INSE 6210: Total Quality Methodologies

Project Report

Using Six Sigma for Improving Pharmaceutical Distribution and Delivery Process in the Alborz Company

Submitted by:

Amirhossein Pakarha	40267958	amirhosseinpakarha@yahoo.com
Mohammadreza Alijani	40278663	Pooriaalijani@gmail.com
Niloufar Kalantari	40259042	niloufar.kalantari@gmail.com
Navid Roshdieh	40235974	navid.roshdieh86@gmail.com

Dr. Zachary Patterson - Winter 2024

Contents

1- Executive summary

In the realm of pharmaceuticals, the delivery process is a critical component affecting both patient safety and business viability. The Alborz Company acknowledges the urgency of refining its pharmaceutical distribution and delivery system to meet industry standards and customer expectations. This report explains how Six Sigma methodology can help this company enhance the accuracy of distribution and delivery processes. (This is a type B project)

The real knowledge about the delivery process in the company had been in hand along with the data of different types of errors during the year 2023, and also the general complaints of the customers about the wrong deliveries were initially known. Based on this data and knowledge, In the Define phase of our project, we meticulously describe the problematic processes within the distribution system, delineate customer expectations, and outline Critical-to-Quality (CTQ) requirements and responsibilities. We have also tried to narrow down the problem and based on the data, the main problem of the delivery process lies in the lack of handling of product batch numbers in the delivery process of the company. Subsequently, in the Measure phase, we identify relevant metrics and establish baseline performances to quantitatively assess the extent of the issue.

Moving to the Analyze phase, we try to propose our methodology for identifying root causes and performance gaps contributing to the occurrence of wrong deliveries. In the improvement phase, we have tried to propose tools and techniques to identify possible solutions and how we can apply them to rectify the issue and introduce possible improvement actions for being implemented. Finally, in the Control phase, we suggested the company run a C-chart to find their out-of-control parts and remove them to check again if their process is in control now or not.

We have also estimated the timeline and approximate cost of this project so that if the company accepts this proposal; it can be done within the proposed schedule and budget.

2- Introduction

The pharmaceutical distribution and delivery process at Alborz Company has been accompanied by inaccuracies, delays, and inefficiencies, posing significant risks to patient safety, damaging the company's reputation, and escalating operational costs. Addressing these challenges has become imperative to bring the distribution process in alignment with industry best practices and elevate it to a standard of excellence that meets the expectations of all stakeholders [1].

In this project, which is a type B project, we have proposed using Six Sigma methodology for identifying and reducing defects in the distribution of pharmaceutical products in Alborz company. Six Sigma is a set of methodologies and tools used to improve business processes by reducing defects and errors, minimizing variation, and increasing quality and efficiency[2].

In the following sections, we have tried to explain the application of the Six Sigma methodology for this project. In the Define phase, we meticulously describe the problematic process within the distribution system, delineate customer expectations, and outline Critical-to-Quality (CTQ) requirements and responsibilities. Subsequently, in the Measure phase, we identify relevant metrics and establish baseline performances to quantitatively assess the extent of the issue. Moving to the Analyze phase, we try to propose our methodology for identifying root causes and performance gaps contributing to the occurrence of wrong deliveries. In the improvement phase, we have tried to propose tools and techniques

to identify possible solutions and how we can apply them to rectify the issue and introduce possible improvement actions for being implemented. Finally, in the Control phase, we suggested the company run a C-chart to find their out-of-control parts and remove them to check again if their process is in control now or not.

3- Define

3-1- Project Charter

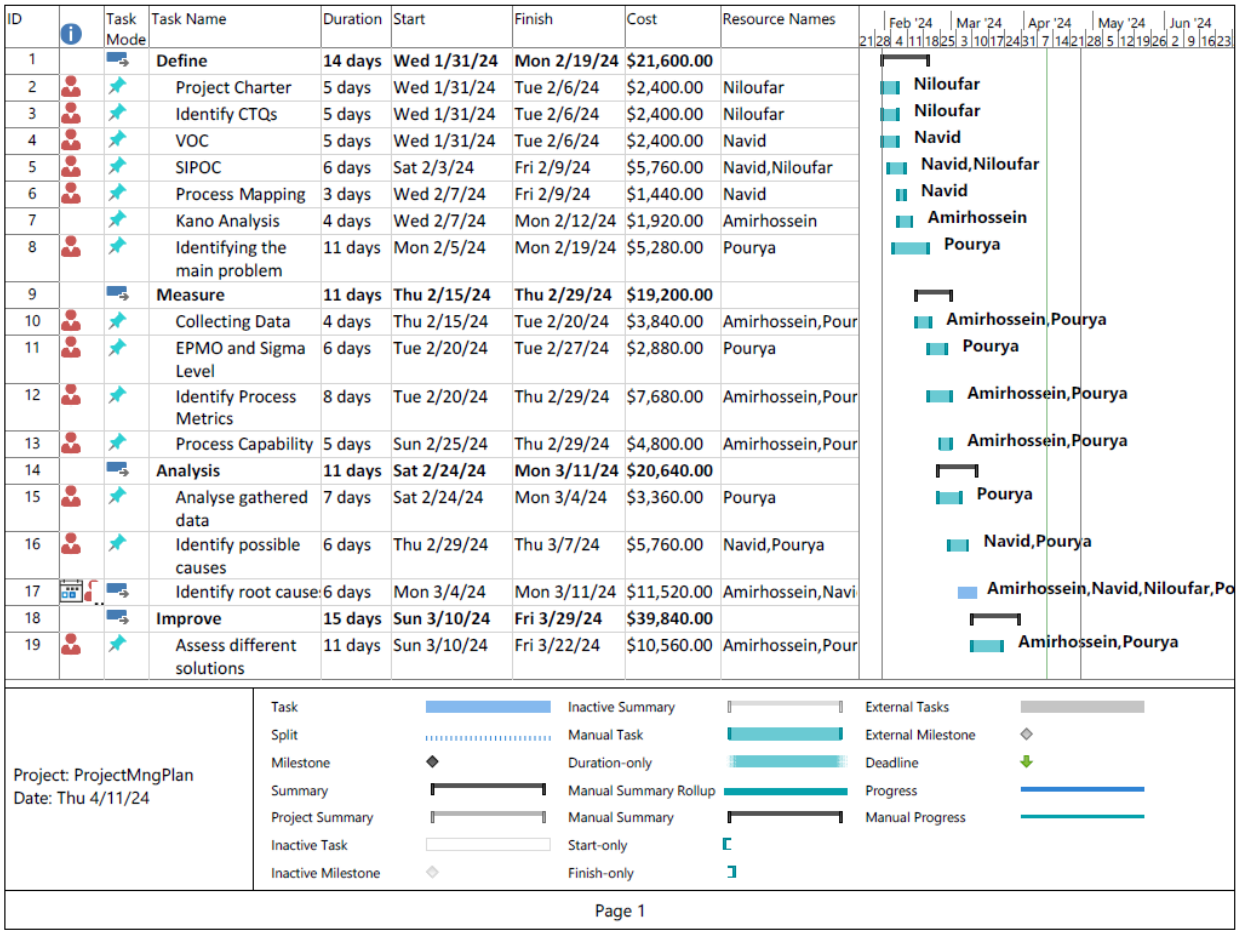
Project Title	**Using Six Sigma for Improving Pharmaceutical Distribution and Delivery Process in the Alborz Company**			
Date	Jan. 28th ,2024			
BUSINESS CASE				
Implementing a Six Sigma DMAIC project to address defects in product deliveries for Alborz Pharmaceutical Distribution Company is critical for improving delivery quality and addressing extra costs. Failure to act may result in compromised patient safety, decreased customer satisfaction, and tarnished company reputation. By prioritizing operational efficiency and accuracy, the company can bolster customer trust, ensure regulatory compliance, and enhance overall financial performance.				
PROBLEM STATEMENTS				
Alborz Pharmaceutical Distribution Company is experiencing delivery errors with an EPMO of 10320.32 (sigma level of 3.81), impacting patient safety and company reliability. This issue warrants immediate attention to ensure accuracy and reliability in distribution processes, achieving Six Sigma level.				
GOAL STATEMENTS				
We aim to reduce errors in delivery, achieving an EPMO of 3.4 or fewer (from EPMO 10320.32), using the DMAIC methodology. This improvement will enhance customer satisfaction and drive increased market share, ultimately yielding a positive return on investment.				
KEY TASK / DISTRIBUTION				
Phase	**Start**	**End**	**Team Member**	**Key Task Distribution**
Define	Jan 31th 2024	Feb 15th 2024	All team members	Define the project, high process map, and CTQ's
Measure	Feb 15th 2024	Feb 29th 2024	All team members	Collecting Data; specifying capability process metrics
Analyze	Feb 24th 2024	Mar 10th 2024	All team members	Analyze gathered data, defining route causes
Improve	Mar 10th 2024	Mar 30th 2024	All team members	Improving Components to reach the desired process outcome, Implementing the best process solution
Control	Mar 24th 2024	Apr 15th 2024	All team members	Examining outcome and restructuring project metrics
Closure	Apr 15th 2024	Apr 25th 2024	All team members	Delivering the documents and signing off
Key roles				

	Name	Signature	Date (MM/DD/YYYY)
Project Sponsor	Alborz company	Alborz Company	28th Jan 2024
Project Manager	Amirhossein Pakarha	Amirhossein Pakarha	28th Jan 2024
Project team member	Navid Roshdieh, Niloufar Kalantari, Mohammadreza Alijani, Amirhossein Pakarha	Navid Roshdieh Mohammadreza Alijani Amirhossein Pakarha Niloufar Kalantari	28th Jan 2024

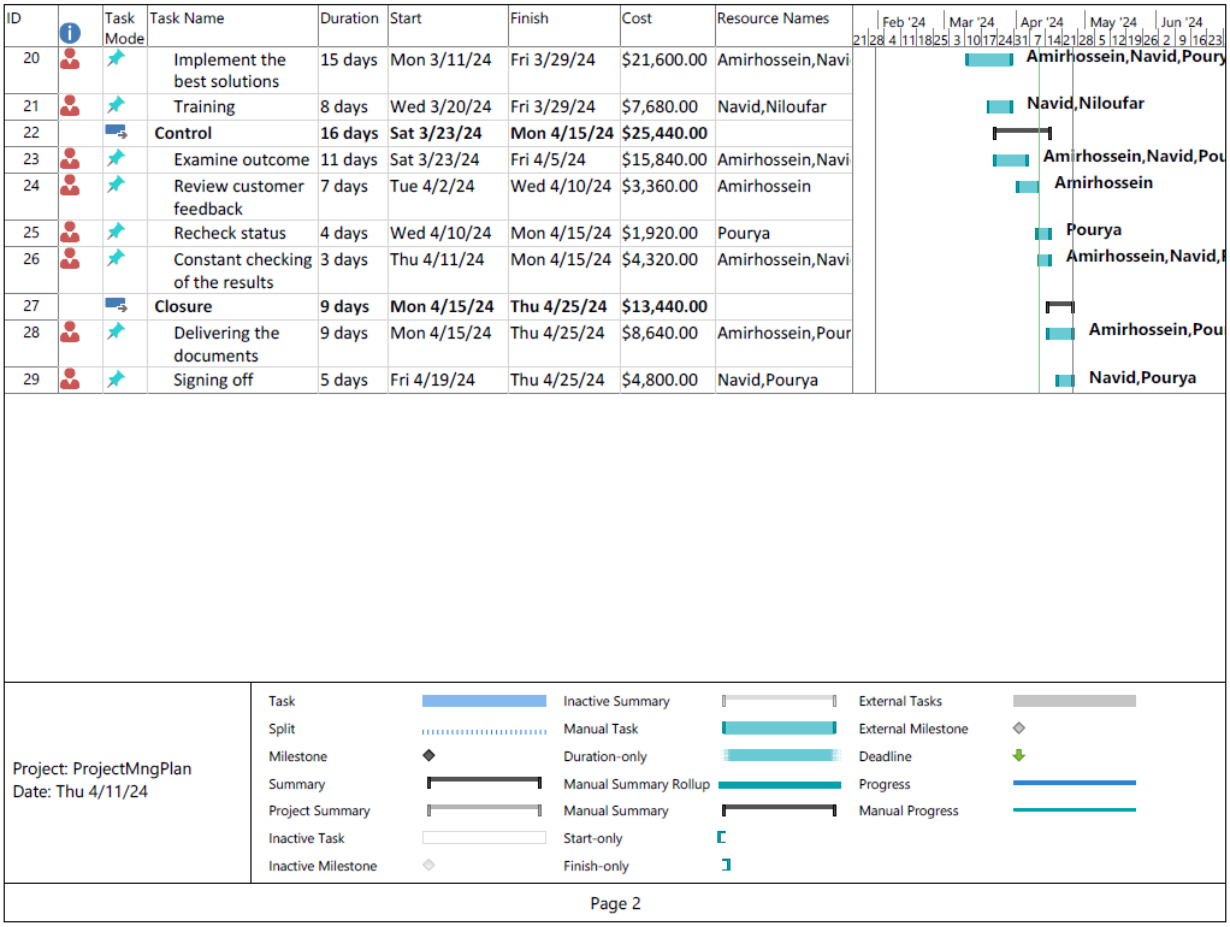
3-2- Project Management Plan

We have put a lot of thought into planning both the schedule and the breakdown of tasks for our project. You can see the proposed timeline in the figures below. The project kicks off on January 31st, 2024, and wraps up on April 25th, 2024.

In addition to mapping out the schedule, we have also clearly defined the team's responsibilities for each task they should complete. After crunching the numbers, we have estimated that the total cost of the project's work will be around $140,000. This includes everything we will need to spend money on to get the project done.



ID	Task Mode	Task Name	Duration	Start	Finish	Cost	Resource Names
1		**Define**	**14 days**	**Wed 1/31/24**	**Mon 2/19/24**	**$21,600.00**	
2		Project Charter	5 days	Wed 1/31/24	Tue 2/6/24	$2,400.00	Niloufar
3		Identify CTQs	5 days	Wed 1/31/24	Tue 2/6/24	$2,400.00	Niloufar
4		VOC	5 days	Wed 1/31/24	Tue 2/6/24	$2,400.00	Navid
5		SIPOC	6 days	Sat 2/3/24	Fri 2/9/24	$5,760.00	Navid,Niloufar
6		Process Mapping	3 days	Wed 2/7/24	Fri 2/9/24	$1,440.00	Navid
7		Kano Analysis	4 days	Wed 2/7/24	Mon 2/12/24	$1,920.00	Amirhossein
8		Identifying the main problem	11 days	Mon 2/5/24	Mon 2/19/24	$5,280.00	Pourya
9		**Measure**	**11 days**	**Thu 2/15/24**	**Thu 2/29/24**	**$19,200.00**	
10		Collecting Data	4 days	Thu 2/15/24	Tue 2/20/24	$3,840.00	Amirhossein,Pour
11		EPMO and Sigma Level	6 days	Tue 2/20/24	Tue 2/27/24	$2,880.00	Pourya
12		Identify Process Metrics	8 days	Tue 2/20/24	Thu 2/29/24	$7,680.00	Amirhossein,Pour
13		Process Capability	5 days	Sun 2/25/24	Thu 2/29/24	$4,800.00	Amirhossein,Pour
14		**Analysis**	**11 days**	**Sat 2/24/24**	**Mon 3/11/24**	**$20,640.00**	
15		Analyse gathered data	7 days	Sat 2/24/24	Mon 3/4/24	$3,360.00	Pourya
16		Identify possible causes	6 days	Thu 2/29/24	Thu 3/7/24	$5,760.00	Navid,Pourya
17		Identify root cause	6 days	Mon 3/4/24	Mon 3/11/24	$11,520.00	Amirhossein,Navi
18		**Improve**	**15 days**	**Sun 3/10/24**	**Fri 3/29/24**	**$39,840.00**	
19		Assess different solutions	11 days	Sun 3/10/24	Fri 3/22/24	$10,560.00	Amirhossein,Pour



3-3- VOC

This section encapsulates the insights gathered directly from the perspectives of the customers involved in or affected by the distribution process. The comment card shown in the figure is used to collect the opinions of customers about the provided service. After investigating the gathered comment cards, the main complaints of customers were listed as below:

- We have received the wrong batch number of the product
- We have been told by the sales representative that we would be given a product with a longer expiration date
- The delivery took longer than expected
- We cannot sell this product with this expiration date
- We wanted the newly produced package of this company
- The delivered package is not what we ordered exactly

COMMENT CARD

Alborz Pharmaceutical Distribution Company

Service Performed:

Date: | Time:

	Excellent	Good	Average	Poor
Professionalism:	○	○	○	○
Attitude:	○	○	○	○
Attentiveness:	○	○	○	○
Efficiency:	○	○	○	○
Environment:	○	○	○	○
Overall Experience:	○	○	○	○

Complaints:

Any Other Comments:

Actions Step

☐ Return Soon	☐ Never Return	☐ Stage Boycott
☐ Big Tip	☐ Low/No Tip	☐ File Charges
☐ Praise to Manager	☐ Inform Manager	☐ ----------

3-4- CTQ Tree

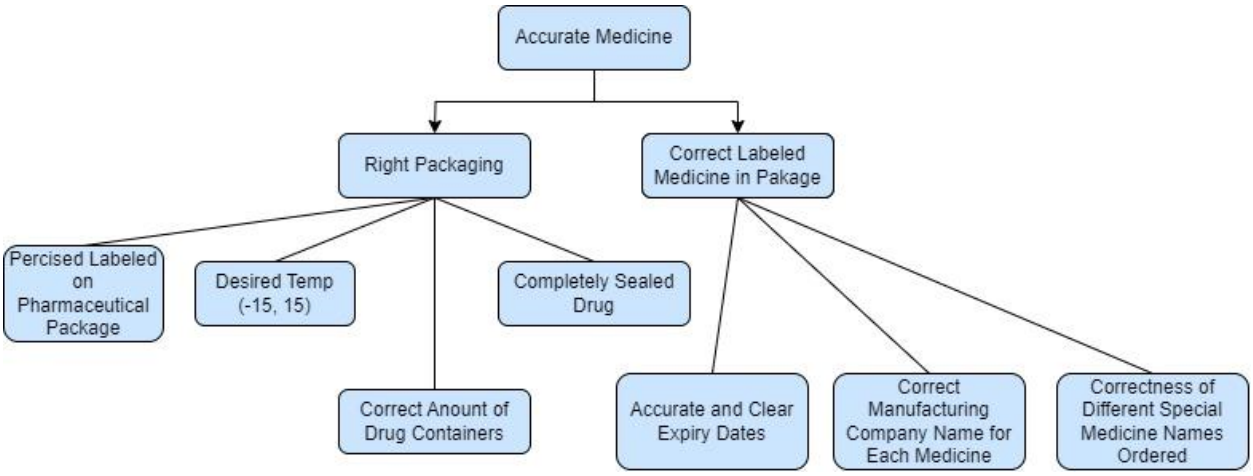


Figure 1: CTQ Tree

3-5- SIPOC

A SIPOC diagram is a high-level process map that defines the boundaries and key elements of any process [2]. The SIPOC diagram of the pharmaceutical distribution and delivery process in Alborz Company is illustrated in Figure 2.

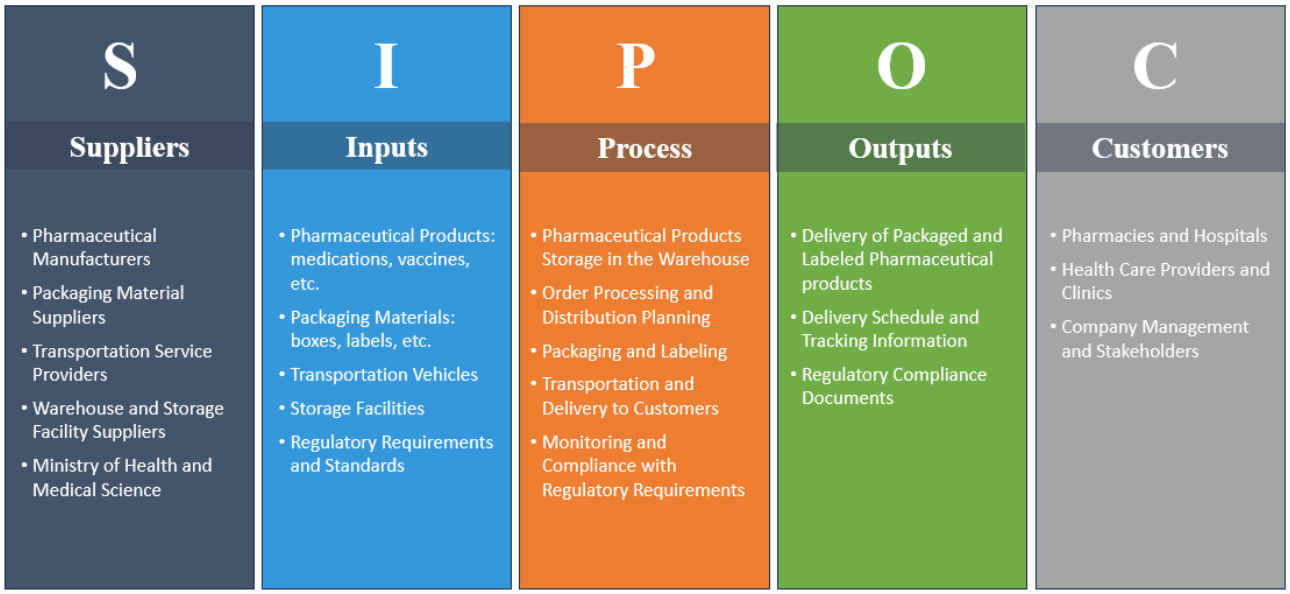


Figure 2: SIPOC Diagram of Pharmaceutical Distribution and Delivery Process in Alborz Company

3-6- Pharmaceutical Production Delivery Process Map

A process map is an extremely helpful tool that allows project participants to visualize process details, making it easier to identify and address mistakes quickly and effectively [3]. The current process map of product distribution and delivery in Alborz Company is shown in Figure 3.

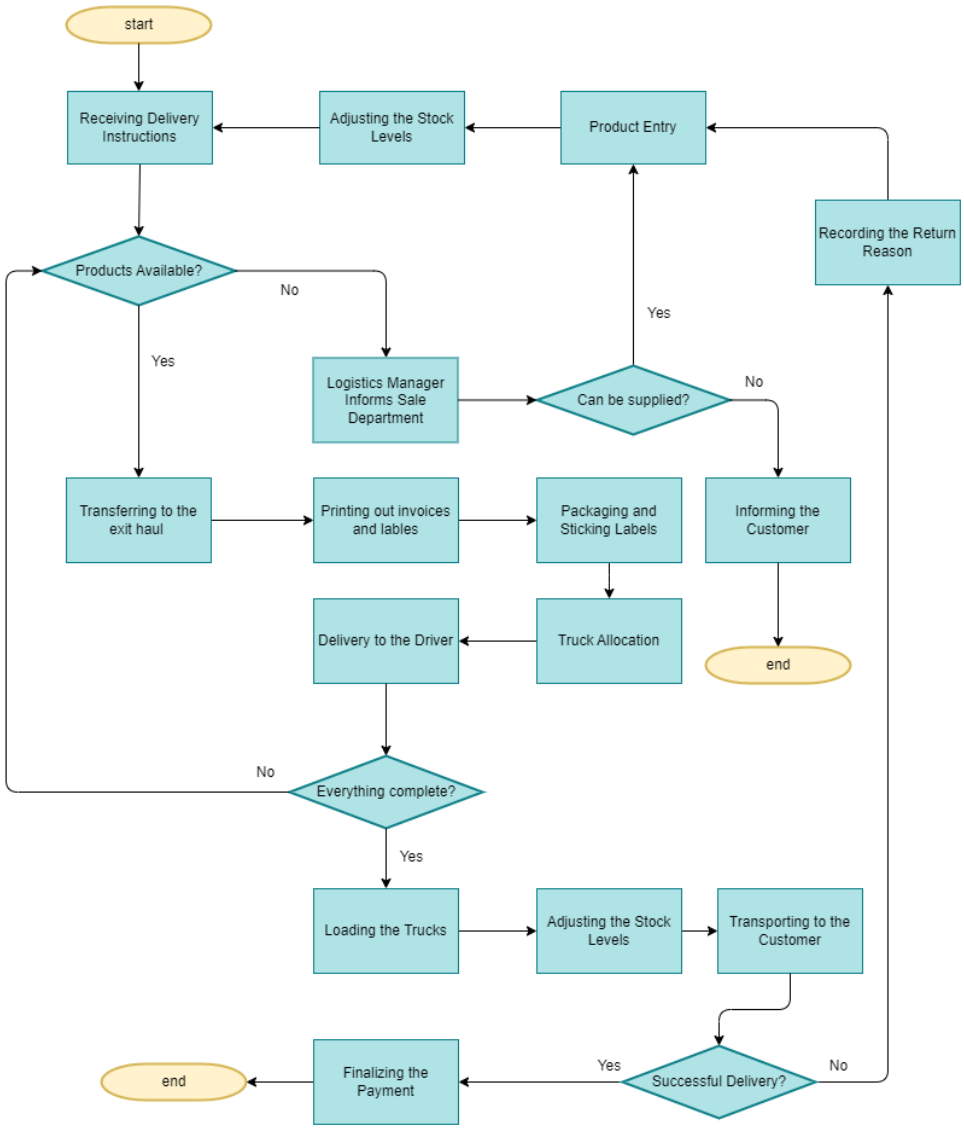


Figure 3: Process Map

3-7- Kano Analysis

Dissatisfiers (Must-haves):

- **Correct delivery of pharmaceutical products:** Ensuring accurate delivery is a fundamental requirement to prevent dissatisfaction and maintain trust in the distribution service.
- **Warranty and support:** This includes assurances regarding product quality, reliability, and any potential issues that may arise post-purchase.
- **Simple ordering:** Customers expect the ordering process to be straightforward and user-friendly. Complicated or cumbersome ordering procedures can lead to frustration and dissatisfaction.

Satisfiers (Wants):

- **On-time delivery of products**: Customers expect their orders to be delivered within the agreed-upon timeframe. Timely delivery ensures that customers have access to their medications when needed, avoiding any inconvenience or delay.
- **Ability to define the expiration date while ordering**: Providing customers with the ability to specify the desired expiration date when ordering pharmaceutical products adds flexibility and customization to the ordering process.
- **Reasonable shipping price:** Offering affordable shipping options ensures that customers perceive the overall cost of their orders as fair and reasonable.

Exciters/Delighters (Never thought of):

- **Online ordering**: Offering an online ordering platform provides convenience for customers. It allows them to place orders from the comfort of their homes or offices, potentially saving time and effort.
- **Online package tracking**: Providing online package tracking capabilities allows customers to monitor the status and location of their orders in real time. This feature adds transparency to the delivery process, reducing uncertainty and anxiety for customers.
- **Returning policy for a limited period**: Implementing a returning policy for a limited period allows customers to return products if they are not satisfied or if there are any issues with the order. This feature demonstrates the company's commitment to customer satisfaction and provides reassurance to customers.

3-8- Identifying the main problem

Based on principles of analyzing and measurement methodologies and after a deeper and closer look through most of the problematic parts of the delivery process, we came to the fact that the main and the most important problem in the whole process comes from wrong deliveries. The main cause that so many products have been returned to the company was because of the wrong batched number of products. The wrong batches caused a massive financial loss for our company. Below are three Pareto charts that show the defects and main problems in detail and proportion:

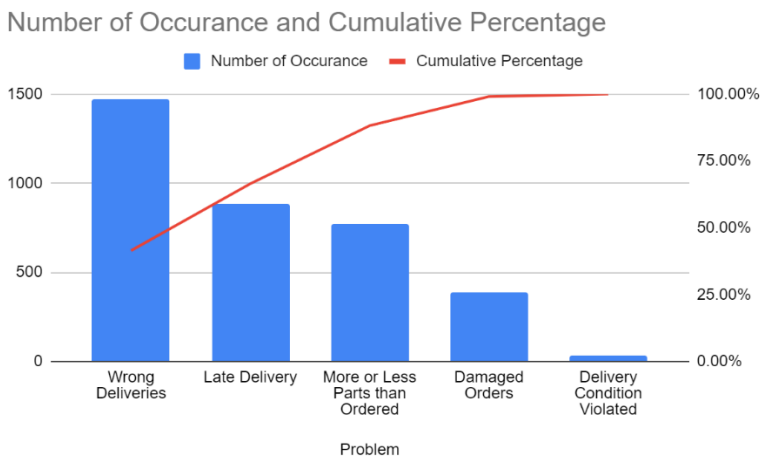


Figure 4: Pareto Chart Level 1

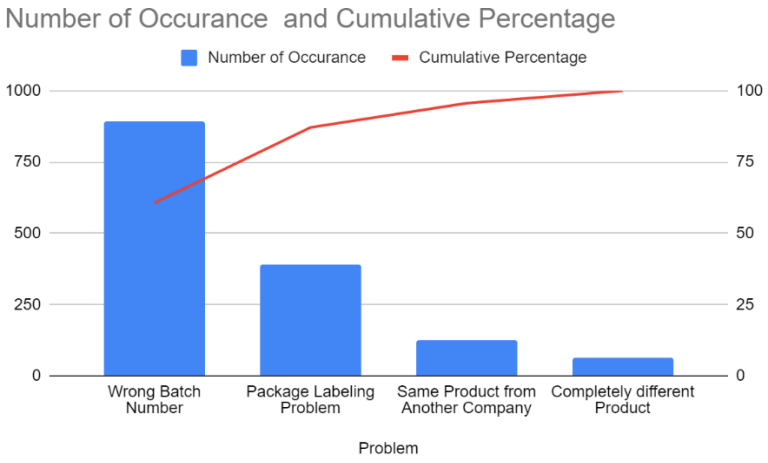


Figure 5: Pareto Chart Level 2

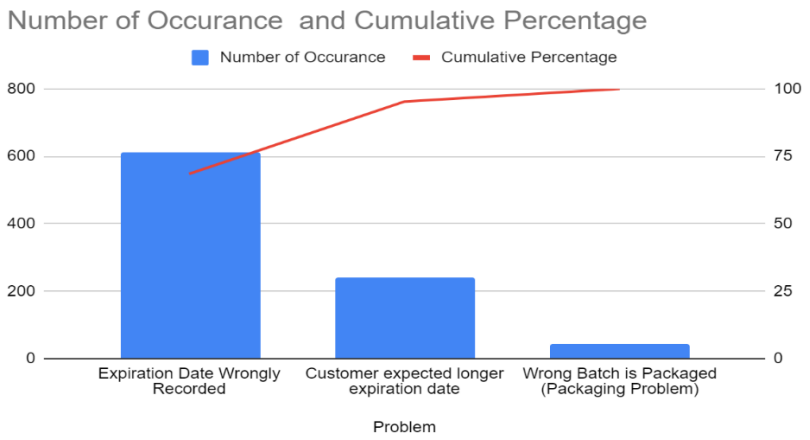


Figure 6: Pareto Chart Level 3

4- Measure Phase

4-1- EPMO and Sigma Level

EPMO and Sigma Level:

The Errors per Million Opportunities (EPMO) metric has been computed using the formula provided below, serving as an indicator of the ratio of errors within one million opportunities. Additionally, the Sigma level has been determined based on the derived EPMO, revealing that the Alborz Pharmaceutical Company presently operates at a 3.81 Sigma Level. Within the scope of this project, errors are defined specifically as instances of inaccurate test results:

$$\textbf{EPMO: } \frac{\textbf{Number of Errors Detected}}{\textbf{Opportunities For Error}} \times 1000000$$

Total Number of Errors= 3546
Total Number of Results= 343594

$$\textbf{EPMO} = \frac{3546}{343594} \times 10^6 = 10320.32$$

$$\textbf{Sigma-Level} = \textbf{NORMSINV}(1 - (\textbf{EMPO} \div 10^6)) + 1.5 = 3.81$$

4-2- Control Charts

Control Charts:

The principal aim of this phase is to address the fundamental inquiry, in which condition is our performance within the measure phase, our focal point pertains to the evaluation of the current performance of the designated process earmarked for improvement. The acquisition of requisite data for comprehensive analysis is essential to facilitate modifications to the identified process.

Within the realm of pharmaceutical distribution processes, a pivotal endeavor involves the computation of control limits to ascertain the process's state of control. Establishing the upper and lower control limits is essential to evaluate the process's controllability. Through the utilization of control charts, insights into the process capability and its prospective trajectory can be gleaned. In this specific undertaking, a random sample comprising 31 observations was procured, of which five were scrutinized to ascertain the upper control limit (UCL), lower control limit (LCL), and centerline (CL). To construct the control chart, a "C-Chart" was employed, predicated on the computed C_i, $\bar{C}$ delineated in the tabular data. Furthermore, the determination of UCL, LCL, and CL was facilitated by the application of pertinent formulas:

$$\text{UCL} = \bar{C} + 3\sqrt{\bar{C}},\ \text{CL} = \bar{C},\ \text{LCL} = \bar{C} - 3\sqrt{\bar{C}},\ \bar{C} = \frac{\sum C_i}{k},\ S_c = \sqrt{\bar{C}}\quad \text{UCL} = 12.1224,\ \text{CL} = 4.2580,\ \text{LCL} = 0$$

Table 1 - Samples

Date	Total Orders	Late Delivery	Wrong Deliveries	Damaged Orders	Delivery Condition Violated	More or Less Parts than Orders	C
2023-02-18	908	3	5	1	0	4	2.6
2023-02-19	927	3	2	0	0	2	1.4
2023-02-20	1098	3	2	1	0	4	2
2023-02-21	784	0	3	1	0	2	1.2
2023-02-22	834	5	3	1	0	3	2.4
2023-02-23	1032	1	3	0	0	2	1.2
2023-02-24	994	17	24	7	3	9	12
2023-02-25	760	0	5	1	0	2	1.6
2023-02-26	803	5	3	2	0	1	2.2
2023-02-27	1082	3	3	0	0	1	1.4
2023-02-28	807	4	2	0	0	3	1.8
2023-03-01	1082	1	4	1	0	0	1.2
2023-03-02	898	4	2	0	0	3	1.8
2023-03-03	843	2	4	0	0	4	2
2023-03-04	740	14	20	3	6	7	10
2023-03-05	988	4	6	1	0	3	2.8
2023-03-06	1037	0	6	0	0	4	2
2023-03-07	1061	5	3	0	0	3	2.2
2023-03-08	1099	5	5	0	0	3	2.6
2023-03-09	1192	4	6	2	0	3	3
2023-03-10	979	2	6	2	0	3	2.6
2023-03-11	1184	5	4	0	0	1	2
2023-03-12	782	0	6	1	0	3	2
2023-03-13	807	4	4	1	0	1	2
2023-03-14	920	16	27	9	3	10	13
2023-03-15	953	1	6	2	0	4	2.6
2023-03-16	924	1	5	0	0	3	1.8
2023-03-17	992	3	6	2	0	1	2.4
2023-03-18	969	4	3	2	0	3	2.4
2023-03-19	878	3	6	2	0	3	2.8
2023-03-20	1011	4	2	1	0	4	2.2

Down below is the process C-Chart:

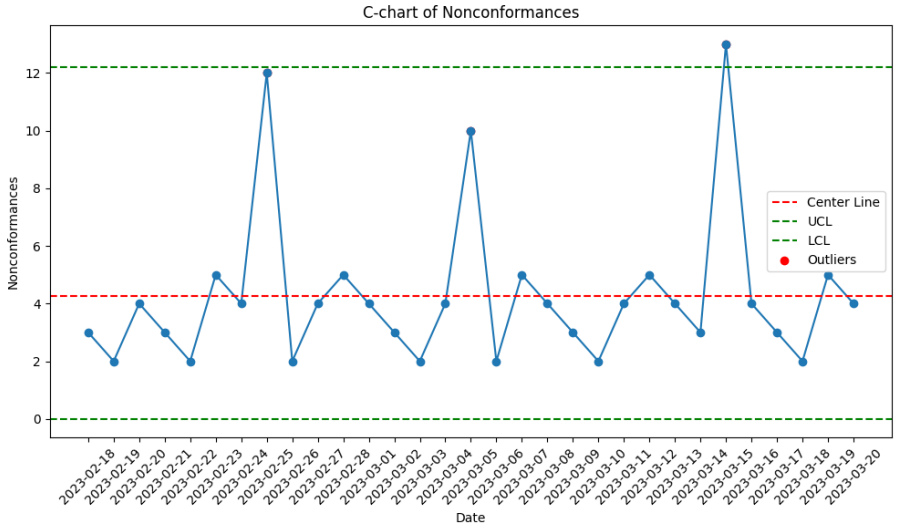


Figure 7: C-chart of Nonconformance

4-3- Process Capability Analysis

Process Capability Analysis:

The evaluation of process capability serves to ascertain the effectiveness of the current operational procedures while utilizing gathered process capability data facilitates the projection of prospective enhancements in subsequent processes. Establishing upper and lower specification limits aligns with considerations of customer satisfaction, expectations, company protocols, and standards. Following this, C_{pk} values were computed using prescribed methodologies to discern the process's capability status.

Table 2 - Measurements

Measurements	**values**
Upper Specification Limit	6.6853
Lower specification Limit	0
Upper Control Limit - UCL = $\overline{\boldsymbol{C}} + 3\sqrt{\overline{\boldsymbol{C}}}$	12.2124
Lower Control Limit - LCL = $\overline{\boldsymbol{C}} - 3\sqrt{\overline{\boldsymbol{C}}}$	0
$\overline{\boldsymbol{C}}$	4.2580
Process Capability Potential - $\boldsymbol{C_p} = \left(\frac{\boldsymbol{USL - LSL}}{\boldsymbol{6s}}\right)$	1.0744
Upper Capability Index - $\boldsymbol{C_{PU}} = \left(\frac{\boldsymbol{USL - \overline{C}}}{\boldsymbol{3s}}\right)$	1.458
Lower Capability Index - $\boldsymbol{C_{PL}} = \left(\frac{\boldsymbol{\overline{C} - LSL}}{\boldsymbol{3s}}\right)$	0.690
Process Capability Index - $\boldsymbol{C_{pk}}$ = Min $(\boldsymbol{C_{PU}}, \boldsymbol{C_{PL}})$	0.690

So, if the $\boldsymbol{C_p} > 1$ the process is capable, and here our $\boldsymbol{C_p}$ is 1.0744, so our process is marginally capable.

5- Analysis Phase

In the Analyze phase, the primary objective is to identify flaws within the subject process and uncover the root causes of the problem using various analytical tools. We propose using Fishbone diagram and 5 Whys technique for the analysis phase. In the following sections a brief description and a sample analysis of Fishbone diagram and 5 Whys technique are presented.

5-1- Fishbone Diagram

By visually mapping out the various factors affecting a process, the Fishbone diagram helps us uncover hidden relationships and prioritize areas for improvement[4]. This diagram is a sample diagram that can be drawn for this purpose during the analysis phase.

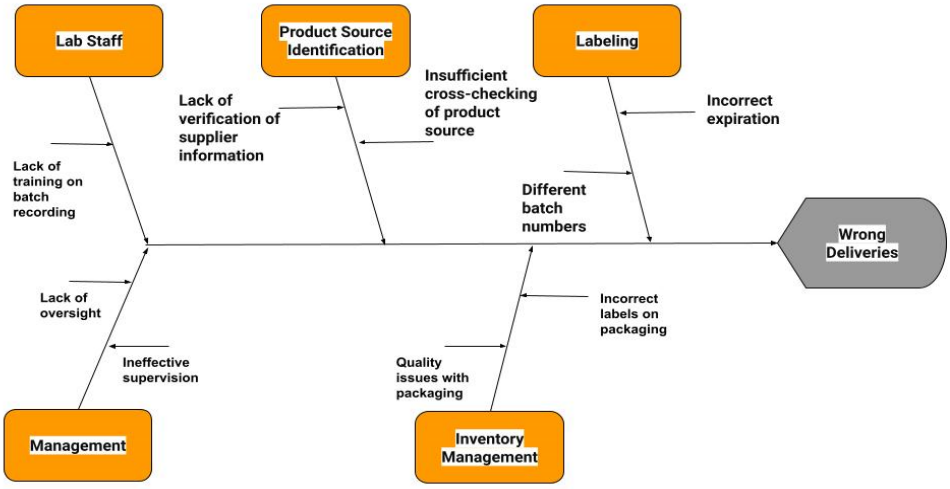


Figure 8: Fishbone Diagram

5-2- Five why technique

The 5 Whys approach complements the Fishbone diagram by delving deeper into the underlying reasons behind the identified causes. By repeatedly asking "why" to trace the chain of events leading to a problem, we can uncover root causes that may not be immediately apparent.

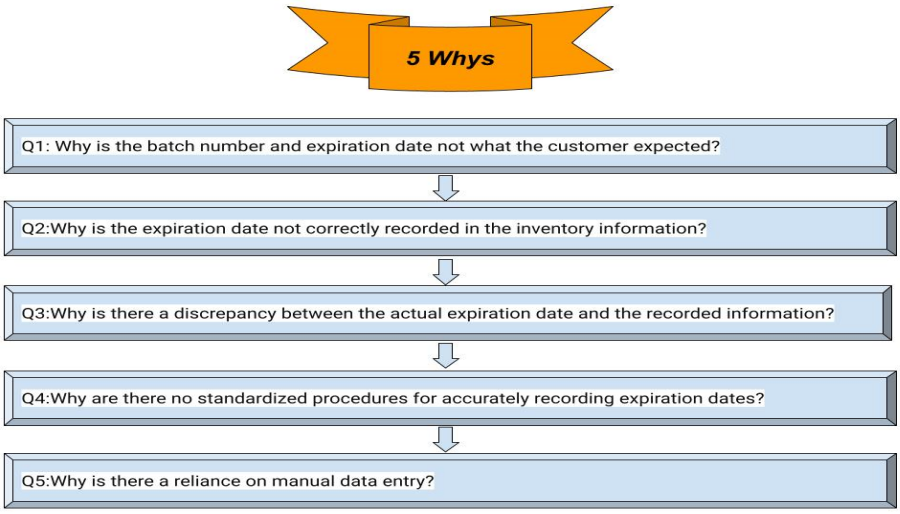
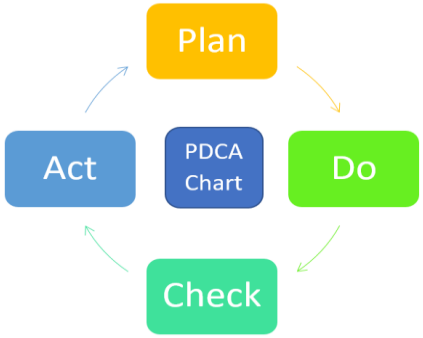


Figure 9: 5 Whys

6- Improvement Phase

6-1- PDCA

The PDCA Cycle is proposed for the improvement phase, which initiates with the Plan phase, where specific objectives and strategies are devised for improvement initiatives. Subsequently, the cycle progresses through the Do phase, where planned actions are executed according to established strategies. In the Check phase, the effectiveness of implemented improvements is evaluated through systematic monitoring and measurement. Finally, in the Act phase, adjustments are made based on evaluation results to further refine processes and ensure ongoing enhancement[5].



6-2- Cost Benefit Analysis

We propose conducting a thorough cost-benefit analysis to assess the financial implications of implementing the proposed solutions to rectify the incorrect batch numbers issue. By identifying and addressing the root causes of incorrect batch numbers, we anticipate significant cost savings through reduced errors, rework, and operational inefficiencies. Improving delivery quality and ensuring accurate batch numbers will enhance customer satisfaction and trust, leading to increased sales and revenue.

The cost-benefit analysis will allow us to assess and mitigate risks associated with the project, ensuring that investments are aligned with strategic objectives and delivering tangible returns.

Table 3 - Cost-Benefit Analysis Template

	2024	2025	2026	2027	2028
Benefits					
Increased Revenue					
Cost Savings					
Costs					
Resource					
Training					
Implementation Costs					
Contingency Budget					
Documentation and Reporting					
Total Benefits-Costs/Year					
NVP(discounted at 10%)					

The company can have a table like this to do the analysis. The Net Present Value (NPV) formula is used to calculate the present value of all cash inflows and outflows associated with a project, discounted to the present using a specified discount rate. The formula for NPV is as follows:

$$\textbf{NVP}= -c_{0+} \sum_{t=1}^{T} \frac{C_t}{(1+i)^t}$$

7- Control Phase

In the measurement phase, we ran a C-chart based on a sample size of 30. We saw that some points are out of control. Consequently, in the analysis phase, we recommended some methods to find the root causes of defects and we would propose some solutions for removing the special causes of the process.

After applying the solutions, we would conduct data gathering again and we would create the following charts to see if the special causes are removed and the process is brought under control or not.

- $\bar{X}$- Chart
- R - Chart
- S – Chart
- P – Chart
- C - Chart
- U – Chart

It is notable that, the control process is not a one-time activity and we should apply solutions and repeat the control phase periodically to see if the special causes are removed or not and to make sure that the process is under control.

8- Conclusion

We have proposed the application of the Six Sigma methodology to the process of pharmaceutical product distribution in the Alborz Company. We categorized the defects, analyzed the customer complaints, identified CTQs, created SIPOC and process maps, and applied Kano analysis to define our customer requirements and process status. Later we tried to narrow down the problem to the issue of mishandling the product batch numbers in the distribution process using progressive Pareto charts.

Transitioning to the Measure phase, we calculated the Error Per Million Opportunities (EPMO) and determined the Six Sigma level of the process. Additionally, we conducted control chart analysis and capability analysis to assess the current state of the process and identified areas for improvement and we shared them with the project stakeholders.

We also suggested that with tools like the Fishbone diagram, 5 Whys approach, and progressive Pareto charts we can identify the root causes and prioritize improvement opportunities to analyze the process.

We proposed the implementation of the PDCA (Plan-Do-Check-Act) cycle to apply potential solutions aimed at addressing the removal of root causes identified during the analysis phase.

Finally, in the Control phase, we proposed different kinds of charts to check if the process has been brought under control or not

9- References

[1] M. H. Weik, “Rules and Guidance for Pharmaceutical Manufacturers and Distributors 2007,” *Computer Science and Communications Dictionary*, vol. 4, no. 1, 2000.

[2] J. R. Evans and W. M. Lindsay, *An introduction to Six Sigma and process improvement*. Cengage Learning, 2014.

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10- Work log

Table 4 - Meeting No. 1

Meeting No: 1 (Kickoff Meeting)			Date: 2024/02/01 10:00 AM	
Meeting Minutes				
Activity/Task	Start	End	Assigned To	Description
Reviewing the project requirements	10:00	10:15	-	
Discussing different ideas	10:15	10:45	-	different ideas were discussed: 1- Manufacturing vehicle parts 2- Amazon delivery service 3- Pharmaceutical distribution and delivery
Deciding on the project topic	10:45	11:00	-	Using Six Sigma for Improving Pharmaceutical Distribution and Delivery Process in the Alborz Company
Working on the proposal	11:00	12:30	Entire team	
Problem Statement task	-	-	Navid	
Business Case task	-	-	Niloufar	
Project Scope task	-	-	Pourya	
Plan task	-	-	Amirhossein	

Table 5 - Meeting No. 2

Meeting No: 2	Date: 2024/02/05 12:00 PM
Meeting Minutes	

Activity	Start	End	Assigned To	Description
Reviewing the proposal	12:00	13:15	Entire team	The proposal reviewed and is ready to be presented to the CEO
Agreeing on member roles	13:15	13:30	Entire team	Members took the task and accepted their project roles.
Scheduling	13:30	14:00	Entire team	Structured scheduling has been set for all members.

Table 6 - meeting No. 3

Meeting No: 3			Date : 2024/02/15 1:00 PM	
Meeting Minutes				
Activity	Start	End	Assigned To	Description
Reviewing the defined tools	20:00	20:30	Entire team	We talked about how we can define the project with some practical tools and tricks.
Reviewing the distribution process	20:30	21:00	Entire team	We started to understand the process to see how our data is distributed and how we can define the distribution problems.
Planning the next week's tasks	21:00	21:45	Entire team	Set tasks and gave them to members.

Table 7 - Meeting No. 4

Meeting No: 4			Date : 2024/03/01 15:00 PM	
Meeting Minutes				
Activity	Start	End	Assigned To	Description
Chose the proper measuring method	14:00	15:00	Entire team	We came up with the perfect measuring methods for this type of project and chose the best method.

Measured the features	15:00	16:00	Entire team	We measured the target features and showed the result of this process.
Finalized and confirmed measurements	16:00	17:30	Entire team	We double-checked the final result and after brainstorming we confirmed the achieved result.

Table 8 - Meeting N0. 5

Meeting No: 5			Date : 2024/03/15 15:00 PM	
Meeting Minutes				
Activity	Start	End	Assigned To	Description
Work on the Analyze phase	14:00	15:00	Entire team	we decided to begin the analyze phase and work on it
Gathered data	15:00	16:00	Entire team	We receive the data and analyze it to make it visualizable
Finalized the session	16:00	17:30	Entire team	After doing final editing on this phase we confirmed the data and visualization

Table 9 - Meeting No. 6

Meeting No: 6			Date : 2024/04/01 15:00 PM	
Meeting Minutes				
Activity	Start	End	Assigned To	Description
Improve Phase	14:00	15:00	Entire team	We provided some explanations about how to improve the process with specific techniques
Control Phase	15:00	16:00	Entire team	We proposed some methods to keep the process in control and repeat it periodically.
Conclusion	16:00	17:30	Entire team	We suggested that for improve and control phase we have to

				repeat these steps for different data and in a different period to prevent any misinformation about the process capability and constant improvement.

Table 10 - Meeting No. 7

Meeting No: 7			Date : 2024/04/11 11:00 AM	
Meeting Minutes				
Activity	Start	End	Assigned To	Description
Review and edit completed parts	11:00	12:30	Entire team	Reviewed and edited the whole project from beginning to end, and corrected labeling, dates, descriptions, etc…
Add labels and references to the project's different parts	12:30	13:00	Entire team	Added some new Labels to the tables and figures and revised the references' correctness.
Confirm the final version of the main file	13:00	15:00	Entire team	After a final review of the project, we exported the final PDF file to present it to the manager.