

LOGICHAIN 2024 YOU&I

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Executive Summary

S

Situation

- A prominent producer of instant coffee products, catering to domestic and international markets
- Operate three main product lines
- Key markets: China, Korea, USA

C

Complications

- **Fluctuating demand:** driven by promotional campaigns
- **Resource constraints:** limited production capabilities
- **Export scheduling:** aligning production timelines with vessel departure

Q

Question

- How can LSC develop an optimal weekly master production schedule that:
- **Balances** fluctuating **demand** ?
 - **Meets** shelf-life and **export delivery** requirements ?
 - **Maximizes** production **efficiency** and minimizing **costs**?

A

Answer

- **Mixed Approach:** leverages safety stock and subcontracting to address constraints
- **Liquid Zone time fence:** allows dynamic adjustments and enhance responsiveness
- **Investment in additional production line**

LSC: Manufacturer of Instant Coffee Products

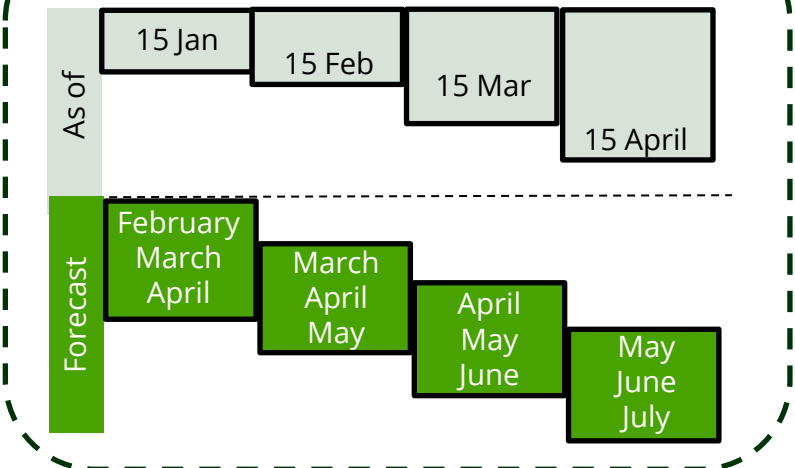
About LSC

A prominent manufacturer with **three product categories** :

- 3In1
- Espresso
- Pure Black

Each product is offered in varying packaging formats, including **bags and boxes**.
Total SKU: 10

Rolling forecast



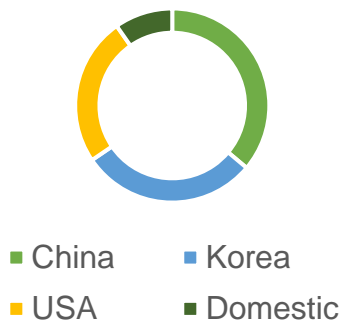
Domestic and foreign market

The company supplies both domestic and international markets, including:

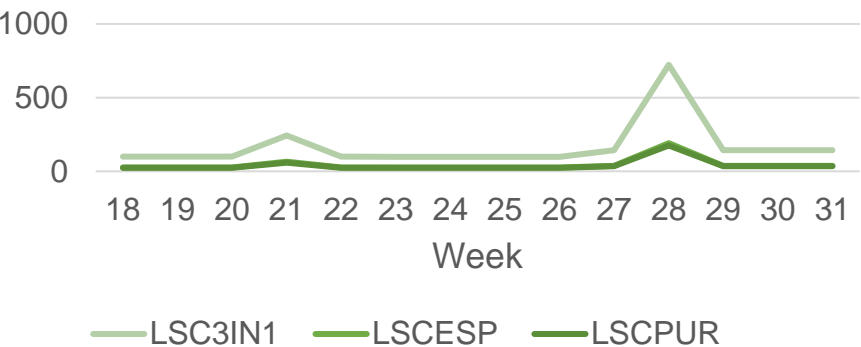
- China
- Korea
- USA

Exported order will follow the term **Free On Board (FOB) Incoterms 2010**.

Ratio of demand forecast of markets to the total demand forecast



Demand spikes due to promotional campaigns



Vessel schedule

	ETDs (CY cut off time 2 - day before ETD)
China	17 th May, 13 rd Jun & 10 th Jul
Korea	12 th May, 08 th Jun & 28 th Jul
USA	28 th May, 17 th Jun & 08 th Jul

The company required a **Master Production Schedule** for the period from **May 2025 to July 2025**

Step 1: Estimate future demand requirement

Based on the given total rolling 3-month demand forecast for May, Jun, and July, each week demand can be calculated :

$$\text{Daily demand} = (\text{Total monthly demand} - \text{demand in promotion week}) / 4$$

Rolling 3 - month demand forecast (received by 15th every month)					MT Promotion Week										MT Promotion Week			
Unit: cartons	Month	May						Jun					July					
	Week																	
SKU Code	Description	18	19	20	21	22	Total	23	24	25	26	Total	27	28	29	30	31	Total
LSC3IN100050	LSC 3in1 Instant Coffee - Bag 50 sticks	36.772	36.772	36.772	90.151	36.772	237.239	36.275	36.275	36.275	36.275	145.100	52.926	52.926	267.265	52.926	52.926	478.969
LSC3IN100100	LSC 3in1 Instant Coffee - Bag 100 sticks	28.600	28.600	28.600	70.117	28.600	184.519	28.214	28.214	28.214	28.214	112.855	41.165	41.165	207.873	41.165	41.165	372.531
LSC3IN100020	LSC 3in1 Instant Coffee - Box 20 sticks	12.768	12.768	12.768	31.302	12.768	82.375	12.595	12.595	12.595	12.595	50.382	18.377	18.377	92.800	18.377	18.377	166.309
LSC3IN100024	LSC 3in1 Instant Coffee - Box 24 sticks	21.280	21.280	21.280	52.171	21.280	137.291	20.992	20.992	20.992	20.992	83.970	30.629	30.629	154.667	30.629	30.629	277.181
LSCESP000015	LSC Espresso Instant Coffee - Box 15 sticks	16.544	16.544	16.544	40.560	16.544	106.736	16.320	16.320	16.320	16.320	65.282	23.812	23.812	120.245	23.812	23.812	215.493
LSCESP000050	LSC Espresso Instant Coffee - Box 50 sticks	4.855	4.855	4.855	11.903	4.855	31.325	4.790	4.790	4.790	4.790	19.159	6.988	6.988	35.289	6.988	6.988	63.242
LSCESP000100	LSC Espresso Instant Coffee - Box 100 sticks	4.855	4.855	4.855	11.903	4.855	31.325	4.790	4.790	4.790	4.790	19.159	6.988	6.988	35.289	6.988	6.988	63.242
LSCPUR000015	LSC Pure Black Coffee - Box 15 sticks	11.091	11.091	11.091	27.191	11.091	71.555	10.941	10.941	10.941	10.941	43.764	15.963	15.963	80.611	15.963	15.963	144.464
LSCPUR000020	LSC Pure Black Coffee - Box 20 sticks	4.906	4.906	4.906	12.027	4.906	31.649	4.839	4.839	4.839	4.839	19.357	7.061	7.061	35.655	7.061	7.061	63.898
LSCPUR000024	LSC Pure Black Coffee - Bag 24 sticks	8.105	8.105	8.105	19.870	8.105	52.290	7.995	7.995	7.995	7.995	31.982	11.665	11.665	58.908	11.665	11.665	105.570
Grand Total		149.777	149.777	149.777	367.195	149.777	966.303	147.752	147.752	147.752	147.752	591.010	215.574	215.574	1,088.602	215.574	215.574	1,950.900

The number of cartons that will be shipped to the export markets, according to the provided ratios:

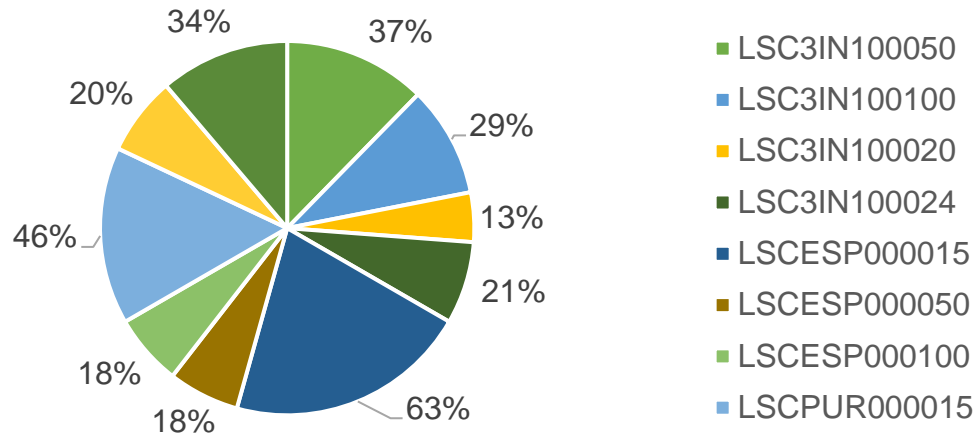
	Ratio of the demand forecast of each market to the total demand forecast		
Export market	May	Jun	July
China	18,20%	13,80%	11,20%
Korea	6,10%	5,80%	4,80%
USA	11,80%	9,80%	8,80%
Total	36,10%	29,40%	24,80%



	Demand forecast of each market to the total demand forecast			Total
Export market	May	Jun	July	
China	175.867	81.559	218.501	475.927
Korea	58.944	34.279	93.643	186.866
USA	114.024	57.919	171.679	343.622
Domestic	617.467	417.253	1.467.077	2.501.797

Estimated monthly SKUs demand forecast for each market

Ratio per SKUs from May to July 2025



The percentage share for product categories in each market is given as follow:

	Remark
Export market	
China	100% vol. of 3in1
Korea	72% vol. of Espresso, 38% vol. of Pure Black
USA	58% vol. of 3in1, 23.1% of Espresso, 18.9% of Pure Black

For each market and product, the calculation are as follow:

Market Volume (cartons) = Total Demand (cartons) x Percentage share for the market x Percentage share for SKU Category

Unit: cartons	China		
demand forecast	May	June	July
LSC3IN100050	65.047	30.166	80.815
LSC3IN100100	50.592	23.462	62.856
LSC3IN100020	22.586	10.474	28.061
LSC3IN100024	37.643	17.457	46.768
LSCESP000015			
LSCESP000050			
LSCESP000100			
LSCPUR000015			
LSCPUR000020			
LSCPUR000024			

Unit: cartons	USA		
demand forecast	May	June	July
LSC3IN100050	24.460	12.425	36.829
LSC3IN100100	19.025	9.664	28.645
LSC3IN100020	8.493	4.314	12.788
LSC3IN100024	14.155	7.190	21.313
LSCESP000015	16.597	8.431	24.990
LSCESP000050	4.871	2.474	7.334
LSCESP000100	4.871	2.474	7.334
LSCPUR000015	9.917	5.037	14.932
LSCPUR000020	4.386	2.228	6.604
LSCPUR000024	7.247	3.681	10.912

Unit: cartons	Korea		
demand forecast	May	June	July
LSC3IN100050			
LSC3IN100100			
LSC3IN100020			
LSC3IN100024			
LSCESP000015	26.743	15.552	42.486
LSCESP000050	7.848	4.564	12.469
LSCESP000100	7.848	4.564	12.469
LSCPUR000015	7.595	4.417	12.066
LSCPUR000020	3.359	1.954	5.337
LSCPUR000024	5.550	3.228	8.817

Unit: cartons	Domestics		
demand forecast	May	June	July
LSC3IN100050	147.732	102.509	361.325
LSC3IN100100	114.902	79.729	281.030
LSC3IN100020	51.296	35.593	125.460
LSC3IN100024	85.493	59.322	209.100
LSCESP000015	63.396	41.299	148.017
LSCESP000050	18.605	12.120	43.440
LSCESP000100	18.605	12.120	43.440
LSCPUR000015	54.043	34.310	117.467
LSCPUR000020	23.904	15.176	51.957
LSCPUR000024	39.493	25.073	85.841
	617.467	417.253	1.467.077

Detail weekly SKUs demand forecast from May – July 2025

Unit: cartons		May					June					July							
SKU	COUNTRY	18	19	20	21	22	Total	23	24	25	26	Total	27	28	29	30	31	Total	Total 3 month
LSC3IN100050	Domestic	22.898	22.898	22.898	56.138	22.898	147.732	25.627	25.627	25.627	25.627	102.509	39.926	39.926	201.619	39.926	39.926	361.325	611.566
	China			65.047					30.166					80.815					
	USA					24.460			12.425				36.829						
	Korea																		
	Total	22.898	22.898	87.945	56.138	47.359	147.732	25.627	68.218	25.627	25.627	102.509	76.755	120.742	201.619	39.926	39.926	361.325	
SKU	COUNTRY	18	19	20	21	22	Total	23	24	25	26	Total	27	28	29	30	31	Total	
LSC3IN100100	Domestic	17.810	17.810	17.810	43.663	17.810	114.902	19.932	19.932	19.932	19.932	79.729	31.054	31.054	156.815	31.054	31.054	281.030	475.662
	China			50.592					23.462					62.856					
	USA					19.025			9.664				28.645						
	Korea																		
	Total	17.810	17.810	68.402	43.663	36.835	114.902	19.932	53.058	19.932	19.932	79.729	59.698	93.910	156.815	31.054	31.054	281.030	
SKU	COUNTRY	18	19	20	21	22	Total	23	24	25	26	Total	27	28	29	30	31	Total	
LSC3IN100020	Domestic	7.951	7.951	7.951	19.492	7.951	51.296	8.898	8.898	8.898	8.898	35.593	13.863	13.863	70.007	13.863	13.863	125.460	212.349
	China			22.586					10.474					28.061					
	USA					8.493			4.314				12.788						
	Korea																		
	Total	7.951	7.951	30.536	19.492	16.444	51.296	8.898	23.687	8.898	8.898	35.593	26.651	41.924	70.007	13.863	13.863	125.460	
SKU	COUNTRY	18	19	20	21	22	Total	23	24	25	26	Total	27	28	29	30	31	Total	
LSC3IN100024	Domestic	13.251	13.251	13.251	32.487	13.251	85.493	14.831	14.831	14.831	14.831	59.322	23.106	23.106	116.678	23.106	23.106	209.100	353.915
	China			37.643					17.457					46.768					
	USA					14.155			7.190				21.313						
	Korea																		
	Total	13.251	13.251	50.894	32.487	27.407	85.493	14.831	39.478	14.831	14.831	59.322	44.418	69.874	116.678	23.106	23.106	209.100	
SKU	COUNTRY	18	19	20	21	22	Total	23	24	25	26	Total	27	28	29	30	31	Total	
LSCESP000015	Domestic	9.826	9.826	9.826	24.090	9.826	63.396	10.325	10.325	10.325	10.325	41.299	16.356	16.356	82.594	16.356	16.356	148.017	252.712
	China																		
	USA					16.597			8.431				24.990						
	Korea		26.743					15.552								42.486			
	Total	9.826	36.569	9.826	24.090	26.424	63.396	25.877	18.756	10.325	10.325	41.299	41.346	16.356	82.594	58.842	16.356	148.017	
SKU	COUNTRY	18	19	20	21	22	Total	23	24	25	26	Total	27	28	29	30	31	Total	
LSCESP000050	Domestic	2.884	2.884	2.884	7.070	2.884	18.605	3.030	3.030	3.030	3.030	12.120	4.800	4.800	24.239	4.800	4.800	43.440	74.165
	China																		
	USA					4.871			2.474				7.334						
	Korea		7.848					4.564							12.469				
	Total	2.884	10.732	2.884	7.070	7.755	18.605	7.594	5.504	3.030	3.030	12.120	12.134	4.800	24.239	17.269	4.800	43.440	
SKU	COUNTRY	18	19	20	21	22	Total	23	24	25	26	Total	27	28	29	30	31	Total	
LSCESP000100	Domestic	2.884	2.884	2.884	7.070	2.884	18.605	3.030	3.030	3.030	3.030	12.120	4.800	4.800	24.239	4.800	4.800	43.440	74.165
	China																		
	USA					4.871			2.474				7.334						
	Korea		7.848					4.564							12.469				
	Total	2.884	10.732	2.884	7.070	7.755	18.605	7.594	5.504	3.030	3.030	12.120	12.134	4.800	24.239	17.269	4.800	43.440	
SKU	COUNTRY	18	19	20	21	22	Total	23	24	25	26	Total	27	28	29	30	31	Total	
LSCPUR000015	Domestic	8.377	8.377	8.377	20.536	8.377	54.043	8.578	8.578	8.578	8.578	34.310	12.980	12.980	65.547	12.980	12.980	117.467	205.820
	China																		
	USA					9.917			5.037				14.932						
	Korea		7.595					4.417							12.066				
	Total	8.377	15.972	8.377	20.536	18.294	54.043	12.994	13.615	8.578	8.578	34.310	27.912	12.980	65.547	25.046	12.980	117.467	
SKU	COUNTRY	18	19	20	21	22	Total	23	24	25	26	Total	27	28	29	30	31	Total	
LSCPUR000020	Domestic	3.705	3.705	3.705	9.083	3.705	23.904	3.794	3.794	3.794	3.794	15.176	5.741	5.741	28.992	5.741	5.741	51.957	91.036
	China							4.386					6.604						
	USA								2.228										
	Korea		3.359					1.954							5.337				
	Total	3.705	7.064	3.705	9.083	8.091	23.904	5.747	6.022	3.794	3.794	15.176	12.346	5.741	28.992	11.078	5.741	51.957	
SKU	COUNTRY	18	19	20	21	22	Total	23	24	25	26	Total	27	28	29	30	31	Total	
LSCPUR000024	Domestic	6.121	6.121	6.121	15.007	6.121	39.493	6.268	6.268	6.268	6.268	25.073	9.485	9.485	47.899	9.485	9.485	85.841	150.407
	China																		
	USA					7.247			3.681				10.912						
	Korea		5.550					3.228							8.817				
	Total	6.121	11.672	6.121	15.007	13.368	39.493	9.496	9.949	6.268	6.268	25.073	20.397	9.485	47.899	18.303	9.485	85.841	

Figure 1: Detail weekly demand forecast for the period May to July 2025

To calculate the weekly demand for each SKU in the domestic market:

Weekly Demand = (Monthly Demand – Peak Week Demand) / Remaining Weeks

For foreign market, the **exporting week demand** equals the **total monthly demand for each SKU** in that market.

Step 2: MPS preparation with existing capacity

Maximum capacity analysis

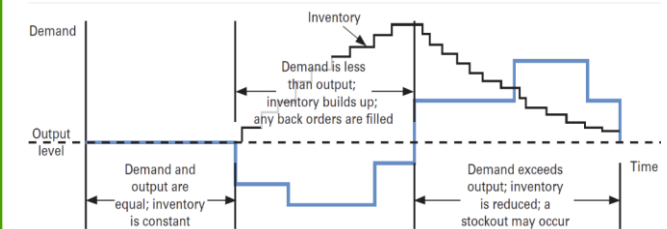
The maximum capacity per week for each stages of instant coffee production are calculated as below:

Extraction	Unit	Quantity	Shift per day	Days of working per week	Capa per machine per shift	Max capacity per week	
	kgs		2	3	6	48,000	1,728,000
Spray drying	Unit	Quantity	Shift per day	Days of working per week	Capa per machine per shift	Max capacity per week	
	kgs		2	3	6	41,800	1,504,800
Mixing							
3in1	Unit	Quantity	Shift per day	Days of working per week	Capa per machine per shift	Max capacity per week	
	kgs		2	3	6	37,150	1,337,400
Espresso	Unit	Quantity	Shift per day	Days of working per week	Capa per machine per shift	Max capacity per week	
	kgs		2	3	6	2,880	103,680
Stick filling							
3in1	Unit	Quantity	Shift per day	Days of working per week	Capa per machine per shift	Max capacity per week	Convert to kg
	stick		2	3	6	2,400,000	86,400,000
Espresso	Unit	Quantity	Shift per day	Days of working per week	Capa per machine per shift	Max capacity per week	Convert to kg
	stick		2	3	6	1,200,000	43,200,000
Pure black	Unit	Quantity	Shift per day	Days of working per week	Capa per machine per shift	Max capacity per week	Convert to kg
	stick		2	3	6	1,300,000	46,800,000
Packing	Unit	Quantity	Shift per day	Days of working per week	Capa per machine per shift	Max capacity per week	
	cartons		710	1	6	50	213,000

*Assumption:

The machine maintenance time of 24 hours every two months is disregarded as the company can utilize the weekend to prevent impact on the highest productivity

Level strategy



- Level Output Strategy:**
 Maintain a strategic inventory level as a buffer to prevent stockouts and ensure product freshness.

Beneficial for **operational stability** by **minimizing disruption** from frequent production changes and **reducing associated costs** (Chopra and Meindl 2022)

Constraints

MACHINE	Type	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Extraction	Production	1,183,073	1,139,247	1,244,726	2,523,823	1,078,341	1,698,913	1,078,341	2,063,914	1,078,341	1,078,341	2,012,703	2,874,238	1,078,341	1,078,341
Extraction	Capacity	2,016,000	2,016,000	2,016,000	2,016,000	2,016,000	2,016,000	2,016,000	2,016,000	2,016,000	2,016,000	2,016,000	2,016,000	2,016,000	2,016,000
Extraction	MCU	58.68%	56.51%	61.72%	125.15%	53.48%	84.27%	53.48%	102.36%	53.48%	53.48%	99.84%	142.57%	53.48%	53.48%
Spray drying	Production	1,183,073	1,139,247	1,244,726	2,523,823	1,078,341	1,698,913	1,078,341	2,063,914	1,078,341	1,078,341	2,012,703	2,874,238	1,078,341	1,078,341
Spray drying	Capacity	1,504,800	1,504,800	1,504,800	1,504,800	1,504,800	1,504,800	1,504,800	1,504,800	1,504,800	1,504,800	1,504,800	1,504,800	1,504,800	1,504,800
Spray drying	MCU	78.62%	75.71%	82.72%	167.72%	71.66%	112.96%	71.66%	137.16%	71.66%	71.66%	133.75%	191.00%	71.66%	71.66%
Mixing (3in1)	Production	979,476	979,476	979,476	2,424,958	979,476	1,523,041	979,476	1,925,933	979,476	979,476	1,797,892	2,775,373	979,476	979,476
Mixing (3in1)	Capacity	1,337,400	1,337,400	1,337,400	1,337,400	1,337,400	1,337,400	1,337,400	1,337,400	1,337,400	1,337,400	1,337,400	1,337,400	1,337,400	1,337,400
Mixing (3in1)	MCU	73.24%	73.24%	73.24%	181.32%	73.24%	113.84%	73.24%	144.01%	73.24%	73.24%	134.42%	207.55%	73.24%	73.24%
Mixing (Espresso)	Production	107,707	88,974	134,059	62,941	62,941	117,064	62,941	90,433	62,941	62,941	144,430	62,941	62,941	62,941
Mixing (Espresso)	Capacity	103,680	103,680	103,680	103,680	103,680	103,680	103,680	103,680	103,680	103,680	103,680	103,680	103,680	103,680
Mixing (Espresso)	MCU	103.88%	85.82%	129.30%	60.71%	60.71%	112.91%	60.71%	87.22%	60.71%	60.71%	139.30%	60.71%	60.71%	60.71%
Mixing (Espresso for K)	Production	42,440	24,681	67,423	-	-	-	-	-	-	-	-	-	-	-
Mixing (Espresso for K)	Capacity	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mixing (Espresso for K)	MCU	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Stock filling (3in1)	Production	979,476	979,476	979,476	2,424,958	979,476	1,523,041	979,476	1,925,933	979,476	979,476	1,797,892	2,775,373	979,476	979,476
Stock filling (3in1)	Capacity	1,382,400	1,382,400	1,382,400	1,382,400	1,382,400	1,382,400	1,382,400	1,382,400	1,382,400	1,382,400	1,382,400	1,382,400	1,382,400	1,382,400
Stock filling (3in1)	MCU	70.85%	70.85%	70.85%	175.42%	70.85%	110.17%	70.85%	139.32%	70.85%	70.85%	130.06%	200.76%	70.85%	70.85%
Stock filling (Espresso)	Production	156,147	113,655	201,482	62,941	62,941	117,064	62,941	90,433	62,941	62,941	144,430	62,941	62,941	62,941
Stock filling (Espresso)	Capacity	198,000	198,000	198,000	198,000	198,000	198,000	198,000	198,000	198,000	198,000	198,000	198,000	198,000	198,000
Stock filling (Espresso)	MCU	139.82%	105.24%	186.59%	58.28%	58.28%	108.36%	58.28%	83.75%	58.28%	58.28%	133.75%	58.28%	58.28%	58.28%
Stock filling (Pure)	Production	53,450	46,118	63,768	35,924	35,924	58,809	35,924	47,548	35,924	35,924	70,381	35,924	35,924	35,924
Stock filling (Pure)	Capacity	46,800	46,800	46,800	46,800	46,800	46,800	46,800	46,800	46,800	46,800	46,800	46,800	46,800	46,800
Stock filling (Pure)	MCU	114.21%	98.54%	136.25%	76.76%	76.76%	123.66%	76.76%	101.60%	76.76%	76.76%	150.36%	76.76%	76.76%	76.76%
Packing	Production	242,063	217,367	276,761	358,965	183,118	297,142	183,118	322,596	183,118	183,118	354,797	401,619	183,118	183,118
Packing	Capacity	319,500	319,500	319,500	319,500	319,500	319,500	319,500	319,500	319,500	319,500	319,500	319,500	319,500	319,500
Packing	MCU	75.76%	68.04%	86.62%	112.36%	57.31%	93.02%	57.31%	100.97%	57.31%	57.31%	111.05%	125.70%	57.31%	57.31%

Comparison between demand and current capacity shows

- **Machine overload:** Machines exceed their capabilities frequently in every steps of production
- **Inconsistent utilization:** machines show both underutilization and overutilization, indicating inefficiencies in production planning
- **Potential Downtime Risks:** Sustained periods of overloading leading to maintenance delays

Start production in the 16th week

To meet the export schedule and align with the Cut-Off date of 2 days, production will start in the 16th week.

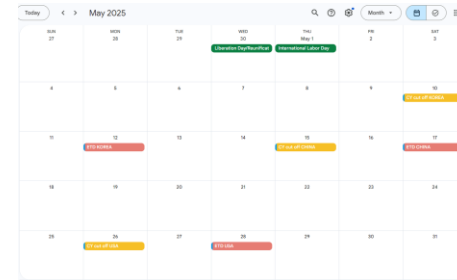


Figure 2: Vessel schedule for May 2025

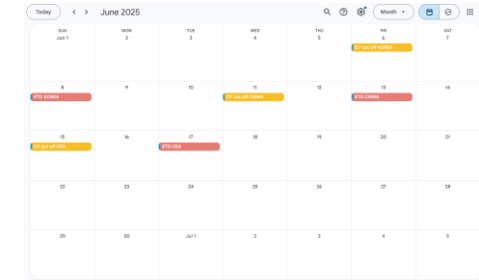


Figure 3: Vessel schedule for June 2025

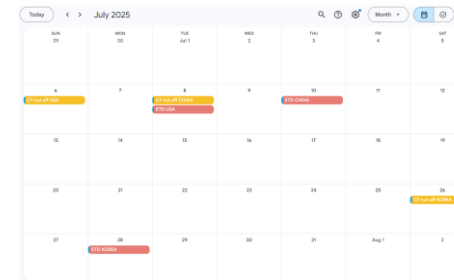


Figure 4: Vessel schedule for July 2025

China and USA's demand will be filled by the production in the previous week of their ETD week, while Korea's will be fulfilled by the **production of weeks 16, 17, and 18**.

Step 3: Adjustment for Production Strategy

01

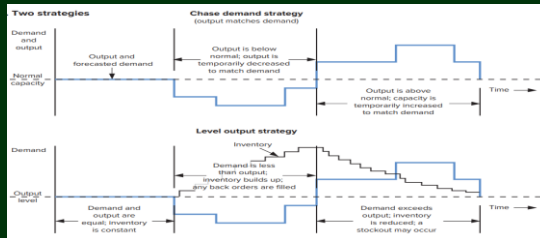
02

03



Mixed Production Approach

Definition:
Combining **maintaining a certain level of inventory** as a buffer (Level Output Strategy) and a temporary **increase in capacity** by subcontracting to fully match the demand (Chase Demand Strategy)

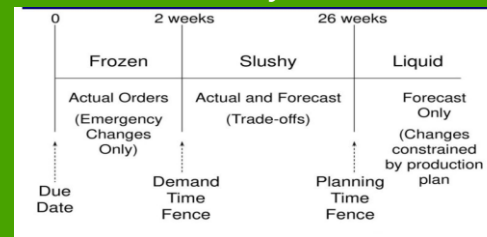


Ensure inventory remains fresh while minimizing sales loss (Palanivel et al. 2024)



Liquid Zone time fence (Forecast Time Fence)

Definition:
By **delaying final production commitments**, the Liquid Zone minimizes the risks of **overproduction** or **underproduction**, optimizes **inventory levels**, and **reduces unnecessary costs**



Enhance strategic decision-making while maintaining the agility to manage uncertainties (Stevenson 2020)



Production Scheduling Adjustment

Prioritize production volume from constraint weeks and Espresso production for Korea during the **first month of production**

Balance by **pushing the surplus** in the constrained weeks into weeks where capacity is **not fully utilized**

-> If not feasible, **roll over** the entire balance of unmet demand weeks to **the first month**

Final Master Production Scheduling

Production Scheduling Adjustments

The constraints in each step are optimized

Unit:cartons		16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
LSC3IN100050	COUNTRY	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
	Domestic	45,384	45,649	45,090	38,309	43,407	43,043	43,407	42,630	56,843	56,843	38,761	34,242	43,043	43,043			611,566
	China				65,047				30,166	80,815								170,990
	USA								24,460	12,425		36,829						73,714
	Total	45,384	45,649	45,090	103,356	43,407	43,043	43,407	72,796	138,658	56,843	38,761	34,242	43,043	43,043			756,270
LSC3IN100100	COUNTRY	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
	Domestic	35,267	35,474	35,039	29,770	33,731	33,449	33,731	33,139	44,172	44,172	30,121	26,609	33,449	33,449			475,662
	China				50,590				23,462	44,172		62,856						138,658
	USA								19,025	9,664		28,445						56,843
	Total	35,267	35,474	35,039	80,361	33,731	33,449	33,731	56,597	93,844	53,812	89,261	26,609	33,449	33,449			611,566
LSC3IN100200	COUNTRY	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
	Domestic	15,744	15,836	15,443	12,290	15,099	14,932	15,099	14,789	19,720	19,720	13,447	11,870	14,932	14,932			212,349
	China				22,586				10,474	19,720		28,061						59,901
	USA								8,493	4,314		12,788						26,435
	Total	15,744	15,836	15,443	22,876	15,099	14,932	15,099	25,263	39,440	14,932	40,849	11,870	14,932	14,932			298,725
LSC3IN100300	COUNTRY	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
	Domestic	26,241	26,394	26,071	21,150	25,098	24,887	25,098	24,568	32,866	32,866	22,411	19,720	24,887	24,887			353,911
	China				37,643				14,155	7,190		21,313						59,358
	USA																	0
	Total	26,241	26,394	26,071	37,643	25,098	24,887	25,098	24,568	39,956	39,956	22,411	19,720	24,887	24,887			413,269
LSC3IN100400	COUNTRY	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
	Domestic	18,710	18,819	18,589	15,793	17,896	17,748	17,896	17,575	23,434	23,434	15,980	14,117	17,748	17,748			252,712
	China								17,575	23,434		34,580						75,589
	USA																	0
	Total	18,710	18,819	18,589	15,793	17,896	17,748	17,896	17,575	23,434	23,434	15,980	14,117	17,748	17,748			252,712
LSC3IN100500	COUNTRY	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
	Domestic	26,743	26,846	26,513	21,852	25,800	25,589	25,800	25,263	32,866	32,866	22,411	19,720	25,589	25,589			353,911
	China				37,643				14,155	7,190		21,313						59,358
	USA																	0
	Total	26,743	26,846	26,513	21,852	25,800	25,589	25,800	25,263	39,956	39,956	22,411	19,720	25,589	25,589			413,269
LSC3IN100600	COUNTRY	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
	Domestic	15,744	15,836	15,443	12,290	15,099	14,932	15,099	14,789	19,720	19,720	13,447	11,870	14,932	14,932			212,349
	China				22,586				10,474	19,720		28,061						59,901
	USA								8,493	4,314		12,788						26,435
	Total	15,744	15,836	15,443	22,876	15,099	14,932	15,099	25,263	39,440	14,932	40,849	11,870	14,932	14,932			298,725
LSC3IN100700	COUNTRY	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
	Domestic	26,241	26,394	26,071	21,150	25,098	24,887	25,098	24,568	32,866	32,866	22,411	19,720	24,887	24,887			353,911
	China				37,643				14,155	7,190		21,313						59,358
	USA																	0
	Total	26,241	26,394	26,071	37,643	25,098	24,887	25,098	24,568	39,956	39,956	22,411	19,720	24,887	24,887			413,269
LSC3IN100800	COUNTRY	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
	Domestic	18,710	18,819	18,589	15,793	17,896	17,748	17,896	17,575	23,434	23,434	15,980	14,117	17,748	17,748			252,712
	China								17,575	23,434		34,580						75,589
	USA																	0
	Total	18,710	18,819	18,589	15,793	17,896	17,748	17,896	17,575	23,434	23,434	15,980	14,117	17,748	17,748			252,712
LSC3IN100900	COUNTRY	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
	Domestic	26,743	26,846	26,513	21,852	25,800	25,589	25,800	25,263	32,866	32,866	22,411	19,720	25,589	25,589			353,911
	China				37,643				14,155	7,190		21,313						59,358
	USA																	0
	Total	26,743	26,846	26,513	21,852	25,800	25,589	25,800	25,263	39,956	39,956	22,411	19,720	25,589	25,589			413,269
LSC3IN101000	COUNTRY	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
	Domestic	15,744	15,836	15,443	12,290	15,099	14,932	15,099	14,789	19,720	19,720	13,447	11,870	14,932	14,932			212,349
	China				22,586				10,474	19,720		28,061						59,901
	USA								8,493	4,314		12,788						26,435
	Total	15,744	15,836	15,443	22,876	15,099	14,932	15,099	25,263	39,440	14,932	40,849	11,870	14,932	14,932			298,725
LSC3IN101100	COUNTRY	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
	Domestic	26,241	26,394	26,071	21,150	25,098	24,887	25,098	24,568	32,866	32,866	22,411	19,720	24,887	24,887			353,911
	China				37,643				14,155	7,190		21,313						59,358
	USA																	0
	Total	26,241	26,394	26,071	37,643	25,098	24,887	25,098	24,568	39,956	39,956	22,411	19,720	24,887	24,887			413,269
LSC3IN101200	COUNTRY	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
	Domestic	18,710	18,819	18,589	15,793	17,896	17,748	17,896	17,575	23,434	23,434	15,980	14,117	17,748	17,748			252,712
	China								17,575	23,434		34,580						75,589
	USA																	0
	Total	18,710	18,819	18,589	15,793	17,896	17,748	17,896	17,575	23,434	23,434	15,980	14,117	17,748	17,748			252,712
LSC3IN101300	COUNTRY	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
	Domestic	26,743	26,846	26,513	21,852	25,800	25,589	25,800	25,263	32,866	32,866	22,411	19,720	25,589	25,589			353,911
	China				37,643				14,155	7,190		21,313						59,358
	USA																	0
	Total	26,743	26,846	26,513	21,852	25,800	25,589	25,800	25,263	39,956	39,956	22,411	19,720	25,589	25,589			413,269
LSC3IN101400	COUNTRY	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
	Domestic	15,744	15,836	15,443	12,290	15,099	14,932	15,099	14,789	19,720	19,720	13,447	11,870	14,932	14,932			212,349
	China				22,586				10,474	19,720		28,061						59,901
	USA								8,493	4,314		12,788						26,435
	Total	15,744	15,836	15,443	22,876	15,099	14,932	15,099	25,263	39,440	14,932	40,849	11,870	14,932	14,932			298,725
LSC3IN101500	COUNTRY	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
	Domestic	26,241	26,394	26,071	21,150	25,098	24,887	25,098	24,568	32,866	32,866	22,411	19,720	24,887	24,887			353,911
	China				37,643				14,155	7,190		21,313						59,358
	USA																	0
	Total	26,241	26,394	26,071	37,643	25,098	24,887	25,098	24,568	39,956	39,956	22,411	19,720	24,887	24,887			

Cost analysis

The total weekly inventory cost for LSC is calculated as follow:

$$\text{Weekly inventory cost} = (\text{Weekly Inventory in tons}) \times (\text{Inventory Cost per ton per month} / 4)$$

	tons	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
3in1 (1)	LSC3IN100050	72	435	800	977	1.621	1.265	1.356	1.324	1.801	1.710	1.960	2.359	2.666	2.044	776	456	137	
3in1 (2)	LSC3IN100100	59	341	625	763	1.263	986	1.056	1.032	1.402	1.331	1.525	1.836	2.074	1.590	603	355	106	
3in1 (3)	LSC3IN100020	25	146	268	327	541	423	453	442	601	570	654	787	889	681	258	152	46	
3in1 (4)	LSC3IN100024	51	292	536	654	1.083	845	905	884	1.202	1.141	1.307	1.573	1.777	1.363	517	304	91	
Es (1)	LSCESP000015	6	75	86	140	85	97	112	99	123	130	150	196	155	157	60	35	11	
Es (2)	LSCESP000050	8	47	54	85	53	59	68	60	74	78	89	116	91	92	35	20	6	
Es (3)	LSCESP000100	4	46	55	89	58	68	79	74	89	96	111	140	117	121	66	51	37	
Pure (1)	LSCPUR000015	3	23	34	47	40	46	49	46	56	61	70	88	73	74	29	17	5	
Pure (2)	LSCPUR000020	1	13	20	28	24	27	29	27	33	36	41	52	43	44	17	10	3	
Pure (3)	LSCPUR000024	1	110	132	209	136	155	178	160	197	209	241	310	250	255	105	67	29	
	Total inventory	229	1.530	2.610	3.318	4.904	3.970	4.286	4.149	5.577	5.362	6.147	7.456	8.136	6.422	2.465	1.467	470	
	Inventory cost (USD/ton/week)	401	2.677	4.567	5.806	8.582	6.948	7.500	7.260	9.760	9.384	10.758	13.048	14.238	11.238	4.313	2.568	823	119.871

Figure 6: Inventory cost

Key figure



Total inventory cost
119,871 USD



Labour outsourcing cost
15,063,360,000 VND



Machine outsourcing cost
1,699,531 USD

Additional production line

High Initial Investment:

Significant upfront costs for machinery, facility upgrades, and training.



Financial Considerations:

Careful planning and resource allocation are crucial.



Drawbacks of the extended production line

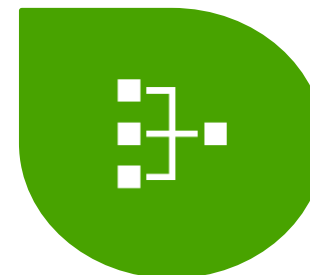
By strategically investing in a new production line, LSC can **position itself** for sustained growth, **optimize operations**, and **solidify its market leadership**.

Why LSC should invest in an additional production line?

Increased Capacity: Addressing peak demand and enabling long-term growth.



Improved Flexibility: Adapting to demand fluctuations and minimizing disruptions.

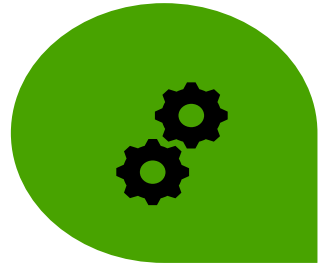


Enhanced Operational Efficiency: Streamlining production processes and reducing costs.

Quality control for Outsourcing

Quality compromising:

Cost prioritization leads to cost-cutting measures that affect quality .



Drawbacks of subcontracting

Subcontracting can **reduce workload** and **save on investments** in specialized machinery for LSC

Inadequate communication:

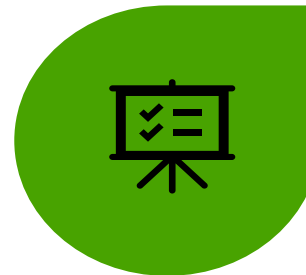
One-of relationship between contractors and subcontractors can cause misunderstandings, leading to unmet requirements (Lin & Gibson 2011).



Implementation plan to address subcontracting drawbacks

Establish Standard and Evaluate Subcontractors

Clearly define quality requirements, rigorously evaluate based on capabilities, certifications, and past performance (Trent 2017).



Quality Monitoring and Support: Using ERP systems for real-time tracking and issue resolution



Foster long-term collaboration: Develop contingency plans to mitigate risks

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