

# Data-Driven Denim: Financial Forecasting at Levi Strauss

In early 2023, Harmit Singh, Chief Financial and Growth Officer of Levi Strauss, faced a critical decision. The company's AI-powered forecasting algorithm was suggesting potential challenges in the second half of 2023, despite a strong start to the year. This 170-year-old apparel company had been incorporating machine learning into its forecasting process since 2018, working with Wipro to streamline operations and improve accuracy.

Singh needed to assess both the AI-generated forecasts and traditional bottom-up forecasts to identify the drivers of pessimism. Then, he and CEO Chip Bergh would need to determine if and how Levi Strauss should respond to these potential headwinds in an uncertain macroeconomic environment.

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# Levi Strauss: A 170-Year Legacy

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## 1853: Founding

Levi Strauss, a German immigrant, establishes a dry goods store in San Francisco during the California Gold Rush.

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## 1873: Blue Jeans Patent

Strauss and tailor Jacob Davis secure a patent for using metal rivets to reinforce trousers, creating the iconic blue jeans.

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## 1971-1986: First Public Era

The company goes public in 1971 and remains so until 1986, when descendants orchestrate the largest apparel industry LBO.

4

## 2019: Second IPO

Under Bergh and Singh's leadership, Levi Strauss returns to public markets, generating \$6 billion in revenue by 2022.



# Brand Portfolio and Distribution Channels

## Brand Portfolio

Levi Strauss operates five apparel brands: Levi's (the core brand famous for 501 jeans), Signature by Levi Strauss and Denizen (value-oriented lines generating 93% of 2022 revenue), Dockers (business casual wear), and Beyond Yoga (premium athleisure acquired in 2021).

## Wholesale Channel

Historically dominant, wholesale distribution through third-party retailers accounted for 62% of total sales in 2022. This includes department stores, specialty retailers, third-party e-commerce sites, and franchised locations.

## "DTC First" Strategy

Direct-to-consumer sales constituted 38% of revenues in 2022, up from 25% in 2014. This includes 1,089 brick-and-mortar stores (81% of DTC sales) and brand-specific websites like levi.com (19% of DTC sales).



# Digital Transformation Journey



## Talent Acquisition

Recruited Dr. Katia Walsh as Chief Global Strategy and AI Officer in 2019 and Jason Gowans as first Chief Digital Officer, while upskilling existing employees through AI and coding boot camps.



## Process Automation

Established a Robotic Process Automation Center of Excellence to identify and implement opportunities to automate labor-intensive tasks.



## AI Implementation

Used AI to identify trends, optimize pricing and shipping decisions, and improve order fulfillment by determining whether to ship from retail stores or distribution centers.

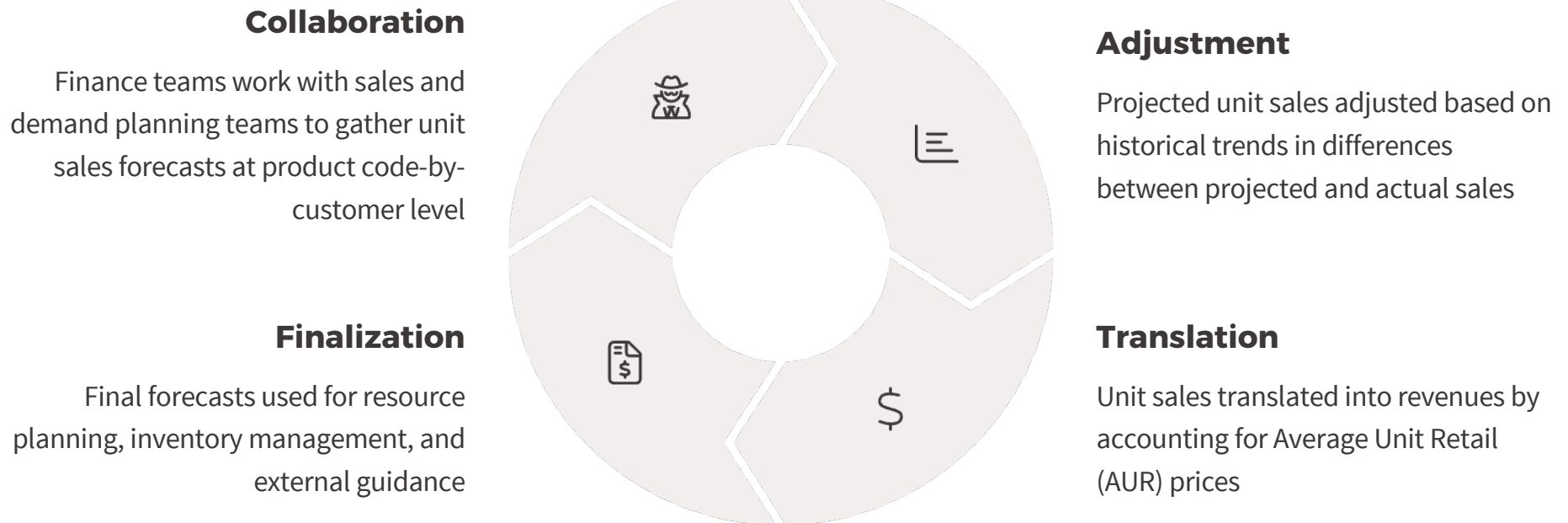


## ERP Implementation

Launched a roadmap for a new enterprise resource planning system globally, providing enhanced data accessibility, financial process consistency, and inventory management.



# Traditional Bottom-Up Forecasting Process



While generally accurate, this process was time-consuming, requiring a week's work from 5-10 employees to develop a country-level forecast. It also relied heavily on human judgment, which was prone to behavioral biases and an inherent conservatism, often overreacting to short-term events by extrapolating them for the remainder of the quarter and year.

# Partnership with Wipro: AI-Powered Forecasting



## Partnership Formation

Singh partnered with Wipro in 2018 after seeing their success with ML/AI forecasting, aiming to improve Levi's forecasting ahead of their 2019 IPO

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## Data Collection

Assembled dataset with 25-30 attributes including historical revenues, dilution, unit levels, returns, order fulfillment rates, promotional calendars, and internal forecasts

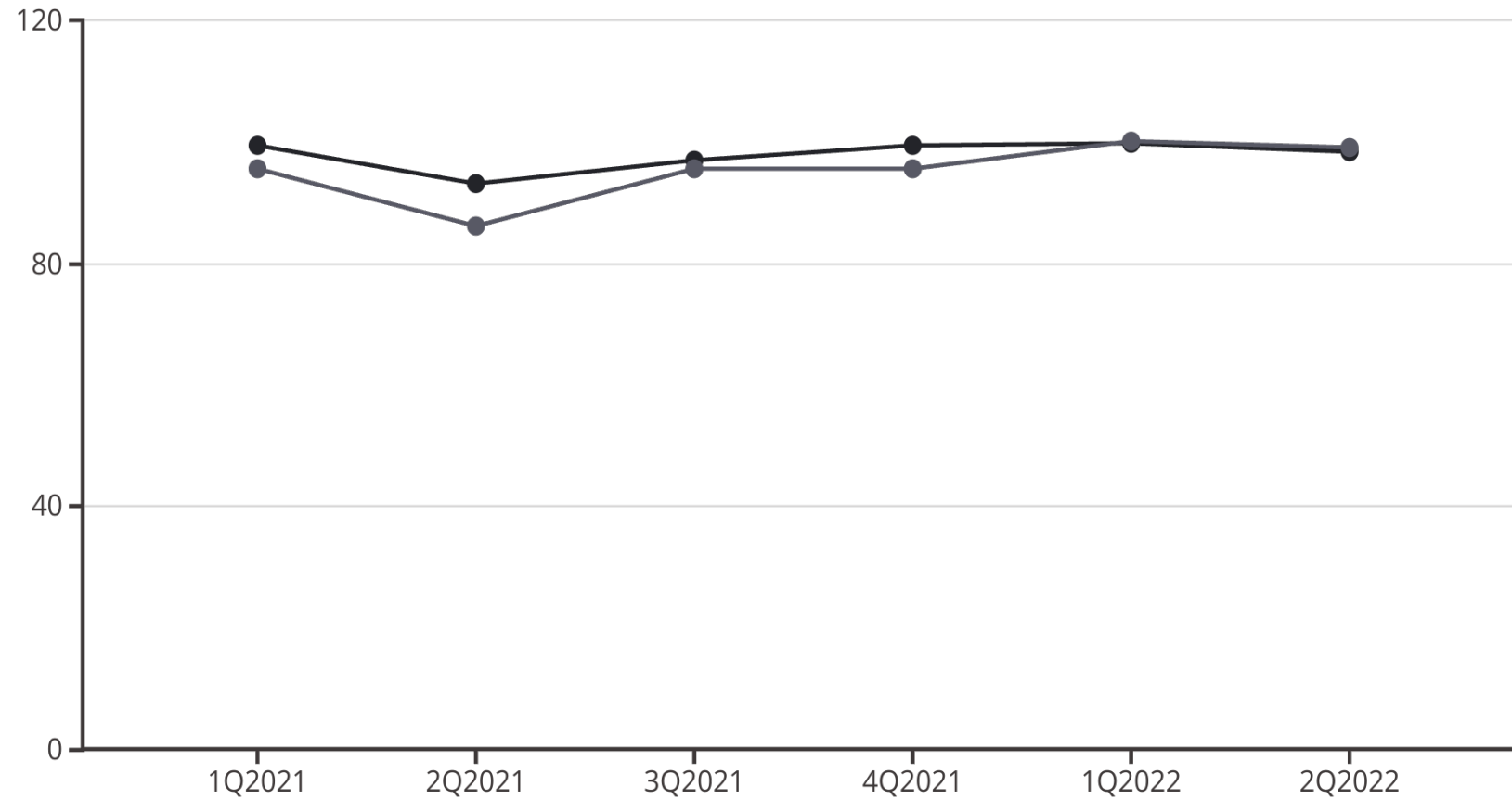


## Model Development

Wipro employed a long short-term memory neural network model, using 2013-2017 data for training and 2018 data for testing

The partnership faced several challenges, including language barriers between data scientists and finance teams, lack of industry understanding from Wipro, and initial skepticism from Levi's finance teams who doubted AI could capture market nuances like viral trends or incorporate "soft" information about wholesaler health and fashion trends.

## Manual vs. AI Forecast Performance



After implementing the AI forecasting model in 2019, Levi Strauss found it produced remarkably accurate forecasts, often outperforming manual forecasts. The AI model maintained a reliable 1-5% error margin pre-pandemic. However, during COVID-19, forecast errors soared to 40-50% as the model erroneously projected growth while economies halted.

As conditions normalized in 2021 and fresh data was incorporated, the model's accuracy recovered. By 2022, the refined Wipro forecasts were implemented globally, serving not as a replacement for bottom-up forecasts but as an additional data point to verify projection accuracy.

# Navigating Levi's Path Forward in 2023

**7%**

## **2022 Revenue Growth**

Year-over-year income increase, with Levi's surpassing Q4 EPS expectations

**6%**

## **Q1 2023 Revenue Growth**

Strong start to the year, with revenues reaching \$1.7 billion

**1.5-3%**

## **2023 Projected Growth**

Management's initial forecast, contingent on no worsening conditions

As 2023 unfolded, both the AI algorithm and manual forecasts began signaling potential challenges ahead, particularly for the latter half of the year. This presented a dilemma for management. While the algorithm generated revenue forecasts, it didn't provide explanations for its predictions, making it difficult to assess appropriate actions.

Singh and Bergh faced two critical decisions: first, determining whether these algorithmic forecasts were reliable, and second, deciding on an appropriate course of action to mitigate potential challenges. The bottom-up analysis showed similar signs of weakness but also identified possible commercial actions to counteract them.



# Case Analysis: Key Questions

- Why is Levi Strauss partnering with Wipro? What are the challenges to working with Wipro? Will this be a profitable partnership moving forward?
- Using the data provided in the Excel workbook “Supplementary Historical Sales Data and Projections,” estimate a linear regression where the dependent variable is gross sales and the independent variable is projected unit sales. Interpret the regression results. Calculate the mean absolute percentage error.
- Can other algorithms other than Linear Regression provide better results, or at list give a higher degree of interpretation of the factors impacting sales?
- The most recent algorithm-produced forecasts suggested that Levi Strauss might face significant headwinds in the second half of 2023, as described in the case. How would you advise Harmit to respond?