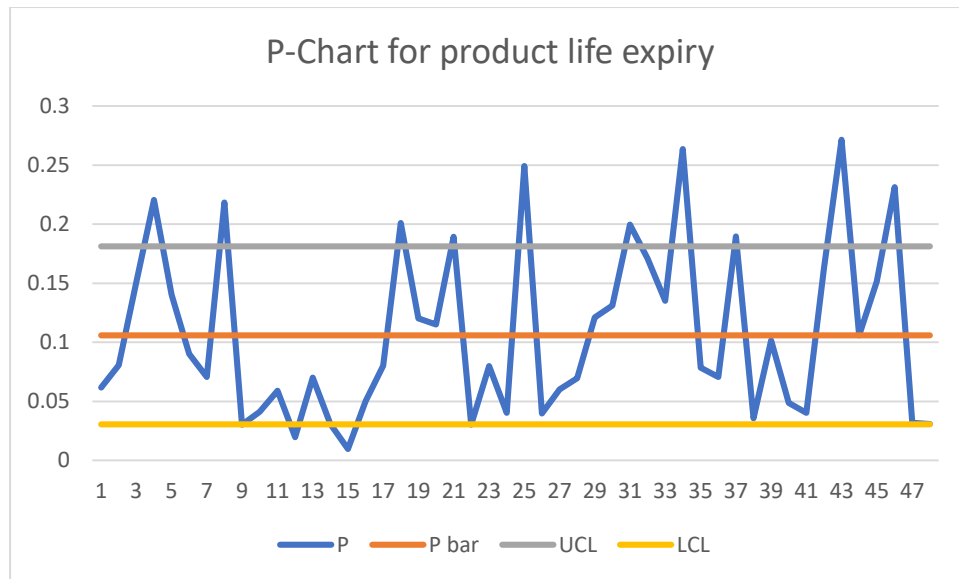
LCL (Lower control limit): 6.20 minutes

SD (Standard Deviation): 1.35 minutes

R-bar value: 3.13.

INTERPRETATION:

From the above chart the obtained mean values are higher than the upper control limits. This brings the conclusion that the process of picking is not in control and there exist a special cause for the delay in the picking process. The necessary steps related to the objectives that must be taken is to reduce the time taken for the picking process.



The above P-chart has been created to check the proportion of products totally produced and the products remaining in the inventory that has the expiry life of less than 85%.

The results are as follows:

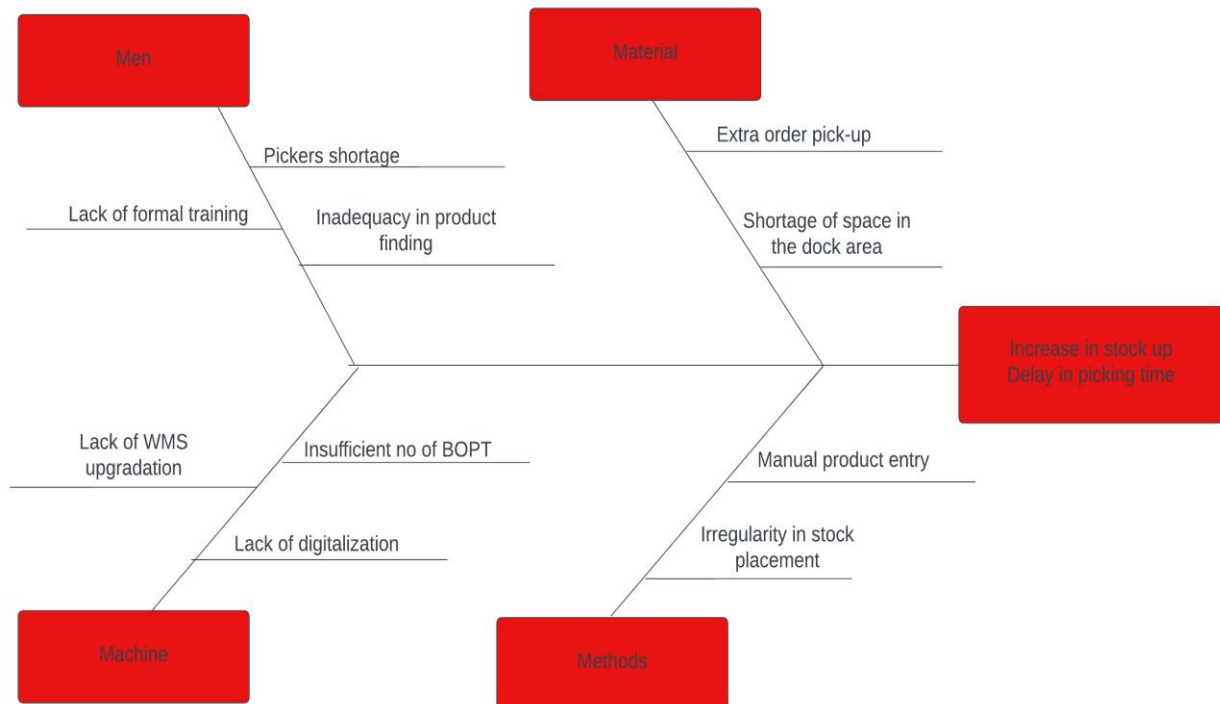
1. P-bar: 0.105
2. UCL (Upper Control Limit): 0.181
3. LCL (Lower Control Limit): 0.030

INTERPRETATION:

From the above chart, we see that the proportion of products is above the upper control limit in some cases and it is also below the lower control limits in some cases. This indicates that the process is out of control and has some special causes. The causes must be identified and required corrective measures must be taken to reduce the increase in stock pile up of products with less product life left.

B. ISHIKAWA /FISHBONE DIAGRAM:

This diagram helps us to find out the potential causes for the above mentioned out of control processes.



From this model, we come to the following results:

❖ Causes due to **Men**:

1. Shortage of pickers
2. Lack of formal training
3. Inadequacy in finding a product

❖ Causes due to **Materials**:

1. Extra order pickup
2. Shortage of space in dock area

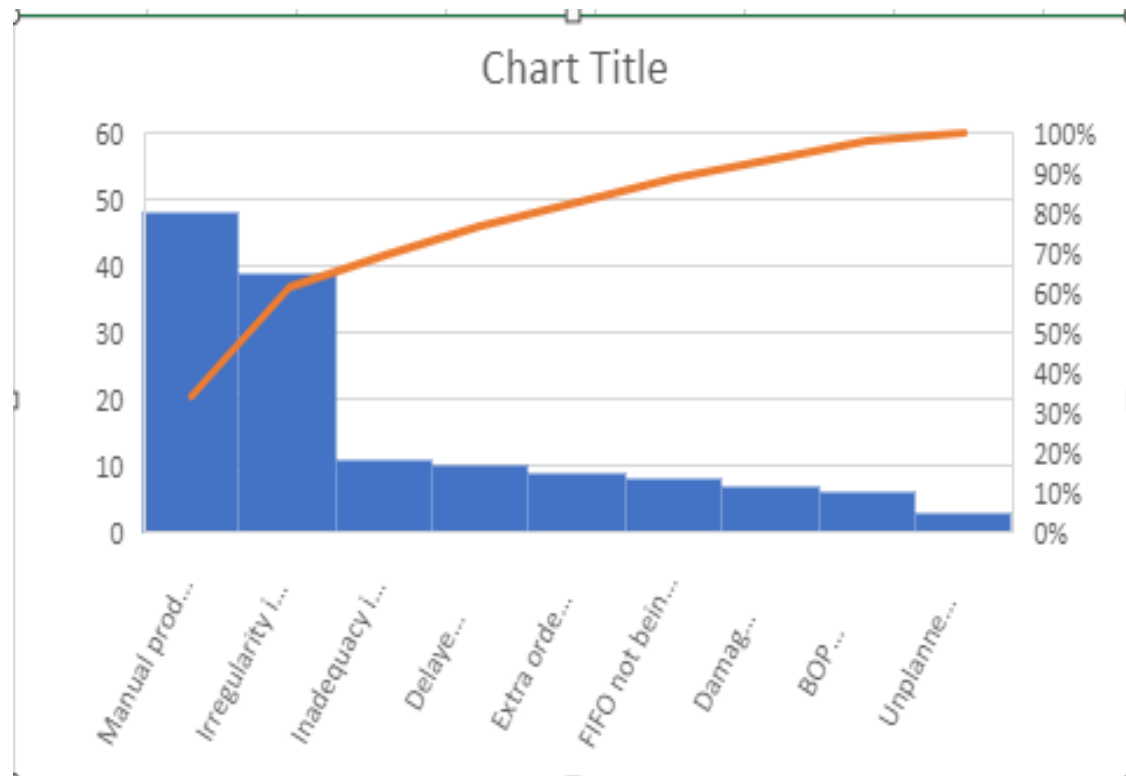
❖ Causes due to **Methods**:

1. Manual Product entry
2. Irregularity in finished goods arrangements

❖ Causes due to **Machines**:

1. Lack of WMS up gradation
2. Insufficient number of BOPT
3. Lack of digitalization

C. PARETO ANALYSIS:



The pareto chart has been created with the above mentioned 9 potential causes found by the Ishikawa diagram.

From the above chart, we can see that the vital few causes are:

1. Manual product entry into WMS
2. Irregularity in stock placement
3. Inadequacy in product finding

D. ROOT CAUSE ANALYSIS:

Cause 1: Manual product entry into systems

Why? – The stock records are informed manually

Why? – The information on moving stock is given manually

Why? - No digital system access for the pickers

Why? – No digital system available for the inventory team.

Cause 2: Irregularity in stock placing

Why? – No designated place allotment for a particular SKU

Why? – No information given on the SOP of stock placement

Why? – No actual SOP for the stock placing layout

Why? – No layout available for placing the stocks

Cause 3: Inadequacy in Product finding:

Why? – No familiarity of storage

Why? – Changes in the places of keeping the SKU's

Why? – No formal information on SKU's placement in the inventory

Why? – No standardized procedure for finding the units

S. No.	Problem	Results of 5 why analysis	Solution for the Root cause
1	Manual product entry to WMS	Lack of digital system implementation	Implementation of QR code system
2	Irregularity in stock placement	Lack of inventory layout system	Design of Inventory grid model system
3	Inadequacy in product finding	Lack of SOP	SOP formulation

CHAPTER V

FINDINGS AND CONCLUSION

SOLUTIONS & RECOMMENDATIONS

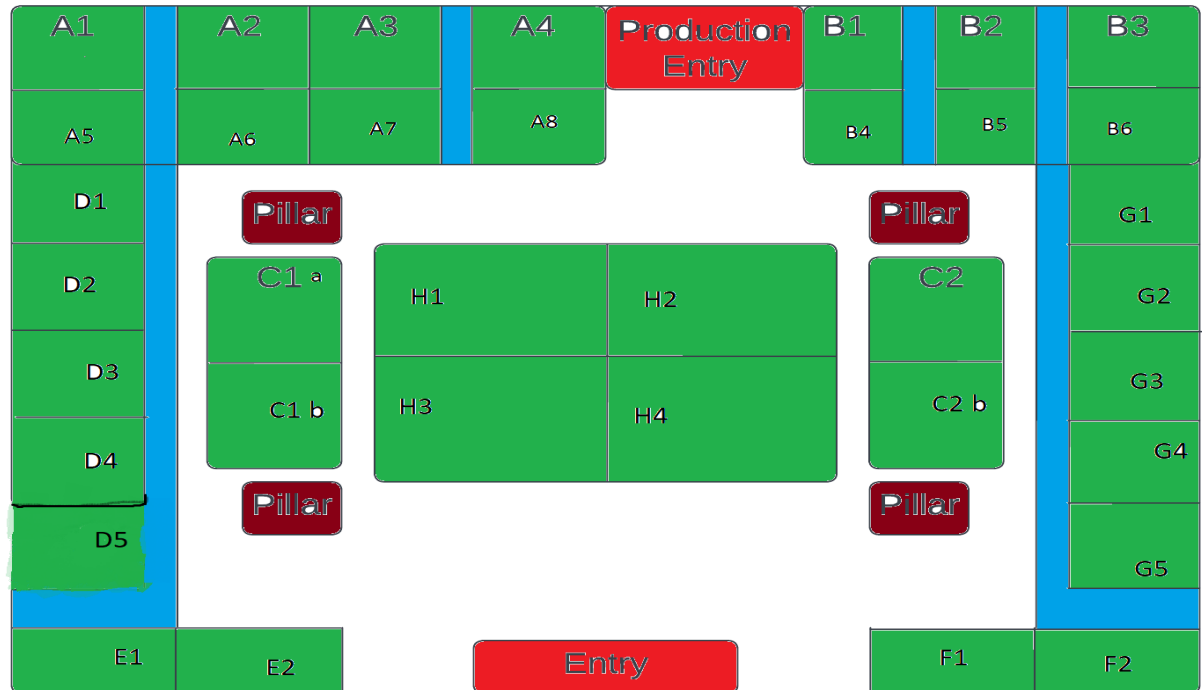
A. INVENTORY LAYOUT SYSTEM:

The problem of irregularity in stock placement can be solved by formulating a proper inventory layout system. A full inventory layout system can be very helpful in solving the problem of delay in time taken by the pickers to pick the SKU's from the inventory and get to the docking area. The practice of keeping the finished goods in pallets and placing it in the floor is usually practiced for LIFO method of inventory; but due to the lack of space in the storage, to install racks, this method is being used. So to make the best use of the available resources, the plan of **'Grid model of inventory layout system'** has been proposed.

This layout involves dividing the total inventory floor into grids with specific location representations. They must be allotted to each SKU to be placed in a particular place every time and must be made as a standard operation procedure. This grid system has made the most optimal use of floor space without any idle spots. This layout has also given space for the free movement of the BOPT's in all sides of the goods for easy accessibility. This system also provides space for the products to breath inside the storage area. As the goods are temperature sensitive, they cannot be placed in a very congestive manner. There must be adequate space between the products for the cold air to pass through them and maintain the temperature and the quality of the products. This facility also helps the products to be visible for the pickers if in any case the whole lot is not despatched. When there is any balance stock in the previous lot, it can be first despatched and then the new stock is moved out. This system provides an organized way of placing and moving the stock.

The names allotted to the grids can be imported to the WMS easily and it is identifiable for anyone operating in a particular inventory. This location can also be used to track the movement of stocks and the sale of products which is used as a data for the demand forecasting and production. Similarly the grid model can be easily accessed by other departments like the production, Quality control as well.

GRID SYSTEM MODEL:



Description:

1. The **Green** area represents the storage area where the finished goods can be placed.
2. The **Blue** area represents the space given for the movement of the BOPT's.
3. There are two entries into the storage one for the pickers and the other is for the production team to keep the finished goods.
4. The **Brown** area is the pillars of the storage area.

B. INVENTORY VISIBILITY SYSTEM:

To solve the issue of pile up of stock with decreasing life percentage, an inventory visibility system can be implemented. This system involves the usage of QR codes to identify the product location, the status of the product in the process after production to the despatch and loading of vehicles. This also involves the use of HHD (Hand Held Devices) for the pickers, the production team, and the quality control team.

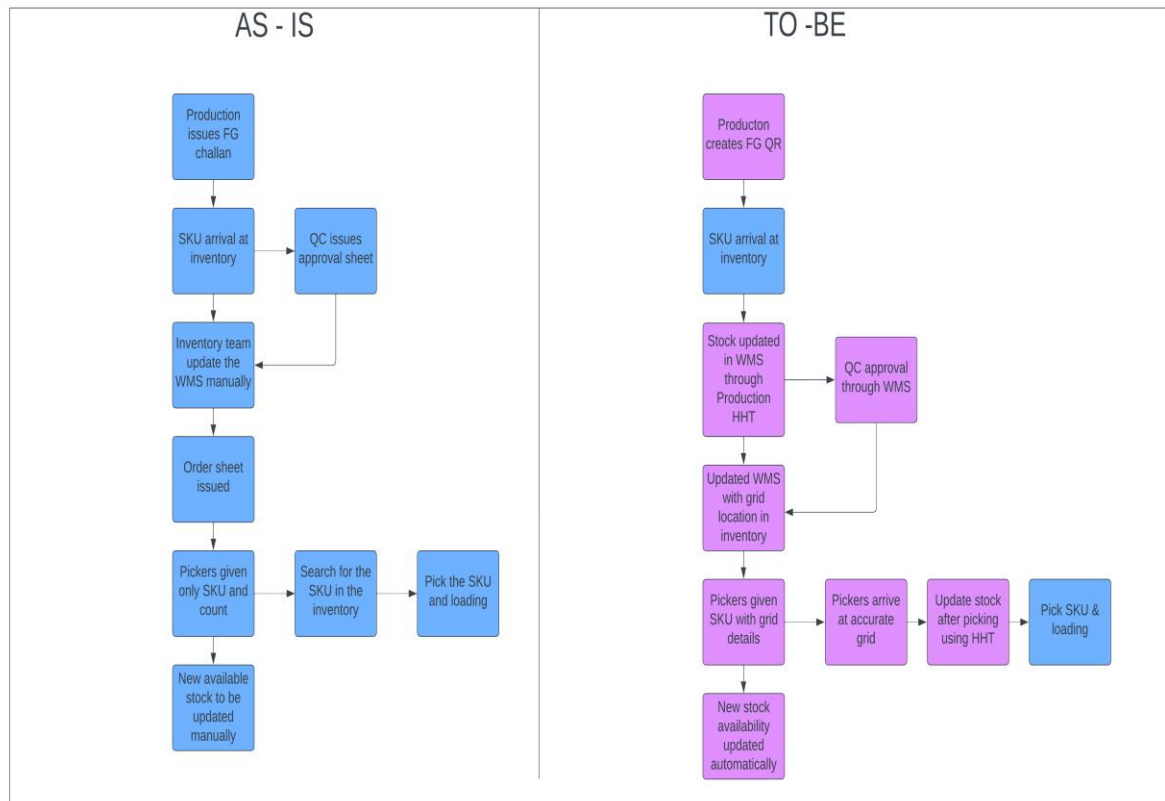
The QR code system provides the best visibility of products as it involves the automated up gradation of the WMS with the balance stock after each time of picking. This greatly solves the problem of manually entering the stock data to the WMS. The QR code is generated in the production area itself with containing some specific information on the SKU. The QR is generated using the WMS and printed with the help of a specialized QR code printer. It is connected to the SKU. Another permanent QR is fixed for the previously mentioned inventory layout system that connects with the QR of the SKU. When the product is brought into the inventory from the production, the QR is scanned and the status gets automatically updated as 'waiting for QC Approval'. The QC is then notified in their system provided they are given access for the WMS that a newly arrived SKU is waiting for QC approval. Then the QC scan their device and start with the sampling and proceed with the QC testing. Once the testing is completed and approves, the QC can approve the lot from their system in the WMS. This helps the inventory staff to automatically identify the entry of goods in the system. There is also no discrepancy between the availability of physical stock and the count of stock available in the system. The next step is that when the checkers and pickers are given the order sheet and delivery challan for loading, they will be given the exact location of the SKU and they can scan the permanent QR to automatically update the WMS about how much stock has been taken for despatch and how much has been left in the storage. So the next time when the requirement for the same SKU arises, the first in stock is cleared and then the newer one is taken for loading.

From this system, the problem of manually entering the stock available, the discrepancy of stock between physical inventory and the WMS, the communication issue between the QC and despatch can be solved. This highly improves the visibility of inventory and reduces the piling up of ageing stock. This also reduces the time taken to get clarifications from various departments due to the communication barrier. The production team can also have an idea of how much stock of the previous batch is left over and they can fulfil the order by considering the available balance.

The QR code generated must have the following details:

1. Manufactured date
2. Batch Number
3. $Ti * Hi$
4. Total number of cases
5. Total quantity
6. SKU balance
7. Grid ID for product location with inventory number
8. Product status

AS-IS & TO-BE PROCESS FOR THE INVENTORY:



LEARNINGS FROM THE INTERNSHIP

The learnings can be put in 2 categories:

A. Technical Learnings:

1. Processes involved in a cold supply chain
2. Dispatch operations in a dairy products manufacturing firm
3. Inventory management & optimization

The concept of cold supply chain is an emerging one in the Indian industrial space. To know about the cold supply chain and its real time applicability is very informative. In this internship, we were also informed about how supply chain operations play a vital role in directly affecting the company's financial margins. Also learning about the inventory operations from an esteemed company gives numerous perspectives and ideas to explore for opportunities.

B. Soft Skill Learnings:

1. Importance of understanding the organizational culture
2. Involving and interacting with stakeholders in a project
3. Managing stakeholders to accept and adapt to process transformations
4. Creating knowledgebase to be used for future in the organization

From this internship, we got the opportunity to directly interact with the industry personals and got complete knowledge of the industry and the company culture and trends. I also got to know about the importance of all the stakeholders in a process.

VALUE ADDED TO THE ORGANIZATION

1. **Identified the root causes** for delay in picking time and increase in product expiry.
2. Designed an **Inventory layout system & digitalization plan**. The digitalization project has been initiated and currently undertaken by the organization.
3. Suggested small and easily adaptable process improvements to be amended in WMS for removing communication lags.

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APPENDIX

APPENDIX – II

Screenshot of Similarity index report

APPENDIX III

Feedback form from the corporate mentor

APPENDIX IV

Feedback form from SBM mentor

APPENDIX V

Feedback form from Viva Panel Member

APPENDIX VI

List of online courses completed on topics related to SIP

- 1. Warehouse Management in Logistics & Supply chain Management – Udemy**