

In March 2011, Neha, the inventory manager of sales and distribution for Toffee Inc., a confectionery company, had just concluded a meeting with all relevant personnel. The meeting had not been entirely positive. The words of the production manager still echoed in his ears: "If the ingredient inventory that was purchased and managed by the firm is not re-examined and re-worked to the firm's advantage then [soon] the final products based on these ingredients will cease to yield the kind of profits that the firm expects."

Ramani's task was to prepare a comprehensive forecasting and inventory management plan with a view to minimize the cost of managing the supply chain by judicious use of resources, better forecasting, and improvement in the ingredient inventory purchasing and management systems. Most importantly, he had to decide how much and when to order the ingredients involved in one of the company's most popular products, the "Seven Star" chocolate bar.

THE COMPANY

Toffee Inc. was a confectionery company working out of the Maharashtra Industrial Development Corporation (MIDC), Amgaon, Maharashtra. The company began its operations in 1990, and was fairly well known in the region. Since 2008, Toffee Inc. had been making thousands of confectionery products, and the core competitiveness of its operations lay in its adaptability to customers' tastes and preferences.

The company had come a long way from its inception. Hansmukhlal Jadhvani (the owner and sole proprietor of the firm) established Toffee Inc. with his two younger brothers. Jadhvani started small, beginning his career as a wholesale trading agent for confectionery and other bakery items. The business was successful and soon Jadhvani turned from trading to small-time production of toffees and candies. As the business started to take off, it expanded the existing manufacturing unit into a modern confectionery processing unit with allied products like chocolates, gums, candies, bars, etc.

SALES AND DISTRIBUTION

Toffee Inc. had six depots, approximately 50 authorized dealers and a sales force of around 85 people. Its sales and distribution network, operated from Nagpur, had a direct or indirect reach to almost all the towns and cities in the states of Maharashtra, Madhya Pradesh, Chhattisgarh, Orissa and West Bengal. The firm was working on a management information system for garnering all data and information generated and reported by the sales force in different parts of the country.

THE CONUNDRUM

Toffee Inc. produced a number of candies and toffees, including the most expensive of its products, a chocolate bar branded Seven Star. It was also one of the most popular Toffee Inc. products. The retailers sold the product loose but the company packaged it in bags of 20 bars each. These bags were then packaged into cartons of 100 bags each. Seven Star had different

ingredients from the normal toffees and candies produced by Toffee Inc., including dark chocolate, cocoa butter, cocoa powder, nuts, condensed milk and sugar glucose. Each chocolate bar weighed 30 grams. In order to maintain the high quality of the product, Toffee Inc. was forced to use high-grade, fresh ingredients, thus ensuring that there was not a large inventory of Seven Star bars. However, this meant that the product could not remain in storage for an extended period of time.

The sales and distribution team at Toffee Inc. were aware that the demand of this flagship brand followed a seasonal variation. It had reviewed the last five years' sales records and concluded that the demand peaked during the festivals and marriage seasons (see Exhibit 1).

Toffee Inc.'s sales and distribution branch managed the regions and was responsible for transportation, stocking and distribution. Primary distributors were concerned about the sales and distribution as they had experienced very impactful seasonal variations in the products that they bought and sold. The shipments took around 15 days to arrive from the day of placing the order. Because of the nature of the food product, it needed careful handling and had to be transported and stored in climate-controlled environments. The ordering cost was relatively high as the product traversed long distances across India and the need for climate-controlled environments (like air-conditioning and refrigeration) added to the cost, which amounted to INR8,000 per order. This included cost of communication, paper trails, service and other taxes, and all kind of octroi clearances. The monthly carrying cost of the cartons amounted to 2.5 per cent of the cost of the goods. According to company records, the cost of each carton was INR1,200.

Issues at the Sales and Distribution Level

In planning the ordering and inventory for the year, Ramani's decision became even more complex because the sales and distribution team needed to determine what levels of stock should be maintained to keep meeting the expected service levels of 95 per cent. For this purpose, the store's manager scouted, collected and compiled the data from 2006 to 2010 along with other information pertaining to all the factors/parameters that would help the company make an informed decision. Seven Star was prepared using four primary ingredients: dark chocolate (7.8 grams per bar), cocoa butter (6.2 grams per bar), cocoa powder (5.1 grams per bar), and dry fruits and nuts (4 grams per bar). In addition, there were other secondary ingredients needed (such as condensed milk, sugar glucose, etc.) but the proportions of these ingredients, though vital to the taste, were not weighed for their exactness and were simply bracketed under the "other ingredients" category.

There were different suppliers and vendors for each of the four main ingredients. The average costs associated with each ingredient (considering all the suppliers and vendors for various parameters like annual ordering costs, annual carrying costs, unit costs of the items with different levels of quantity procured, etc.) were available to the production team (see Exhibits 2 to 5).

THE MEETING AND THE COURSE OF ACTION

As Ramani contemplated his task with respect to ordering the ingredients of Seven Star, other related questions circled his mind: What were the short-term and long-term implications of these quantitative decisions on inventory management and other aspects of effectiveness, like quality and supply chain?

A high-level executive meeting was called at the Toffee Inc. main office. The core agenda of the meeting was to discuss the twin issues of managing the purchase decisions on two fronts:

1) At the level of the company the sales and distribution branch had to decide on the expected sales for 2011, based on past performances, and choose the right order size considering all the data available through various records and databases;

2) At the level of the vendors Toffee Inc. had to confront the problem of order quantity for the ingredients supplied by the vendors while factoring in various information, such as the bulk discounts available, cost of orders, cost of holding, etc. The goal was to minimize the annual cost of purchase by selecting the right quantity, which satisfied all the needs of the firm.

Characters:

- Neha (Lead Presenter)
- Shamik (Data Nerd)
- Akancha (Solution Expert)
- Abhinav (Comic Relief)
- Judge (not on stage, but interacted with)

Scene: *The team enters the room confidently, holding a box of chocolates. The screen behind them shows the title slide of the presentation.*

Neha (Lead Presenter):

cheerfully

"Good day, everyone! We are here to give you a sweet solution—literally! Today, we're diving into the story of Toffee Inc. and how we solved their inventory conundrum. But first, let me introduce my brilliant team."

Switch to 'Meet the Teammates' slide.

Shamik (Data Nerd):

nervously holding a stack of papers

"I'm the one who stares at spreadsheets all day, so if you see my glasses fog up, it's probably due to the *data heat*."

Akancha (Solution Expert):

coolly

"And I'm the person who turns that data into *magic*—well, logical solutions, actually, but magic sounds cooler."

Abhinav (Comic Relief):

grinning

"I'm just here to make sure nobody falls asleep! Trust me, you'll want to stay awake for this... we've got chocolate!"

Slide changes to 'Company Overview and Flagship Product'.

Neha:

"Now, about Toffee Inc. — they've been making Maharashtra's favorite confectionery since 1990. But their real superstar is this: the *Seven Star Chocolate Bar*!"

Abhinav dramatically holds up the chocolate bar like it's the crown jewel.

Abhinav:

whispering to the audience

"And it's got seven stars... because that's how you'll feel after eating it."

Neha:

"But here's where things get sticky. Despite the bar's popularity, the company was struggling with inventory management. That brings us to... *cue dramatic music*... the problem statement!"

Switch to 'Problem Statement' slide.

Akancha (Solution Expert):

seriously

"Too much stock, and ingredients go bad. Too little stock, and they run out during peak demand. We call it... the Chocolate Crisis."

Shamik (Data Nerd):

panicking

"Chocolate Crisis?! That sounds like my worst nightmare!"

Switch to 'Root Cause' slide.

Neha:

"Jokes aside, the root cause was poor forecasting. Seasonal demand wasn't being tracked properly, and ingredient orders were all over the place."

Abhinav (Comic Relief):

leans in

"Imagine showing up to a wedding without the Seven Star bars... that's a disaster waiting to happen!"

Switch to 'Data Overview' slide.

Shamik (Data Nerd):

"Here's the data breakdown. The demand spikes during festivals and weddings, but we also have to consider transportation time, climate control, and high ordering costs."

Abhinav:

"Or as I call it, the 'let's-not-let-our-chocolate-melt-on-the-way' plan."

Switch to 'Solutions' slide.

Akancha (Solution Expert):

"After analyzing five years of sales data, we came up with a better inventory management system. By optimizing the order quantities and timing, we can maintain a 95% service level without overstocking."

Neha:

"We've even factored in bulk discounts, holding costs, and shipping times. Now, instead of chaos, we have control. And... better chocolate!"

Abhinav:

excitedly

"Speaking of which... shall we hand out some of this *delicious* control?"
grins and gestures towards the judges.

Neha:

"Indeed, it's time to sweeten the deal. Ladies and gentlemen, allow us to present our flagship product... the Seven Star Chocolate Bar!"

Abhinav hands out the chocolates to the judges.

Shamik:

proudly

"That's the taste of success... with better inventory management."

Switch to 'Conclusion' slide.

Neha:

"In conclusion, our solution is simple: smarter forecasting, optimized ordering, and happier customers. And, of course, more chocolates for everyone!"

Akancha:

"And remember, a well-stocked inventory is like a well-stocked candy jar—no one should run out."

Abhinav:

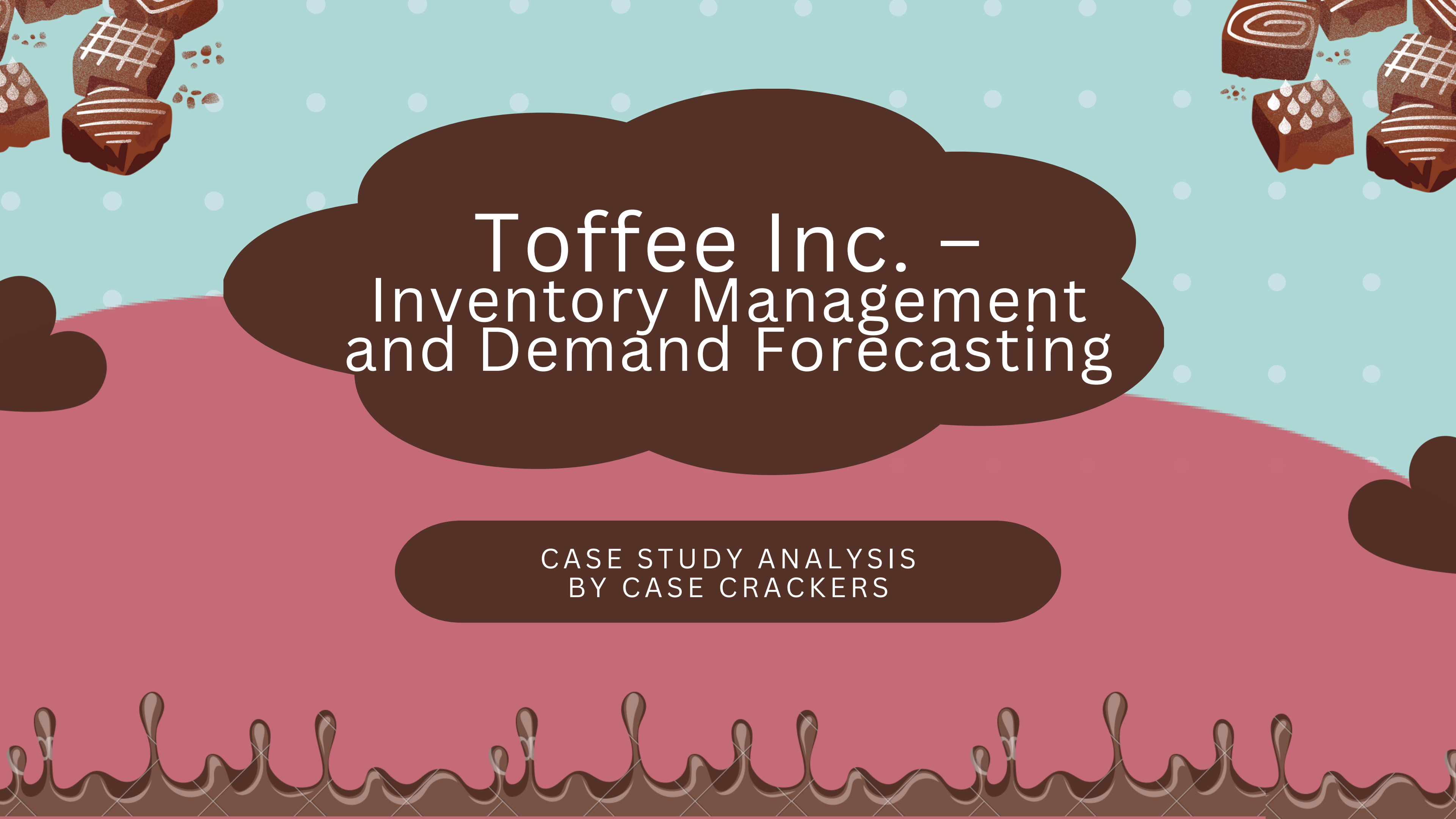
whispering

"Especially not during a wedding!"

Neha:

"Thank you for your time. Any questions, or would you prefer to let the chocolate speak for itself?"

End with the team waving, grinning proudly as they walk off the stage.

The background is a light blue sky with white polka dots. In the top corners, there are clusters of various chocolate candies, including round ones with white icing patterns and square ones with white icing and sprinkles. A large, dark brown, cloud-like shape is centered in the sky. Below the sky is a solid pink ground area. At the bottom of the image, there is a decorative border of chocolate drips.

Toffee Inc. – Inventory Management and Demand Forecasting

CASE STUDY ANALYSIS
BY CASE CRACKERS

Meet the Teammates



Akancha Sharma
BBA GB



Neha Kumari
BBA ATA



Abhinav Verma
BBA DM



Shamik Banerjee
BBA E



Madhushree Das Sarma
BBA HM



Shakshi Chettri
BBA GB



Company Overview (Toffee Inc.)

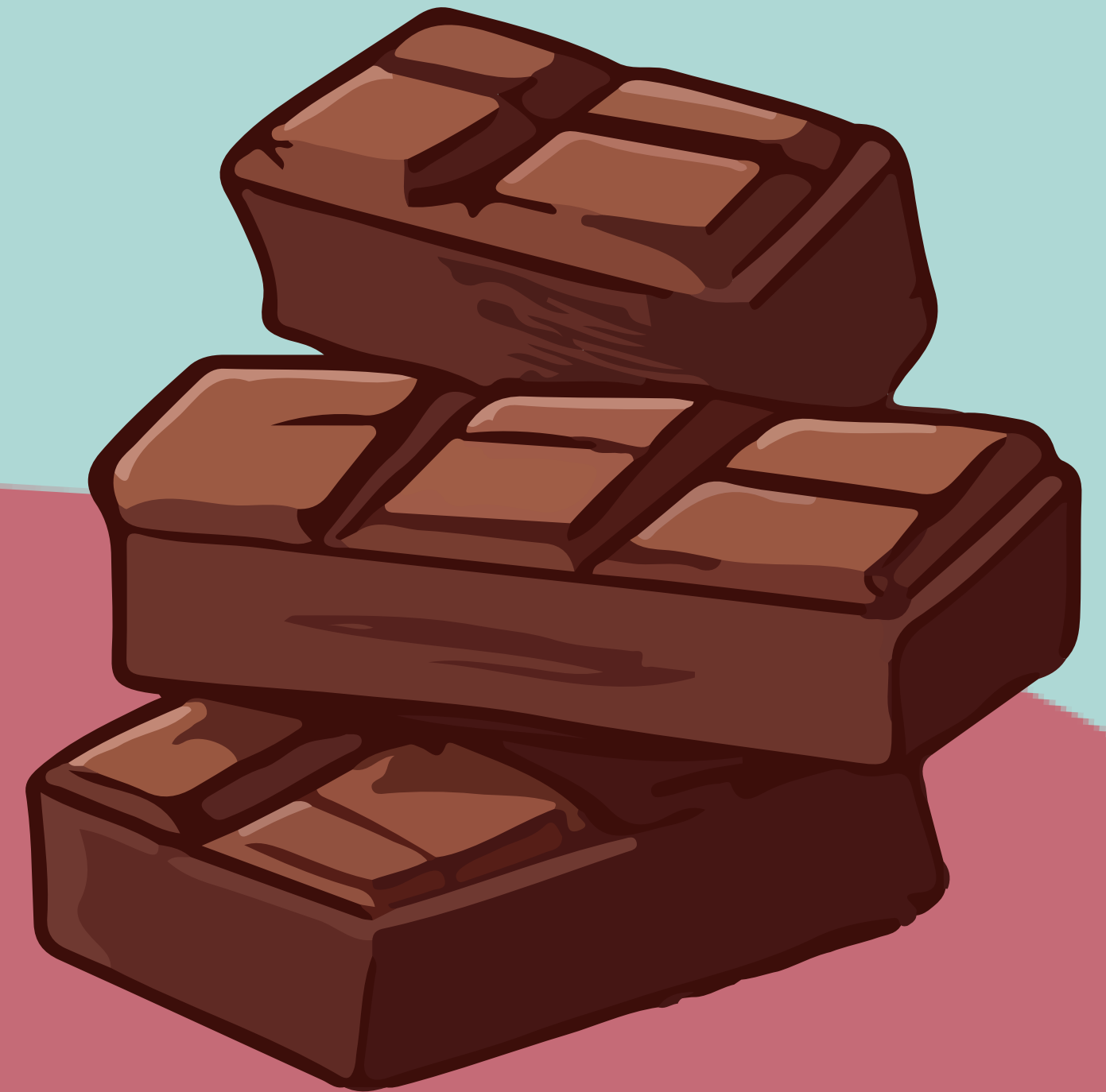
- Established in 1990, based in Maharashtra, India.
- Produces toffees, chocolates, gums, and candies.
- Strong distribution across multiple states.

Flagship Product (Seven Star)

- Premium chocolate bar made with high-quality ingredients.
- High demand during festivals and weddings.

Problem Statement

- Objective: Optimize supply chain, improve demand forecasting, and reduce inventory costs.
- Challenges:
 - Seasonal demand variations for Seven Star chocolate.
 - High inventory and ordering costs.
 - Long lead times and need for climate-controlled storage.
 - Maintaining product quality and minimizing waste



Why Inventory Levels Are Not Optimized

- Long Lead Times: Delays in receiving ingredients cause difficulties in maintaining consistent stock levels.
- Climate-Controlled Storage: The need for refrigeration and climate control increases storage costs.
- High Costs: High ordering and carrying costs make it expensive to maintain optimal inventory levels.



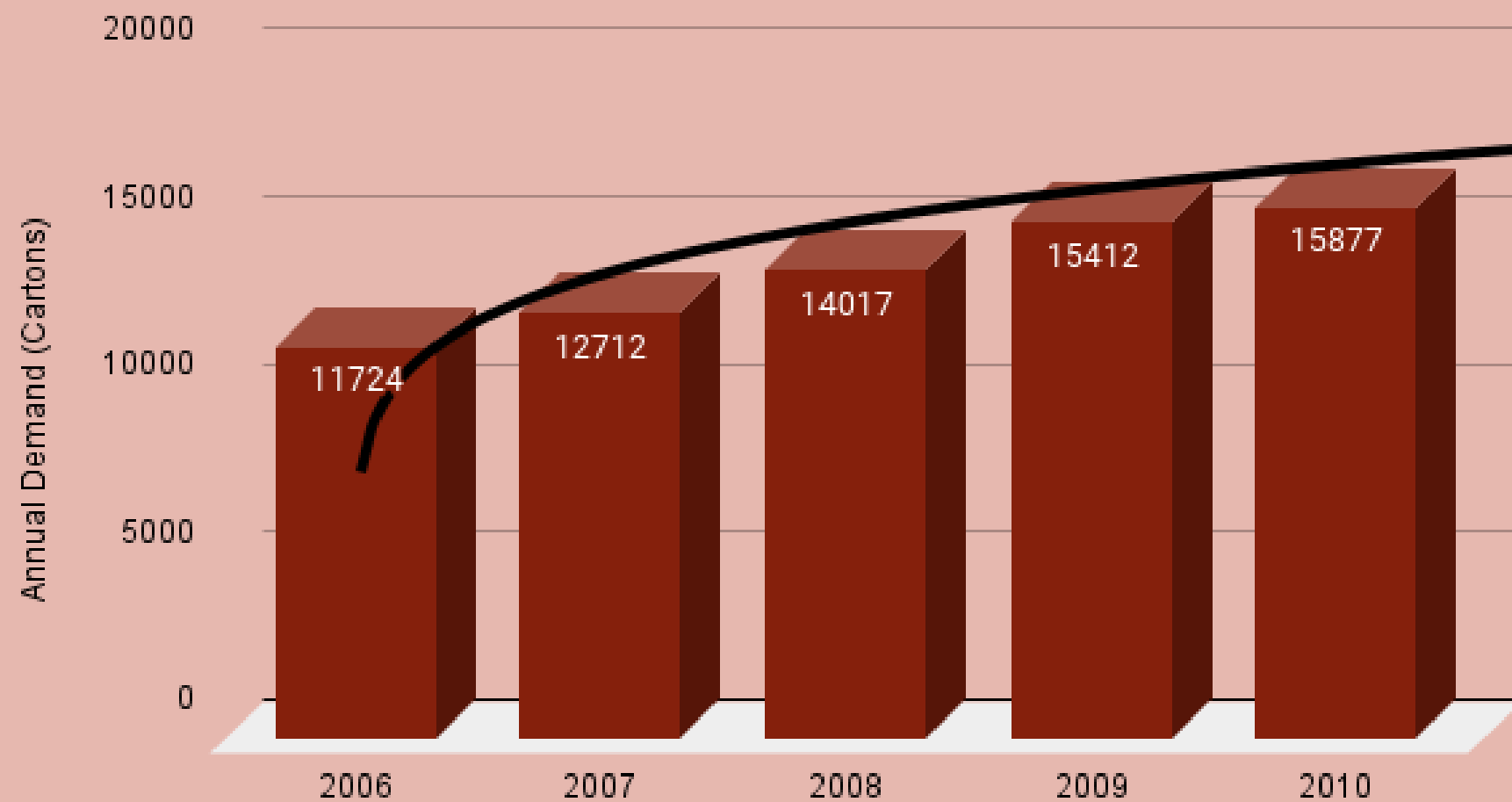
Impact of Inaccurate Demand Forecasting

- Seasonal Demand: Failure to predict seasonal spikes leads to stockouts during peak times and overstock during off-seasons.
- High Perishability: Misjudging demand results in excess stock, causing spoilage and waste of perishable ingredients.
- Missed Sales Opportunities: Inaccurate forecasting can cause product shortages, leading to lost revenue and customer dissatisfaction.

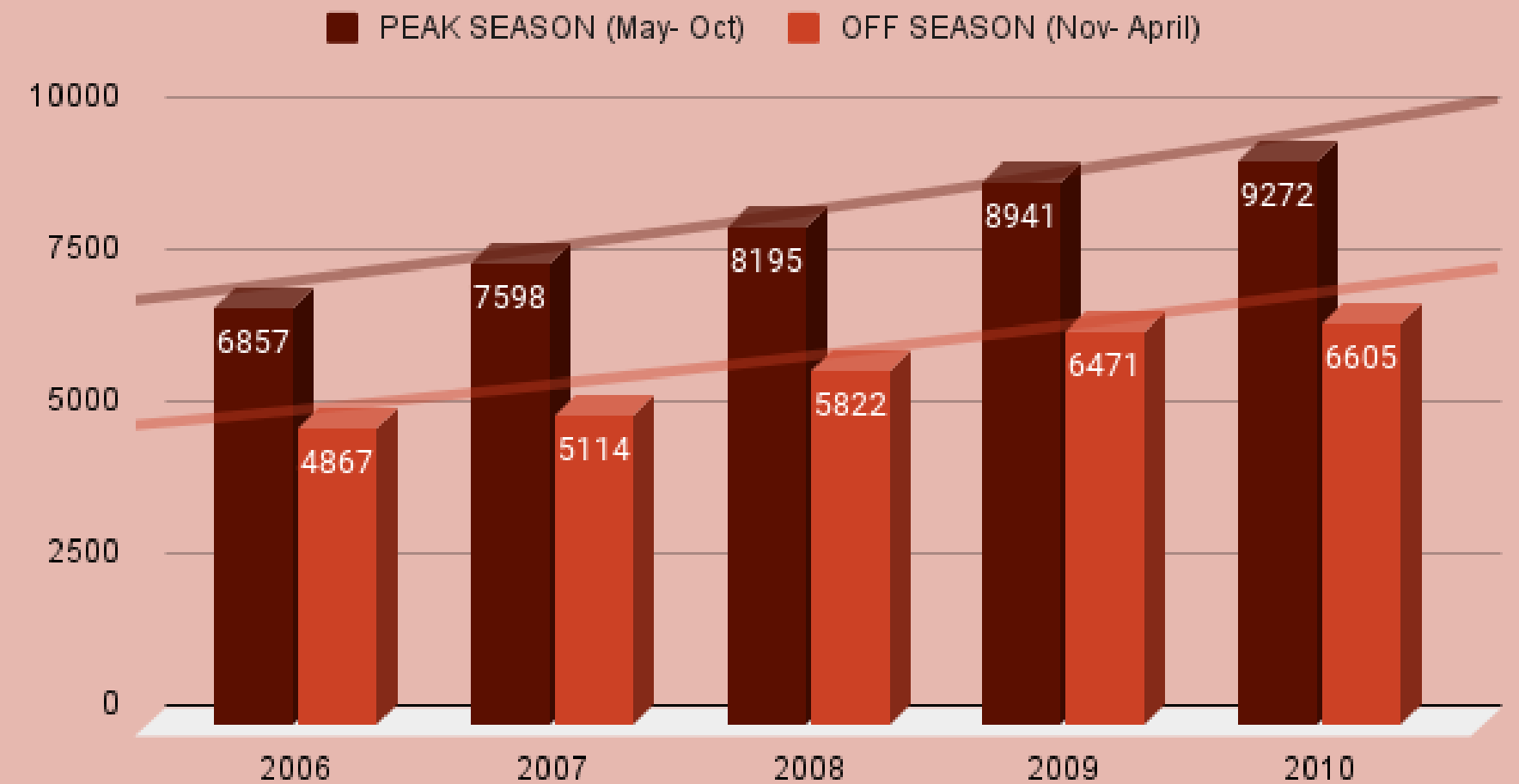


Demand Data Overview

Annual Demand (Cartons)



Change in Demand during Peak Season and Off Season



Demand for Seven Star in last 5 years

Demand Forecasting For FY 2011-2012 Using Moving Average Method

YEAR	PEAK -SEASON	OFF- SEASON
2006	1142.833333	811.1666667
2007	1266.333333	915.7142857
2008	1365.833333	970.3333333
2009	1490.166667	1078.5
2010	1545.333333	1100.833333
2011	1362.1	975.3095238

The total cost of manufacturing and maintaining the cartons of chocolates for Peak Season

Given data:

Demand: Approx 1,362 cartons (for 6 months of Peak Season)

Manufacturing cost per carton: INR 1,200 (as mentioned)

Carrying cost: 2.5% per month of the manufacturing cost per carton.

1. Manufacturing Cost:

Total manufacturing cost = 1,362 cartons * INR 1,200 per carton

Total manufacturing cost = INR 1,634,400

2. Carrying Cost:

Monthly carrying cost per carton = 2.5% of INR 1,200 = INR 30

Total carrying cost for 6 months = 1,362 cartons * INR 30 * 6 months

Total carrying cost = INR 245,160

Total Cost:

Total cost = Manufacturing cost + Carrying cost

Total cost = INR 1,634,400 + INR 245,160 = **INR 1,879,560**

The total cost of manufacturing and maintaining the cartons of chocolates for Off Season

Given data:

Demand: Approx 975 cartons (for 6 months of Off Season)

Manufacturing cost per carton: INR 1,200 (as mentioned)

Carrying cost: 2.5% per month of the manufacturing cost per carton.

1. Manufacturing Cost:

Total manufacturing cost = 975 cartons * INR 1,200 per carton

Total manufacturing cost = INR 11,70,000

2. Carrying Cost:

Monthly carrying cost per carton = 2.5% of INR 1,200 = INR 30

Total carrying cost for 6 months = 975 cartons * INR 30 * 6 months

Total carrying cost = INR 1,75,500

Total Cost:

Total cost = Manufacturing cost + Carrying cost

Total cost = INR 11,70,000 + INR 1,75,500 = **INR 13,45,500**

Total Cost After Implementing ECONOMIC ORDER QUANTITY (EOQ)

EOQ= The Square Root of $2 \times (\text{annual demand in units, multiplied by order cost per purchase order})$, Divided by Annual Holding Cost Per unit

The total cost of manufacturing and maintaining the cartons of chocolates for Peak Season

Given data:

Demand: Approx 54.3676 cartons (for 6 months of Peak Season)

Manufacturing cost per carton: INR 1,200 (as mentioned)

Carrying cost: 2.5% per month of the manufacturing cost per carton.

1. Manufacturing Cost:

Total manufacturing cost = 54.3676 cartons * INR 1,200 per carton

Total manufacturing cost = INR 65,241.12

2. Carrying Cost:

Monthly carrying cost per carton = 2.5% of INR 1,200 = INR 30

Total carrying cost for 6 months = 54.3676 cartons * INR 30 * 6 months

Total carrying cost = INR 9,786.168

Total Cost:

Total cost = Manufacturing cost + Carrying cost

Total cost = INR 65,241.12 + INR 9,786.168 = **INR 75,027.288**

The total cost of manufacturing and maintaining the cartons of chocolates for Off Season

Given data:

Demand: Approx 38.9290 cartons (for 6 months of Off Season)

Manufacturing cost per carton: INR 1,200 (as mentioned)

Carrying cost: 2.5% per month of the manufacturing cost per carton.

1. Manufacturing Cost:

Total manufacturing cost = 38.9290 cartons * INR 1,200 per carton

Total manufacturing cost = INR 4,6714.8

2. Carrying Cost:

Monthly carrying cost per carton = 2.5% of INR 1,200 = INR 30

Total carrying cost for 6 months = 38.9290 cartons * INR 30 * 6 months

Total carrying cost = INR 7,007.22

Total Cost:

Total cost = Manufacturing cost + Carrying cost

Total cost = INR 4,6714.8 + INR 7,007.22 = **INR 53,722.02**

Cost Benefit After Implementing ECONOMIC ORDER QUANTITY (EOQ)

Total Cost Before EOQ

Peak Season- INR 18,79,560

Off Season- INR 13,45,500

Total Cost After EOQ

Peak Season- INR 75,027.288

Off Season- INR 53,722.02

Cost Benefit After EOQ

Peak Season- INR 18,04,532.71

Off Season- INR 12,91,777.98

When And How Much Ingredients To Order

2						
3	DARK CHOCOLATE			COCOA POWDER		
4	Annual demand	18228.6		Annual demand	11918.7	
5	Total cost	21874320		Total Cost	14302440	
6	Ordering cost per order	800		Ordering cost per order	1000	
7	Annual holding cost per unit	6380.01		Annual holding cost per unit	4767.48	
8	EOQ	2342.160175		EOQ	2449.489743	
9						
10	DRY FRUITS & NUTS			COCOA BUTTER		
11	Annual demand	9348		Annual demand	14489.4	
12	Total Cost	11217600		Total cost	17387280	
13	Ordering cost per order	2100		Ordering cost per order	1200	
14	Annual holding cost per unit	2804400		Annual holding cost per unit	4346.82	
15	EOQ	129.614814		EOQ	3098.386677	
16						

Solutions to Optimizing Inventory Levels

- Optimizing Order Quantities: Economic Order Quantity (EOQ) to minimize costs, supported by calculations.
- Climate-Controlled Logistics: Partner with logistics providers like DHL for better cold-chain management.
- Seasonal Storage Optimization - Invest in energy-efficient climate control technology to reduce long-term storage costs
- Supplier Collaboration: Improve relationships with suppliers to reduce lead times and get bulk deals.
 1. Vendor Collaboration and Bulk Purchase Agreements
 2. Vendor-Managed Inventory (VMI) System



Strategies to Boast OFF season Demand to Increase Sales

- **Product Bundling:** Bakeries and dessert shops can incorporate Seven Star chocolate bars into their offerings, creating special desserts like chocolate cakes, brownies, shakes or ice creams featuring the product.
- **Cross-Promotions:** Suggest collaborations with gifting companies, fitness brands, or online retailers.
- **Tourism and Hospitality:** Partnering with Hotels, airlines, resorts and Event Planning and Wedding Industry that often offer complimentary sweets to guests, can elevate brand visibility and associate Seven Star with luxury experiences.
- **Cooking Competitions & Influencers:** Sponsor cooking competitions using Seven Star, collaborate with influencers, and publish recipes in magazines and newspapers for promotion.

*Thank
You*