



THE FRESH CONNECTION INDIVIDUAL REPORT

Integrated Decision Making in Supply Chain
Management – Spring 2025

Abstract

This report elaborates upon the strategic decision-making in the sales department with a focus on service level, obsolete stock, revenues, and ROI during the Fresh Connection simulation. It also shows how we recovered when the performance declined, using subsequent data-driven changes. It is through these financial analyses, including cost breakdowns and shifts in the contract index, which elucidate the contribution of integrated decision-making to balance between efficiency, responsiveness, and longer-term sustainability in supply chain management.

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Round 2

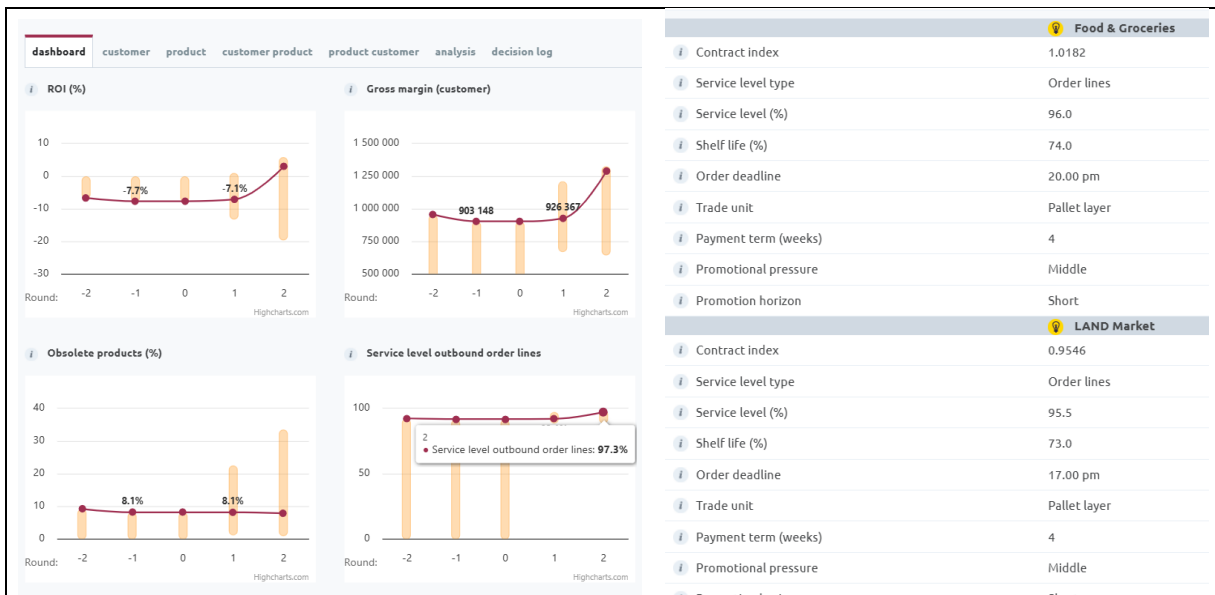


Figure 1: KPIs Round 2

Order management

Shortage rule: Customer priority

Customer priority:

- 1 Food & Groceries
- 2 LAND Market
- 3 Dominick's

Figure 3: Customer priority

Food & Groceries	
Contract index	1.0182
Service level type	Order lines
Service level (%)	96.0
Shelf life (%)	74.0
Order deadline	20.00 pm
Trade unit	Pallet layer
Payment term (weeks)	4
Promotional pressure	Middle
Promotion horizon	Short
LAND Market	
Contract index	0.9546
Service level type	Order lines
Service level (%)	95.5
Shelf life (%)	73.0
Order deadline	17.00 pm
Trade unit	Pallet layer
Payment term (weeks)	4
Promotional pressure	Middle
Promotion horizon	Short
Dominick's	
Contract index	1.0113
Service level type	Order lines
Service level (%)	96.0
Shelf life (%)	72.0
Order deadline	12.00 pm
Trade unit	Pallet
Payment term (weeks)	2
Promotional pressure	Middle
Promotion horizon	Short

Figure 2: Decision Log Round 2

What did you decide?	Why did you decide that?	How do you evaluate the result of the decision?
<p>1. Increased the service level for all customers:</p> <p>a) Food & Groceries: 95% → 96%</p> <p>b) Land Market: 95% → 95.5%</p> <p>c) Dominick's 95% → 96%</p>	<p>Our main strategy is providing high service level. To accommodate that goal, we had some changes in our supply chain: <i>changing suppliers in purchasing, reducing bottlenecks in operations and changing the frozen period in supply chain</i>, giving room for expectation of our service level to go to 96%. Not only that, but also increasing our service level gives us a higher contract index and that eventually gives us a higher ROI. The exact reason why each customer got their percentage is based on an estimation of the current service level and anticipated improvements, taking into account that Food & Groceries is our highest priority customer.</p>	<p>Service level outbound order lines Increased: 92.1% → 97.3%. Making it a good decision, as this a large increase, giving room for even a higher service level percentage in the next round.</p> <p>Penalties changed to Bonuses: from -299,109 € in penalties to +13,751 € in bonuses. Indicating that the customers were more satisfied.</p> <p>ROI Improved: -7.1% → +3.06% Profitability increased.</p>

<p>2. Decreased the shelf life for all customers:</p> <ul style="list-style-type: none"> a) Food & Groceries: 75% → 74% b) Land Market: 75% → 73% c) Dominick's 75% → 72% 	<p>The slight decrease in the shelf life helps with reducing holding costs and obsolete products. It also increases service level when products are received with the expected freshness. I chose Food & Groceries to have the highest shelf life percentage and decreased by one percent increments for the remaining two customers. With Dominick's having the lowest shelf life of 72%. It still did not affect the contract index as much, because Dominick's is a smaller chain and their products sell quicker.</p>	<p>Obsolete Stock Decreased: 8.1% → 7.8%. Not as much as expected, meaning the shelf life was still high and not exactly meeting the internal shelf life.</p>
<p>3. Changed the order management to Customer Priority. Ordering them from biggest customer to lowest.</p>	<p>Since Food & Groceries is our largest consumer, it was put first. Then land market as it is the second biggest and then Dominick's, making it the least prioritized. After some rough estimations, it was concluded that Food & Groceries makes up almost half of our sales revenue, and prioritizing them would give us higher returns.</p>	<p>Revenue (Contracted Sales Revenue): Increased from 2,628,963 € to 2,633,265 €, which is a 4,302 € increase, With Food & Groceries increasing 12,484 € from last round. Not as much as we were expecting but that goes to show how important prioritizing Food & Groceries is, because they take up almost half of our revenue. Change of Contracted Sales revenue for the Land Market and Dominick's from last round: Land Market: 4,542 € decrease. Dominick's: 3,640 € decrease. Not much of an impact on the overall Sales revenue, so this was a good decision.</p>

Round 3

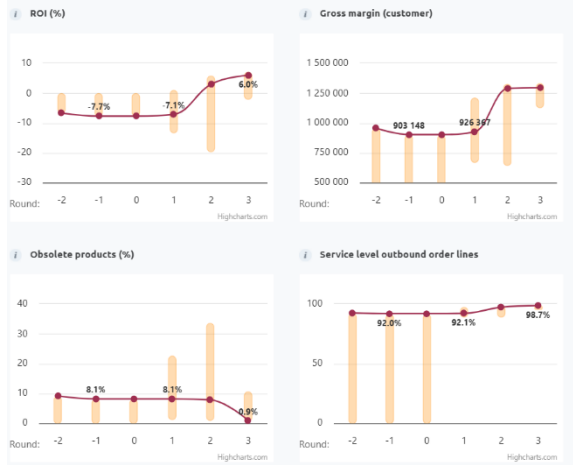


Figure 4: KPIs Round 3



Figure 5: Demand Fluctuations without Promotions



Figure 7: Demand Fluctuations with Promotions

agreements	ord.mgmt.	cat.mgmt	forecasting	kpis
Food & Groceries				
Contract index				1.0321
Service level type				Order lines
Service level (%)				98.5
Shelf life (%)				72.0
Order deadline				17.00 pm
Trade unit				Pallet layer
Payment term (weeks)				2
Promotional pressure				None
Promotion horizon				Short
Negotiate				
LAND Market				
Contract index				0.9497
Service level type				Order lines
Service level (%)				98.0
Shelf life (%)				69.5
Order deadline				17.00 pm
Trade unit				Pallet layer
Payment term (weeks)				3
Promotional pressure				None
Promotion horizon				Short
Negotiate				
Dominick's				
Contract index				1.0325
Service level type				Order lines
Service level (%)				99.0
Shelf life (%)				67.0
Order deadline				14.00 pm
Trade unit				Pallet
Payment term (weeks)				1
Promotional pressure				None
Promotion horizon				Short

Figure 6: Decision Log Round 3

Benchmark demand	=	0% additional sales in liters
Low promotional pressure	=	0.5% - 1.0% additional sales
Middle promotional pressure	=	1.5% - 2.0% additional sales
High promotional pressure	=	4.0% - 5.5% additional sales

Table 1: Promotional effect on sales

What did you decide?	Why did you decide that?	How do you evaluate the result of the decision?
1. Reducing Shelf life percentage for all customers: a) Food & Groceries:	Food & Groceries: Reduced the shelf life to 72% , since obsoletes did not decrease from last round and did not align with the internal shelf life of the Juice. <i>(The internal shelf life is</i>	Obsolete Stock Decreased: 7.8% → 0.9% . This was a big jump and can indicate that we were being too conservative with our shelf life and can benefit from increasing them next

<p><i>Reduced shelf life from: 74% to 72%.</i></p> <p>b) Land Market: <i>Reduced shelf life from 73% to 69.5%.</i></p> <p>c) Dominick's <i>Reduced shelf life from 73% to 67%.</i></p>	<p><i>calculated as the total shelf life of 20 weeks minus the sum of the production interval and safety stock, expressed as a percentage of the total shelf life.)</i></p> <p>Land Market: Reduced the shelf life by to 69.5% with 2.5 increments from the previous customer percentage. This variability helps balance inventory effectiveness.</p> <p>Dominick's: Since they have the fastest in store stock movement and our smallest customer, they were given the lowest shelf life of 67%.</p>	<p>round. Our goal is having obsoletes under 2%.</p>
<p>2. Reduce payment terms all customers:</p> <p>a) Food & Groceries: Reduced from 4 weeks to 2 weeks</p> <p>b) Land Market: Reduced from 4 weeks to 3 weeks</p> <p>c) c) Dominick's: Reduced from 2 weeks to 1 week.</p>	<p>In terms of finances, a focus on reducing the payment term was crucial for OJ's liquidity and financial responsiveness, the payment term would give us the needed money before having to pay our supplier for about a month on average in advance, giving us a chance to make profitable interest as well.</p> <p>a) Food & Groceries: Reduced from 4 to 2 weeks was because they are our largest customer, and we get the largest payments from them.</p> <p>b) Land Market: Reduced from 4 to 3 weeks because they are not as big as Food & Groceries and their contract index is already low. So this small increase gives us some cash but still maintains customer relationship.</p> <p>c) Dominick's: Reduced from 2 to 1 weeks as it is the smallest customer and gives us the window to be less lenient when it comes to payments.</p>	<p>ROI Improved: +3.06% → +6.0% (Profitability increased). Payment terms decreased by - 156,569 €. This was our biggest contributor to the high ROI this round. Contracted Sales Revenue decreased by 61,285 €. This is due to the contract index changes because of other compromises like payment terms, lower shelf life and removing promotions decreased some sales as well. Our lack of obsoletes and decreased payment terms covered that loss, and still increased our ROI.</p>
<p>3. Removing promotional pressure for all customers. (IMPORTANT DECISION)</p>	<p>1) Stabilizing Demand: Promotions create fluctuations in demand, making it harder to maintain consistent inventory levels and supply chain decisions.</p> <p>2) Enhancing Responsiveness: Since OJs objective is to be more responsive to the market, removing promotions allows for a more predictable</p>	<p>Less Demand fluctuations: As shown in the figures 5 and 7, the demand fluctuations in the finished products significantly changed, indicators that prove that is the difference of values on the Y axis as well as the size of the peaks and how often they occur. This lead to a more stable order flow as expected.</p> <p>Around 2% less Sales Revenue: As shown in table 1, we had medium</p>

	<p>and steady demand flow, reducing the risk of stock shortages or overstocking.</p> <p>3) Financial Stability: Promotions often increase short-term sales but reduce profit margins as shown in table 1. By removing them, the focus shifts to sustainable sales growth and profitability.</p>	<p>promotional pressure and when removing that it decreased our sales by around 1.5% to 2%, but this was also expected.</p> <p>Service level outbound order lines Increased: 97.3% → 98.7%, part of it was because our ability to meet demand more efficiently.</p> <p>Extra (Other department): Production Plan Adherence in Operations increased by 10% on average. Making us a more responsive supply chain.</p>
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Round 4

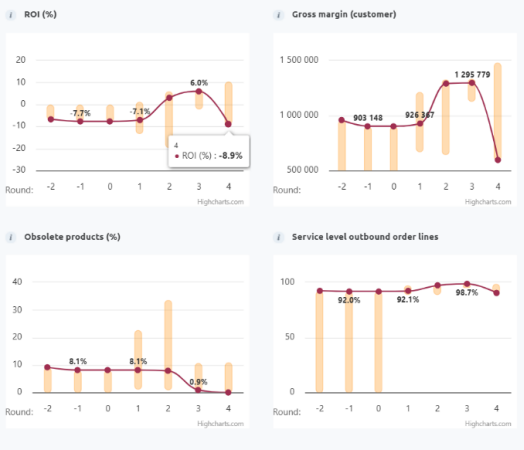


Figure 8: KPIs Round 4




Figure 9: Decision Log Round 4

Table 2: XYZ analysis

Product	Mean Consumption	Standard Deviation	Coef. Of Variation	Category
Fressie Orange 1 liter	63892,8	21227,8	33%	X
Fressie Orange/Mango 1 liter	41203,2	15074,2	37%	X
Fressie Orange PET	110661,1	41047,1	37%	X
Fressie Orange/C-power PET	16174,1	8894,9	55%	Y
Fressie Orange/Mango PET	49273,9	23942,1	49%	Y
Fressie Orange/C-power 1 liter)	10372,8	7217,9	70%	Z

What did you decide?	Why did you decide that?	How do you evaluate the result of the decision?
1. Removing all Vitamin C products	After doing an XYZ analysis (table 2), It revealed that vitamin C products were in the Z articles with a coefficient of variation of around 70%, this demand variability challenges our overall goal of having a high service level and a responsive supply chain, so we then had to figure out how much this product is affecting our revenue. After doing the ABC analysis it showed that vitamin C is in the C articles and has the lowest percentage of the purchase value as well as the sales revenue. Given that in supply chain, this decision would also decrease inventory costs (safety stock and shelf space) and in operations would decrease the working hours of the workers and possibly the breakdown times as well as in purchasing would reduce the costs of buying and transporting vitamin C.	ROI decreased from: +6.0% → -8.9% Service level outbound order lines decreased: 98.7% → 90.7% The total distribution costs decreased from 185k € to 166k €. No cost calculated to see the profitability of Vit. C.
2. Not introducing VMI to our customers	The reason why VMI was not chosen was because we are already giving our customers a high service level percentage (98% and up) and we have low demand fluctuation meaning we can expect demand and would not need to look into the customers inventory levels, it would also cost us 15k a year to maintain this service and extra work with outbound service, what also made the choice easier is the fact that the size of the warehouse of customer is not known so currently have no idea how much we will have to supply and how frequently, the more frequent the services the more costly it is.	Service level outbound order lines decreased: 98.7% → 90.7% Would've been better to implement VMI. We had the lowest service levels from the start of the simulation. Food & Groceries: 90.8% Land Market: 90.7% Dominick's: 90.4% The overall Gross margin (customer) decreased 2,585,732 € → 1,779,136 € Due to unsatisfaction (penalties).
3. Increase service level and keeping shelf life the same	Increasing service level since our goal is having the highest service level possible and meeting it.	Service level outbound order lines decreased: 98.7% → 90.7% Obsoletes: 0% Bad decision as there was no alignment with supply chain and we could have benefited from the higher shelf life due to our very low safety stock. Needed to be changed as soon as possible.

Round 5

Cost analysis to produce Vitamin C (3 week period)		
Category	Amount in EUR	Notes
Inventory Costs		
Safety Stock	1464	Multiplied safety stock (3 weeks) with the stock value (488\$)
Capacity of warehouse	-	Outsourced and is a small percentage of Orange Capacity
Operation Costs		
Workforce	187.2	Ratio of hours needed for vitamin C per week by using demands, multiplied by the hourly rate of the worker
Purchasing Costs		
Purchase value	4012.5	
Cost Vs Revenue		
Costs	5663.7	
Revenue	35085	Percentage of vit. c
Profits	29421.3	

Table 3: Cost analysis Vit. C

Food & Groceries	
Contract index	1.1318
Service level type	Order lines
Service level (%)	98.0
Shelf life (%)	78.0
Order deadline	14.00 pm
Trade unit	Pallet
Payment term (weeks)	2
Carbon footprint (kg CO2 / liter)	0.8000
Promotional pressure	None
Promotion horizon	Short
Collaboration projects	
VMI	✓
LAND Market	
Contract index	0.9916
Service level type	Order lines
Service level (%)	98.5
Shelf life (%)	75.0
Order deadline	14.00 pm
Trade unit	Pallet
Payment term (weeks)	2
Carbon footprint (kg CO2 / liter)	0.8000
Promotional pressure	None
Promotion horizon	Short
Collaboration projects	
VMI	✓
Demnick's	
Contract index	1.0765
Service level type	Order lines
Service level (%)	99.0
Shelf life (%)	72.0
Order deadline	14.00 pm
Trade unit	Pallet
Payment term (weeks)	1
Carbon footprint (kg CO2 / liter)	0.8000
Promotional pressure	None
Promotion horizon	Short
Collaboration projects	
VMI	✓

Figure 10: Decision Log Round 5

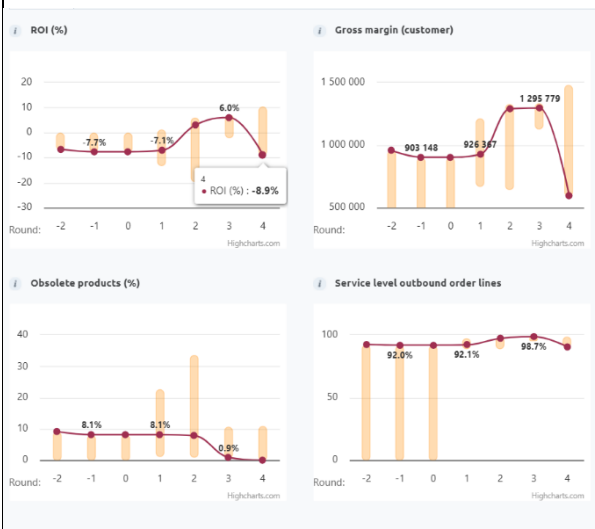


Figure 11: KPIs Round 4

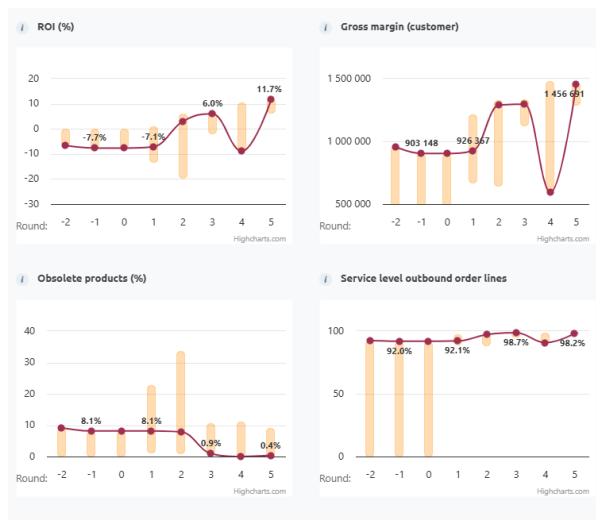


Figure 12: KPIs Round 5

What did you decide?	Why did you decide that?	How do you evaluate the result of the decision?
<p>1. Adding VMI for each customer (IMPORTANT DECISION)</p>	<p>Eliminating the need for double inventory, we know the exact demand of the customers reducing the bullwhip effect, and it gives us access to their inventory making production planning way more effective. Contributes directly to our goal of being a responsive supply chain.</p>	<p>Service level outbound order lines Increased: 90.7% → 98.2%. Making it a good decision. ROI Improved: -8.9% → +11.7% Profitability increased Gross margin (customer) increased: 594,740 € → 1,456,691 €.</p>
<p>2. Increase Shelf life</p> <ul style="list-style-type: none"> • Food & Groceries: 78% • Land Market: 75% • Dominick's: 72% 	<p>Calculated the internal shelf life for each product by adding the safety stock and production intervals in weeks, I took the highest value: 3.7 weeks and rounded it up to 4 weeks. 20-4= 16 weeks We can promise 80% shelf life and to be on the safe side I put 0,78 as a base line for food & groceries and decreased by increments of 0.03% for the remaining customers.</p>	<p>Looking at the obsolete percentage of 0.4% and the high contract indexes, as well as the high service level of 98.2%, I decided to stick with these values for the rest of the game simulation as we managed to find a good balance.</p>
<p>3. Add Vit. C back</p>	<p>Due to some complications from last week, our ROI has decreased a lot, so we decided to add Vitamin C products back since we are sure that it will give us revenue even if it is not so much. Table 3 is a breakdown of the cost calculations. Since we are profiting roughly 29,000 EUR when producing Vitamin C products it would be more profitable for us to reintroduce it to regain momentum and increase our ROI. Since this decision counteracts our goal of being sustainable, other decisions were made to improve our carbon footprint eliminating the consequences (trade-offs).</p>	<p>ROI increased from -8.93% to 11.68%. Vit. C products gave us around 11,600 € in sales per week, and costed almost less than half of that to produce, making it accurate to the cost predictions for this round. Some benefits as well is the increase in service level that was expected since the products are back. However one cost that we were not expecting is the payment terms increasing from 15,583 € to 87,968 €, due to the change of decisions.</p>

Round 6

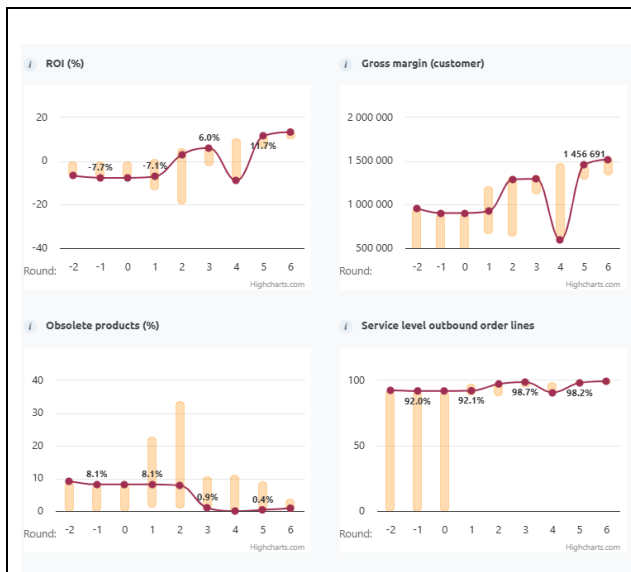


Figure 13: KPIs Round 6

Customer	Attained contract index	Service level (pieces)	Service level (order lines)
Food & Groceries	1.075	99.4%	99.3%
LAND Market	0.980	99.2%	99.3%
Dominick's	1.008	99.4%	99.4%

Figure 14: Service Levels Round 6

Food & Groceries	
Contract index	1.0783
Service level type	Order lines
Service level (%)	99.0
Shelf life (%)	78.0
Order deadline	14.00 pm
Trade unit	Pallet
Payment term (weeks)	1
Carbon footprint (kg CO2 / liter)	0.9700
Promotional pressure	None
Promotion horizon	Short
Collaboration projects	
VMI	✓
Negotiate	
LAND Market	
Contract index	0.9791
Service level type	Order lines
Service level (%)	98.5
Shelf life (%)	75.0
Order deadline	14.00 pm
Trade unit	Pallet
Payment term (weeks)	1
Carbon footprint (kg CO2 / liter)	0.9400
Promotional pressure	None
Promotion horizon	Short
Collaboration projects	
VMI	✓
Negotiate	
Dominick's	
Contract index	1.0085
Service level type	Order lines
Service level (%)	98.0
Shelf life (%)	72.0
Order deadline	14.00 pm
Trade unit	Pallet
Payment term (weeks)	1
Carbon footprint (kg CO2 / liter)	1.2300
Promotional pressure	None
Promotion horizon	Short
Collaboration projects	
VMI	✓

Figure 15: Decision Log Round 6

What did you decide?	Why did you decide that?	How do you evaluate the result of the decision?
1. Change the carbon footprint for each supplier	We overestimated our carbon footprint in the last round, due to lack of information. So we set them exactly from last round rounding it to the nearest 100 th .	Customer (carbon footprint): Did not vary much from the previous round. Penalties of carbon footprint decreased from 185,398 € to 9,515 €. However, still indicating that the expectation was higher than the actual and if there was another round we would've decreased the numbers a bit.
2. Increase service level and keep shelf life the same	We found a good spot with the shelf life, but we increased our service level back to our target since we recovered from the ROI decrease and we won't need the bonuses anymore.	Service level (order lines): ranged from 99.2%-99.4% to all customers further supporting the decision of increasing the service levels. Fig.

		14 shows the service levels in round 6. Bonuses/Penalties changed from last round: -4,588 € → 5,144 € , indicating that the customers are satisfied and providing bonuses.
3. Reducing payment terms	Our payment terms increased when we reintroduced Vit. C, so we reduced them to the minimum of 1 week for Food & Groceries and Land Market to be able to decrease that number and lead to a higher ROI.	Payment terms decreased from 87,968 € to 4,795 € . This contributed to the higher ROI of 13.35% .

Importance of Integrated Decision Making

Being a part of the integrated decision making course allowed me to gain a hands-on learning experience and an understanding of what integrated decision making truly is. Reading about coordination problems in supply chain management (like the bullwhip effect) is one thing and working with them first hand is another, it shows a glimpse of what a real environment in decision making can be. The round I am using for my example is round 4, where we had the least alignment, and many suboptimal decisions. I learned a lot that round about data-driven decision making, effective communication and cross-functional alignment.

The integration of decisions in supply chain management is crucial as it makes sure there is coherence between all departments. One decision in one department can directly affect another result in a different department, and it can be positive or negative effect depending on if it was communicated efficiently. Another reason why integrated decision making is crucial is because it mitigates departmental isolation, misalignment and inefficiencies, while also reducing inventory costs, over/underproduction and fluctuations in service levels. The more communication there is the more responsive the supply chain is, leading to maximum operational and strategic effectiveness.

Without integration, inefficiencies can lead to low ROI, service level and revenue, which is exactly what happened in round four. This is the round where everything fell apart; significant drops in service levels 98.7% → 90.7% and ROI +6% → -8.9%. It was a turning point for me to realise how important it is for each department to work together for a shared purpose (our overall strategy).

The decisions I took that round had a lack of alignment with other departments causing losses. One of these decisions that I took that round was NOT implementing VMI, as it would've costed us € 15k annually and extra coordination. However, that did not work in our favour as we had experienced the bullwhip effect first hand, because of the lack of initiative towards knowing the exact demand, which eventually caused our service levels to go down. That made us a less responsive supply chain overall and lead to financial penalties. What I learned was, having a more integrated approach would have shown the long-term effect of implementing VMI, instead of just focusing on the current monetary costs.

Another decision was increasing the service level and not the shelf life. This was based on the internal goal of the sales department achieving the highest service levels possible and disregarding other departments and how this decision would affect them. The lack of integration caused a simple mistake of overlooking the safety stock levels and how low they were, preventing us from benefiting from the very high freshness that we offered our customers that round. Our obsolesces were at 0% (maximum freshness), and our shelf life expectation at 67%. What I learned was how much of an effect each decision (in each department) has on one another, and that there should be clear communication before any decision is made.

The last major decision I made wrong was removing all Vitamin C products, this decision was based on Vitamin C being a Z article in the XYZ analysis and a C article in the ABC analysis. From a general standpoint it was obvious that we should stop producing and putting money into a product that is variable and gives us low revenue like that. What I did not realise was the effect it had on customer satisfaction and overall revenue. The overall finances of OJs suffered that round and it was partially because of this decision. What I learned is that decisions have to be data driven, a profitability analysis was conducted the round after and was concluded that vitamin C actually makes more profits than expected, there are some things that cannot be predicted without data.

This shows a glimpse of what I learned, without mentioning all of the other small improvements that were made across the whole 7 weeks. In summary, it was clear that even if the decisions make sense individually, when they are aligned together with other department decisions, they can result in a bad overall performance.

Key learnings:

1. Decisions must be data-driven.
2. Decisions must be synchronized effectively.
3. Must know the direct effect of decisions on the SC.

Looking back, I would make the same mistakes again, because I got to see the result of every decision I made and how it affected the overall supply chain. That was a true learning process and it has definitely changed my perspective on decision making in so many ways.

This experience did not just show the importance of integrated decision making, but also highlighted the importance of having a shared goal and working together towards it.

The significant changes in the results from round four to round five proves how integrated decision making is important for driving significant improvements in supply chain performance. We were able to recover from the losses in round four giving us these results: ROI increased (-8.9% → +11.7%), Service Level increased (90.8% → 98.2%) and Gross margin (594,740 € to 1,456,691 €). Everything was well thought out and showed how much of a difference some small changes can make in supply chain management.