CIS 5320
ENTERPRISE EXECUTIVE ANALYTICS PROJECT REPORT

ON

ERPSIM SIMULATION GAME

(FALL-2023)

BY

Team – OO

Manimozhi Neethinayagam - CEO

Dauren Omarov – Material Manager

Mitali L Purohit – Sales Manager

Solange Ruiz – Purchase Manager

Contents:

1. Introduction:

We are Team OO of in ERP simulation Game of Dairy Farm based in Germany with three locations North, South, West. The company mainly sells six different Dairy products namely Butter, Cheese, Milk, Cream, Ice Cream, Yoghurt.

In this Project Report, we are analysis the data of 5 companies that participated in the simulation game. All the 5 companies have unique warehouses and associated three regions. The regions are North, South, and West. Based on the results at the end of the game, we performed various analyses to understand and compare the data with the winning company and other companies.

Each company has 4 participants with dedicated roles such as CEO, Sales Manager, Purchase Planning Manager, Material Manager. All the participants operate in their designated roles to target and reach the sale and revenue goals. The objective of the game includes strategies to maximize the profit and win against the competitors. The main strategy will be on 1) Independent planning, 2) price fixing for our products, 3) strategically use Pull/Push Technique.

Every Company has a central warehouse that receives and stores the products from the supplier. The country also has unique preference for each region related to dairy products. The Same product will not be sold in same quantity on all days and in all regions. So, we must utilize the Pull/Push Strategy to stock the products from main inventory to the regional storage location. We also must keep in mind the operational costs involved while ordering the products and transportation fees.

The objective of winning the game involves higher sales margin result in bigger profit and help us to increase the revenue. Avoid the zero inventory days by synchronizing the Pull and Push strategy. Constantly checking the sales report and Inventory stocks to find the low stocks or there more stock in the inventory which is not sold. If there is high stock reduce the price of products and if some products are selling at high quantity increase the price.

To win the game, it is important to coordinate with the entire team and constantly checking the reports. By monitoring the reports, we can easily understand if the inventory is running low or high. Based on that we can change the strategy. All these factors play a major role in winning the game.

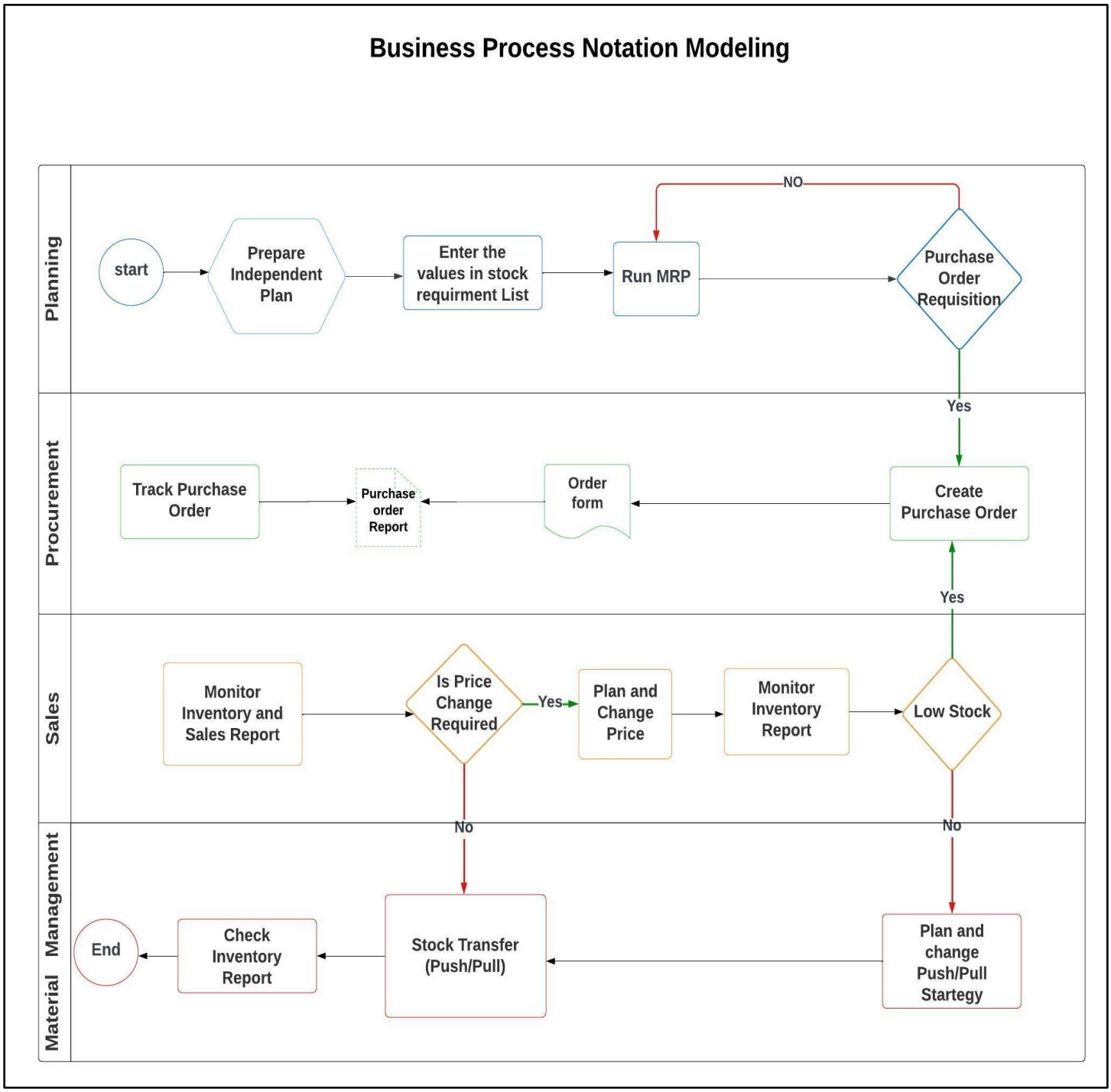
Our Company won the game, as we have a very good profit. We sold the products at very good price point.

Below is the COMPANY (TEAM Member) OO:

Role	Team Member Name
CEO - Leader	Manimozhi Neethinayagam
Sales Manager	Mitali L Purohit
Material Manager	Dauren Omarov
Purchase Planning Manager	Solange Ruiz

2. Business Process Model and Notation (BPMN):

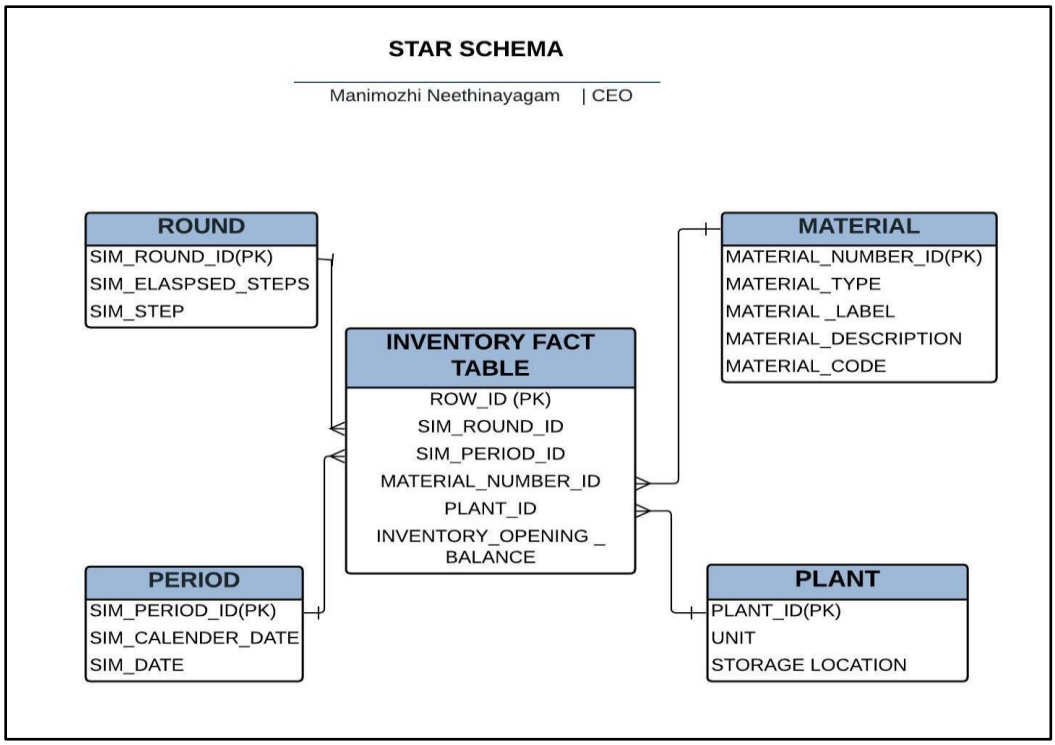
(by Manimozhi Neethinaygam)



3. Multi-dimensional data modeling:

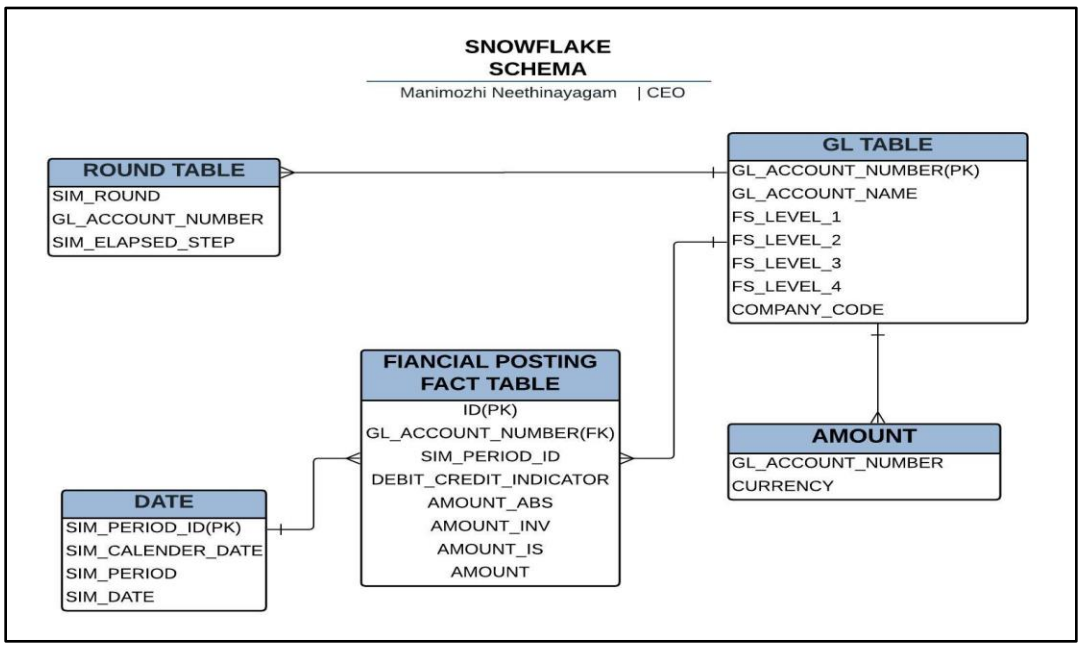
i. Inventory Table

(by Manimozhi Neethinaygam)

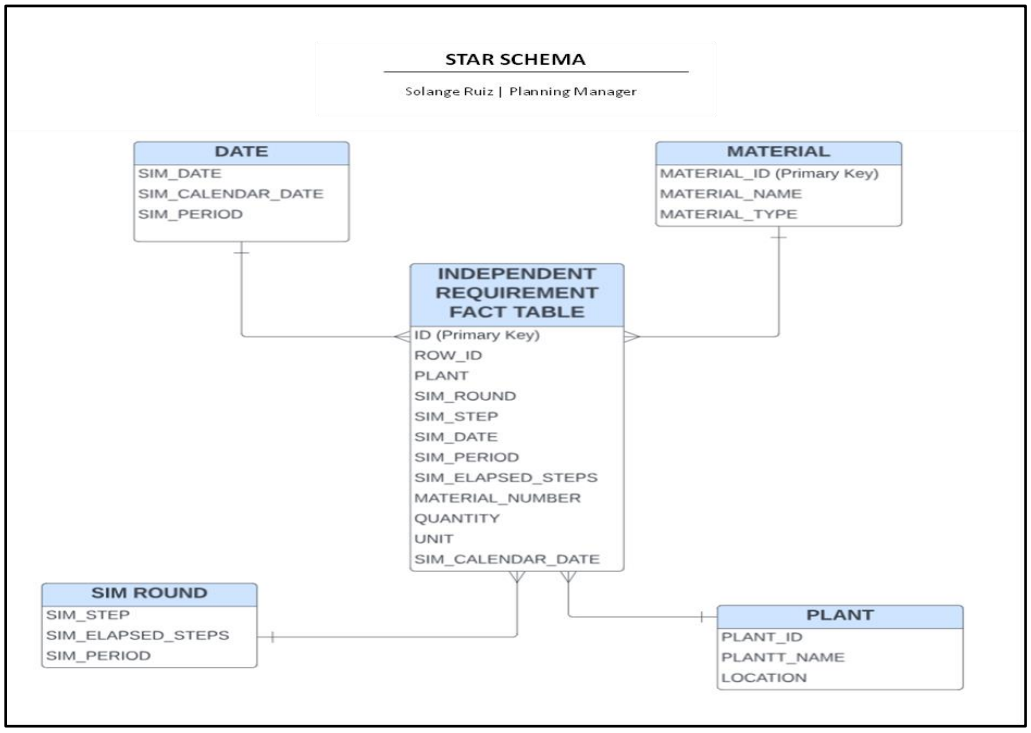


ii. Financial posting table

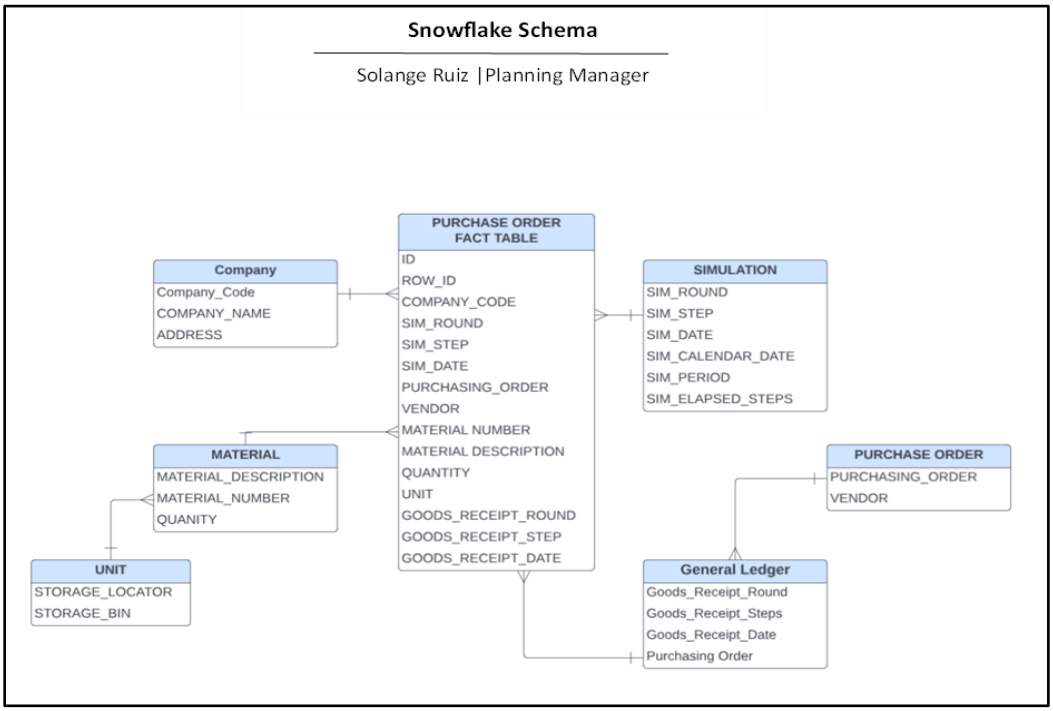
(by Manimozhi Neethinaygam)



iii. Independent requirements table
(by Solange Ruiz)

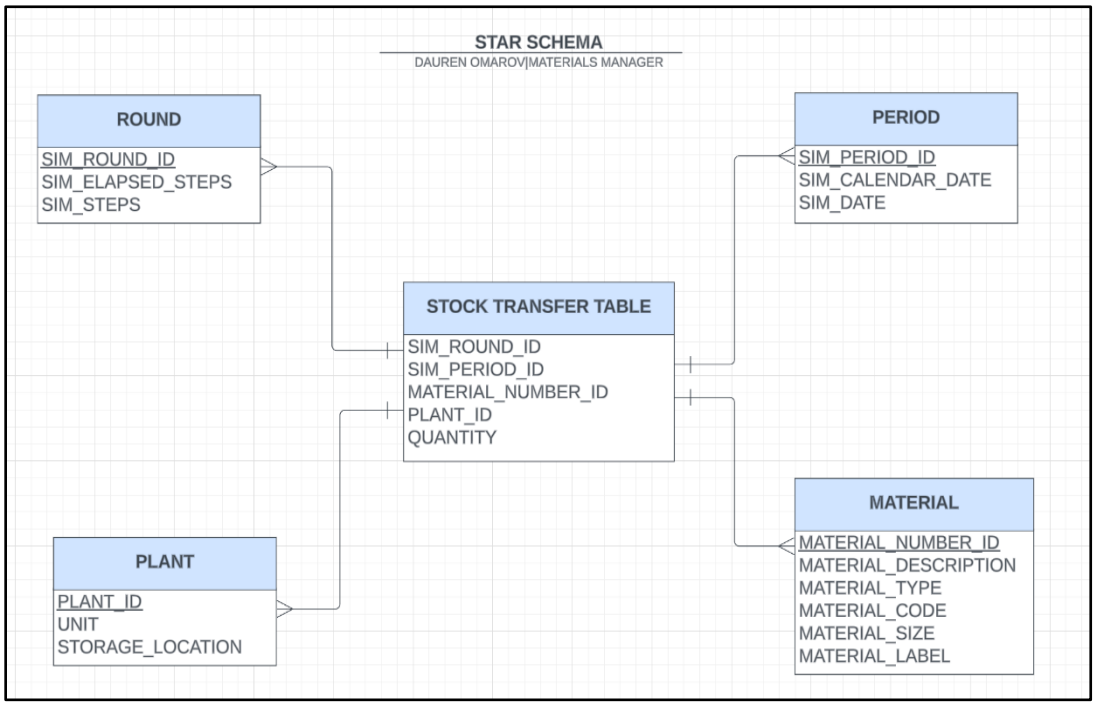


iv. Purchase order table
(by Solange Ruiz)



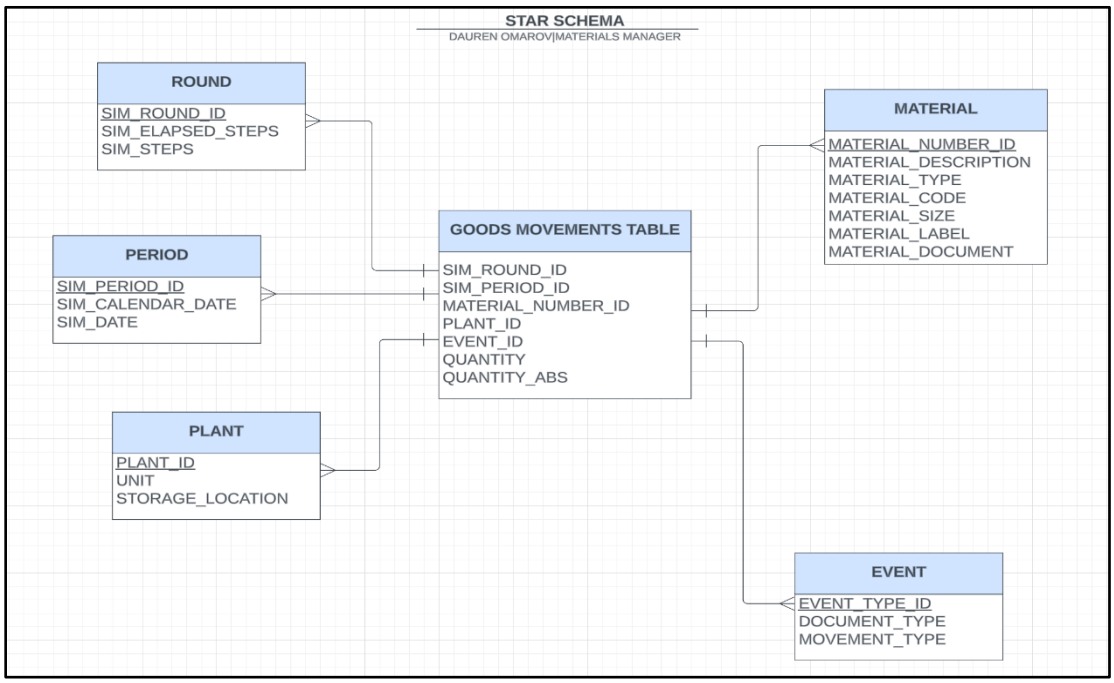
v. Stock Transfers' table

(by Dauren Omarov)



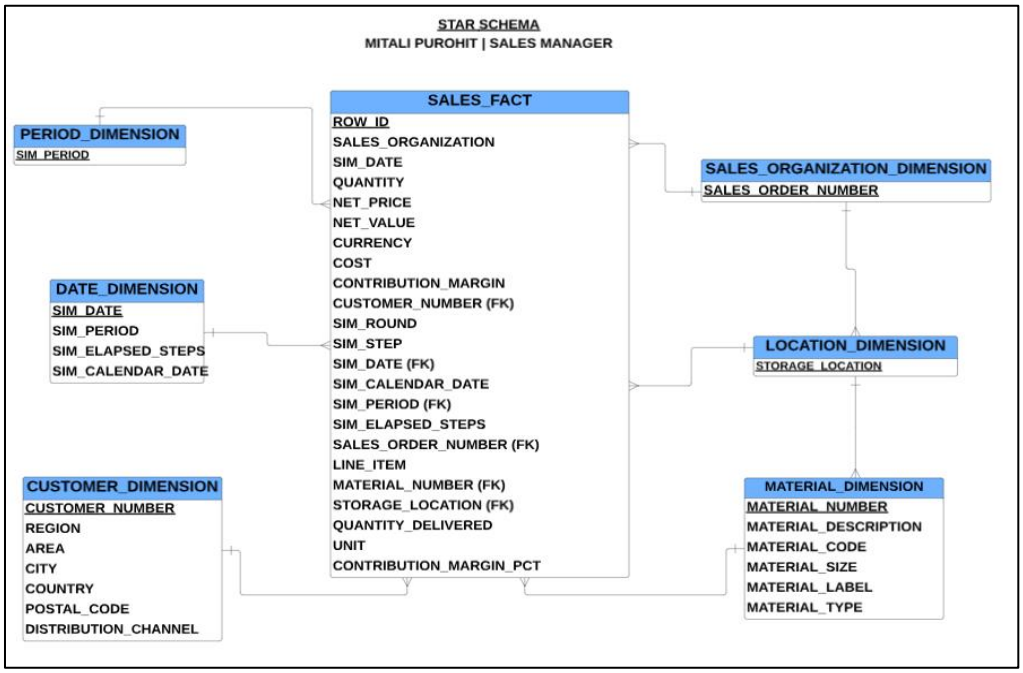
vi. Goods Movement table

(by Dauren Omarov)



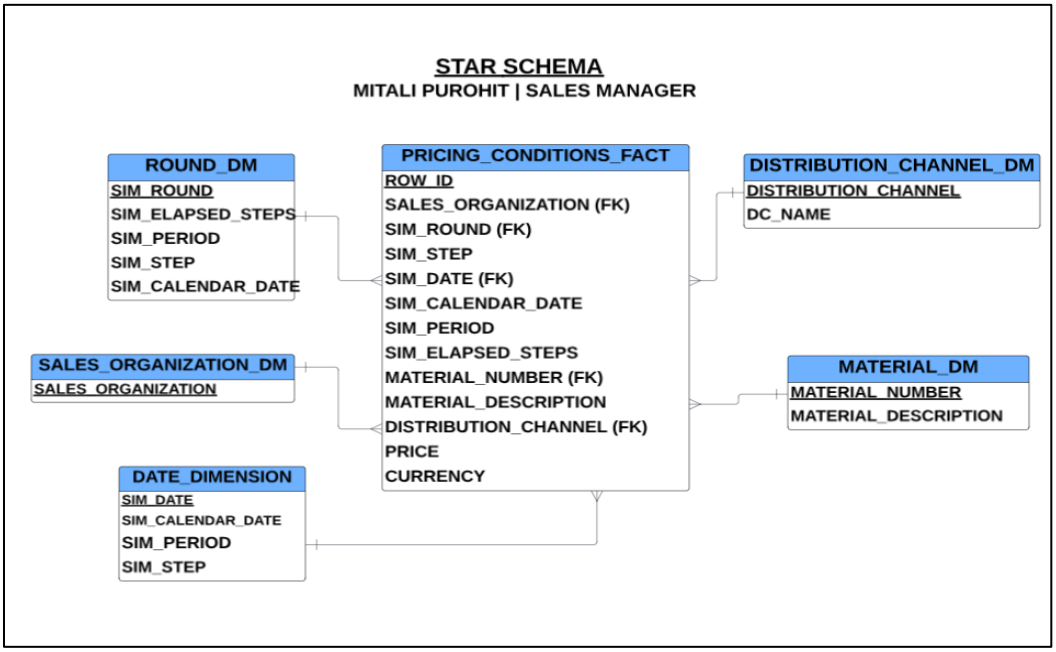
vii. Sales Table:

(by Mitali Purohit)



viii. Pricing Table:

(by Mitali Purohit)



4. Analyzing enterprise data for all the companies:

i. Company Highest Revenue:

(by Solange Ruiz)

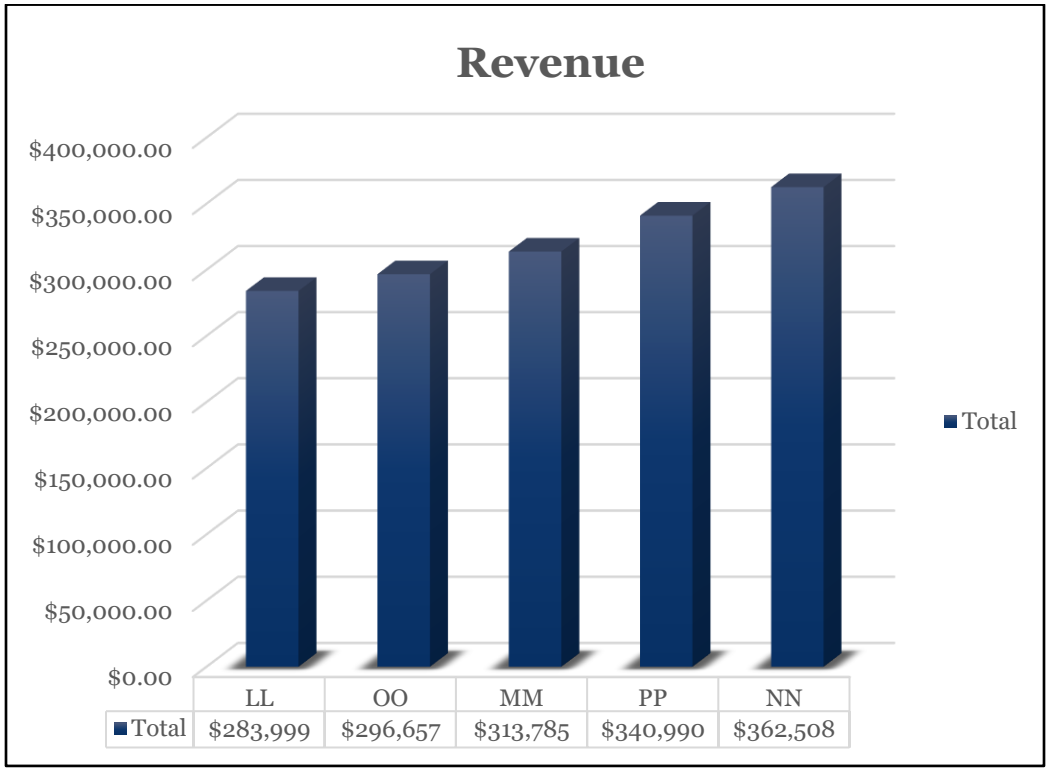


Figure: 1 Company highest revenue (Solange Ruiz)

The company with the highest revenue among **LL, MM, NN, OO**, and **PP** is **NN**, with a revenue of **$362,508.81**. Therefore, **NN** had the highest revenue among the listed companies.

The company with the greatest revenue is shown in the above bar chart figure 1. Revenue is shown in the chart in descending order. By the end of round three, business NN had the strongest revenue, according to the first visual, which showed the patterns of all the companies that were studied. Therefore, the following figure that displays the total income of all firms is supported by this. Our company OO comes fourth place in the ranking. Having a high revenue is a key operation strategy for achieving the goal of high competitor value. The corporation with the largest revenue, on the other hand, did not win the game since their sales margin is not high enough to create profits and income. As a result, determining the best strategy is critical.

ii. Dairy product highest revenue
(by Solange Ruiz)

The dairy product milk earned the largest revenue for Company **PP**. The total income is **$95,936.94.**

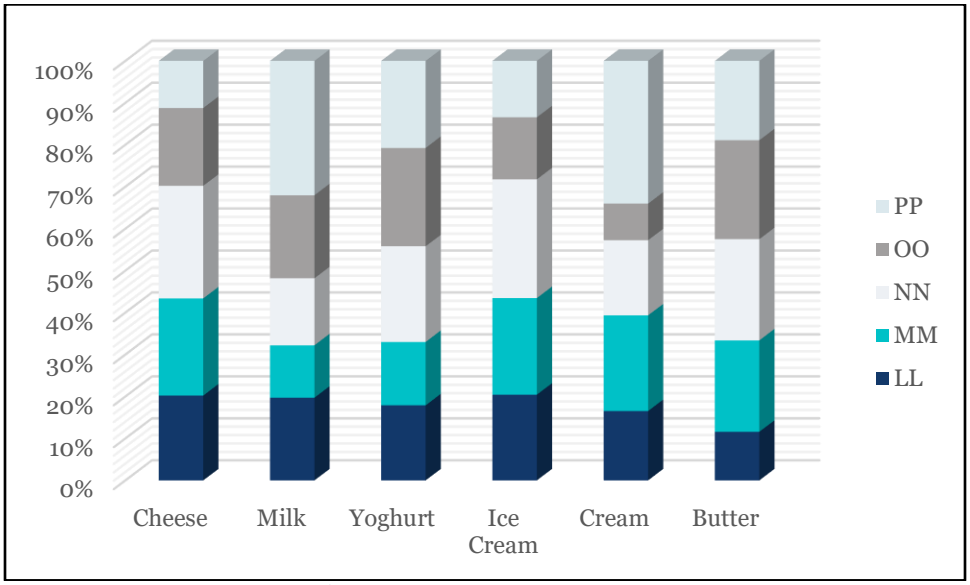


Figure: 2 Highest revenue for dairy products across all company. (Solange Ruiz)

Figure 3 chart illustrates the total net values for various dairy products across different regions, providing an insightful overview of their financial performance.

At the peak of revenue stands the Cheese category, boasting a substantial total net value of $345,300.46. It's followed closely by Milk, which accumulates $299,506.31, showcasing its significant contribution to the company's earnings. Yoghurt and Ice Cream both command respectable figures, securing $240,916.24 and $210,719.77, respectively, while Cream and Butter present solid, albeit slightly lower, net values at $218,777.79 and $282,720.65, respectively.

Across the regions LL, MM, NN, OO, and PP, each product's performance varies. Notably, NN demonstrates the highest cumulative net value of $362,508.81, followed closely by PP at $340,990.01. Conversely, LL registers the lowest total net value of $283,999.62 among the regions.

Sum of NET_VALUE				Winning Team		
Row Labels	**LL**	**MM**	**NN**	**OO**	**PP**	**Grand Total**
Cheese	$69,822.15	$79,992.00	$92,667.80	$63,980.23	$38,838.28	$345,300.46
Milk	$59,053.00	$37,388.00	$47,847.25	$59,281.12	$95,936.94	$299,506.31
Butter	$32,779.86	$61,563.00	$68,244.94	$66,658.48	$53,474.37	$282,720.65
Yoghurt	$43,108.51	$36,400.00	$54,956.00	$56,458.05	$49,993.68	$240,916.24
Cream	$36,182.26	$49,891.00	$39,173.32	$19,098.17	$74,433.04	$218,777.79
Ice Cream	$43,053.84	$48,551.00	$59,619.50	$31,181.73	$28,313.70	$210,719.77
Grand Total	**$283,999.62**	**$313,785.00**	**$362,508.81**	**$296,657.78**	**$340,990.01**	**$1,597,941.22**

Figure: 3 Highest revenue for each dairy product across all companies. (Solange Ruiz)

iii. Company that sold the most expensive dairy product:

(by Mitali Purohit)

The most expensive dairy product “cheese” was sold by NN.

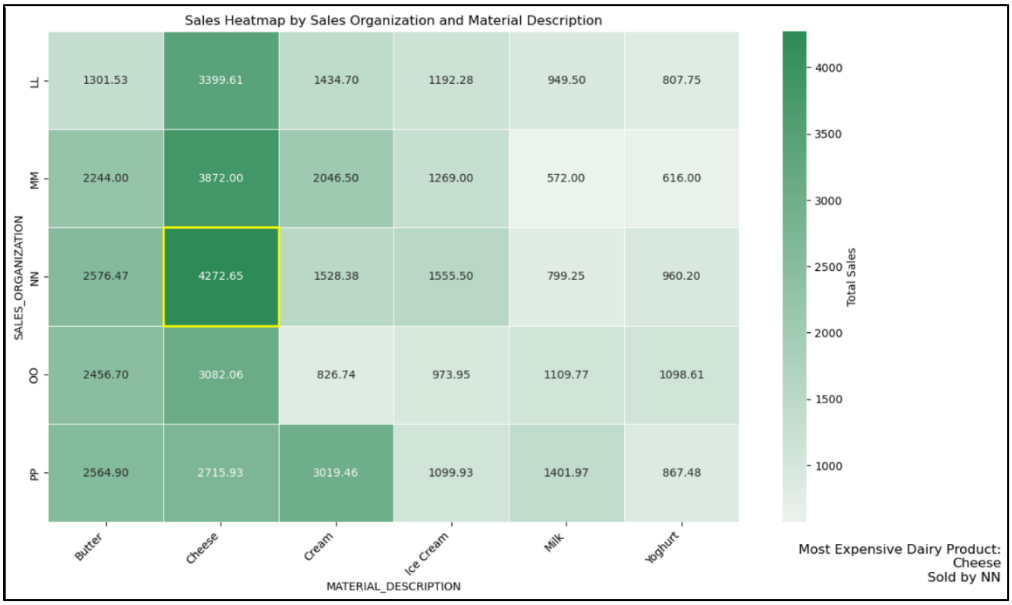


Figure: 4 Heatmap for the Company that sold the most expensive dairy product

The figure, a Heatmap for the Company that sold the most expensive dairy product, visually encapsulates the pricing landscape of various dairy products across different companies or teams. Each cell in the heatmap corresponds to a specific dairy product and seller, with color intensity representing the price range. By examining the heatmap, viewers can readily identify the intersection where the most expensive dairy product, such as "cheese," is sold, with the distinctive color in that cell indicating that the company or team labeled as "NN" holds the top position as the seller of the highest-priced cheese. This graphical representation offers a swift and intuitive insight into the comparative pricing dynamics of dairy products, highlighting the leading entity in terms of selling the most expensive item.

iv. Company that sold the most quantity:

(by Mitali Purohit)

In the provided Marimekko map, the information indicates that the company denoted as "PP" stands out as the leader in selling the most quantity of dairy products. The map likely visualizes the distribution of sales across different companies, and the distinct proportions within each block represent the quantity of dairy products sold. By analyzing this map, viewers can identify "PP" as the top-performing company in terms of sales volume. Additionally, the answer specifies that the most sold product for this company is "Milk," suggesting that within the product portfolio of "PP," milk is the primary contributor to its substantial quantity of sales. The Marimekko map, with its segmented blocks and proportions, serves as a comprehensive visual representation, aiding in the swift interpretation of both the leading company and its highest-selling dairy product.

Company that sold the most quantity: PP
Most sold product for the company: Milk

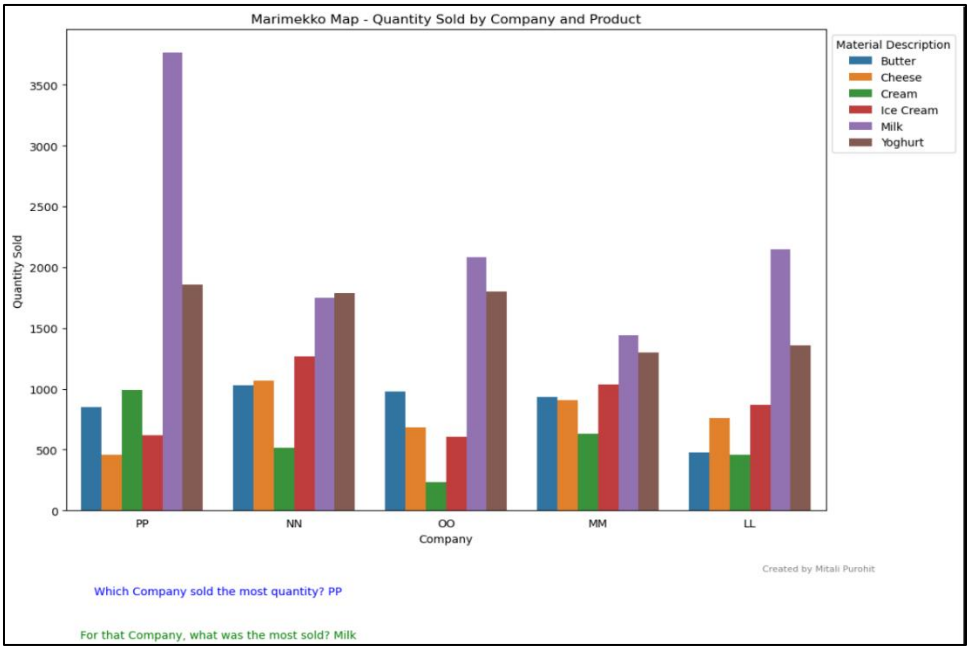


Figure 5:Marimekko Map - Identifying the Leading Company in Sales Volume

v. Analyzing the Best-selling dairy product in region wise

(by Dauren Omarov**)**

MATERIAL_CODE	(Multiple Items)
AREA	North
SALES_ORGANIZATION	(All)
Row Labels	**Sum of QUANTITY_DELIVERED**
Milk	6774
Yoghurt	4161
Ice Cream	2958
Butter	2466
Cheese	1666
Cream	1471
Grand Total	**19496**

Milk sold the most in the North with 6774.

MATERIAL_CODE	(Multiple Items)
AREA	South
SALES_ORGANIZATION	(All)

Row Labels	**Sum of QUANTITY_DELIVERED**
Yoghurt	4334
Milk	3939
Butter	2773
Ice Cream	2030
Cream	1899
Cheese	1361
Grand Total	**16336**

Yoghurt sold the most in the South with a quantity of 4334.

MATERIAL_CODE	(Multiple Items)
AREA	West
SALES_ORGANIZATION	(All)

Row Labels	**Sum of QUANTITY_DELIVERED**
Milk	5273
Yoghurt	4047
Cheese	3334
Ice Cream	1626
Butter	1558
Cream	1147
Grand Total	**16985**

Milk sold the most in the West with a quantity of 5273.

MATERIAL_CODE	(Multiple Items)
SALES_ORGANIZATION	(All)

Sum of QUANTITY_DELIVERED	**Column Labels**			
Row Labels	**North**	**South**	**West**	**Grand Total**
Milk	6774	3939	5273	15986
Yoghurt	4161	4334	4047	12542
Butter	2466	2773	1558	6797
Ice Cream	2958	2030	1626	6614
Cheese	1666	1361	3334	6361
Cream	1471	1899	1147	4517
Grand Total	**19496**	**16336**	**16985**	**52817**

Milk sold the most in Total with quantity of 15986.

vi. Warehouse cost charges and shipping cost charges during the game:

(by Dauren Omarov)

FS_LEVEL_2	Operating Expenses
FS_LEVEL_1	Income Statement
COMPANY_CODE	OO

Row Labels	Sum of AMOUNT_INV	Sum of AMOUNT
Shipping costs	-1800	1800
Grand Total	**-1800**	**1800**

1800 EUR is charges for shipping for team O. Team O has 0 charges for warehousing.

FS_LEVEL_2	Operating Expenses	
FS_LEVEL_1	Income Statement	
COMPANY_CODE	(All)	

Row Labels	Sum of AMOUNT_INV	Sum of AMOUNT
Shipping costs	-16400	16400
Warehousing Costs	-9600	9600
Grand Total	**-26000**	**26000**

16400 EUR is charges for shipping costs and 9600 EUR is charges for warehousing costs. Total expenses for all teams are 26000 EUR.

vii. Correlation between Price and Revenue:

(by Manimozhi Neethinayagam)

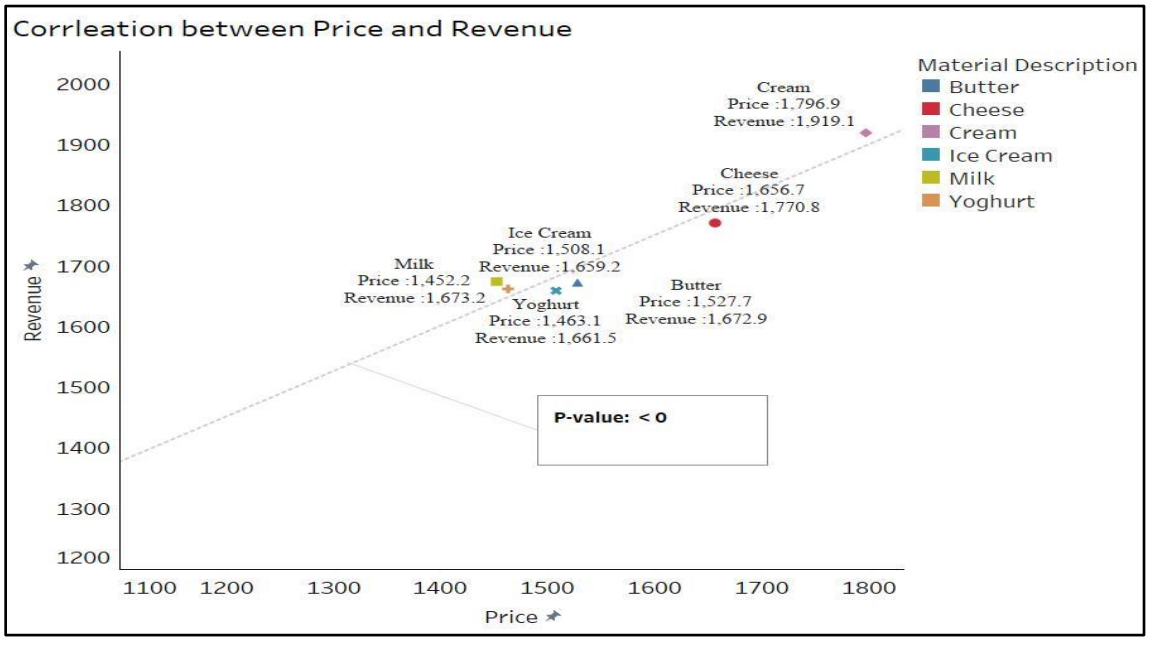


Figure: 6 correlations between Price and Revenue for all company (by Manimozhi Neethinaygam)

From the figure :6 We can see the correlation is statistically significant, explaining a high proportion of the variability in Net Value based on the linear relationship with Avg. Cost. The R-squared value is 0.938492 indicates, in the average Net Value is explained by the **linear trend model**. This coefficient indicates that, on average, for each unit increase in Avg. Cost, the predicted Net Value increases by 0.747426.
The t-value of 7.81231 and a p-value of 0.0014489 suggest that this **coefficient is statistically significant**.

Correlation between price and Revenue for our company OO:

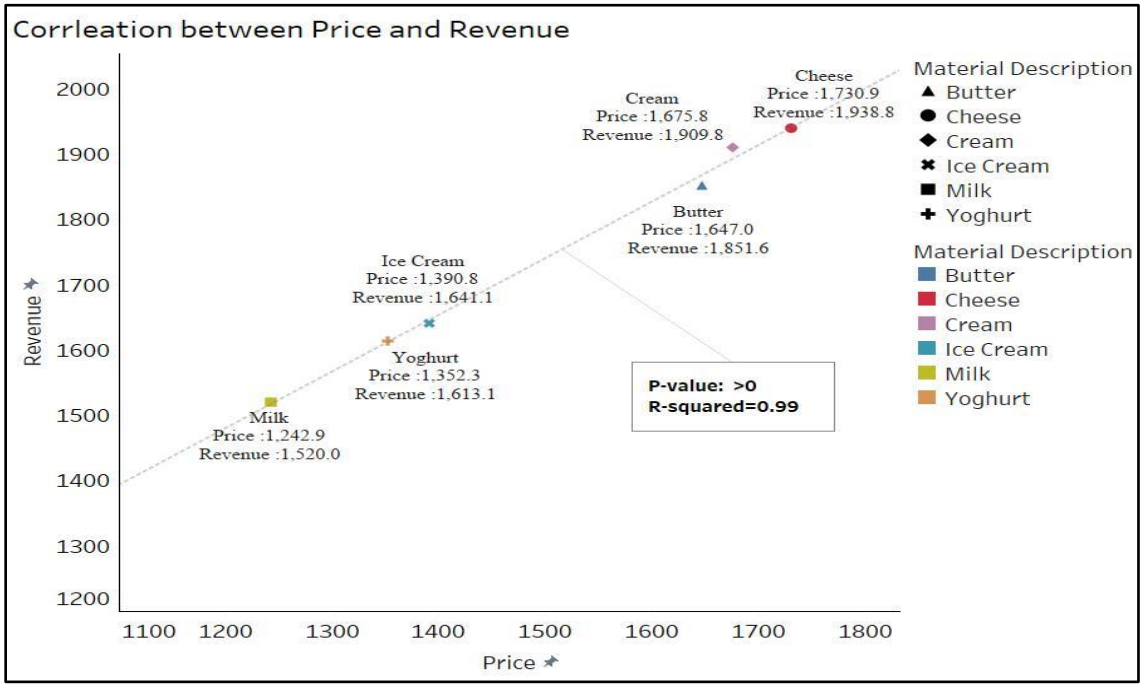


Figure: 6.1 correlations between Price and Revenue for company OO (by Manimozhi Neethinaygam)

Scatter plot is used to show the correlation between the Price and Revenue. Shape and Color differentiate the different products. The Tread Line is used to show the correlation between the Cost price and Revenue earnings in all three rounds and in all three regions for our company OO.

The above scatter plot Figure 6.1 and Trend Line indicate (figure: 4) that we have a **linear regression** model and there is a **positive linear correlation between "Avg. Cost" and "Avg. Net Value,"** with a coefficient of 0.866795 (p-value < 0.0001). The intercept term is also significant (p-value = 0.866795). The **R-squared is 0.99** indicates very strong relationship between the variables.

Avg. Net Value=0.866795×Avg. Cost+439.812

The **positive sign of the coefficient suggests a positive linear relationship** between Avg. Net Value and Avg. Cost. The Value 0.866795 represent the slope of regression line and indicating that, on average, for each unit increase in cost, net value increases by 0.866795. In regression analysis, a low p-value typically suggests that the variable is a significant predictor of the response variable.

viii. Correlation between Price and Income:

(by Manimozhi Neethinaygam)

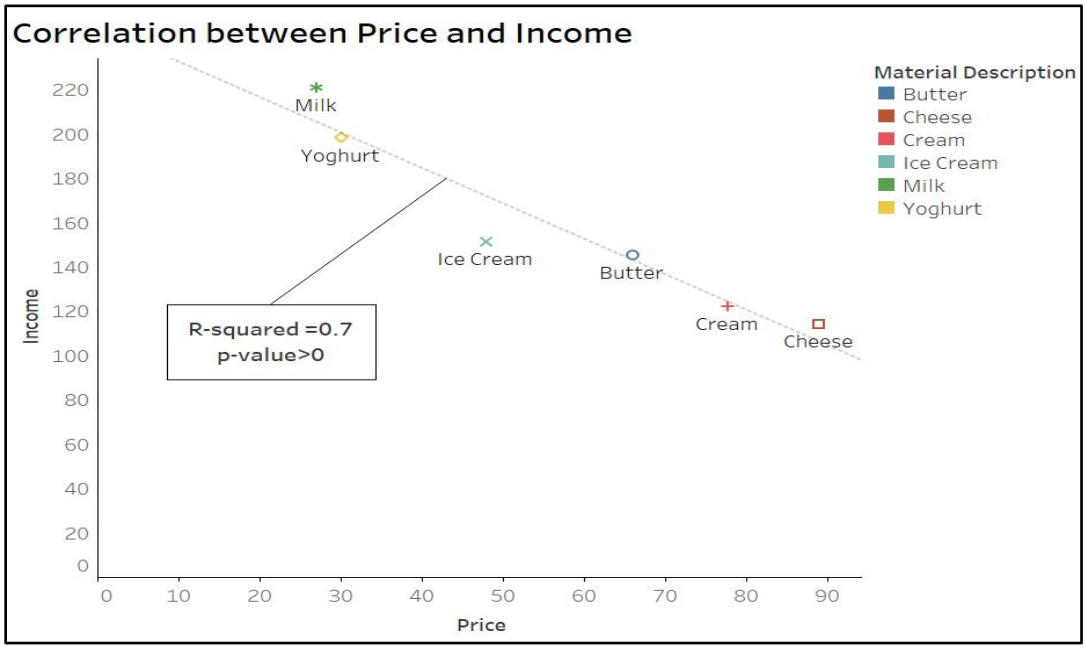


Figure: 7 correlations between Price and Income for all company (by Manimozhi Neethinaygam)

The correlation is statistically significant, explaining a high proportion of the variability in the average Contribution Margin based on the **linear relationship with Avg. Net Price**.

Avg. Contribution Margin = -1.59993*Avg. Net Price + 248.665

The negative coefficient for Avg. Net Price suggests a negative impact on Contribution Margin as Net Price increases. Both the Avg. Net Price term and the intercept are statistically significant, contributing significantly to the model. When calculating for all the company, we can see that Milk and Ice cream deviates from the trend line. The margin coefficient is -ve because not all the company had good profit and high profit margin.

Correlation between Price and Income for company OO:

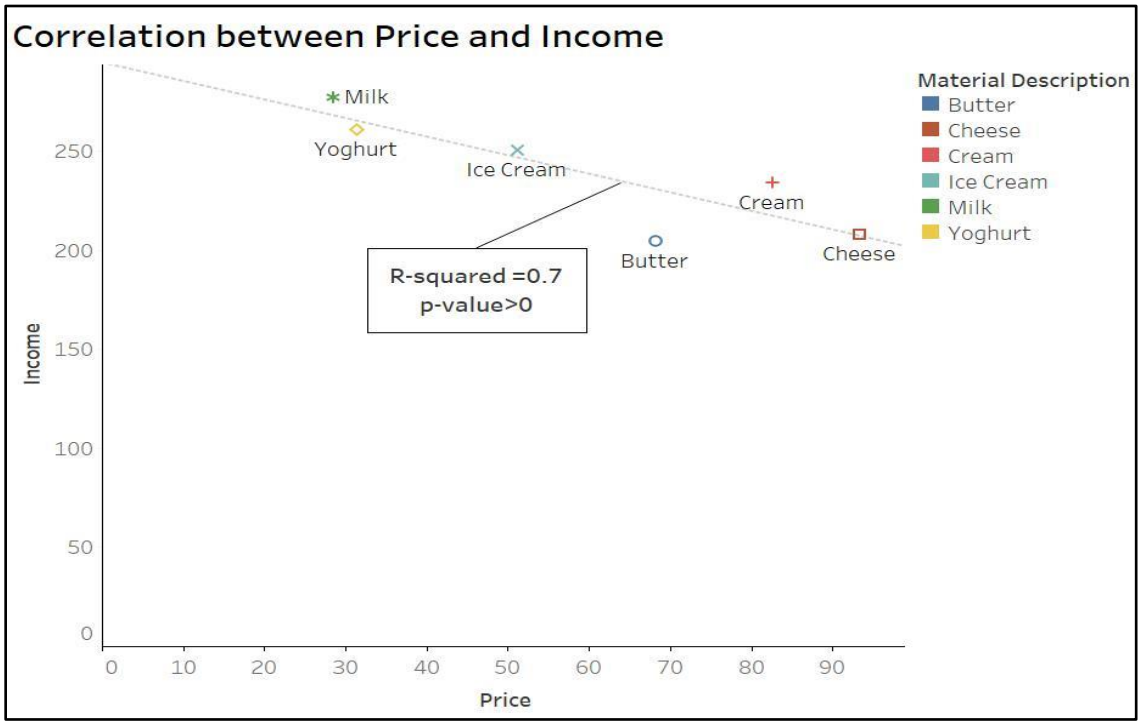


Figure: 7.1 correlations between Price and Income for company OO (by Manimozhi Neethinaygam)

Scatter plot is used to show the correlation between the Price and Income. Shape and Color differentiate the different products. The Tread Line is used to show the correlation between the Cost price and Revenue earnings in all three rounds and in all three regions for our company OO.

The above scatter plot and Trend Line indicate (figure :7.1) that we have a **linear regression** model and there is a **Negative correlation between "Avg. Net Price" and "Avg. Contribution Margin,"** with a coefficient of 0.0270467 (p-value < 0.0001). The intercept term is also significant (p-value = 0.0270467), representing the starting point of net value when cost is zero. The **R-squared is 0.7** indicates moderately **strong relationship between the variables.**

Avg. Contribution Margin = -0.936831*Avg. Net Price + 294.616.

The coefficient for "Avg. Net Price" is −0.936831which indicates negative relation ship.

This coefficient indicates that, on average, for each unit increase in Avg. Net Price, the Avg. Contribution Margin decreases by −0.936831.

5. Comparing our company(OO) data with other company(PP):

i. The sold quantity of each product in each region:

(by Dauren Omarov)

Team O:

MATERIAL_CODE	(Multiple Items)			
SALES_ORGANIZATION	OO			
Sum of QUANTITY_DELIVERED	**Column Labels**			
Row Labels	**North**	**South**	**West**	**Grand Total**
Milk	915	473	692	2080
Yoghurt	675	653	471	1799
Butter	293	450	234	977
Cheese	132	65	488	685
Ice Cream	254	143	210	607
Cream	70	119	42	231
Grand Total	**2339**	**1903**	**2137**	**6379**

Team P:

MATERIAL_CODE	(Multiple Items)			
SALES_ORGANIZATION	PP			
Sum of QUANTITY_DELIVERED	**Column Labels**			
Row Labels	**North**	**South**	**West**	**Grand Total**
Milk	1807	800	1160	3767
Yoghurt	594	573	693	1860
Cream	329	380	279	988
Butter	304	303	244	851
Ice Cream	267	198	155	620
Cheese	198	133	128	459
Grand Total	**3499**	**2387**	**2659**	**8545**

As you can see, team P sold more products in total than team O. Team O sold in total of 6379 products, while team P sold 8545 products in total. Team P sold more Milk, Yoghurt, Cream, and Ice Cream in total. Team P sold more units of Milk and Cream in each region than team O. Team P was particularly strong in the North region, where they sold more of every product except yoghurt than team O.
Team O was more competitive in the South, where they sold more yogurt and butter than team P.

ii. The Revenue of each product in each region:

(by Dauren Omarov)

MATERIAL_CODE	(Multiple Items)			
SALES_ORGANIZATION	OO			
Sum of NET_VALUE	**Column Labels**			
Row Labels	**North**	**South**	**West**	**Grand Total**
Butter	19984.48	30655.8	16018.2	66658.48
Cheese	12336.18	6065.8	45578.25	63980.23
Milk	26070.08	13449.2	19761.84	59281.12
Yoghurt	21187.02	20438.21	14832.82	56458.05
Ice Cream	12984.62	7393	10804.11	31181.73
Cream	5781.89	9865.77	3450.51	19098.17
Grand Total	**98344.27**	**87867.78**	**110445.73**	**296657.78**

MATERIAL_CODE	(Multiple Items)			
SALES_ORGANIZATION	PP			
Sum of NET_VALUE	**Column Labels**			
Row Labels	**North**	**South**	**West**	**Grand Total**
Milk	48048.68	19373.51	28514.75	95936.94
Cream	24760	28484.78	21188.26	74433.04
Butter	19000.42	19043.24	15430.71	53474.37
Yoghurt	15956	15634.79	18402.89	49993.68
Cheese	16774.68	11236.8	10826.8	38838.28
Ice Cream	12152.46	9071.54	7089.7	28313.7
Grand Total	**136692.24**	**102844.66**	**101453.11**	**340990.01**

As you can see, Team P had higher total revenue than team O. Team P revenue is 340,990.01, while team O revenue is 296,657.78, the difference is quite big, however team O has higher gross margin than team P. Team O had more revenue for Butter in all regions. Team P had higher revenue for Milk and Cream in all regions. Team P had higher revenue for all products in the South region, except for Yoghurt and Butter. Overall, Team P had a higher revenue for more products in most regions, while Team O had a higher revenue for butter in all regions.

iii. The Net Income of each product in each region:

(by Solange Ruiz)

The winning company **OO** earned the greatest money of **$41,257.03**, while the losing company **PP** earned the least **$16,848.80**.

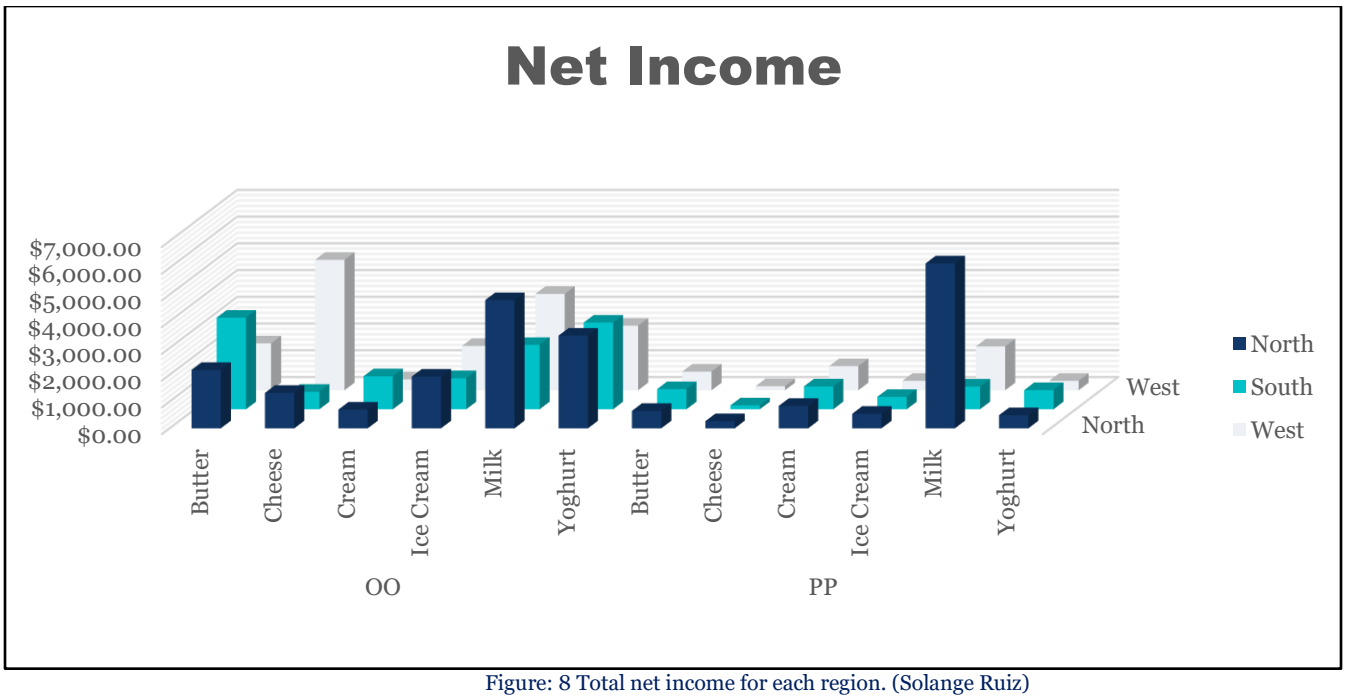


Figure: 8 Total net income for each region. (Solange Ruiz)

OO, our company's flagship product, has a remarkable consistency in profitability throughout all three areas. The bars indicating their performance fluctuate but remain stable, demonstrating their durability and consistent income generating. PP's product line, on the other hand, is mediocre, with flat and irregular earnings. Their financial path is unstable across most items, except for their milk variant, which stands out as the top earner in the North area.

Figure 9 reveals a comprehensive investigation of the calculating methods used to derive the net income for each product. The net income calculation involves subtracting the cost of products from the net value of the relevant commodity, providing a detailed picture of the profitability of each product within specified locations.

Sum of Net Income	Column Labels			
Row Labels	North	South	West	Grand Total
OO	**$14,405.07**	**$12,132.55**	**$14,719.41**	**$41,257.03**
Butter	$2,184.22	$3,426.72	$1,754.54	$7,365.48
Cheese	$1,325.22	$655.18	$4,880.82	$6,861.22
Cream	$700.52	$1,234.53	$405.30	$2,340.35
Ice Cream	$1,933.64	$1,164.71	$1,657.38	$4,755.73
Milk	$4,793.60	$2,407.47	$3,605.39	$10,806.46
Yoghurt	$3,467.87	$3,243.94	$2,415.98	$9,127.79
PP	**$8,959.87**	**$3,792.36**	**$4,096.57**	**$16,848.80**
Butter	$651.91	$755.35	$698.49	$2,105.75
Cheese	$267.88	$147.90	$153.10	$568.88
Cream	$839.50	$856.76	$900.94	$2,597.20
Ice Cream	$542.94	$465.26	$352.20	$1,360.40
Milk	$6,167.52	$850.76	$1,639.81	$8,658.09
Yoghurt	$490.12	$716.33	$352.03	$1,558.48
Grand Total	**$23,364.94**	**$15,924.91**	**$18,815.98**	**$58,105.83**

Figure: 9 Total net income for each region. (Solange Ruiz)

iv. Analysis on Purchase Order created during the game:

(by Solange Ruiz)

We were informed prior to the game that exceeding 4,000 in product inventories will result in taxes and penalties for the business we own. As a result, we took great care in the first round to stay inside this boundary. Our company reordered products on three occasions to meet demand. With these actions, our plant did not generate any penalty charges due to inventory overstock. Inventory levels were kept under 4,000 units every day. See below table figure 10 with a list of all purchase orders and product quantities. In the first occasion, we started with a higher inventory for most of all products with milk and yogurt being that highest of orders in comparison with second and third occasion the demand deteriorated to only purchasing Yogurt, Milk and Butter.

	01						02						03		
	Butter	Cheese	Cream	Ice Cream	Milk	Yoghurt	Butter	Cheese	Cream	Ice Cream	Milk	Yoghurt	Butter	Milk	Yoghurt
4500000052	600	664	650	420	950	715									
4500000054	163	90	47	43	247	256									
4500000059							202	224	46	191	684	595			
4500000064													87	199	337

QUANITY

Figure: 10 purchase order & quantity of each product. (Solange Ruiz)

v. Daily inventory for six dairy products for our company OO and the company PP:

(by Manimozhi Neethinayagam)

Daily Stock Inventory for Company OO:

The Company PP has the highest product sold compared to all other companies. We wanted to check how many days the inventory went to zero for both company OO (ours) and Company PP. Before calculating the zero inventory stocks for both companies, we checked the daily stock inventory for the company OO and Company PP.

Below is the summarization of stock for the company OO for three different regions and three different Rounds. We used Highlight tables to show the stock. The darker color indicates the zero to low stocks and the light color indicates the more to average stocks in the inventory.

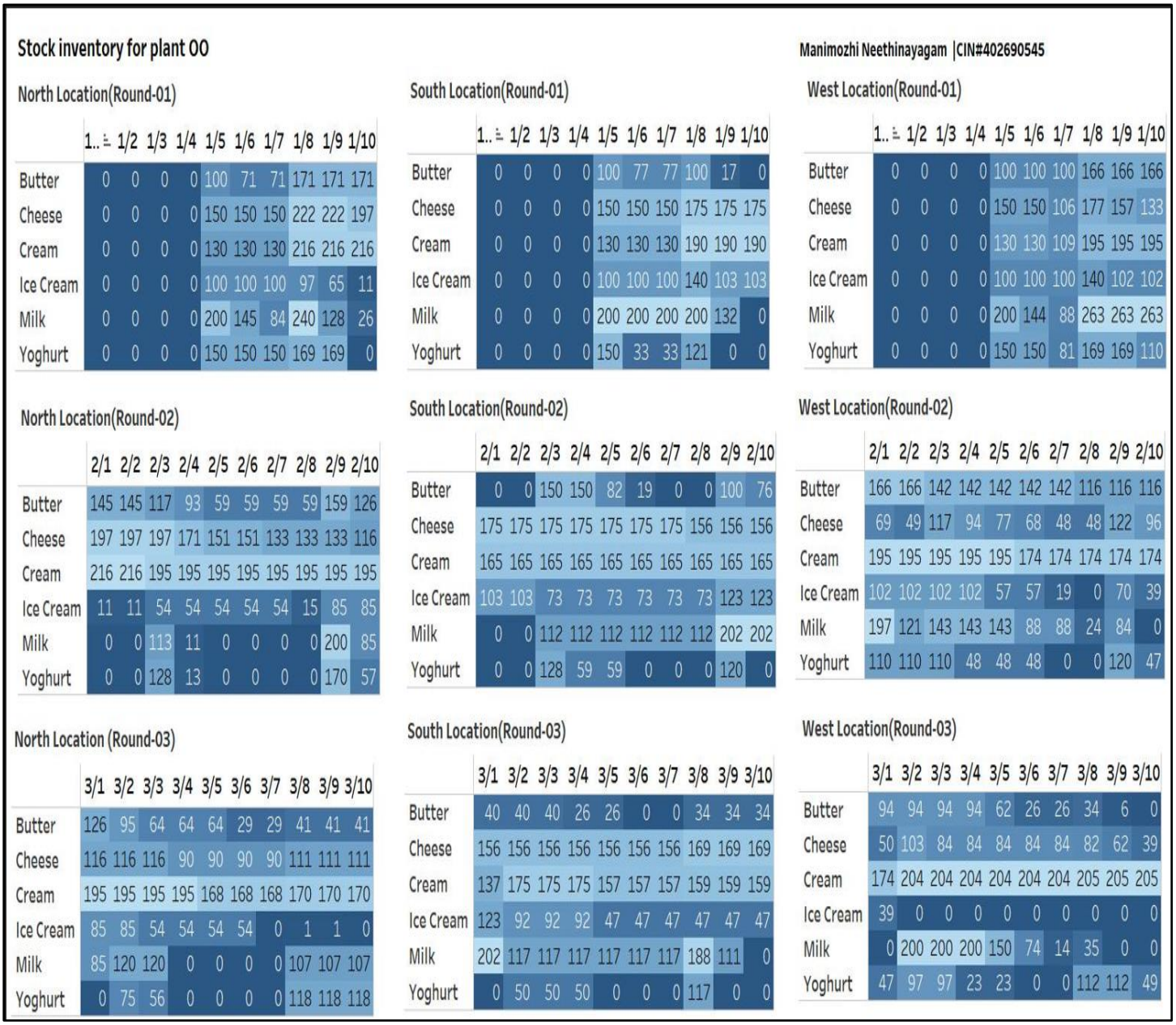


Figure: 11 Stock inventory of company OO for all 3 regions and for all rounds (by Manimozhi Neethinaygam)

From the above the figure 11 we can see that the **company OO had good stocks in our inventory**. Our inventory was zero for the initial few days in Round-01 and stocked up in the upcoming days. And we can see that our inventory didn't go to zero often in the middle of rounds 2 and round 3. Only the **product Milk and Yoghurt stocks went below in round -02 and round 03.**

Daily Stock Inventory for Company PP:

We checked the stock inventory for the Company PP, to understand their company's stock plan. We used Highlight tables to show the stock. The darker color indicates the zero to low stocks and the light color indicates the more to average stocks in the inventory.

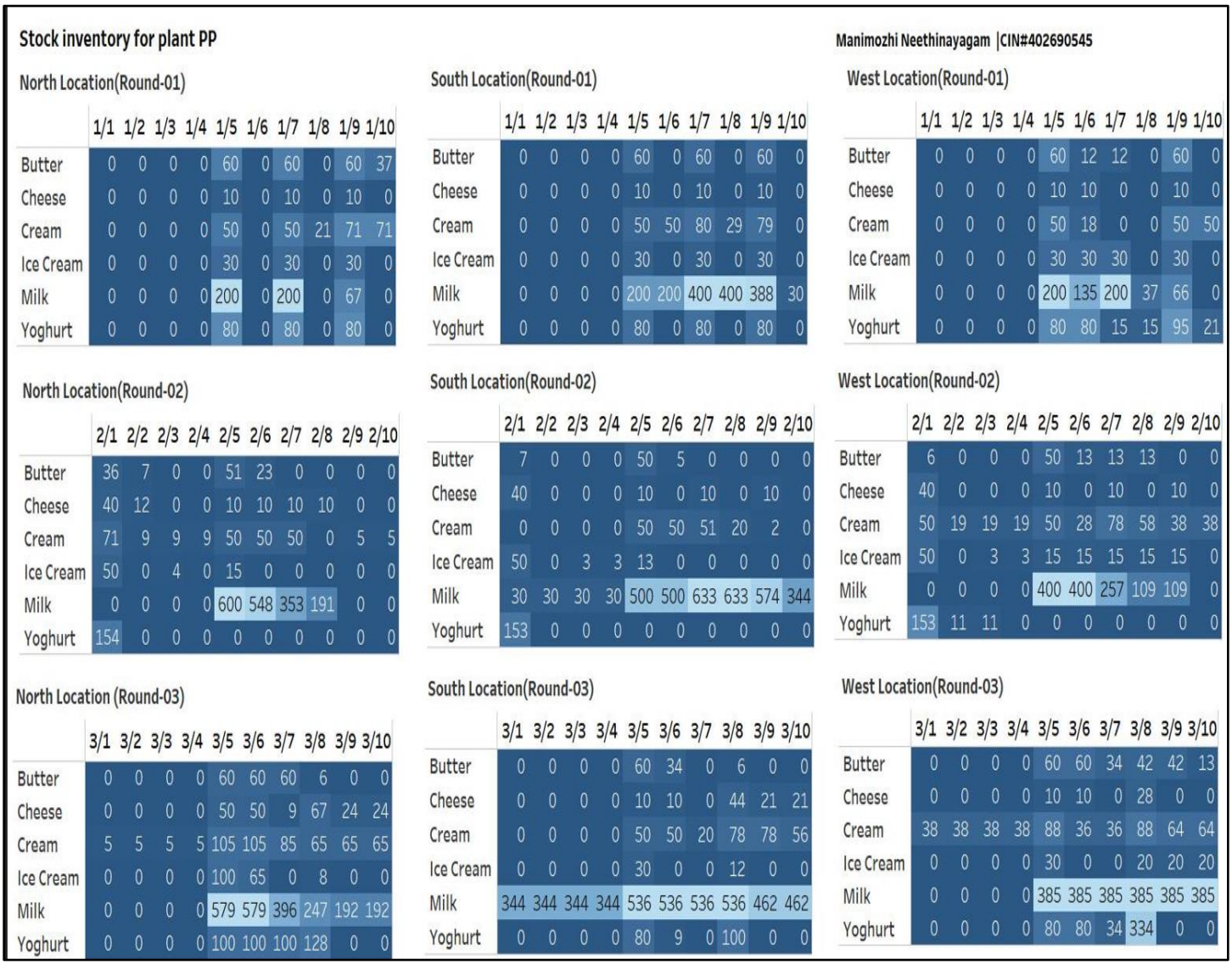


Figure: 12 Stock inventory of company PP for all 3 regions and for all rounds(by Manimozhi Neethinaygam)

From the above figure 12, we can see that company PP stocks were not enough; they had zero stocks on most of the days in round 02 and round 03. Especially for the products, cheese**, yoghurt, their stocks were low and went to zero stock often.**

We used **Line chart** to show the Stock trend between our Company OO and the Company PP for three rounds in three different Regions (North, South, West).

Line chart to compare the daily stock in the Inventory between the company OO and PP

Round -01 of daily stock inventory:

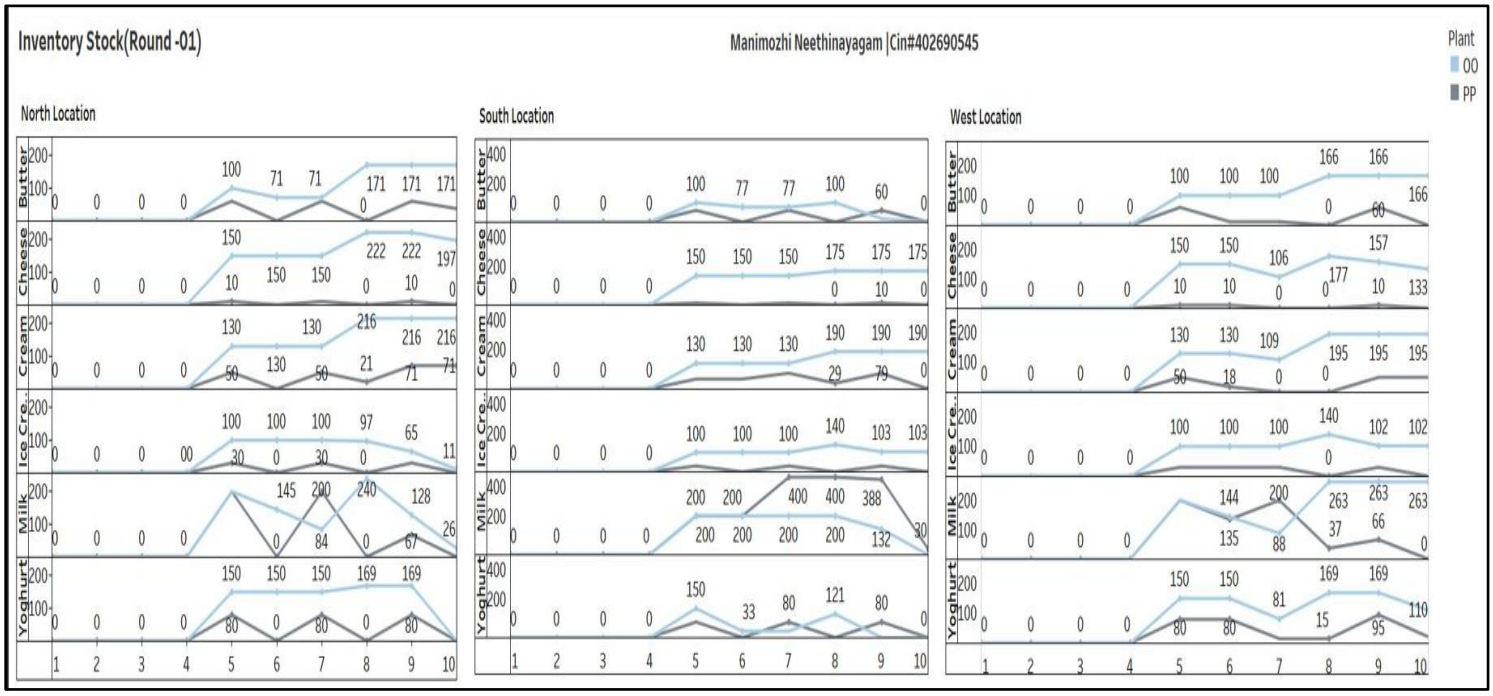


Figure: 13.1 Stock inventory of company OO and PP for all 3 regions in round-01 (by Manimozhi Neethinayagam)

From Figure :13.1, Round-01, we can see that our company OO the stocks in the inventory were increasing, only at the end of round-01 graph declined, which shows that we maintained good stock inventory in round-01, compared to the company PP, where they missed to monitor the stocks in the inventory.

Round -02 daily stock inventory between the company OO and the company PP:

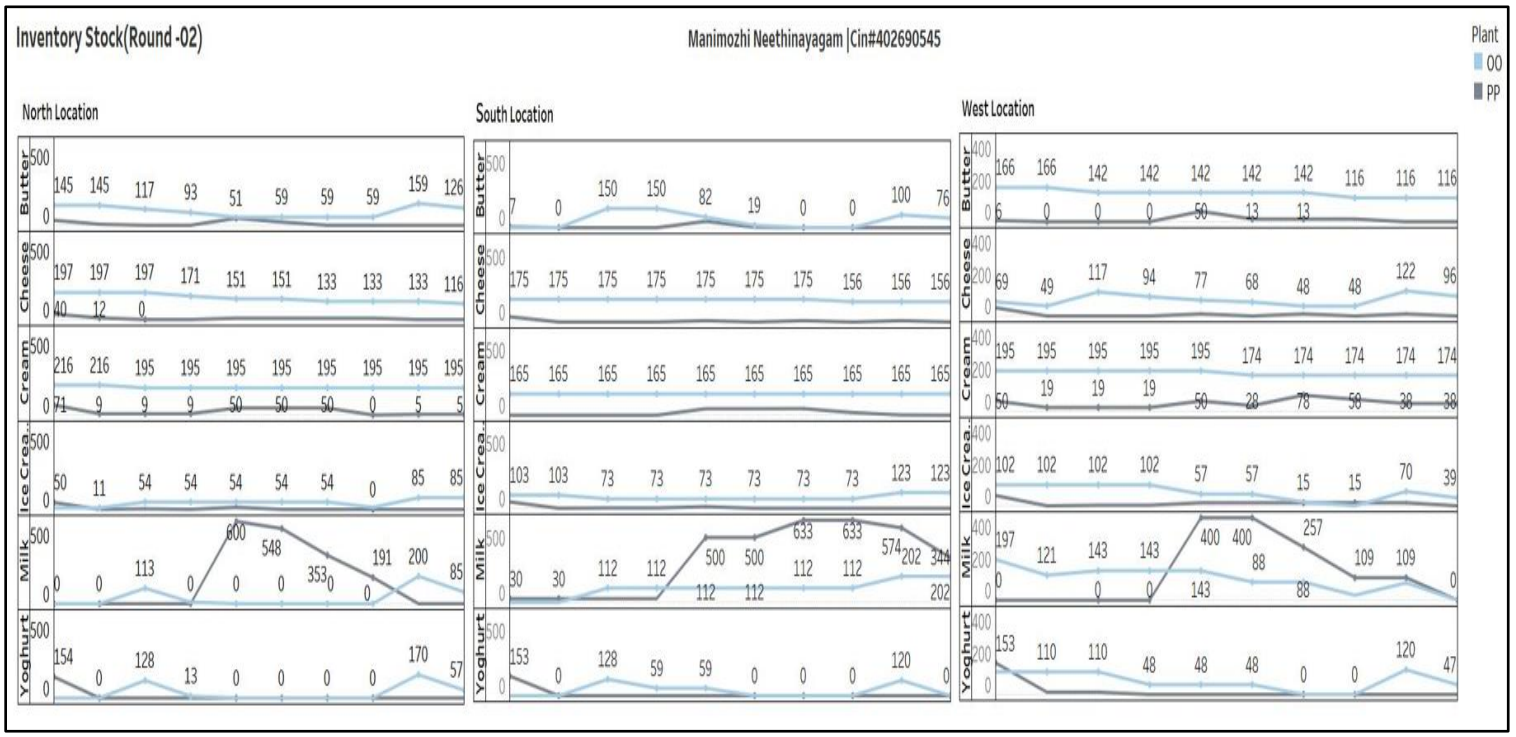


Figure: 13.2 Stock inventory of company OO and PP for all 3 regions in round-02 (by Manimozhi Neethinayagam)

From Figure:13.2 round-02, the company OO stocks of yoghurt were less, the inventory was zero for only some of the days in all location, whereas for company PP, the stocks like yoghurt, butter, milk had zero inventory for most of the days in location North and some days in all the other region.

Round -03 daily stock inventory between the company OO and the company PP:

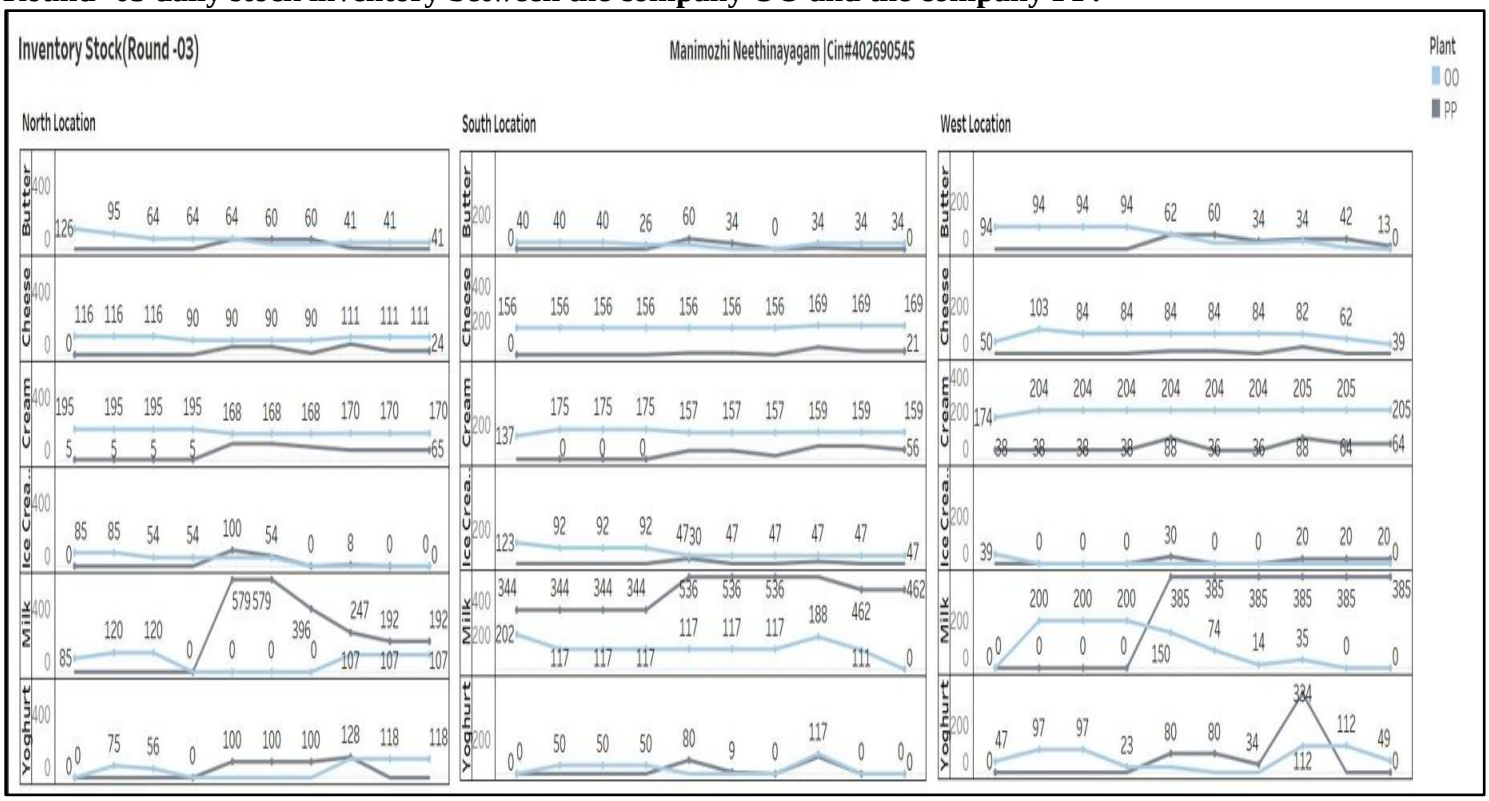


Figure: 13.3 Stock inventory of company OO and PP for all 3 regions in round-03(by Manimozhi Neethinayagam)

As we can see from the Figure :13.3 the company PP had not enough stock in the inventory at the beginning of the game in round –03, and also, we can see that except Milk and cream they didn't have more stocks on other dairy products where as our company OO had good stock in the initial stage of round-03 and had enough stocks on all products to sale.

The **good stocked up inventory for our company OO** had increased the chance to win the game.

vi. Daily Price change of Product:

(by Manimozhi Neethinaygam)

Company OO daily price change:

SIM_ROUND	(All)
SALES_ORGANIZATION	OO
MATERIAL_LABEL	(Multiple Items)

The blank value indicate there is no stock available during those dates.

Average of NET_PRICE	Material Label					
Date	Butter	Cheese	Cream	Ice Cream	Milk	Yoghurt
01/05	68.06				28.02	31.23
01/06		93.32	82.29		28.02	31.23
01/07	68.06	93.32	82.29	51.32	28.02	31.23
01/08	68.06	93.32		51.32	28.02	31.23
01/09	68.06	93.32		51.32	28.02	31.23
01/10	68.06	93.32	81.01		28.02	
02/01		93.32			28.02	
02/02	68.06	93.32	81.01	51.32		
02/03	68.06	93.32			28.02	31.23
02/04	68.06	93.32		51.32	28.02	31.23
02/05	68.06	93.32	82.02		28.02	31.23
02/06	68.06	93.32		51.32		31.23
02/07	68.06	93.32		51.32	28.02	
02/08		93.32				
02/09	68.06	93.32		51.32	28.02	31.23
02/10	68.06	93.32	83.02			31.23
03/01	68.09	93.32	84.01	52.01	29.03	
03/02	68.09	93.32		52.01		31.99
03/03	68.78	94.01			30.02	31.99
03/04	68.78		84.9	52.05	30.02	31.99
03/05	68.78				30.02	31.99
03/06				50.01	30.02	
03/07	68.78	94.01			28.02	
03/08	68.78	94.01			28.02	31.29
03/09	68.78	94.01		50.01	29.01	32.02
03/10		93.06	81.29		29.01	32.02
Grand Total	68.24	93.40	82.67	51.26	28.46	31.39

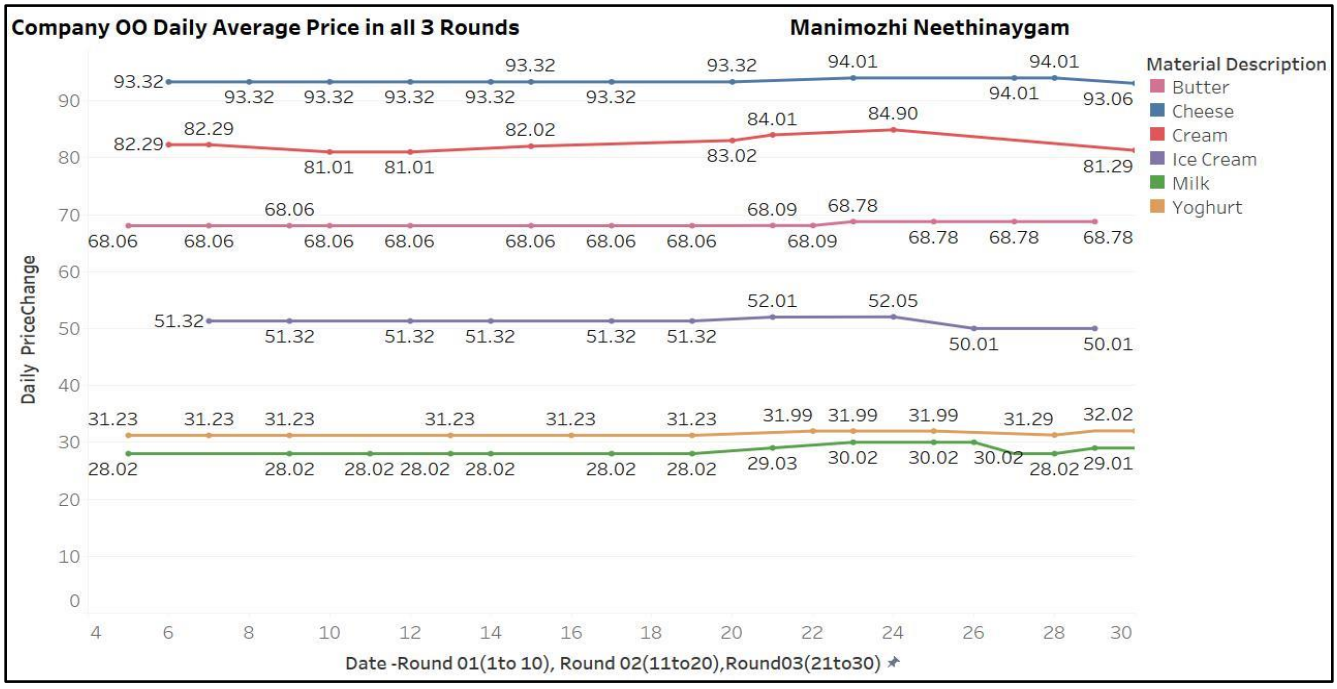


Figure:14 Daily price change for company OO (by Manimozhi Neethinaygam)

From the above figure: 14, we can understand that our **company OO had a good price range from the beginning** and the **daily price change was steady** and did not decrease the price rapidly. Even though the products sold by our company OO were few lesser when compared to other companies, this price range and profit percentage has helped us to win the game.

Company PP daily average price range:

SIM_ROUND	(All)
SALES_ORGANIZATI(	PP
MATERIAL_LABEL	(Multiple Items)

Average of NET_PRICE	Material Label					
Date	Butter	Cheese	Cream	Ice Cream	Milk	Yoghurt
01/05	63	87	76	46	24	27
01/06		87	76		24	27
01/07	60.00	83.00	73.00	44.00	23.00	26.00
01/08					24	
01/09	60	83	73	44	23	26
01/10	60.00					26.00
02/01	60	83	73	44		26
02/02	63.99	84.99				
02/03				46.99		29.99
02/04				46.99		
02/05	63.99	84.99	79.99	46.99	28.99	
02/06	62.99	86.49	76.25		26.75	
02/07		86.49	76.25		26.75	
02/08	62.99	86.49	76.25		26.75	
02/09		87	76	46	24	
03/05	70.49		79.99	51.99		34.49
03/06	66	87	77	44	32	32
03/07	66		77		32	32
03/08	62	84	74	45	28.99	26
03/09	70.49		79.99			
03/10	60	83	73		23	
Grand Total	62.56	84.87	75.49	45.83	25.49	27.11

The Blank Value represent the zero stocks on that date.

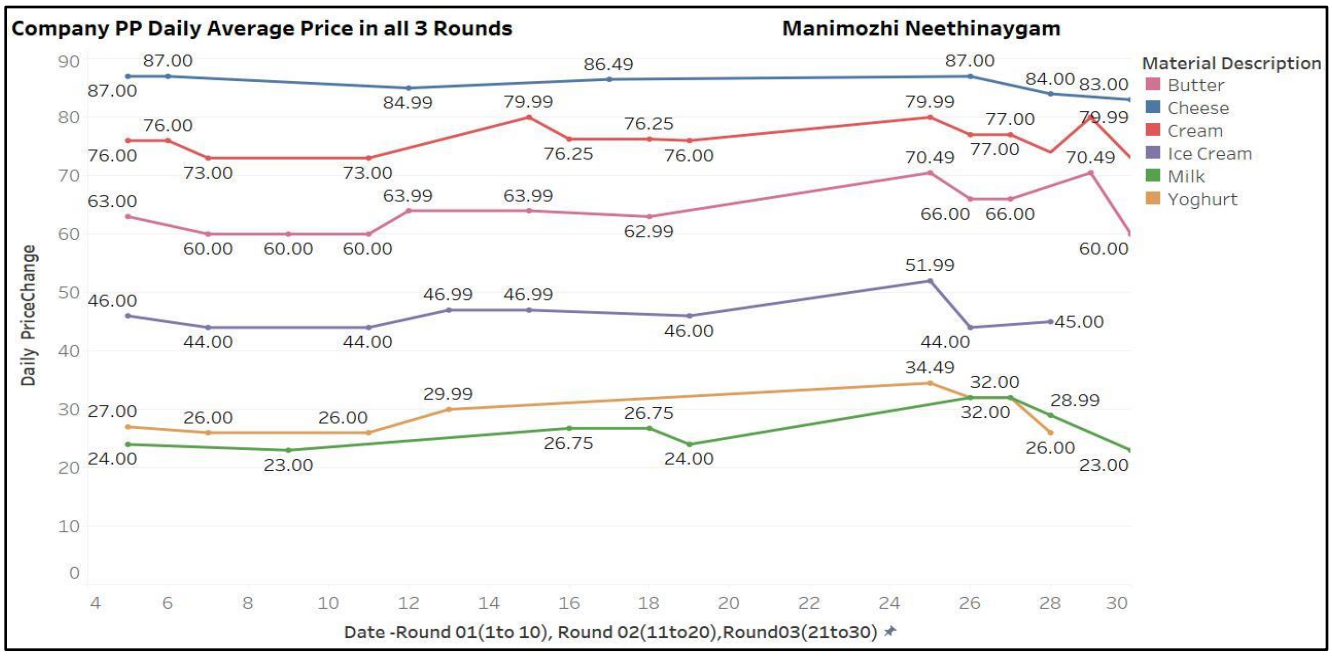


Figure: 15 Daily price change for company PP (by Manimozhi Neethinaygam)

After analyzing the company, we can understand that the company PP daily price range varies**,** and **their price was very low at the beginning of the game**. They started the game with **less profit,** and they decreased the price in the in the round-01 often, compared to the winning company OO and their price increased rapidly in round-03. But only in round-03, they had a good price point. They also had **zero inventory in most of the days for company PP when compared to our company OO**. Even though they had a good quantity of products sold, the price range is not as profitable compared to the winning company.

vii. Out of Stock Summary for all three regions:

(by Manimozhi Neethinaygam)

We know the daily inventory stock status for both the companies, we summarized the total days out of stock for the products in each region for all three rounds.

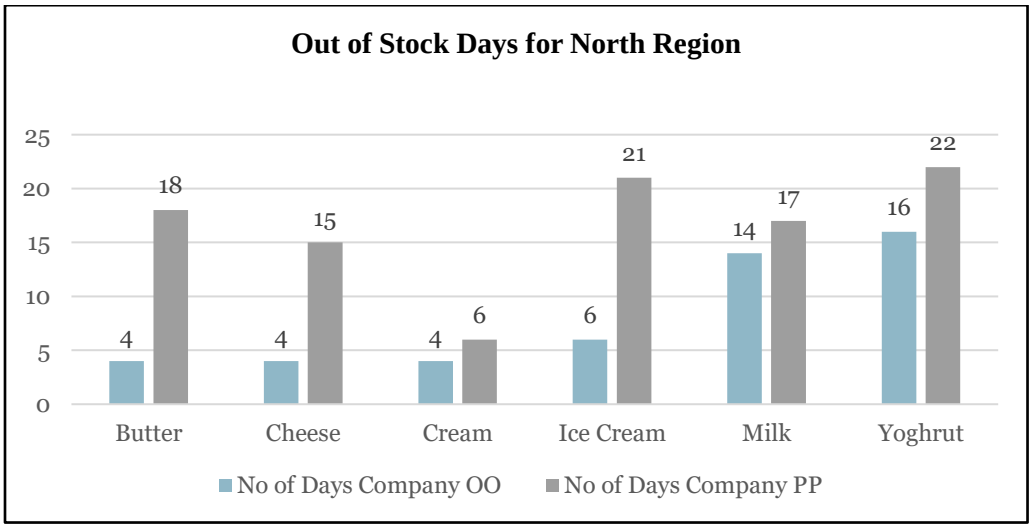


Figure:16.1 Summary out of stock inventory for North region (by Manimozhi Neethinayagam)

From the Figure 16.1, we can see that in North Location Ice cream and Yoghurt were out of stock for more days in all three rounds for company PP, whereas for Company OO Milk and Yoghurt were out of stock for a greater number of days in all three rounds in North Region. In **North Region over all Company OO had more number of stocks.**

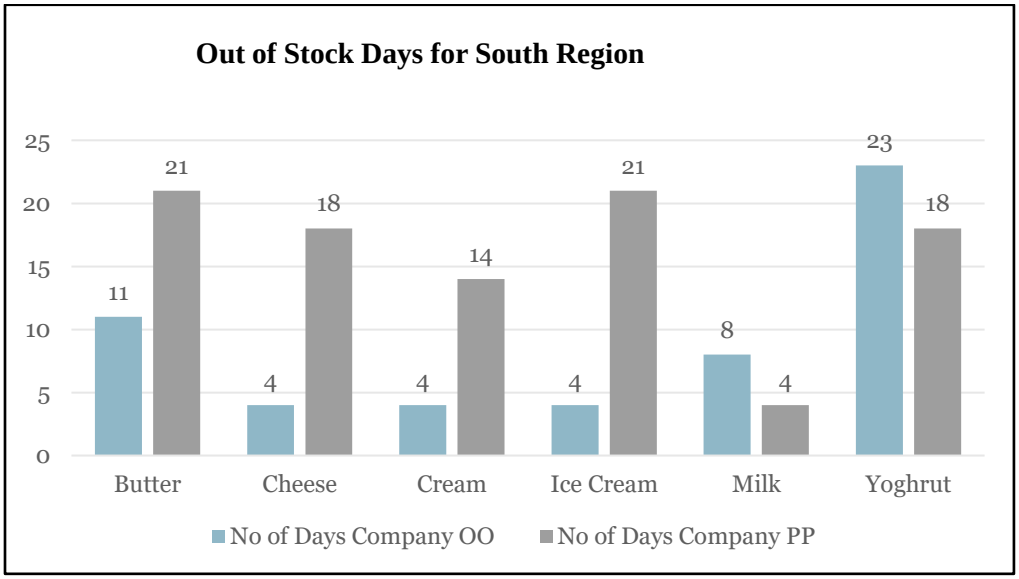


Figure:16.2 Summary out of stock inventory for south region (by Manimozhi Neethinayagam)

From the Figure 16.2, we can see that in South Location Ice cream, and Butter were out of stock for more days in all three rounds for company PP, whereas for Company OO Butter and Yoghurt were out of stock for a greater number of days in all three rounds in South Region. In **South Region over all Company OO had more number of stocks except yoghurt.**

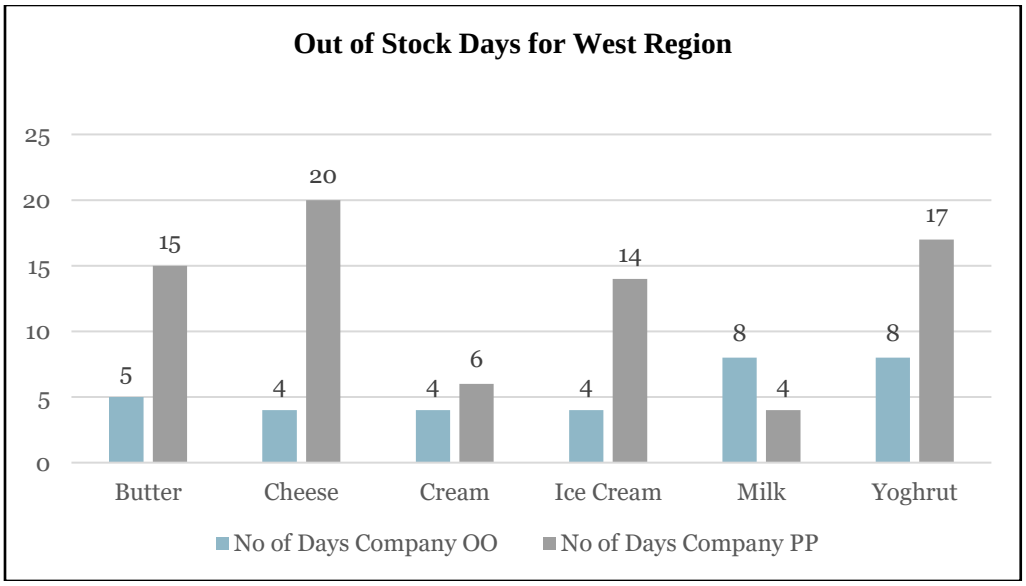


Figure:16.3 Summary out of stock inventory for West region (by Manimozhi Neethinayagam)

From the Figure 16.3, we can see that in West Location cheese and yoghurt were out of stock for more days in all three rounds for company PP, whereas for Company OO Milk and Yoghurt were out of stock for a greater number of days in all three rounds in South Region. In **West Region over all Company OO had more number of stocks.**

North	No of Days	
Out of stock inventory		
Material Description	Company OO	Company PP
Butter	4	18
Cheese	4	15
Cream	4	6
Ice Cream	6	21
Milk	14	17
Yoghrut	16	22
Total	48	99

South	No of Days	
Out of stock inventory		
Material Description	Company OO	Company PP
Butter	11	21
Cheese	4	18
Cream	4	14
Ice Cream	4	21
Milk	8	4
Yoghrut	23	18
Total	54	96

West	No of Days	
Out of stock inventory		
Material Description	Company OO	Company PP
Butter	5	15
Cheese	4	20
Cream	4	6
Ice Cream	4	14
Milk	8	4
Yoghrut	8	17
Total	33	76

Figure:16.4 Summary out of stock inventory for all 3 regions (by Manimozhi Neethinayagam)

From the Figure 16.4, we can understand that, even though the company PP had the highest sales compared to company OO, they ran out of stocks more days, compared to our company OO. The Company PP in all three Rounds and in all three regions, their Butter, yoghurt, Ice Cream and cheese were majorly out of stock whereas for Company OO except Milk, Butter and yoghurt they had a very stock inventory compared to other company PP. **Company OO had less zero inventory** compared to company PP and which **increased the chance of company OO to win** the game. Company PP had been out of stock on cheese, which is the highest dairy product in the inventory, they ran out of cheese majorly in all three regions, whereas our company OO had least cheese out of stock in all the regions and the price profit is also good.

viii. Changes made on six product quality in our independent planning

(by Mitali Purohit)

From the beginning, we focused on making high-quality products. We planned carefully how much to make and sell so that we could meet customer needs while also managing our inventory wisely. This smart approach, along with our six key improvements to product quality, helped us win the first round. By balancing product quality with sales and inventory management, we found a winning combination that pleased customers and kept costs down.

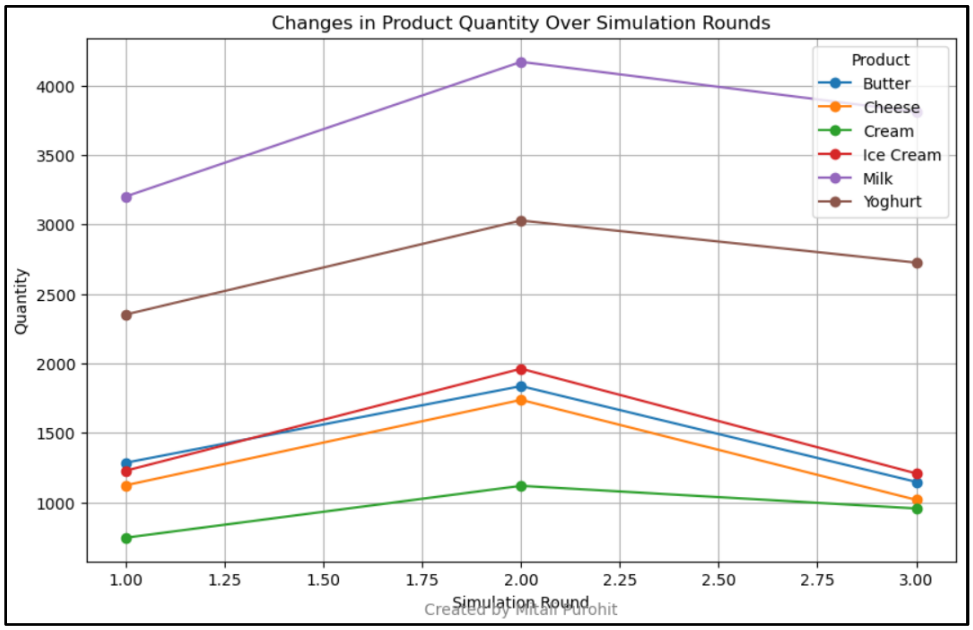


Figure: 17 Changes made on six product quality in our independent planning

The figure captures transformative quality changes in six products through our independent planning, showcasing successful efforts to exceed customer expectations.

ix. The changes in our sales margin for each dairy of 6 products

(by Mitali Purohit)

As Sales Manager, I am pleased to report that our team has successfully implemented a strategic pricing approach that has resulted in a significant increase in our sales margins for each dairy of 6 products. By gradually increasing prices by 10-11% in the first round and maintaining stable prices thereafter, we have been able to maximize profits while maintaining a competitive edge and customer satisfaction.

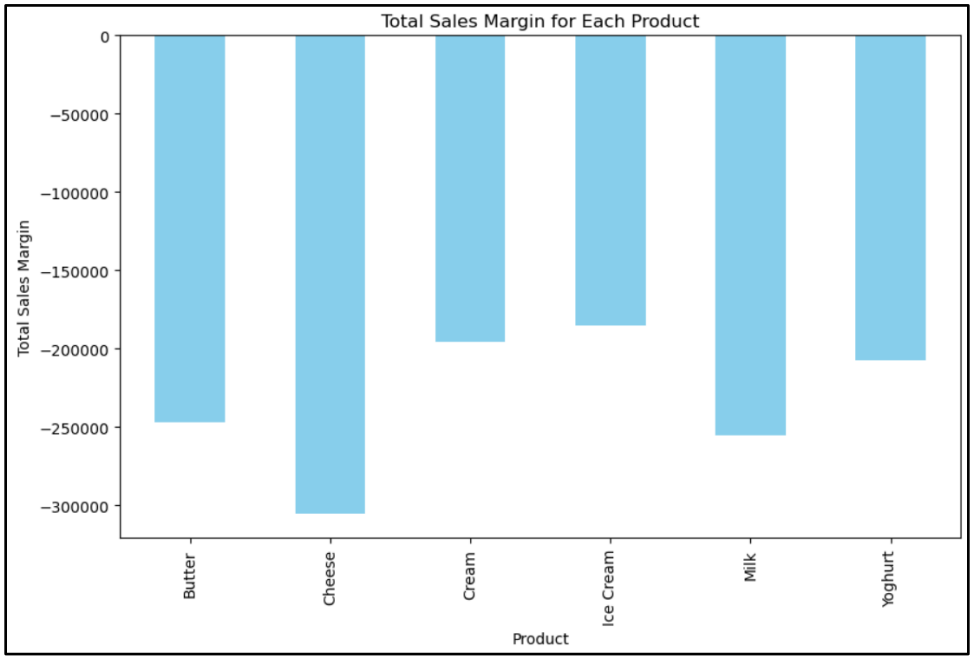


Figure: 18 The changes in our sales margin for each dairy of 6 products

This figure illustrates the remarkable changes in sales margins for each of our six dairy products as a result of the implemented strategy.

The strategic pricing approach was implemented in a phased manner:

- **Phase 1:** Gradual price increase of 10-11% across all six dairy products.
- **Phase 2:** Maintenance of stable prices to assess customer response and market trends.

Throughout the implementation process, we closely monitored sales data, customer feedback, and market trends to evaluate the effectiveness of the pricing strategy.

The success of the strategic pricing approach can be attributed to several factors:

- **Gradual price increase:** The gradual price increase minimized customer resistance and allowed us to maximize profits while maintaining customer satisfaction.
- **Competitive edge:** By maintaining stable prices after the initial increase, we were able to retain our competitive edge in the market.

6. Summary:

i. Initial Operation Strategy:

(by Manimozhi Neethinayagam)

We had three main strategies throughout the game.

- Cost optimization
- Inventory Management
- Effectively used Pull and Push

Cost Optimization:

- We calculated the profit margin and priced all our products with cost-effective strategies by gross margin of between 12-13%.
- We paid attention in reducing the Operational costs of products, which really helped us to win the game.

Inventory Management:

- By monitoring the inventory report, we forecasted our most selling product and reordered it in advance to avoid out of stocks.

Effectively used Pull and Push:

- By constant checking on the stocks, sales report, we effectively made choices between Push and pull Technique for the stock transfer.

ii. Consequential issues irrelevant to your operations strategy:

(by Manimozhi Neethinayagam)

Like other teams, we didn't face any of login issues, so we are lucky in way, but our Purchase Planning Manager faced a device issue (laptop) during the game, it was unexpected issue and the CEO pitched in and guided to make the purchase order on time, because without creating the purchase order at correct time would make us to lose the game. Without purchase order, we cannot get the stocks to Inventory, and we cannot make sales. We had co-ordination and proper communication in the team during the entire game, which helped us to win the game. Everyone worked and listened to each other's strategy and executed well on the final game day. Our team was fully co-operative with each other, we had clear communication, and the strategies were clearly communicated to all the team members on how we are going to play the game. The breakout zoom-meetings really helped us to connect with each other and perform better in the game. All these factors helped us to win the game.

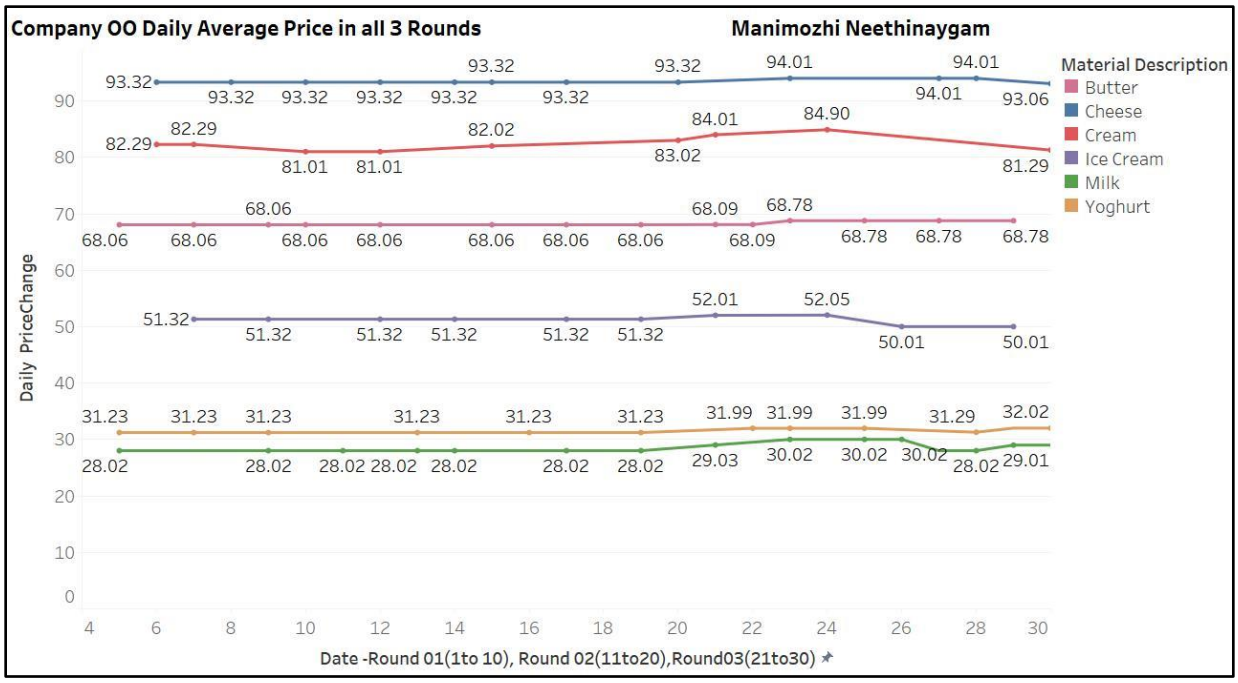
iii. Summarize the business data of the enterprise based on analytics:

(by Dauren Omarov)

Based on the performance in the ERPsim Logistics Game, the enterprise is performing well financially. The company has a net income of $39,456.56, gross margin of 13.907%, and ROE of 7.314%.
Overall, the enterprise is performing well financially in comparison with other teams. The company is generating profits efficiently and has a strong financial position.

Here are some specific observations from the daily price change analytics:
Cheese: The price of cheese is the mostly stable. It slightly increases in round 3, then drops at the end of round 3. In round 3 demand may have decreased for the product.
Butter: The price of butter also increases in round 3, but to a lesser extent than cream. The price then remains stable in round 3. The demand for butter is constant in all rounds.

Milk: The price of milk is the most stable of all the products in the first two rounds, with only a tiny increase in round 3 and then decrease.
Yoghurt: the most stable of all the products, with only a small increase in round 3.
Ice cream: The price of ice cream increases slightly in the start of round 3, but then decreases slightly in the half of round 3. So, this product was in constant demand during all 3 rounds.
Cream: The price of cream slightly decreases in round 1 and then bounces back in round 2. The price of cream is the most volatile of all the products in round 3, with a significant increase followed by a significant decrease. This may be due to changes in the supply or demand for cream during the game.
Overall, the prices of the different products in the ERPsim Logistics Game are relatively stable across the three fluctuations.



iv. Correlation between Price and Profit:

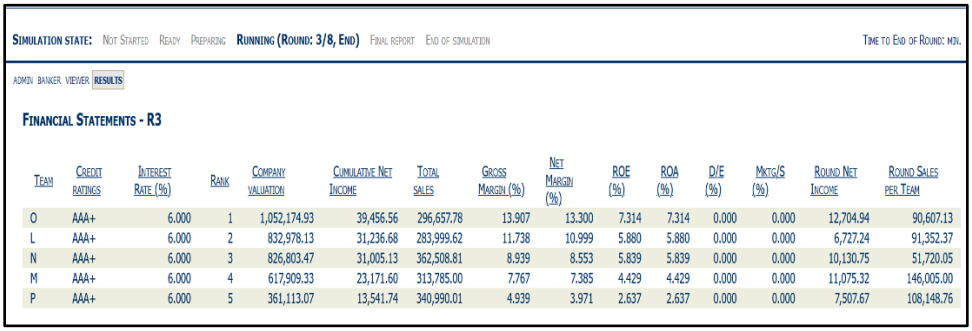
(by Manimozhi Neethinayagam)

There are a linear and positive regression correlation exits between Price and Profit. We priced our product at **13.9% of gross margin** and our interest rate is 6% with ROE is 7.3% and ROA 7.3% which is high compared to all other companies. All these factors and calculation, strategies used to price the product the yield us the Net income 12,704.94 euros which raised our company valuation and made us to Win the game.
With the increase in Price, there is increase in Profit. From figure 6 and 6.1 we can see that there positive sign of the coefficient suggests a **positive linear relationship** exists between the Price quoted and revenue earned during the game.

From the previous experience in simulation game, we understood that if we keep the gross margin between 10 - 13% we can be in top 3. So, we followed this strategy and won the game.

v. The winning team's performance data and explanation on profit results:

(by Dauren Omarov**)**



SIMULATION STATE: NOT STARTED READY PREPARING **RUNNING (ROUND: 3/8, END)** FINAL REPORT END OF SIMULATION — TIME TO END OF ROUND: MIN.

ADMIN BANKER VIEWER **RESULTS**

FINANCIAL STATEMENTS - R3

TEAM	CREDIT RATINGS	INTEREST RATE (%)	RANK	COMPANY VALUATION	CUMULATIVE NET INCOME	TOTAL SALES	GROSS MARGIN (%)	NET MARGIN (%)	ROE (%)	ROA (%)	D/E (%)	MKTG/S (%)	ROUND NET INCOME	ROUND SALES PER TEAM
O	AAA+	6.000	1	1,052,174.93	39,456.56	296,657.78	13.907	13.300	7.314	7.314	0.000	0.000	12,704.94	90,607.13
L	AAA+	6.000	2	832,978.13	31,236.68	283,999.62	11.738	10.999	5.880	5.880	0.000	0.000	6,727.24	91,352.37
N	AAA+	6.000	3	826,803.47	31,005.13	362,508.81	8.939	8.553	5.839	5.839	0.000	0.000	10,130.75	51,720.05
M	AAA+	6.000	4	617,909.33	23,171.60	313,785.00	7.767	7.385	4.429	4.429	0.000	0.000	11,075.32	146,005.00
P	AAA+	6.000	5	361,113.07	13,541.74	340,990.01	4.939	3.971	2.637	2.637	0.000	0.000	7,507.67	108,148.76

Our team O is the winning team.

Here is Team O's performance:

Team	O
Credit Ratings	AAA+
Interest Rate (%)	6
Rank	1
Company Valuation	1,052,174.93
Cumulative Net Income	39,456.56
Total Sales	296,657.78
Gross Margin (%)	13.907
Net Margin (%)	13.3
ROE (%)	7.314
ROA (%)	7.314
D/E (%)	0
Mktg/S (%)	0
Round Net Income	12,704.94
Round Sales per Team	90,607.13

The winning team had a very strong performance across all metrics. They had a credit rating of AAA+, a cumulative net income of $39,456.56, and a total sales of $296,657.78. They also had a gross margin of 13.907%, a return on equity (ROE) of 7.314%, and a return on assets (ROA) of 7.314%. Their marketing/sales (MKTG/S) ratio was 0.000%, and their round net income was $12,704.94. Their round sales were $90,607.13.

The team's profit results can be explained by their strong performance in all areas of the business. They had a high ROE, ROA, and gross margin, which indicates that they were able to generate profits efficiently. They also had a low MKTG/S ratio, which indicates that they were able to generate sales without spending a lot on marketing. Overall, the team's strong performance in all areas of the business led to their victory in the ERPsim Extended Logistics Game. The winning team's performance was significantly better than the other teams in the game. They had the highest cumulative net income, gross margin, ROE, and ROA. They also had the lowest MKTG/S ratio. The winning team's success can be attributed to several factors. They were able to keep their costs low, generate high sales, and make sound financial decisions. They also had a strong team that was able to work together effectively.

Overall, the winning team's performance was outstanding. They were able to outperform the other teams in all areas of the business, and they were a deserving winner of the ERPsim Extended Logistics Game.

vi. Company's new strategy for upcoming games:

(by Manimozhi Neethinayagam)

We focused on inventory, profit margin, but we didn't concentrate on selling more products. In upcoming games, we must focus and make new strategy on pull and push technique to sell more products. If we have good plan on selling more product, our revenue, and total sales will also be high which will increase the winning chance.

Conduct thorough market research to identify trends and implement strategies to sell more products in the simulation games. The company can develop a comprehensive strategy that not only considers financial factors like inventory and profit margins but also emphasizes the crucial aspect of selling more products.

vii. The relationships that exist between operations factors:

(by Mitali Purohit)

These relationships play a crucial role in shaping the overall performance and success of a company.

1. **Inventory Management and Production Planning:**
    - **Efficient inventory management** ensures the right amount of raw materials and components are available, preventing shortages and delays in production.
    - **Effective production planning** determines the required inventory levels, avoiding overstocking and unnecessary costs.
2. **Sales Performance:**
    - **High production efficiency** enables shorter lead times, increased customer satisfaction, and potentially higher sales.
    - **Strong sales performance** influences production planning and resource allocation, ensuring alignment with customer demand.
3. **Quality Control and Cost Management:**
    - **Rigorous quality control measures** minimize defects, reduce warranty costs, and maintain customer satisfaction.
    - **Effective quality control** identifies areas for process improvement, leading to cost savings and increased efficiency.
4. **Sales Strategy:**
    - **Customer-centric sales strategies** tailor sales approaches to specific customer segments, increasing sales success.
    - **Data-driven sales strategies** adapt to market trends and demand patterns, enhancing sales effectiveness.

viii. The operation strategies for success based on analytics:

(by Mitali Purohit)

key operation strategies for success based on analytics.

Forecast demand and optimize inventory: Use data to predict customer demand and avoid stockouts or overstocking.
Plan and schedule production: Use analytics to schedule production efficiently and meet customer demand on time.

Manage supply chains and mitigate risks: Use data to identify supply chain issues and avoid disruptions.
Control quality and prevent defects: Use analytics to identify and prevent product defects.
Optimize maintenance and asset usage: Use data to predict equipment breakdowns and schedule maintenance efficiently.
Allocate resources and plan capacity: Use analytics to use resources effectively and meet production goals.
Analyze customer behavior and optimize sales: Use data to understand customer preferences and target sales efforts effectively.
Improve processes and reduce costs: Use analytics to identify inefficiencies and streamline processes.
Monitor operations in real time: Use data dashboards to track key performance indicators (KPIs) and make quick decisions.
Use predictive analytics to manage risks: Use data to anticipate problems and take proactive measures.

ix. Best practice for day-to-day operations:

(by Solange Ruiz)

a) Focus Team Effort- Maintaining team dynamics is a vital priority. The finest outcomes may be attained by constant team goal realignment and reevaluation that is enthusiastic, proactive, and productive.

b) Inventory Management – Maintaining an inventory of goods that consumers want and can afford. It also aids in the organization's ability to keep accurate inventory records at all times.

c) Performance Measurement- the goal is to attain a certain income target by practical and manageable methods, assisting companies in implementing attainable results.

d) Streamline/production – One of the most important factors is to alter and adapt with time, putting a greater emphasis on new tools, equipment, and methods of enhancing output.

e) Analytical/Aptitude skills- Involves risk assessments to pinpoint difficulties in adverse circumstances when starting new initiatives.

x. Conclusion:

(by Solange Ruiz)

The most important thing we gained from this process was to improve communication and teamwork. Having in-person project meetings helped us increase the team's focus and comprehension of the simulation. The team quickly convened and strategized on purchasing, material management, and price strategy, as well as fulfilled tasks such as agility sprint and milestones. Everyone involved was given instructions by the team in charge, and the tasks were completed using a work breakdown structure theme.

Another important lesson was the price fluctuation. Using SAP predictive analytics helped us understand how our clients reacted to the price change and how it affected the amount sold. To sustain market share, we should not modify the price by more than 10%. We discovered that increasing the price barrier too much influenced sales volumes. Even though we did not have the biggest sales of any team, the team members' coordination enabled us to win.