



The Future of Forecasting

MIT SCM Capstone Project

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Advisor | Inma Borrella



Agenda

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Introduction

1. Company Background
2. Motivation
3. Objective and Scope

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1. Overview
2. Discovery
3. Diagnosis
4. Demand Sensing Approaches

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1. Characterization of Demand
2. Current Forecasting Process
3. Forecast Accuracy Analysis
4. Suggestions for Implementing Demand Sensing

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2. Future work



1 Introduction

Company Background

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1960s
Company Founded

Originally 'Frontier Contact Lenses' from Buffalo, New York. Later moved to Jacksonville, Florida



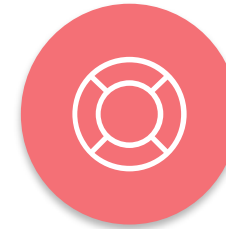
1970s
Developed Etafilcon

Chief Optometrist develops new material, Etafilcon, that allowed production of soft lenses.



1980s
Acquired by J&J

Division was renamed to 'Vistakon'. Developed automated production system, leading to the creation of the Acuvue brand.



1990s
1 Day Lenses

Created first low-cost, daily disposable lens. Expanded globally to Brazil, Japan, Singapore and UK. Changed name to JJVC.



2000+
Market Leader

JJVC gains and maintains leadership in the contact lens market.

Company Background

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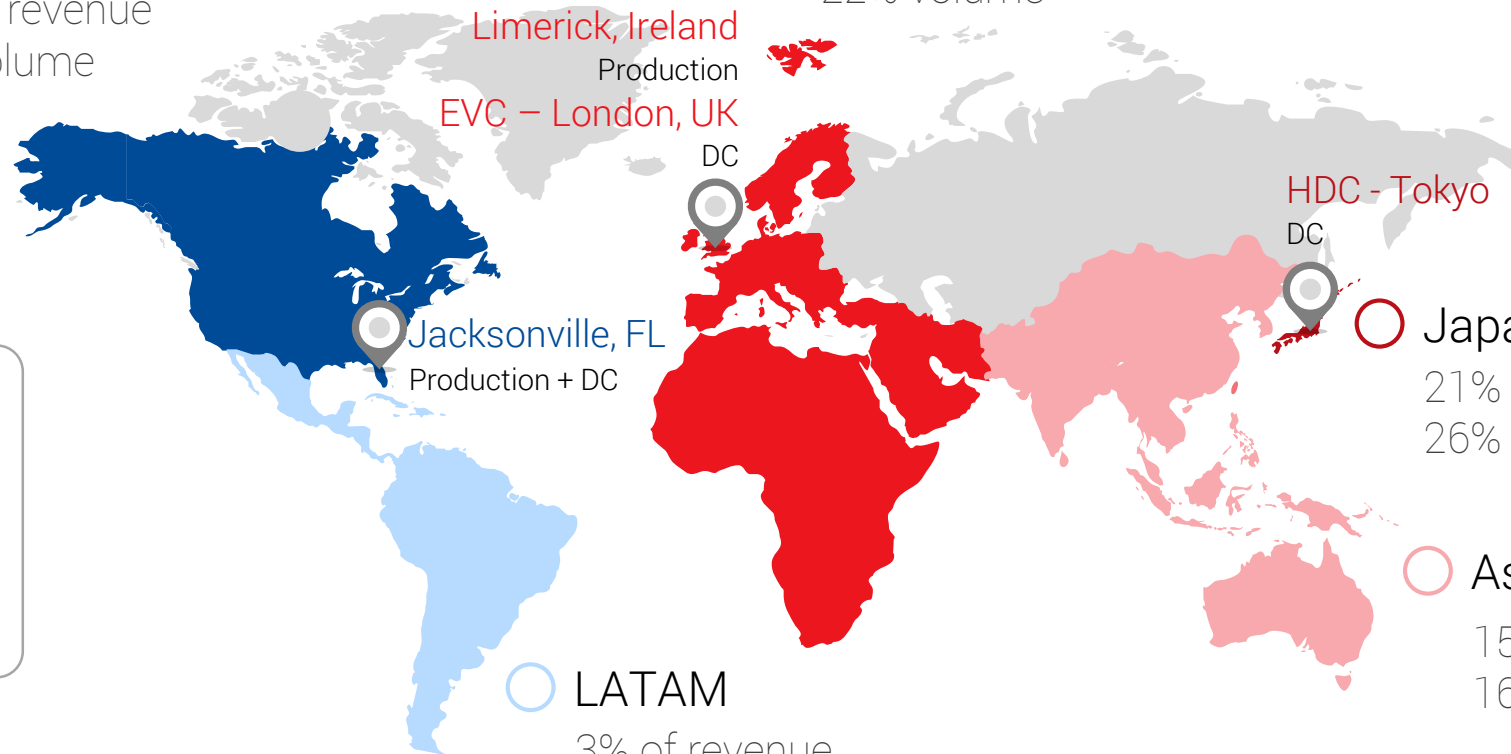
○ US and Canada
38% of revenue
32% volume

○ Europe, Middle East and Africa
21% of revenue
22% volume

○ Japan
21% of revenue
26% volume

○ Asia Pacific
15% of revenue
16% of volume

○ LATAM
3% of revenue
1% of volume



Key Insights
\$3Bn Business
4Bn Lenses
22,000 SKUs

“

We must constantly strive to reduce our cost in order to maintain reasonable prices. Customers' orders must be serviced promptly and accurately.

- Lines 3 and 4 of the J&J Credo

Johnson & Johnson

Motivation

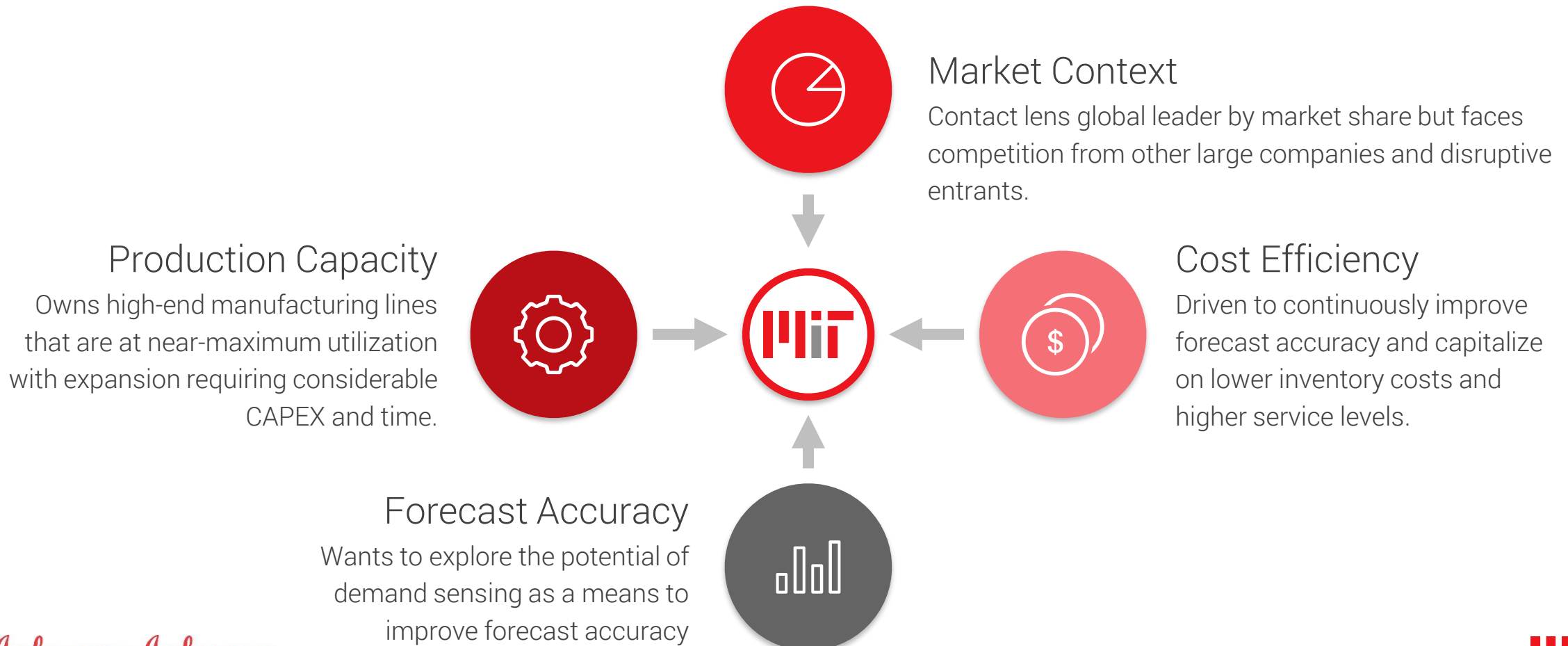
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Objective and Scope

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Objective

Analyze the current J&J Vision Care forecasting process and propose suggestions for improvement, paying special attention to Demand Sensing approaches.



The logo for Johnson & Johnson, featuring the company name in a red, cursive font.

Scope



Region

Continental United States



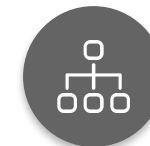
Production Facility

Jacksonville, FL



Brand

Acuvue



Brand Family

1-Day Moist (1DM)

1-Day Moist for Astigmatism (1DM-A)



2 Methodology

Overview

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Tasks

Sep

Oct

Nov

Dec

Jan

Feb

Mar

Apr

May

Jun

Phase I

Objective and Scope

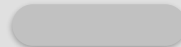
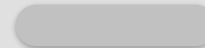
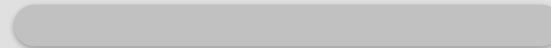
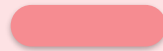
Discovery

Phase II

Diagnosis

Demand Sensing Approaches

Capstone Write-up



Discovery

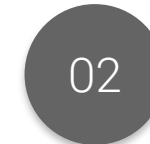
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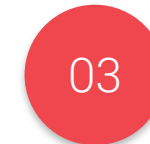
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Literature Review
SCM History
Forecasting Techniques
Forecasting Measures
Demand Sensing Case Studies



Interviews
Forecasting
Demand Planning
S&OP



Site Visit
Jacksonville, FL
Production Facility
Distribution Center
S&OP Interviews

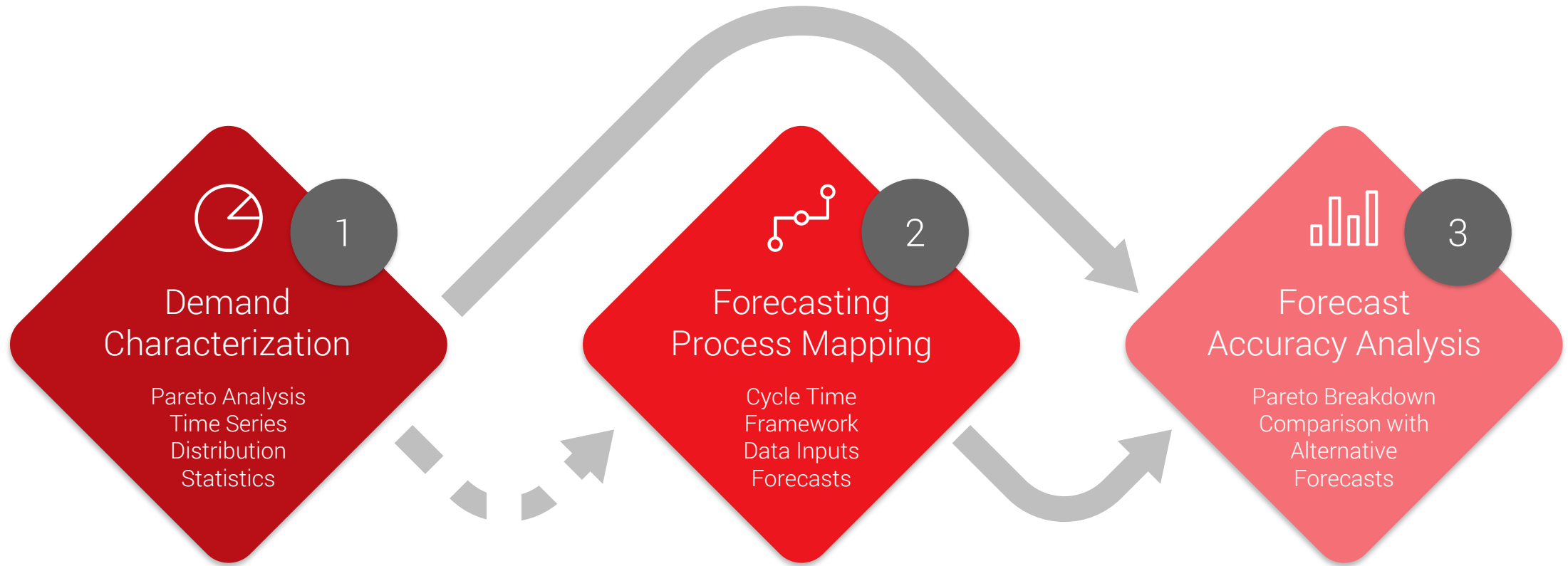
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Demand Sensing Approaches

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Latency Reduction

Reduce cycle time between forecasts to take advantage of latest demand information updates.

01



Downstream Data Integration

Include downstream supply chain data, such as POS data, in the demand forecasting model.

02



03

Measuring the Impact of Demand Shaping Actions

Record and measure the impact of demand shaping events such as promotions, price changes, product launches and forward-buy arrangements.





3 Findings

Characterization of Demand

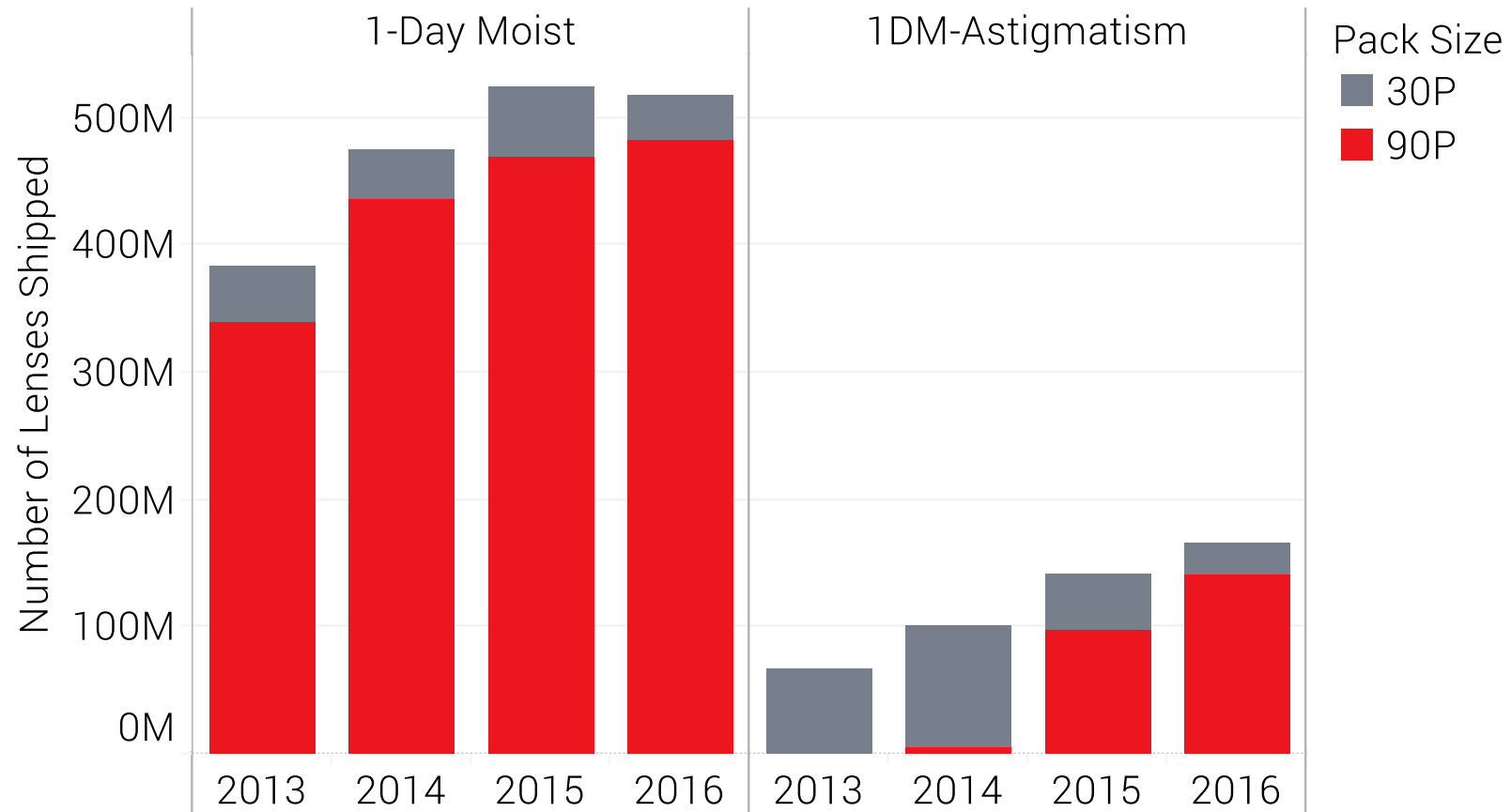
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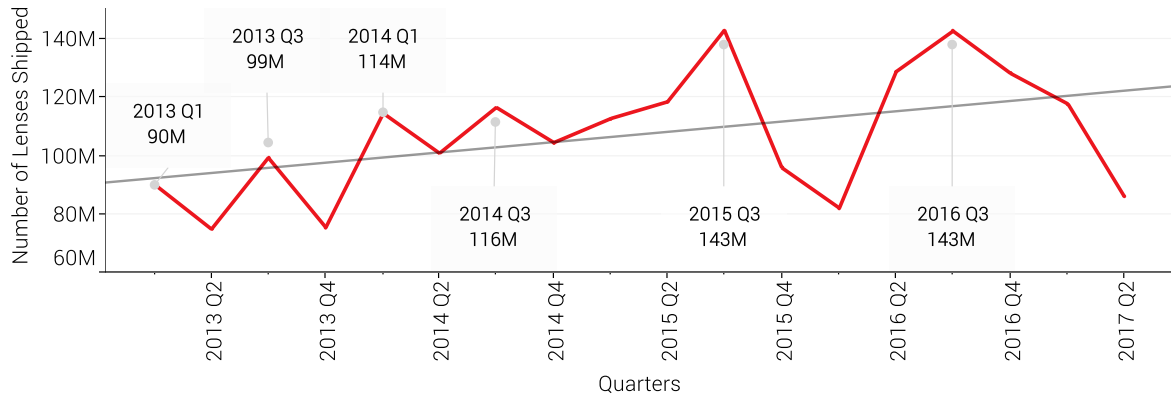


Characterization of Demand

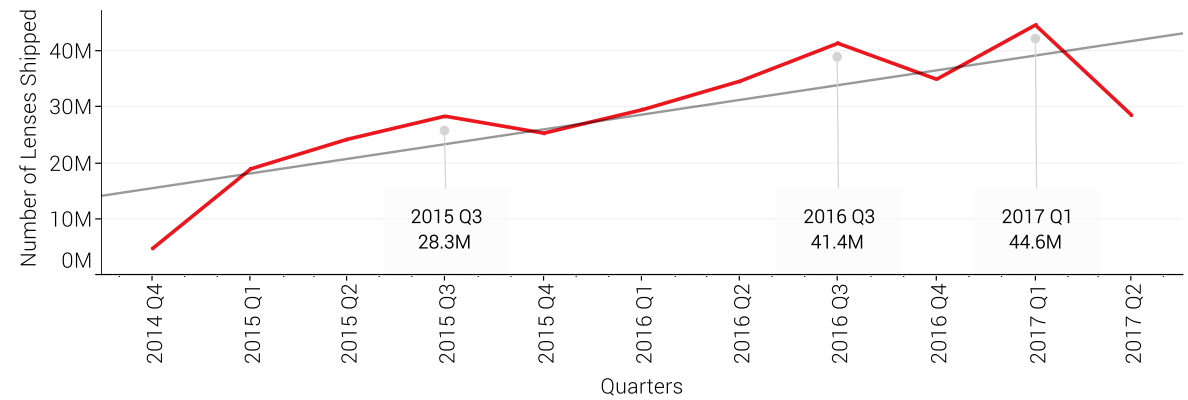
Shipments Time Series by Quarters



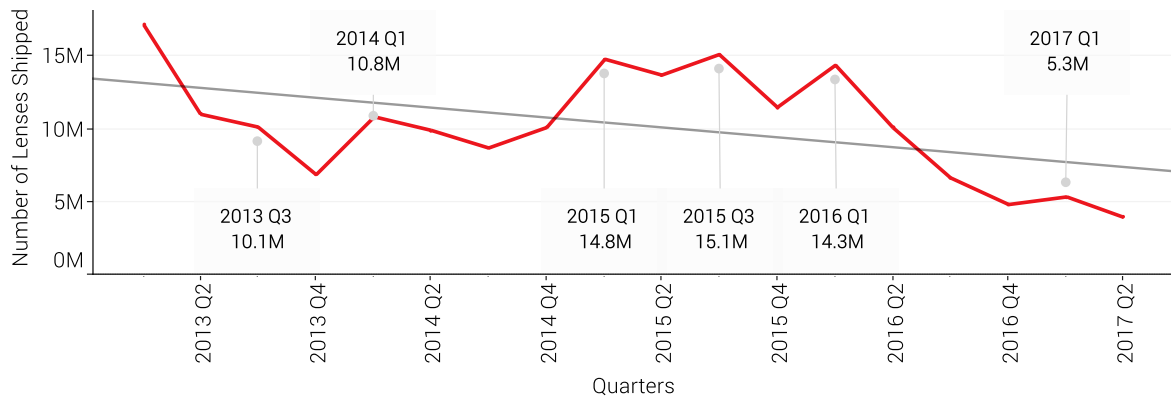
1 Day Moist 90-Pack



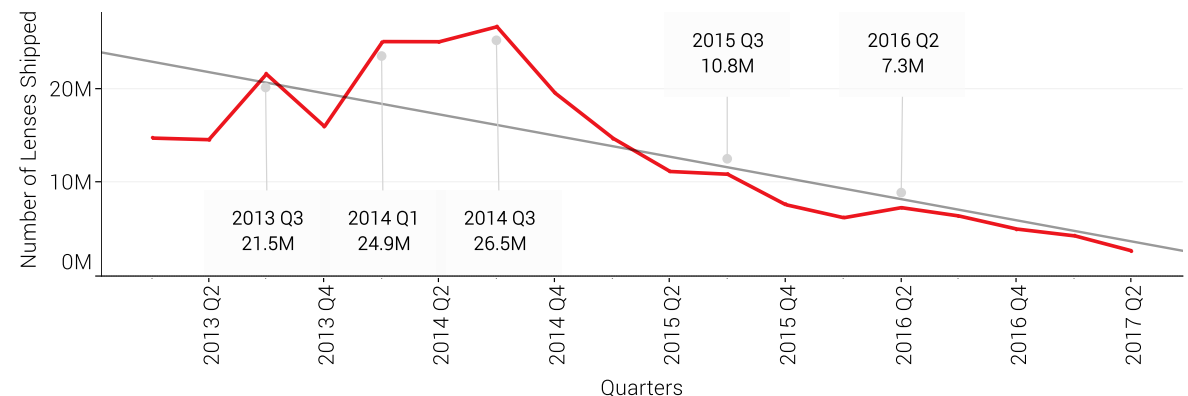
1 Day Moist for Astigmatism 90-Pack



1 Day Moist 30-Pack



1 Day Moist for Astigmatism 30-Pack

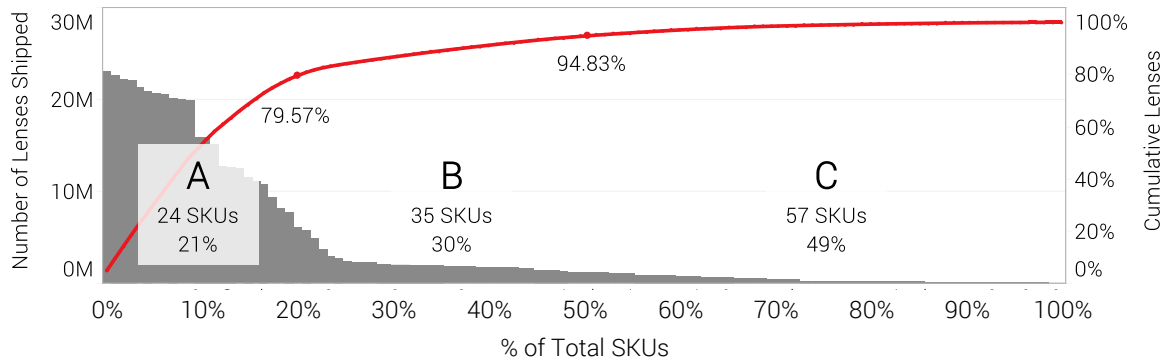




Characterization of Demand

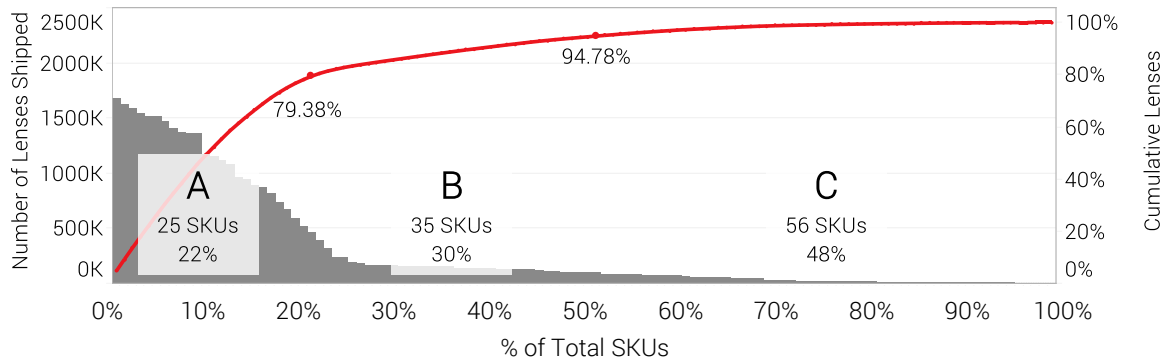
Pareto Curves

1 Day Moist 90-Pack

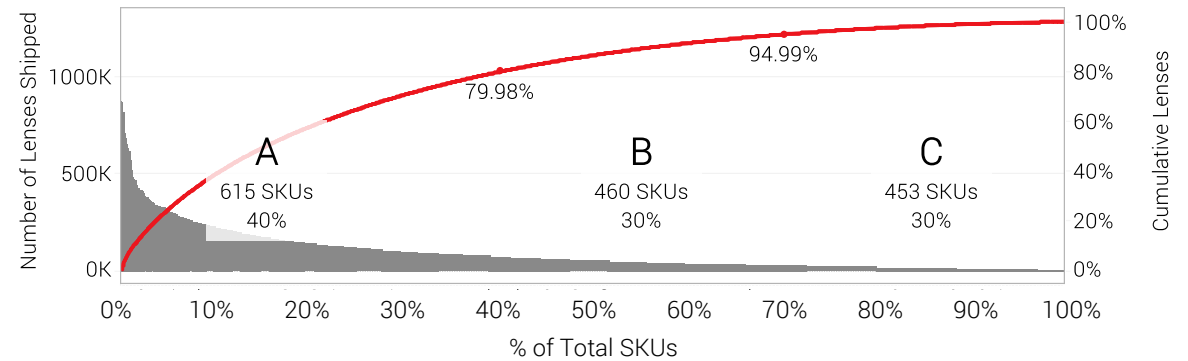


116 SKUs

1 Day Moist 30-Pack

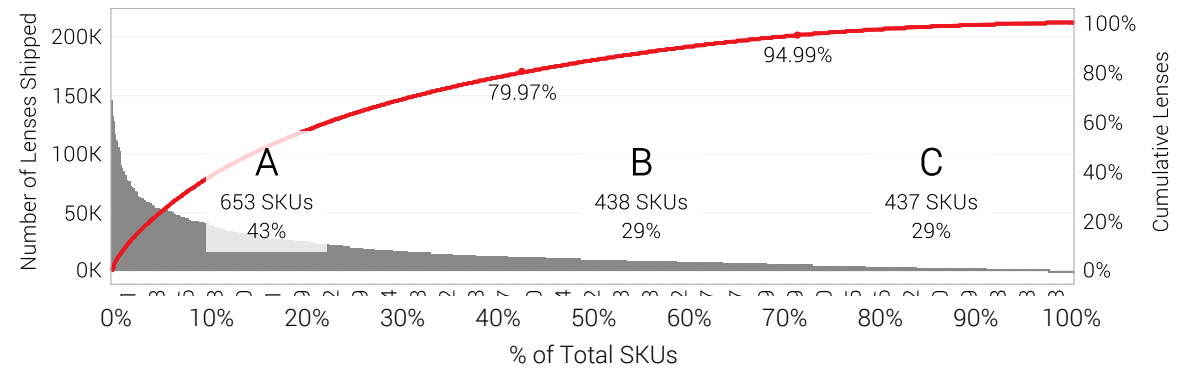


1 Day Moist for Astigmatism 90-Pack



1528 SKUs

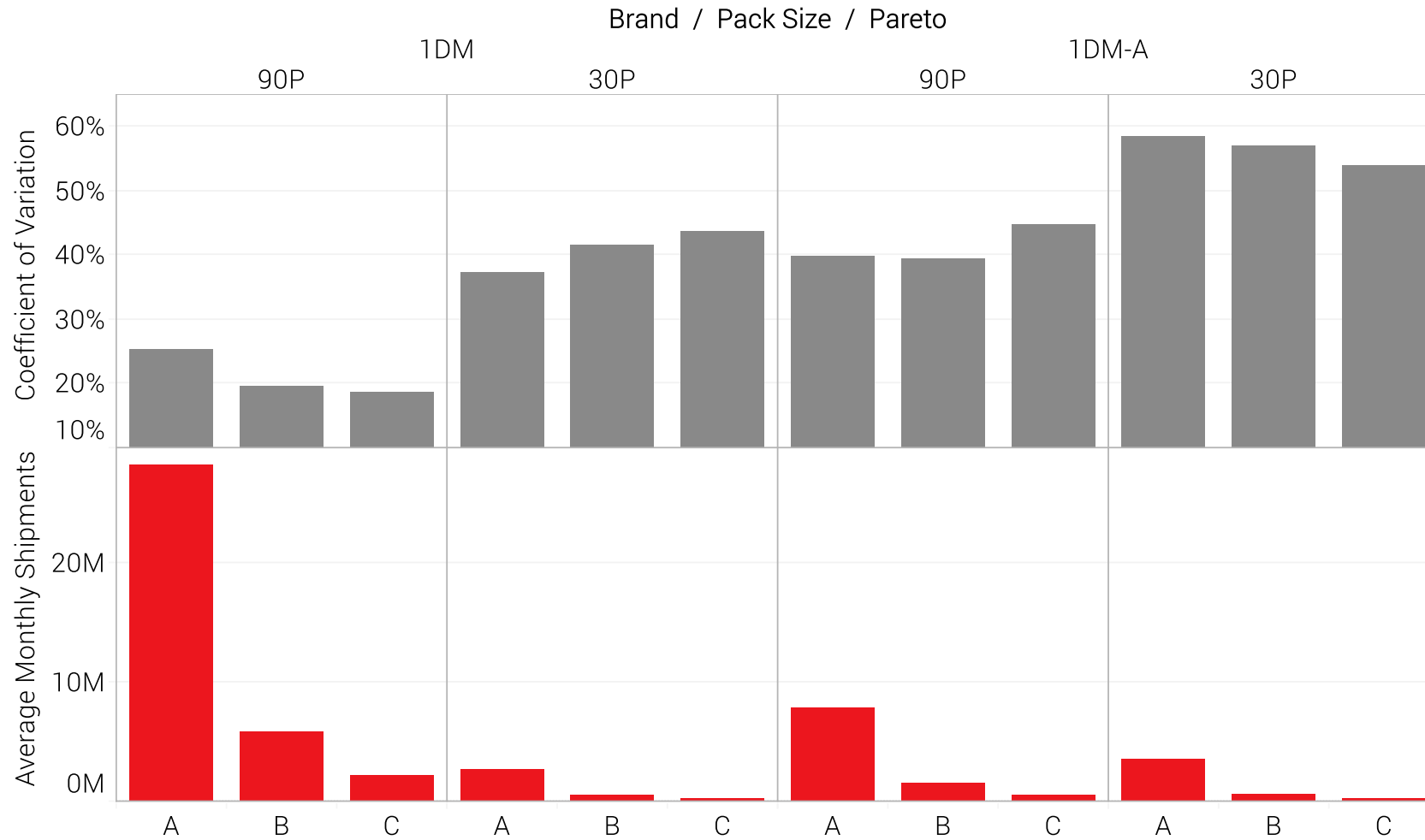
1 Day Moist for Astigmatism 30-Pack



Characterization of Demand



Mean Shipments vs Coefficient of Variation for each Pareto segment



Forecast Accuracy Analysis

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1 Aggregation Levels

- Brand
- Pack Size
- Pareto
- SKU
- Month
- Quarters

2 Forecasts Compared

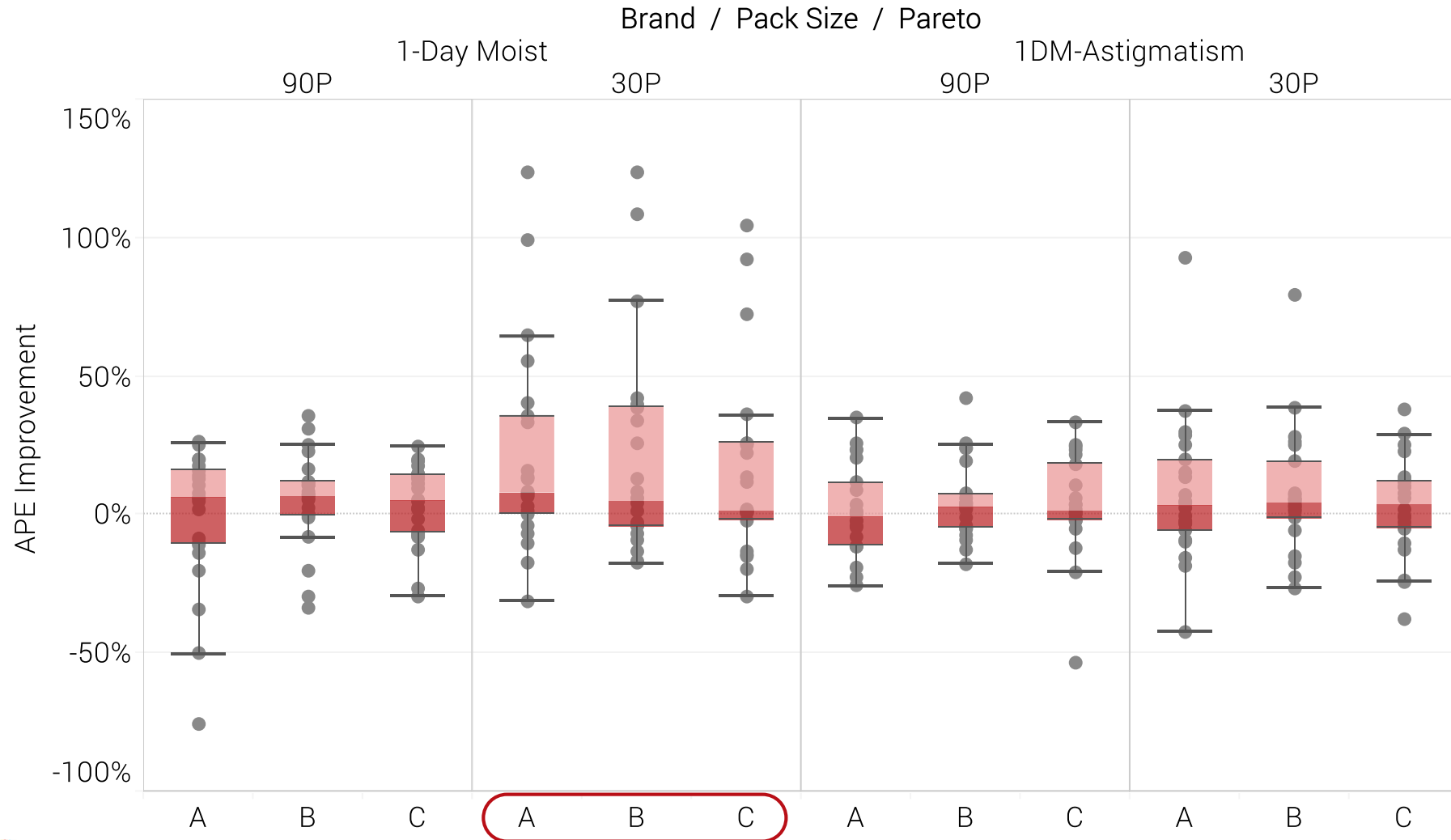
- J&J Vision Care - Statistical
- J&J Vision Care - Lag 03
- J&J Vision Care - Lag 02
- J&J Vision Care - Lag 01
- Naïve
- 2-Month Average
- 3-Month Average
- 4-Month Average
- 5-Month Average
- 6-Month Average
- Simple Exp. Smoothing
- Double Exp. Smoothing

3 Accuracy Metrics

- Bias
- MAPE
- MAPV
- PVE
- RMSE

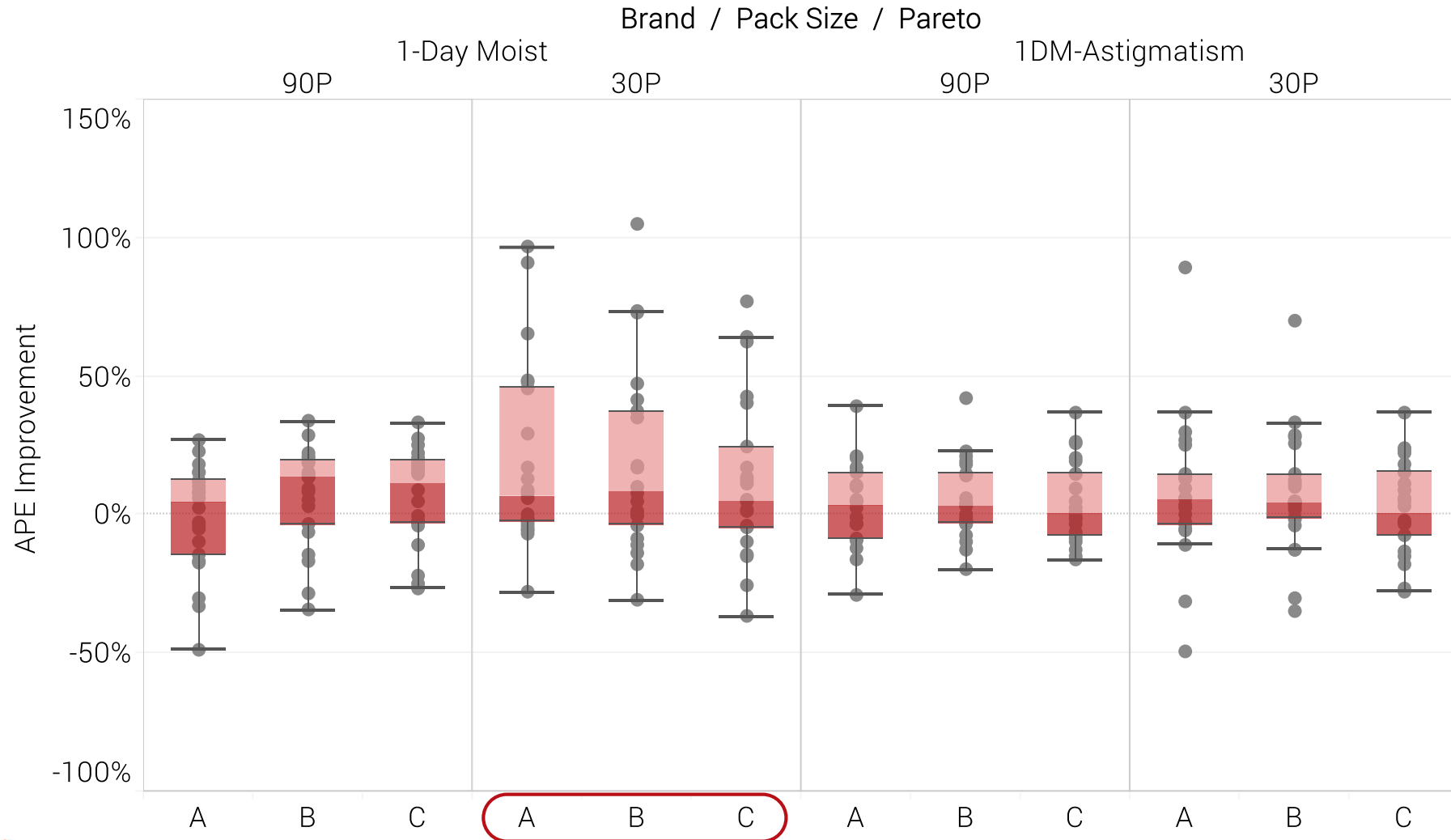
Forecast Accuracy Analysis

Naïve vs Lag 01 Forecast Comparison Results



Forecast Accuracy Analysis

2-Month Average vs Lag 01 Forecast Comparison Results



Current Forecasting Process

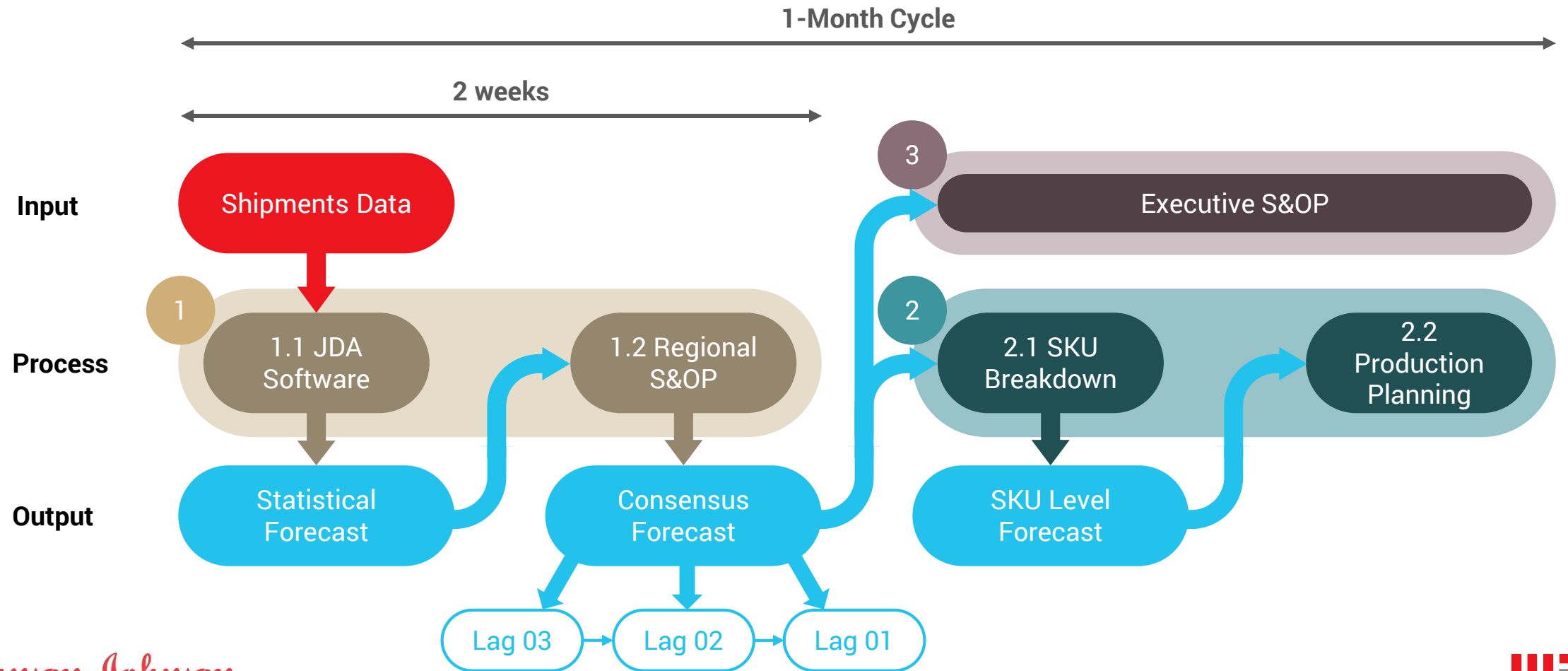
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Suggestions for Implementing Demand Sensing

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Latency Reduction

Reduce cycle time between forecasts to take advantage of latest demand information updates.

01



Downstream Data Integration

Include downstream supply chain data, such as POS data, in the demand forecasting model.

02



03

Measuring the Impact of Demand Shaping Actions

Record and measure the impact of demand shaping events such as promotions, price changes, product launches and forward-buy arrangements.



Suggestions for Implementing Demand Sensing

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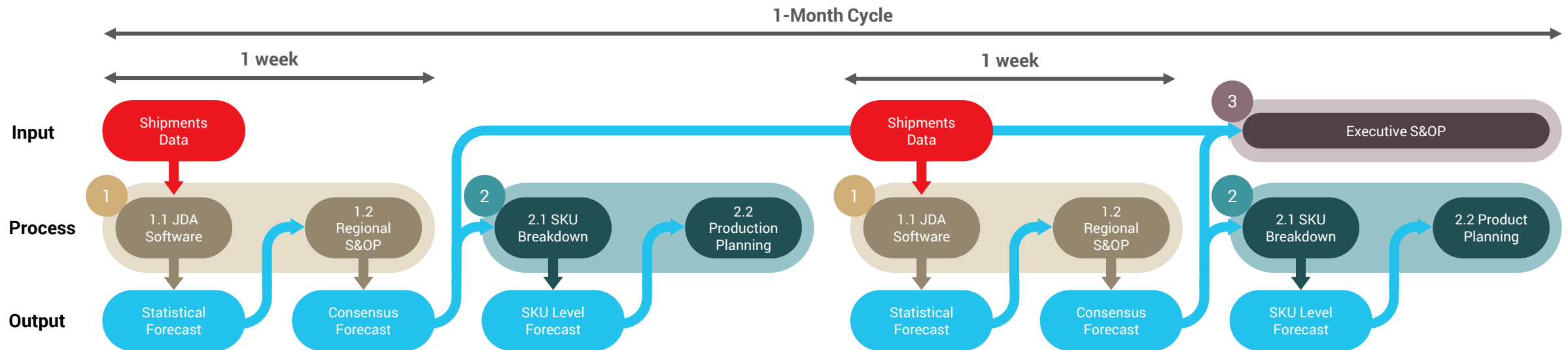
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01 Latency Reduction



Suggestions for Implementing Demand Sensing

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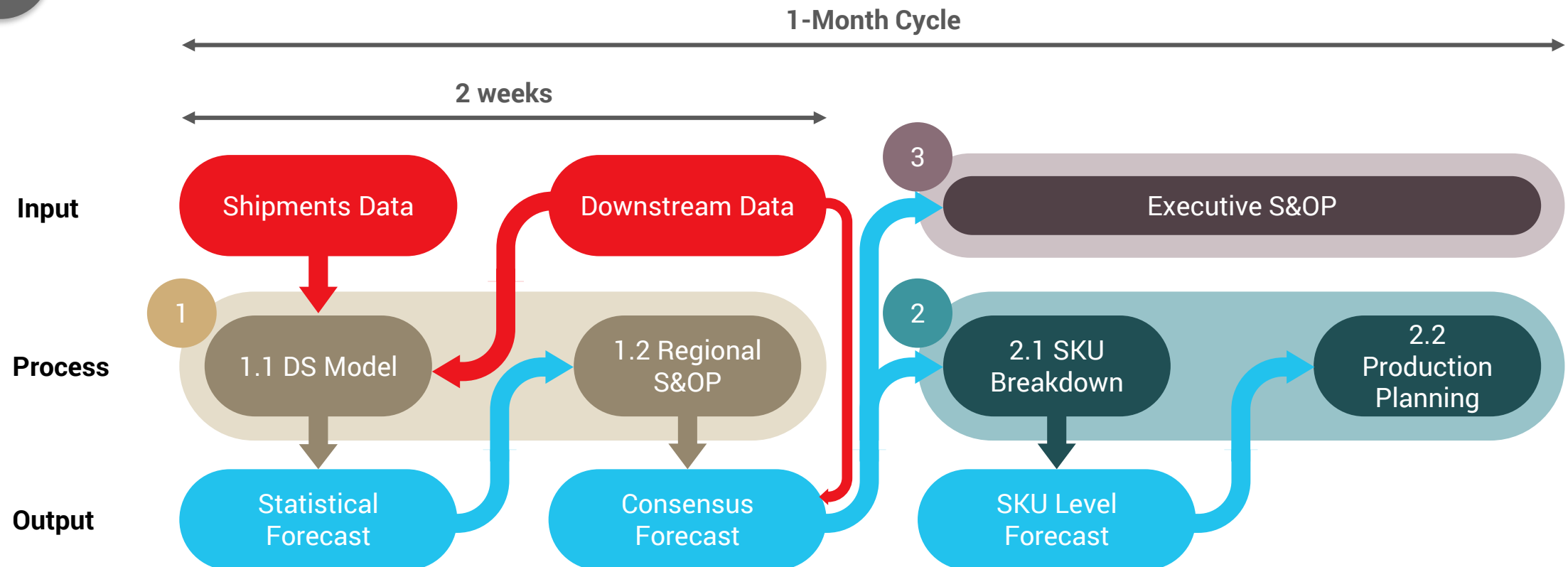
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02 Downstream Data Integration



Suggestions for Implementing Demand Sensing

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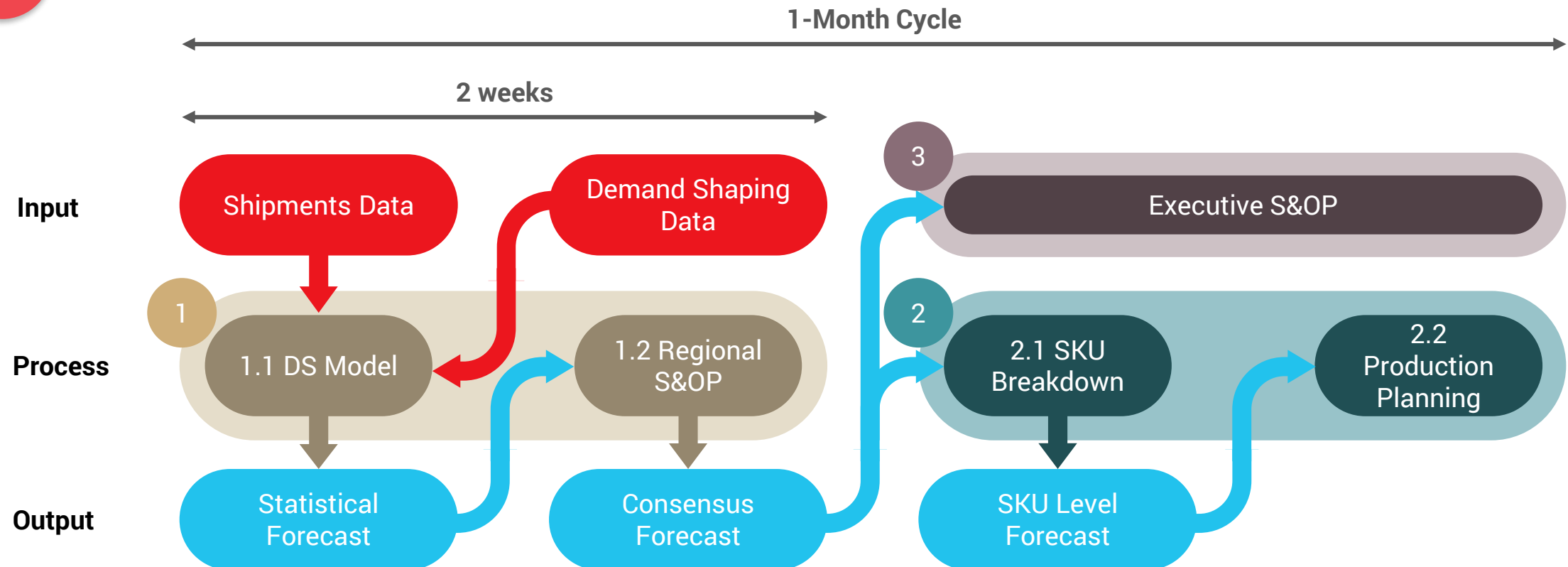
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03 Measuring the Impact of Demand Shaping Actions



Suggestions for Implementing Demand Sensing

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Latency Reduction

- Cost-benefit tradeoff
- Cross-functional coordination

Downstream Data Integration

- Cost-benefit tradeoff
- Systems integration
- Data access
- No guaranteed benefit in accuracy

Demand Shaping Actions

- Cost-benefit tradeoff
- Data structuring
- No guaranteed benefit in accuracy

Challenges

Opportunities

- Simplest solution
- Fastest to Implement
- Guaranteed improvement in accuracy

- Greater accuracy potential
- Real time updates
- More responsive to change



4 Conclusions

Takeaways

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01

Forecast Accuracy Improvements

We recommend J&J Vision Care consider the use of simpler forecasting techniques for the 30-Pack pack size category and, more specifically, for the 1-Day Moist 30-Pack product segment.

02

Demand Sensing Initiatives

We recommend J&J Vision Care consider the Demand Sensing initiatives we provided. Latency Reduction should be implemented first.

Future Work

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● Downstream Data Integration

- Collect data at different echelons in the Supply Chain.
- Develop predictive system to forecast demand based on variations in downstream supply chain data.

● Measuring the Impact of Demand Shaping Actions

- Propose a system to capture demand shaping events in a structured manner.
- Measure the impact of past initiatives.
- Develop predictive system to forecast future events.



Thank You

Questions?

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VISION CARE, INC.

