



Executive Summary

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Situation

- Diverse instant coffee product portfolio
- Anticipates revenues of \$388 million in 2025
- Aims to align production with seasonal demand, reduce costs, and maintain quality

C

Complication

- Current production can't meet peak demand efficiently with a one-month lead time
- Risks include high inventory costs, stockouts, and slower response to demand changes

Q

Question

Enhance production capacity to meet 2025 demand while cutting costs and staying competitive

A

Answers

- Short-term: Use a two-month lead time, add machine capacity, and subcontract labor
- Long-term: Invest in a new production line to reduce bottlenecks and seasonal dependency
- Inventory strategy: Implement FIFO to manage shelf life



LSC: a coffee products manufacturer specializing in instant coffee



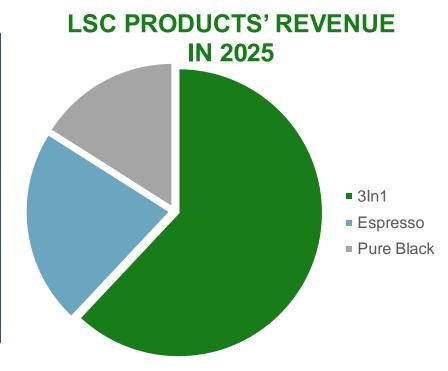
LSC has three main product categories: 3In1, Espresso, and Pure Black

In 2025, LSC is expected to have a total revenue of \$388,000,000

Require a whole-year capacity plan for the instant coffee products in2025

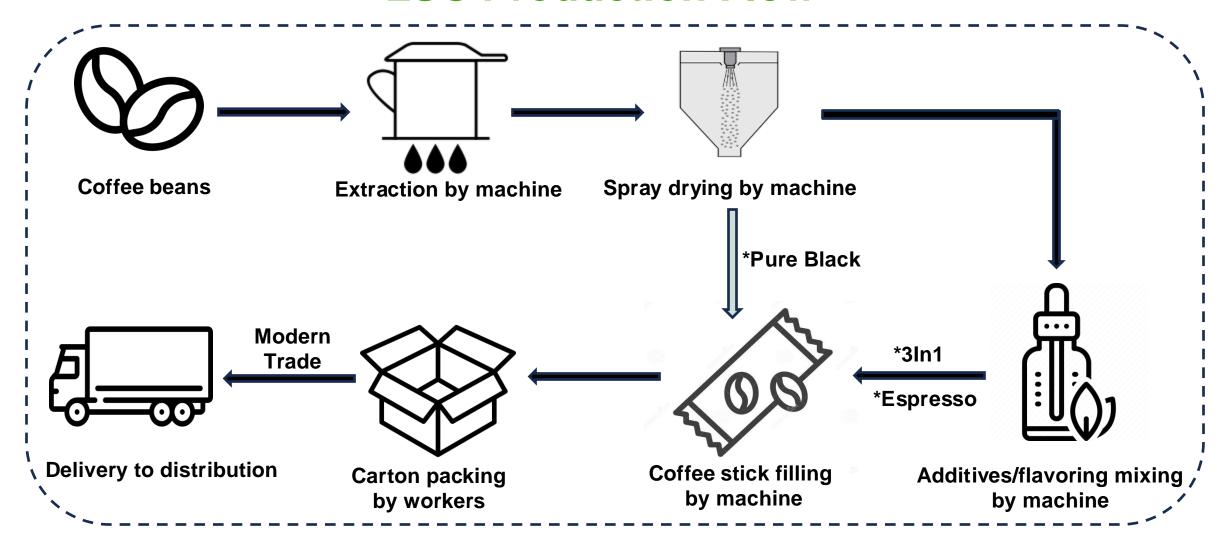
PRODUCT SKUS

Categories	SKU Code	Description
	LSC3IN100050	3In1 Instant Coffee - Bag 50 sticks
3ln1	LSC3IN1000100	3In1 Instant Coffee - Bag 100 sticks
OIII I	LSC3IN100020	3In1 Instant Coffee – Box 20 sticks
	LSC3IN100024	3In1 Instant Coffee - Box 24 sticks
	LSCESP000015	Espresso Instant Coffee – Box 15 sticks
Espresso	LSCESP000100	Espresso Instant Coffee – Box 50 sticks
	LSCESP000050	Espresso Instant Coffee – Box 100 sticks
	LSCPUR000015	Pure Black Instant Coffee – Box 15 sticks
Pure Black	LSCPUR000020	Pure Black Instant Coffee - Box 20 sticks
	LSCPUR000024	Pure Black Instant Coffee – Bag 24 sticks





LSC Production Flow





Estimate future capacity requirements:

Total

Month	Seasonal index
January	89,50%
February	102,00%
March	97,70%
April	94,60%
May	67,90%
June	41,50%
July	171,40%
August	61,00%
September	94,70%
October	71,20%
November	189,40%
December	119,10%

Total revenue per month	3ln1 (62%)	Espresso (22%)	Pure Black (16%)
\$28,938,333	\$17,941,767	\$6,366,433	\$4,630,133
\$32,980,000	\$20,447,600	\$7,255,600	\$5,276,800
\$31,589,667	\$19,585,593	\$6,949,727	\$5,054,347
\$30,587,333	\$18,964,147	\$6,729,213	\$4,839,973
\$21,954,333	\$13,611,687	\$4,829,953	\$3,512,693
\$13,418,333	\$8,319,367	\$2,952,033	\$2,146,933
\$55,419,333	\$34,359,987	\$12,192,253	\$8,867,093
\$19,723,333	\$12,228,467	\$4,339,133	\$3,155,733
\$30,619,667	\$18,984,193	\$6,736,327	\$4,899,147
\$23,021,333	\$14,273,227	\$5,064,693	\$3,683,413
\$61,239,333	\$37,968,387	\$13,472,653	\$9,798,293
\$38,509,000	\$23,875,580	\$8,471,980	\$6,161,440
\$388,000,000	\$240,560,000	\$85,360,000	\$62,080,000

Estimated revenue of product categories for each month of 2025



Estimate future capacity requirements of each SKUs:

For example: LSC3IN100050 in January

Based on the given revenue ratio per group, the estimated revenue of LSC3IN100050 in 2025 can be calculated:

Revenue of 3in1 Coffee in 2025 x LSC3IN100050(percentage) = $$240,560,000 \times 36\% = $86,601,600$

The number of carton:

Revenue of LSC3IN100050 in 2025 / Selling price per carton= \$86,601,600 / \$20.70 = 4,183,652.174 cartons

The number of carton in January:

LSC3IN100050's carton number x Jan's index/ total 12 months index= 4,183,652.174 x 89,50% / 1200% = 312,030.72 cartons

The number of bag/box in January:

LSC3IN100050's carton number in Jan x Bag/box per carton= $312,030.72 \times 10 = 3,120,307.2 \text{ bags}$

The number of sticks in January:

LSC3IN100050's bag/box in Jan x Sticks per bag= 3,120,307.2 x 50 = 156,015,362.32 sticks

LSC3IN100050's kgs in Jan: LSC3IN100050's sticks in Jan x N.W per sticks = 156,015,362.32 x 0.016 = 2,496,245.80 kg



Estimate future capacity requirements:

From the formula, the future demand for the number of kg per SKU are calculated as follow:

_												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
LSC3IN100050	2,496,246	2,844,883	2,724,952	2,638,490	1,893,800	1,157,477	4,780,520	1,701,352	2,641,279	1,985,840	5,282,558	3,321,820
LSC3IN1000100	1,941,525	2,212,687	2,119,407	2,052,159	1,472,955	900,260	3,718,182	1,323,274	2,054,328	1,544,542	4,108,656	2,583,638
LSC3IN100020	835,108	951,743	911,620	882,695	633,562	387,229	1,599,301	569,180	883,628	664,354	1,767,256	1,111,300
LSC3IN100024	1,675,858	1,909,916	1,829,400	1,771,354	1,271,405	777,074	3,209,408	1,142,205	1,773,226	1,333,197	3,546,453	2,230,108
LSCESP000015	193,688	220,739	211,433	204,725	146,943	89,811	370,928	132,011	204,941	154,085	409,882	257,745
LSCESP000100	390,038	444,513	425,774	412,264	295,906	180,856	746,956	265,836	412,700	310,288	825,400	519,034
LSCESP000050	303,363	345,732	331,157	320,650	230,149	140,666	580,966	206,762	320,989	241,335	641,978	403,693
LSCPUR000015	52,194	59,484	56,976	55,168	39,598	24,202	99,956	35,574	55,227	41,522	110,453	69,456
LSCPUR000020	53,694	61,193	58,613	56,754	40,735	24,897	102,828	36,596	56,814	42,715	113,627	71,452
LSCPUR000024	88,712	101,102	96,840	93,767	67,302	41,135	169,891	60,463	93,866	70,573	187,732	118,051
	8,030,426 kg	9,151,995 kg	8,766,177 kg	8,488,029 kg	6,092,361 kg	3,723,611 kg	15,378,945 kg	5,473,259 kg	8,497,006 kg	6,388,460 kg	16,994,006 kg	10,686,310 kg



Existing Capacity Analysis

Assuming the working days for machine consist of 26 days, with maintenance once every 2 months on the weekend, the production capacity for each steps of production flow are:

Extra	ction	Quantity	Shift per day	Days of working	Capa per machine per shift	Maximum capa per month	
LAtia		2	3	26	48,000	7,488,000 kg	
Spray	drying	Quantity	Shift per day	Days of working	Capa per machine per shift	Maximum capa per month	
Оргау	ar yirig	2	3	26	41,800	6,520,800 kg	
	3In1	Quantity	Shift per day	Days of working	Capa per machine per shift	Maximum capa per month	
Mixing	31111	2	3	26	37,150	5,795,400 kg	
Mixing	Esp Quantity 2	Quantity	Shift per day	Days of working	Capa per machine per shift	Maximum capa per month	
	Esp	2	3	26	2,880	449,280 kg	
	21:04	Quantity	Shift per day	Days of working	Capa per machine per shift	Maximum capa per month	
	3ln1	2	3	26	37,150	374,400,000 sticks	
Stick	F a.a.	Quantity	Shift per day	Days of working	Capa per machine per shift	Maximum capa per month	
filling	Esp	2	3	26	2,880	187,200,000 sticks	
	РВ	Quantity	Shift per day	Days of working	Capa per machine per shift	Maximum capa per month	
	PB	2	3	26	2,880	208,800,000 sticks	
Pack	cina	Quantity	Shift per day	Days of working	Capa per worker per shift	Maximum capa per month	
I acr	wilg -	2	3	26	2,880	2,769,000 cartons	



Compare maximum capacity with future demand

Extraction (kgs)	Sum of Dec-24	Sum of Jan-25	Sum of Feb-25	Sum of Mar-25	Sum of Apr-25	Sum of May-25	Sum of Jun-25	Sum of Jul-25	Sum of Aug-25	Sum of Sep-25	Sum of Oct-25	Sum of Nov-25	
Openning inventory	0		(2.286.419)	(3.604.592)	<u> </u>		435,421	(7.495.516)	(5.520.767)	(6.569.765)	(5.510.215)	(15.056.210)	
Production	7.448.000	7.448.000	7.448.000	7.448.000	7.448.000	7.448.000	7.448.000	7.448.000	7.448.000	7.448.000	7.448.000	7.448.000	
Demand	8.030.425	9.151.993	8.766.174	8.488.025	6.092.356	3.723.605	15.378.938	5.473.251	8.496.998	6.388.450	16.993.995	10.686.298	
Closing inventory	(582.425)	(2.286.419)	(3.604.592)	(4.644.617)	(3.288.974)	435.421	(7.495.516)	(5.520.767)	(6.569.765)	(5.510.215)	(15.056.210)	(18.294.508)	
Spray drying (kgs)	Sum of Dec-24	Sum of Jan-25	Sum of Feb-25	Sum of Mar-25	Sum of Apr-25	Sum of May-25	Sum of Jun-25	Sum of Jul-25	Sum of Aug-25	Sum of Sen-25	Sum of Oct-25	Sum of Nov-25	
Openning inventory	- Julii oi Dec-24	(1.509.625)		(6.386.192)					(12.938.367)	(14.914.565)	(14.782.215)	(25.255.410)	
Production	6.520.800	6.520.800	6.520.800	6.520.800	6.520.800	6.520.800	6.520.800	6.520.800	6.520.800	6.520.800	6.520.800	6.520.800	
Forecast	8.030.425	9.151.993	8.766.174	8.488.025	6.092.356	3.723.605	15.378.938	5.473.251	8.496.998	6.388.450	16.993.995	10.686.298	
Closing inventory	(1.509.625)								(14.914.565)		(25.255.410)		
Mining (01-4) (1)	0	0 6 1 05	0 6.5-1- 0.5	0 (11 05	0	0 (11 05	0 05	0 6 11 05	0 6 0 05	0	0	O 5 N O.5	
Mixing (3in1) (kgs)	Sum of Dec-24								Sum of Aug-25				
Openning inventory	F 70F 400	(1.153.336)		(5.067.146)					(9.972.027)		(11.261.622)	(20.171.144)	
Production	5.795.400	5.795.400	5.795.400	5.795.400	5.795.400	5.795.400	5.795.400	5.795.400	5.795.400	5.795.400	5.795.400	5.795.400	
Forecast	6.948.736	7.919.230 (3.277.166)	7.585.380 (5.067.146)	7.344.697 (6.616.443)	5.271.723 (6.092.766)	3.222.040 (3.519.405)	13.307.412 (11.031.417)	4.736.010 (9.972.027)	7.352.461 (11.529.089)	5.527.933 (11.261.622)	14.704.923 (20.171.144)	9.246.865 (23.622.610)	
Closing inventory	(1.153.336)	(3.277.100)	(5.067.146)	(0.010.443)	(0.092.700)	(3.319.403)	(11.031.417)	(9.972.021)	(11.529.069)	(11.201.022)	(20.171.144)	(23.022.010)	
Mixing (Espresso) (kgs)	Sum of Dec-24	Sum of Jan-25	Sum of Feb-25	Sum of Mar-25	Sum of Apr-25	Sum of May-25		Sum of Jul-25	Sum of Aug-25	Sum of Sep-25	Sum of Oct-25	Sum of Nov-25	
Openning inventory	-	(437.809)	(999.514)	(1.518.599)	(2.006.957)	(2.230.676)	(2.192.728)	(3.442.298)	(3.597.627)	(4.086.976)	(4.343.403)	(5.771.383)	
Production	449.280	449.280	449.280	449.280	449.280	449.280	449.280	449.280	449.280	449.280	449.280	449.280	
Forecast	887.089	1.010.985	968.365	937.639	672.999	411.332	1.698.851	604.608	938.630	705.707	1.877.260	1.180.473	
Closing inventory	(437.809)	(999.514)	(1.518.599)	(2.006.957)	(2.230.676)	(2.192.728)	(3.442.298)	(3.597.627)	(4.086.976)	(4.343.403)	(5.771.383)	(6.502.576)	
Stick filling (3in1) (kgs)	Sum of Dec-24	Sum of Jan-25	Sum of Feb-25	Sum of Mar-25	Sum of Apr-25	Sum of May-25	Sum of Jun-25	Sum of Jul-25	Sum of Aug-25	Sum of Sep-25	Sum of Oct-25	Sum of Nov-25	
Openning inventory	-	(958.336)		(4.482.146)		•			(8.412.027)	(9.774.089)	(9.311.622)	(18.026.144)	
Production	5.990.400	5.990.400	5.990.400	5.990.400	5.990.400	5.990.400	5.990.400	5.990.400	5.990.400	5.990.400	5.990.400	5.990.400	
Forecast	6.948.736	7.919.230	7.585.380	7.344.697	5.271.723	3.222.040	13.307.412	4.736.010	7.352.461	5.527.933	14.704.923	9.246.865	
Closing inventory	(958.336)	(2.887.166)	(4.482.146)	(5.836.443)	(5.117.766)	(2.349.405)	(9.666.417)	(8.412.027)	(9.774.089)	(9.311.622)	(18.026.144)	(21.282.610)	
Stick filling (Espresso) (kgs)	Sum of Dec 24	Sum of Ion 25	Sum of Eab 25	Cum of Mar 25	Sum of Apr 25	Sum of May 25	Sum of Jun 25	Sum of Jul 25	Sum of Aug-25	Cum of Con 25	Sum of Oct 25	Sum of Nov 25	
Openning inventory	Julii Oi Dec-24	(419.089)		(1.462.439)				(3.311.258)	(3.447.867)	(3.918.496)	(4.156.203)	(5.565.463)	
Production	468.000	468.000	468.000	468.000	468.000	468.000	468.000	468.000	468.000	468.000	468.000	468.000	
Forecast	887.089	1.010.985	968.365	937.639	672.999	411.332	1.698.851	604.608	938.630	705.707	1.877.260	1.180.473	
Closing inventory	(419.089)			(1.932.077)			(3.311.258)		(3.918.496)	(4.156.203)	(5.565.463)	(6.277.936)	
Stick filling (Pure Black) (kgs)	Sum of Dec-24												
Openning inventory				(20.408)	(23.297)	31.868	144.434	(25.441)	44.727	41.620	89,610	(119.403)	
Production	-	8.200	(10.779)									000 000	
	202.800	202.800	202.800	202.800	202.800	202.800	202.800	202.800	202.800	202.800	202.800	202.800	
Forecast	194.600	202.800 221.779	202.800 212.429	202.800 205.689	202.800 147.635	202.800 90.234	202.800 372.675	202.800 132.632	202.800 205.906	202.800 154.810	202.800 411.813	258.959	
		202.800	202.800 212.429	202.800	202.800 147.635	202.800	202.800	202.800 132.632	202.800	202.800	202.800		
Forecast	194.600 8.200	202.800 221.779 (10.779)	202.800 212.429 (20.408)	202.800 205.689 (23.297)	202.800 147.635 31.868	202.800 90.234 144.434	202.800 372.675 (25.441)	202.800 132.632 44.727	202.800 205.906	202.800 154.810 89.610	202.800 411.813 (119.403)	258.959 (175.562)	
Forecast Closing inventory	194.600 8.200	202.800 221.779 (10.779)	202.800 212.429 (20.408) Sum of Feb-25	202.800 205.689 (23.297)	202.800 147.635 31.868 Sum of Apr-25	202.800 90.234 144.434 Sum of May-25	202.800 372.675 (25.441) Sum of Jun-25	202.800 132.632 44.727 Sum of Jul-25	202.800 205.906 41.620	202.800 154.810 89.610	202.800 411.813 (119.403)	258.959 (175.562)	
Forecast Closing inventory Packing (cartons)	194.600 8.200	202.800 221.779 (10.779) Sum of Jan-25 (342.052)	202.800 212.429 (20.408) Sum of Feb-25 (860.788)	202.800 205.689 (23.297) Sum of Mar-25 (1.318.745)	202.800 147.635 31.868 Sum of Apr-25 (1.732.884)	202.800 90.234 144.434 Sum of May-25 (1.769.628)	202.800 372.675 (25.441) Sum of Jun-25 (1.433.217)	202.800 132.632 44.727 Sum of Jul-25 (2.932.898)	202.800 205.906 41.620 Sum of Aug-25	202.800 154.810 89.610 Sum of Sep-25	202.800 411.813 (119.403) Sum of Oct-25	258.959 (175.562) Sum of Nov-25	
Forecast Closing inventory Packing (cartons) Openning inventory	194.600 8.200 Sum of Dec-24	202.800 221.779 (10.779) Sum of Jan-25 (342.052) 923.000	202.800 212.429 (20.408) Sum of Feb-25 (860.788) 923.000	202.800 205.689 (23.297) Sum of Mar-25 (1.318.745) 923.000	202.800 147.635 31.868 Sum of Apr-25 (1.732.884) 923.000	202.800 90.234 144.434 Sum of May-25 (1.769.628) 923.000	202.800 372.675 (25.441) Sum of Jun-25 (1.433.217) 923.000	202.800 132.632 44.727 Sum of Jul-25 (2.932.898) 923.000	202.800 205.906 41.620 Sum of Aug-25 (2.872.112)	202.800 154.810 89.610 Sum of Sep-25 (3.287.665)	202.800 411.813 (119.403) Sum of Oct-25 (3.371.053)	258.959 (175.562) Sum of Nov-25 (5.125.158)	

Scenario 1: Production starts in December 2024

Capacity < Demand

Even with maximum capacity, production still fall well off the projected demand -> Consider adopting a 2-month

production strategy





Compare maximum capacity with future demand

Sum of Nov-24	Sum of Dec-24	Sum of Jan-25	Sum of Feb-25	Sum of Mar-25	Sum of Apr-25	Sum of May-25	Sum of Jun-25	Sum of Jul-25	Sum of Aug-25	Sum of Sep-25	Sum of Oct-25	Sum of Nov-25
-	7.448.000	6.865.575	5.161.581	3.843.408	2.803.383	4.159.026	7.883.421	(47.516)	1.927.233	878.235	1.937.785	(7.608.210)
7.448.000	7.448.000	7.448.000	7.448.000	7.448.000	7.448.000	7.448.000	7.448.000	7.448.000	7.448.000	7.448.000	7.448.000	7.448.000
	8.030.425	9.151.993	8.766.174	8.488.025	6.092.356	3.723.605	15.378.938	5.473.251	8.496.998	6.388.450	16.993.995	10.686.298
7.448.000	6.865.575	5.161.581	3.843.408	2.803.383	4.159.026	7.883.421	(47.516)	1.927.233	878.235	1.937.785	(7.608.210)	(10.846.508)
Sum of Nov-24	Sum of Dec-24	Sum of Jan-25	Sum of Feb-25	Sum of Mar-25	Sum of Apr-25	Sum of May-25	Sum of Jun-25	Sum of Jul-25	Sum of Aug-25	Sum of Sep-25	Sum of Oct-25	Sum of Nov-25
-												
6 520 800						, ,		, ,		, ,	, ,	6.520.800
0.020.000												10.686.298
6.520.800			134.608		(1.404.174)	1.393.021	(7.465.116)					
Sum of Nov-24												
-												
5.795.400												5.795.400
	6.948.736	7.919.230	7.585.380	7.344.697	5.271.723		13.307.412	4.736.010	7.352.461	5.527.933	14.704.923	9.246.865
5.795.400	4.642.064	2.518.234	728.254	(821.043)	(297.366)	2.275.995	(5.236.017)	(4.176.627)	(5.733.689)	(5.466.222)	(14.375.744)	(17.827.210)
Sum of Nov-24	Sum of Dec-24	Sum of Jan-25	Sum of Eah-25	Sum of Mar-25	Sum of Apr-25	Sum of May-25	Sum of Jun-25	Sum of Jul-25	Sum of Aug.25	Sum of Sep-25	Sum of Oct-25	Sum of Nov-25
Julii 01 1404-24												(5.322.103)
440 290			. ,	. ,		, ,	, ,			, ,	, ,	449.280
449.200												1.180.473
440.200												
449.280	11.4/1	(550.234)	(1.069.319)	(1.557.677)	(1.781.396)	(1.743.448)	(2.993.018)	(3.148.347)	(3.637.696)	(3.894.123)	(5.322.103)	(6.053.296)
Sum of Nov-24	Sum of Dec-24	Sum of Jan-25	Sum of Feb-25	Sum of Mar-25	Sum of Apr-25	Sum of May-25	Sum of Jun-25	Sum of Jul-25	Sum of Aug-25	Sum of Sep-25	Sum of Oct-25	Sum of Nov-25
-	5.990.400	5.032.064	3.103.234	1.508.254	153.957	872.634	3.640.995	(3.676.017)	(2.421.627)	(3.783.689)	(3.321.222)	(12.035.744)
5.990.400	5.990.400	5.990.400	5.990.400	5.990.400	5.990.400	5.990.400	5.990.400	5.990.400	5.990.400	5.990.400	5.990.400	5.990.400
	6.948.736	7.919.230	7.585.380	7.344.697	5.271.723	3.222.040	13.307.412	4.736.010	7.352.461	5.527.933	14.704.923	9.246.865
5.990.400	5.032.064	3.103.234	1.508.254	153.957	872.634	3.640.995	(3.676.017)	(2.421.627)	(3.783.689)	(3.321.222)	(12.035.744)	(15.292.210)
Sum of Nov-24	Sum of Dec-24	Sum of Jan-25	Sum of Eah-25	Sum of Mar-25	Sum of Apr-25	Sum of May-25	Sum of Jun-25	Sum of Jul-25	Sum of Aug.25	Sum of Sep.25	Sum of Oct-25	Sum of Nov-25
-												(5.097.463)
468 000						, ,	, ,			, ,		468.000
400.000												1.180.473
468 000												
100.000	10.011	(101.071)	(001.100)	(1.101.011)	(1.000.010)	(1.012.100)	(2.010.200)	(2.010.001)	(0.100.100)	(0.000.200)	(0.001.100)	(0.000.000)
Sum of Nov-24	Sum of Dec-24	Sum of Jan-25	Sum of Feb-25	Sum of Mar-25	Sum of Apr-25	Sum of May-25	Sum of Jun-25	Sum of Jul-25	Sum of Aug-25	Sum of Sep-25	Sum of Oct-25	Sum of Nov-25
-	202.800	211.000	192.021	182.392	179.503	234.668	347.234	177.359	247.527	244.420	292.410	83.397
202.800	202.800	202.800	202.800	202.800	202.800	202.800	202.800	202.800	202.800	202.800	202.800	202.800
	194.600	221.779	212.429	205.689	147.635	90.234	372.675	132.632	205.906	154.810	411.813	258.959
202.800	211.000	192.021	182.392	179.503	234.668	347.234	177.359	247.527	244.420	292.410	83.397	27.238
Sum of Nov-24	Sum of Dec-24	Sum of Jan-25	Sum of Feb-25	Sum of Mar-25	Sum of Apr-25	Sum of May-25	Sum of Jun-25	Sum of Jul-25	Sum of Aug-25	Sum of Sep-25	Sum of Oct-25	Sum of Nov-25
Sum of Nov-24	Sum of Dec-24 923.000		Sum of Feb-25 62.212	Sum of Mar-25 (395.745)	Sum of Apr-25 (809.884)	Sum of May-25 (846.628)					Sum of Oct-25 (2.448.053)	
Sum of Nov-24 - 923.000	923.000	580.948	62.212	(395.745)	(809.884)		(510.217)	(2.009.898)	(1.949.112)	(2.364.665)	(2.448.053)	(4.202.158)
-	923.000	580.948 923.000	62.212 923.000	(395.745) 923.000	(809.884) 923.000	(846.628)	(510.217) 923.000	(2.009.898)	(1.949.112) 923.000	(2.364.665) 923.000	(2.448.053) 923.000	(4.202.158) 923.000
	7.448.000 7.448.000 7.448.000 7.448.000 6.520.800 6.520.800 5.795.400 5.795.400 5.795.400 5.795.400 5.990.400 5.990.400 5.990.400 Sum of Nov-24 468.000 468.000 Sum of Nov-24	- 7.448.000 7.448.000 8.030.425 7.448.000 8.030.425 7.448.000 6.865.575 Sum of Nov-24 Sum of Dec-24 - 6.520.800 6.520.800 6.520.800 6.520.800 5.795.400 5.795.400 5.795.400 6.948.736 5.795.400 4.642.064 Sum of Nov-24 Sum of Dec-24 - 449.280 449.280 449.280 11.471 Sum of Nov-24 Sum of Dec-24 - 5.990.400 5.990.400 5.990.400 5.990.400 6.948.736 6.948.736	- 7.448.000 6.865.575 7.448.000 7.448.000 7.448.000 8.030.425 9.151.993 7.448.000 6.865.575 5.161.581 Sum of Nov-24 Sum of Dec-24 Sum of Jan-25 6.520.800 6.520.800 6.520.800 8.030.425 9.151.993 6.520.800 6.520.800 6.520.800 8.030.425 9.151.993 6.520.800 5.011.175 2.379.981 Sum of Nov-24 Sum of Dec-24 Sum of Jan-25 - 5.795.400 4.642.064 5.795.400 5.795.400 5.795.400 5.795.400 4.642.064 2.518.234 Sum of Nov-24 Sum of Dec-24 Sum of Jan-25 - 449.280 11.471 449.280 449.280 449.280 449.280 11.471 5.599.400 5.990.400 6.948.736 7.919.230 5.990.400 5.990.400 5.990.400 5.990.400 5.990.400 5.990.400 5.990.400 5.990.400 6.948.736 7.919.230 5.990.400 5.990.400 6.948.736 7.919.230 5.990.400 5.990.400 6.948.736 7.919.230	- 7.448.000 6.865.575 5.161.581 7.448.000 7.448.000 7.448.000 7.448.000 8.030.425 9.151.993 8.766.174 7.448.000 6.865.575 5.161.581 3.843.408 Sum of Nov-24 Sum of Dec-24 Sum of Jan-25 Sum of Feb-25 - 6.520.800 5.011.175 2.379.981 6.520.800 6.520.800 6.520.800 6.520.800 8.030.425 9.151.993 8.766.174 6.520.800 5.011.175 2.379.981 134.608 Sum of Nov-24 Sum of Dec-24 Sum of Jan-25 Sum of Feb-25 - 5.795.400 4.642.064 2.518.234 5.795.400 5.795.400 5.795.400 5.795.400 5.795.400 5.795.400 5.795.400 5.795.400 5.795.400 4.642.064 2.518.234 728.254 Sum of Nov-24 Sum of Dec-24 Sum of Jan-25 Sum of Feb-25 - 449.280 11.471 (550.234) 449.280 449.280 449.280 449.280 887.089 1.010.985 968.365 449.280 11.471 (550.234) (1.069.319) Sum of Nov-24 Sum of Dec-24 Sum of Jan-25 Sum of Feb-25 - 5.990.400 5.990.400 5.990.400 5.990.400 6.6948.736 7.919.230 7.585.380 5.990.400 5.990.400 5.990.400 5.990.400 6.6948.736 7.919.230 7.585.380 5.990.400 5.990.400 48.911 (494.074) 468.000 468.000 468.000 468.000 837.089 1.010.985 968.365 468.000 48.911 (494.074) (994.439) Sum of Nov-24 Sum of Dec-24 Sum of Jan-25 Sum of Feb-25 - 468.000 48.000 468.000 468.000 837.089 1.010.985 968.365 468.000 48.911 (494.074) (994.439) Sum of Nov-24 Sum of Dec-24 Sum of Jan-25 Sum of Feb-25 - 202.800 202.800 202.800 202.800 202.800 202.800 202.800 202.800 202.800 202.800 202.800 202.800	- 7.448.000 6.865.575 5.161.581 3.843.408 7.448.000 8.488.025 7.500 8.030.425 9.151.993 3.8766.174 8.488.025 8.000 6.520.800 8.0000 7.580.800 6.520.800 7.580.800	7.448.000	7.448.000 6.650.000 6.650.000 6.650.000 6.650.000 6.650.000 6.500.	- 7.448.000 6.865.575 5.161.581 3.843.408 2.803.383 4.159.026 7.883.421 7.448.000 6.865.575 5.161.581 3.843.408 2.803.383 4.159.026 7.883.421 (47.516) 8.000 6.520.80	- 7.448.000 6.865.575 5.161.581 3.843.408 2.803.383 4.159.026 7.883.421 (47.516) 7.448.000 7.488.000 7.883.421 (47.516) 1.927.233 7.408.000 7.883.421 (47.516) 1.927.233 7.408.000 7.883.421 (47.516) 1.927.233 7.408.000 7.883.421 (47.516) 1.927.233 7.408.000 7.883.421 (47.516) 1.927.233 7.408.000 7.883.421 (47.516) 1.927.233 7.408.000 7.883.421 (47.516) 1.927.233 7.408.000 7.488.000 7.488.000 7.488.000 7.488.000 7.488.000 7.488.000 7.488.000 7.488.000 6.528.000 6.528.000 6.528.000 6.528.000 6.528.000 6.528.000 6.528.000 6.528.000 6.528.000 6.528.000 6.528.000 6.528.000 6.528.000 6.528.000 6.528.000 6.528.000 6.528.000 6.528.000 7.48888.000 7.488888.000 7.488888.000 7.488888.000 7.488888.000 7.488888.000 7.488888.000 7.488888.000 7.488888.000 7.488888.000 7.488888.000 7.4888888.000 7.4888888.000 7.48888888.000 7.4888888.000 7.488888.0000 7.4888888.0000 7.	- 7.448.000 6.865.575 5.161.581 3.843.408 2.203.383 4.159.026 7.883.421 (47.516) 1.927.233 7.448.000 7.448.000 7.448.000 7.448.000 7.448.000 7.448.000 7.448.000 7.448.000 7.448.000 7.448.000 7.448.000 7.448.000 7.448.000 7.448.000 7.448.000 6.865.575 5.161.581 3.843.408 2.203.383 4.159.026 7.883.421 (47.516) 1.927.233 878.235 878.235 879.2	- 7.448 000 6 865.757 5 161.581 3 843.408 2 203.383 4 159.026 7.883.421 (47.516) 1 1927.273 878.273 7 448 000 7.448	7.448.000 7.448.

Scenario 2: **Production starts** in November 2024

Capacity < Demand

Despite improvement from scenario 1, there is still a shortage in certain demand

-> Consider adopting a 2-month production strategy with increases in machine and labor capacity

Recommendation short-term



Analysis

Outsourcing manufacturing equipment cost

Minimum order quantity(kgs)	5.000.000 kg
Order quantity each month(kgs)	6.080.000 kg
Ordering cost per ton	\$200,00
Outsourcing cost per month	\$1.216.000
Outsourcing cost for the whole plan Total capacity of machine per month	\$15.808.000 26.874.680
Percentage of outsourcing machine	22,62%

Outsourcing capacity increase

Minimum Monthly Order Quantity: 5,000 tons **Required Capacity Increases:**

• Extraction: 0.840 tons

• Spray Drying: 1.770 tons

• **3-in-1 Mixing:** 1.380 tons

• Espresso Mixing: 0.460 tons

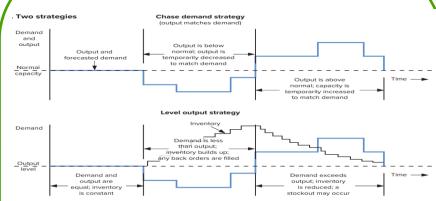
• 3-in-1 Stick Filling: 1.177 tons

• Espresso Stick Filling: 0.447 tons

Total Cost of Additional Equipment: \$15,808,000

This subcontract is feasible since the total capacity increase does not exceed the maximum capacity allowed (<30%)

Definition



- Level Output Strategy: Maintain a strategic inventory level as a buffer to prevent stockouts and ensure product freshness.
- Chase Demand Strategy: Temporarily increase capacity through overtime, subcontracting, or other flexible methods to meet peak demand.

Beneficial for reducing holding costs by ensuring inventory remains fresh while minimizing the sales loss with balanced operations (Palanivel et al. 2024)

Hybrid strategy

Recommendation short-term



ANALYSIS

After comparison between the option of overtime labor and outsourced labor, the monthly labor cost from option 1 is completely higher (8.786.960.000 > 7.710.400.000). As a result, LSC should decide to outsource to increase the capacity, fulfilling the shortage.

Outsourced Labor costs of the Packing step

Cost Estimation for option 1 of Packing step	
(Overtime)	
Basic Salary per month (26 days)	7.072.000 đ
Number of Days per month	26
Basic salary per person per shift	272.000 đ
Basic salary per person per hour	34.000 đ
Overtime Salary per person per hour	51.000 đ
Labor cost per person per day	476.000 đ
Total labor cost per month	8.786.960.000 đ
Total labor cost for the whole year	114.230.480.000 đ
Cost Estimation for option 2 of the Packing step	
(Outsource)	
Basic Salary per month (26 days)	7.072.000
Number of Days per month	26
Basic salary per person per shift	272.000 đ
Basic salary per person per hour	34.000 đ
Outsourcing Salary per person per shift	352.000 đ
Shift required	7640
Total labor cost per month	7.710.400.000 đ
Total labor cost for the whole plan	100.235.200.000 đ





Production line investment:

High Initial Investment:

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



Drawbacks of the extended production line

Financial Considerations:

Careful planning and resource allocation are crucial.



Why another production line is enough



leadership.

Improved Flexibility:

By strategically investing in a

new production line, LSC can

position itself for sustained

and solidify its market

growth, optimize operations,

Adapting to demand fluctuations and minimizing disruptions.

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





Enhanced Operational Efficiency: Streamlining production processes and reducing costs.

Capacity plan





Capacity plan:

		_											
Extraction (kgs)	Sum of Nov-24	Sum of Dec-24	Sum of Jan-25				Sum of May-25	Sum of Jun-25	Sum of Jul-25	Sum of Aug-25	Sum of Sep-25	Sum of Oct-25	Sum of Nov-25
Openning inventory	-	8.288.000	8.545.575	7.681.581	7.203.408	7.003.383	011001000	13.763.421	6.672.484	9.487.233	9.278.235	11.177.785	2.471.790
Production	7.448.000		7.448.000	7.448.000	7.448.000	7.448.000		7.448.000			7.448.000	7.448.000	7.448.000
Forecast		8.030.425	9.151.993	8.766.174	8.488.025	6.092.356	3.723.605	15.378.938	5.473.251	8.496.998	6.388.450	16.993.995	10.686.298
Closing inventory	7.448.000		6.841.581	6.363.408	6.163.383	8.359.026	12.923.421	5.832.484	8.647.233		10.337.785	1.631.790	(766.508)
Outsource	840.000		840.000	840.000	840.000	840.000	840.000	840.000			840.000	840.000	840.000
Result after outsource	8.288.000	8.545.575	7.681.581	7.203.408	7.003.383	9.199.026	13.763.421	6.672.484	9.487.233	9.278.235	11.177.785	2.471.790	73.492
Spray drying (kgs)	Sum of Nov-24	Sum of Dec-24	Sum of Jan-25	Sum of Feb-25	Sum of Mar-25	Sum of Apr-25	Sum of May-25	Sum of Jun-25	Sum of Jul-25	Sum of Aug-25	Sum of Sep-25	Sum of Oct-25	Sum of Nov-25
Openning inventory	-	8.290.800	8.551.175	7.689.981	7.214.608	7.017.383	9.215.826	13.783.021	6.694.884	9.512.433	9.306.235	11.208.585	2.505.390
Production	6.520.800	6.520.800	6.520.800	6.520.800	6.520.800	6.520.800	6.520.800	6.520.800	6.520.800	6.520.800	6.520.800	6.520.800	6.520.800
Forecast		8.030.425	9.151.993	8.766.174	8.488.025	6.092.356	3.723.605	15.378.938	5.473.251	8.496.998	6.388.450	16.993.995	10.686.298
Closing inventory	6.520.800	6.781.175	5.919.981	5.444.608	5.247.383	7.445.826	12.013.021	4.924.884	7.742.433	7.536.235	9.438.585	735.390	(1.660.108)
Outsource	1.770.000	1.770.000	1.770.000	1.770.000	1.770.000	1.770.000	1.770.000	1.770.000	1.770.000	1.770.000	1.770.000	1.770.000	1.770.000
Result after outsource	8.290.800	8.551.175	7.689.981	7.214.608	7.017.383	9.215.826	13.783.021	6.694.884	9.512.433	9.306.235	11.208.585	2.505.390	109.892
Mixing (3ln1) (kgs)	Sum of Nov-24	Sum of Dec-24	Sum of Jan-25	Sum of Feb-25	Sum of Mar-25	Sum of Apr-25	Sum of May-25	Sum of Jun-25	Sum of Jul-25	Sum of Aug-25	Sum of Sep-25	Sum of Oct-25	Sum of Nov-25
Openning inventory	-	7.175.400	7.402.064	6.658.234	6.248.254	6.078.957	7.982.634	11.935.995	5.803.983		8.066.311	9.713.778	2.184.256
Production	5.795.400	5.795.400	5.795.400	5.795.400	5.795.400	5.795.400	5.795.400	5.795.400	5.795.400	5.795.400	5.795.400	5.795.400	5.795.400
Forecast		6.948.736	7.919.230	7.585.380	7.344.697	5.271.723	3.222.040	13.307.412	4.736.010	7.352.461	5.527.933	14.704.923	9.246.865
Closing inventory	5.795.400	6.022.064	5.278.234	4.868.254	4.698.957	6.602.634	10.555.995	4.423.983	6.863.373	6.686.311	8.333.778	804.256	(1.267.210)
Outsource	1.380.000	1.380.000	1.380.000	1.380.000	1.380.000	1.380.000	1.380.000	1.380.000	1.380.000	1.380.000	1.380.000	1.380.000	1.380.000
Result after outsource	7.175.400	7.402.064	6.658.234	6.248.254	6.078.957	7.982.634	11.935.995	5.803.983	8.243.373	8.066.311	9.713.778	2.184.256	112.790
Mixing (Espresso) (kgs)	Sum of Nov-24	Sum of Dec-24	Sum of Jan-25	Sum of Feb-25	Sum of Mar-25	Sum of Apr-25	Sum of May-25	Sum of Jun-25	Sum of Jul-25	Sum of Aug-25	Sum of Sep-25	Sum of Oct-25	Sum of Nov-25
Openning inventory	-	915.280	943.471	847.766	794.681	772.323		1.518.552	734.982	1.045.653	1.022.304	1.231.877	269.897
Production	449.280	449.280	449.280	449.280	449.280	449.280	449,280	449.280			449.280	449.280	449.280
Forecast	710.200	887.089	1.010.985	968.365	937.639	672.999	411.332	1.698.851	604.608	938.630	705.707	1.877.260	1.180.473
Closing inventory	449.280	477.471	381,766	328.681	306.323	548.604	1.052.552	268.982	579.653	556.304	765.877	(196.103)	
Outsource	466.000		466.000	466.000	466.000	466.000	466.000	466.000		466.000	466.000	466.000	466.000
Result after outsource	915.280		847.766	794.681	772.323	1.014.604	1.518.552	734.982		1.022.304	1.231.877	269.897	4.704
Stick filling (3ln1) (kgs)	Sum of Nov-24	Sum of Dec-24	Sum of Jan-25	Sum of Eab 25	Sum of Mar-25	Sum of Apr-25	Sum of May-25	Sum of Jun-25	Sum of Jul-25	Sum of Aug-25	Sum of Sep-25	Sum of Oct-25	Sum of Nov-25
Openning inventory	Julii 01 N0V-24	7.167.400		6.634.234	6.216.254	6.038.957	7.934.634		5.739.983		7.986.311	9.625.778	2.088.256
Production	5.990.400	5.990.400	5.990.400	5.990.400	5.990.400	5.990.400		5.990.400			5.990.400	5.990.400	5.990.400
Forecast	5.880.400	6.948.736	7,919,230	7,585,380	7.344.697	5.271.723	0.0001100	13.307.412	0.0001.00	010001100	5.527.933	14.704.923	9.246.865
	5.990.400		5.457.234	5.039.254	4.861.957	6.757.634	10.702.995	4.562.983	6.994.373	6.809.311	5.527.933 8.448.778	911.256	(1.168.210)
Closing inventory Outsource	1.177.000		1.177.000	1.177.000	1.177.000	1.177.000	1,177,000	1.177.000			1.177.000	1,177,000	1.177.000
Result after outsource	7.167.400	7.386.064	6.634.234	6.216.254	6.038.957	7.934.634	11.879.995	5.739.983	8.171.373	7.986.311	9.625.778	2.088.256	l 8.790

Significant production backlog at the end of November -> Offloading unfinished work to external suppliers





Capacity plan:

Stick filling (Esspreso) (kgs)	Sum of Nov-24	Sum of Dec-24	Sum of Jan-25	Sum of Feb-25	Sum of Mar-25	Sum of Apr-25	Sum of May-25	Sum of Jun-25	Sum of Jul-25	Sum of Aug-25	Sum of Sep-25	Sum of Oct-25	Sum of Nov-25
Openning inventory	-	915.000	942.911	846.926	793.561	770.923	1.012.924	1.516.592	732.742	1.043.133	1.019.504	1.228.797	266.537
Production	468.000	468.000	468.000	468.000	468.000	468.000	468.000	468.000	468.000	468.000	468.000	468.000	468.000
Forecast		887.089	1.010.985	968.365	937.639	672.999	411.332	1.698.851	604.608	938.630	705.707	1.877.260	1.180.473
Closing inventory	468.000	495.911	399.926	346.561	323.923	565.924	1.069.592	285.742	596.133	572.504	781.797	(180.463)	(445.936)
Outsource	447.000	447.000	447.000	447.000	447.000	447.000	447.000	447.000	447.000	447.000	447.000	447.000	447.000
Result after outsource	915.000	942.911	846.926	793.561	770.923	1.012.924	1.516.592	732.742	1.043.133	1.019.504	1.228.797	266.537	1.064
Stick filling (Pure Black) (kgs)	Sum of Nov-24	Sum of Dec-24	Sum of Jan-25	Sum of Feb-25	Sum of Mar-25	Sum of Apr-25	Sum of May-25	Sum of Jun-25	Sum of Jul-25	Sum of Aug-25	Sum of Sep-25	Sum of Oct-25	Sum of Nov-25
Openning inventory	-	202.800	211.000	192.021	182.392	179.503	234.668	347.234	177.359	247.527	244.420	292.410	83.397
Production	202.800	202.800	202.800	202.800	202.800	202.800	202.800	202.800	202.800	202.800	202.800	202.800	202.800
Forecast		194.600	221.779	212.429	205.689	147.635	90.234	372.675	132.632	205.906	154.810	411.813	258.959
Closing inventory	202.800	211.000	192.021	182.392	179.503	234.668	347.234	177.359	247.527	244.420	292.410	83.397	27.238
Outsource Option													
Packing (cartons)	Sum of Nov-24	Sum of Dec-24	Sum of Jan-25	Sum of Feb-25	Sum of Mar-25	Sum of Apr-25	Sum of May-25	Sum of Jun-25	Sum of Jul-25	Sum of Aug-25	Sum of Sep-25	Sum of Oct-25	Sum of Nov-25
Openning inventory	-	1.305.000	1.344.948	1.208.212	1.132.255	1.100.116	1.445.372	2.163.783	1.046.102	1.488.888	1.455.335	1.753.947	381.842
Production	923.000	923.000	923.000		923.000		923.000		923.000	923.000		923.000	923.000
Forecast		1.265.052	1.441.736	1.380.957	1.337.139	959.744	586.589	2.422.681	862.214	1.338.553	1.006.388	2.677.105	1.683.438
Closing inventory	923.000	962.948	826.212	750.255	718.116	1.063.372	1.781.783	664.102	1.106.888	1.073.335	1.371.947	(158)	(378.596)
Outsource	382.000	382.000	382.000	382.000	382.000	382.000	382.000	382.000	382.000	382.000	382.000	382.000	
Closing Inventory after outsource	1.305.000	1.344.948	1.208.212	1.132.255	1.100.116	1.445.372	2.163.783	1.046.102	1.488.888	1.455.335	1.753.947	381.842	3.404
Option 2: Outsource													
Packing (cartons)	Sum of Nov-24	Sum of Dec-24	Sum of Jan-25		Sum of Mar-25		Sum of May-25	Sum of Jun-25		Sum of Aug-25	Sum of Sep-25	Sum of Oct-25	Sum of Nov-25
Openning inventory	-	1.305.000	1.344.948	1.208.212	1.132.255	1.100.116	1.445.372	2.163.783	1.046.102	1.488.888	1.455.335	1.753.947	381.842
Production	923.000				923.000		923.000			923.000		923.000	
Forecast		1.265.052			1.337.139		586.589	2.422.681	862.214	1.338.553		2.677.105	
Closing inventory	923.000	962.948	826.212	750.255	718.116	1.063.372	1.781.783	664.102	1.106.888	1.073.335	1.371.947	(158)	(378.596)
Outsource	382.000				382.000	550,000	382.000	382.000		382.000		382.000	382.000
Closing Inventory after outsource	1.305.000	1,344,948	1.208.212	1.132.255	1,100,116	1.445.372	2.163.783	1.046.102	1.488.888	1.455.335	1.753.947	381.842	3.404

Significant production backlog at the end of November -> Offloading unfinished work to external suppliers Except for the stick filling process for the pure black category, there is no need to increase the capacity level.

