

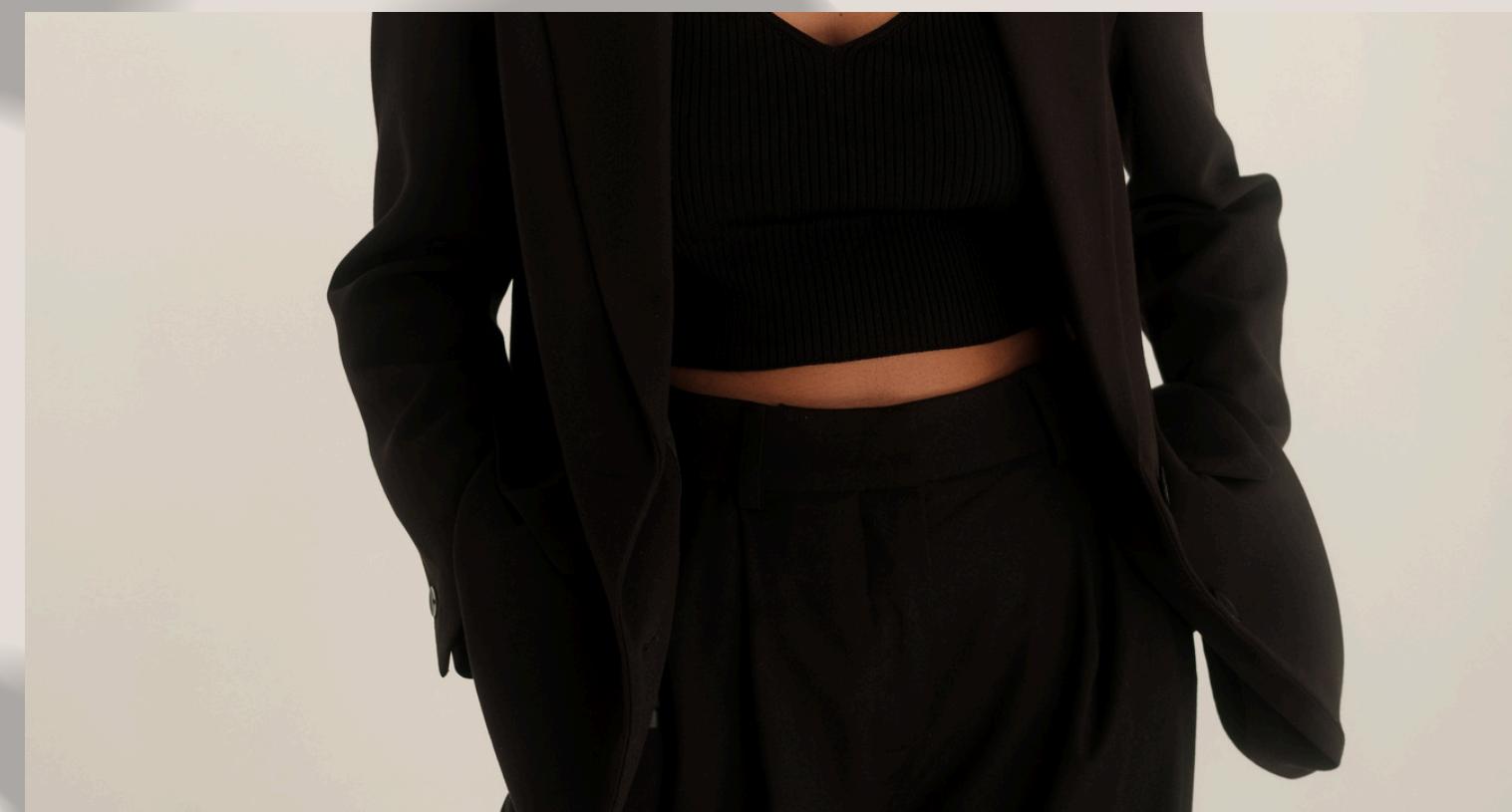
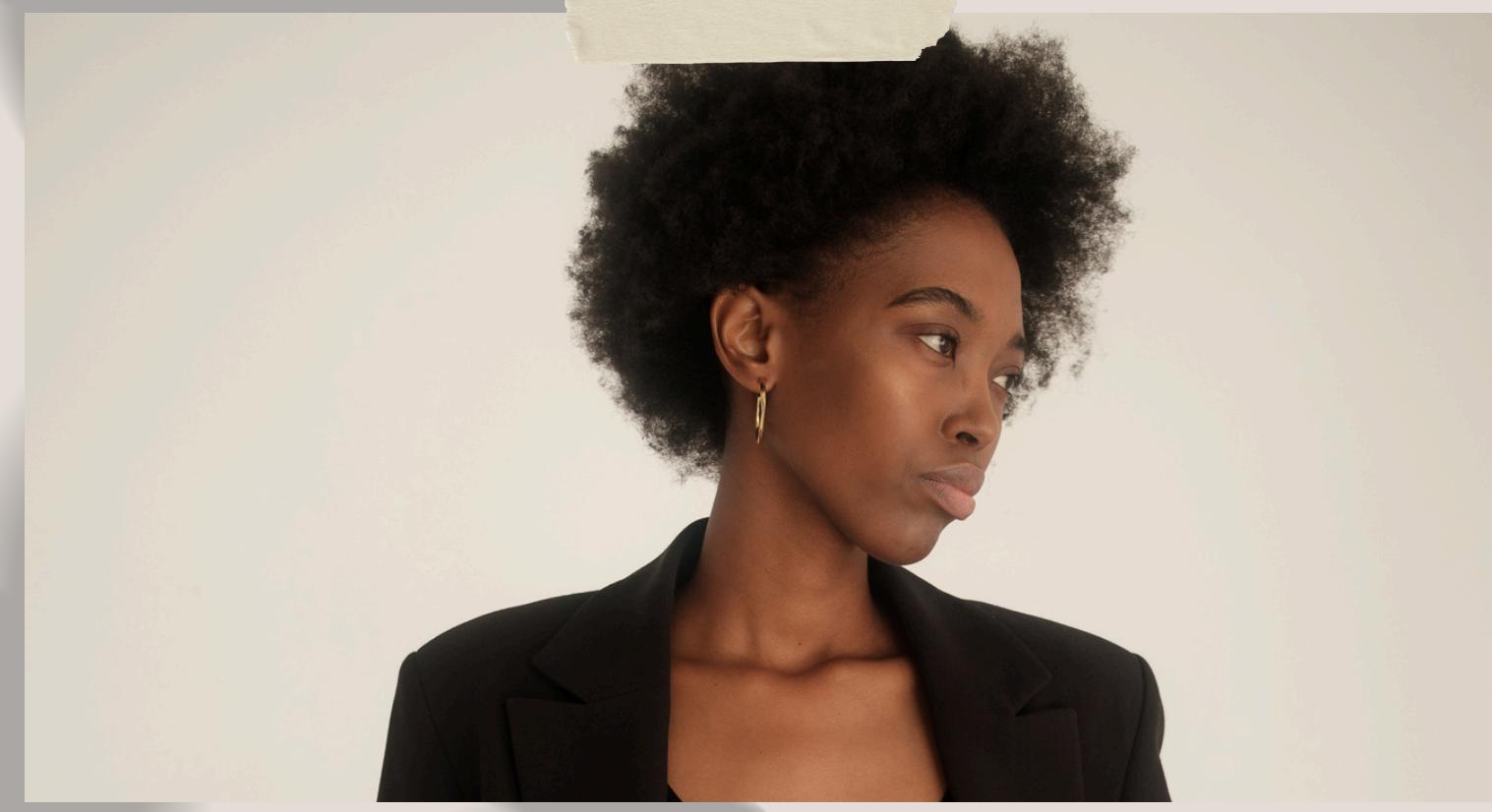


Optimizing Inventory Through Data Analytics

By Jieda Wang

LIST OF CONTENTS

- 01 Project Overview**
- 02 Analytical Framework**
- 03 Sales Predictions Analysis**
- 04 Visual Insights from Sales Predictions**
- 05 Order Suggestions Analysis**
- 06 Visual Insights from Order Suggestions**
- 07 Recommendations**
- 08 Strategic Implications**



PROJECT OVERVIEW

Brief Background

- **Challenge:** Manual, time-consuming process to decide how much to order of each article.
- **Current Method:** Buyers estimate sales per article and market, leading to potential inaccuracies.

Objective

- **Innovation:** Use machine learning to automate sales predictions and order quantities.
- **Goal:** Enhance efficiency, accuracy, and sustainability in inventory management.

Analytical Framework

Data Sources

- 5 csv files: Actual Sales, Article Hierarchy, Model Predictions, and Price & Cost.

Analytical Phases

- Phase 1: Sales Predictions
- Phase 2: Order Suggestions

Market	RMSE Model A	RMSE Model B	MAE Model A	MAE Model B
BE	279.054868	373.341860	191.117320	259.447588
CA	55.112532	67.047296	34.476325	41.857244
DE	242.270873	291.961097	148.736934	182.535889
GB	101.137653	83.010060	65.450142	53.485806
JP	84.792202	78.778071	44.198259	39.306093
SE	80.715632	71.937141	39.070782	33.899947
CN	145.779804	125.792453	88.595966	73.207357
PL	118.673830	96.352336	72.636408	59.867587
US	267.976236	220.341626	184.911500	143.356500

Quarterly Cumulative Profit Comparison

Quarter	Cumulative Profit A	Cumulative Profit B
18-Q1	9.076189e+08	9.322179e+08
18-Q2	1.126321e+09	1.152696e+09
18-Q3	1.203976e+09	1.227991e+09
18-Q4	1.211181e+09	1.234754e+09
19-Q1	1.211220e+09	1.234791e+09

A	B	C	D	E	F	G	H	I	J	K	L
article_id	week_nb	market	actual_sales	department_name	section_name	cost_sek	price_sek	sales_prediction_pcs_model_a	order_suggestion_pcs_a	sales_prediction_pcs_model_b	order_suggestion_pcs_b
1744192	201817	BE	10	Department_F	Section_03	36	199	166	21041	692	17001
1744192	201818	BE	53	Department_F	Section_03	36	199	553	0	968	0
1744192	201819	BE	103	Department_F	Section_03	36	199	912	0	1171	0
1744192	201820	BE	199	Department_F	Section_03	36	199	1004	0	1132	0
1744192	201821	BE	280	Department_F	Section_03	36	199	1097	0	1230	0
1744192	201822	BE	508	Department_F	Section_03	36	199	1152	0	1201	0
1744192	201823	BE	716	Department_F	Section_03	36	199	1255	0	1196	0
1744192	201824	BE	822	Department_F	Section_03	36	199	1279	4062	1143	0
1744192	201825	BE	953	Department_F	Section_03	36	199	1082	0	918	0
1744192	201826	BE	1466	Department_F	Section_03	36	199	1052	0	802	0
1744192	201827	BE	2317	Department_F	Section_03	36	199	1137	0	801	0
1744192	201828	BE	2723	Department_F	Section_03	36	199	856	0	554	0
1744192	201829	BE	2025	Department_F	Section_03	36	199	622	0	359	0
1744192	201819	CA	0	Department_F	Section_03	36	199	70	3684	285	3593
1744192	201820	CA	53	Department_F	Section_03	36	199	224	0	385	0
1744192	201821	CA	92	Department_F	Section_03	36	199	336	0	413	0
1744192	201822	CA	154	Department_F	Section_03	36	199	383	0	398	0

A	B	C	D	E	F	G	H	J	L	M	N	O	P
article_id	week_nb	market	actual_sales	department_name	section_name	cost_sek	price_sek	order_suggestion_pcs_a	order_suggestion_pcs_b	accumulated_sales_a	accumulated_sales_b	stock_a	stock_b
1744192	201817	BE	10	Department_F	Section_03	36	199	21041	17001	1869	12175	21041	17001
1744192	201818	BE	53	Department_F	Section_03	36	199	0	0	0	0	20988	16948
1744192	201819	BE	103	Department_F	Section_03	36	199	0	0	0	0	20885	16845
1744192	201820	BE	199	Department_F	Section_03	36	199	0	0	0	0	20686	16646
1744192	201821	BE	280	Department_F	Section_03	36	199	0	0	0	0	20406	16366
1744192	201822	BE	508	Department_F	Section_03	36	199	0	0	0	0	19898	15858
1744192	201823	BE	716	Department_F	Section_03	36	199	0	0	0	0	19182	15142
1744192	201824	BE	822	Department_F	Section_03	36	199	4062	0	10306	0	22422	14320
1744192	201825	BE	953	Department_F	Section_03	36	199	0	0	0	0	21469	13367
1744192	201826	BE	1466	Department_F	Section_03	36	199	0	0	0	0	20003	11901
1744192	201827	BE	2317	Department_F	Section_03	36	199	0	0	0	0	17686	9584
1744192	201828	BE	2723	Department_F	Section_03	36	199	0	0	0	0	14963	6861
1744192	201829	BE	2025	Department_F	Section_03	36	199	0	0	0	0	12938	4836
1744192	201819	CA	0	Department_F	Section_03	36	199	3684	3593	299	299	3684	3593
1744192	201820	CA	53	Department_F	Section_03	36	199	0	0	0	0	3631	3540
1744192	201821	CA	92	Department_F	Section_03	36	199	0	0	0	0	3539	3448
1744192	201822	CA	154	Department_F	Section_03	36	199	0	0	0	0	3385	3294
1744192	201823	CA	207	Department_F	Section_03	36	199	3512	1105	3429	3429	6690	4192
1744192	201824	CA	297	Department_F	Section_03	36	199	0	0	0	0	6393	3895
1744192	201825	CA	316	Department_F	Section_03	36	199	0	0	0	0	6077	3579
1744192	201826	CA	370	Department_F	Section_03	36	199	0	0	0	0	5707	3209
1744192	201827	CA	462	Department_F	Section_03	36	199	0	0	0	0	5245	2747
1744192	201828	CA	536	Department_F	Section_03	36	199	0	0	0	0	4709	2211
1744192	201829	CA	549	Department_F	Section_03	36	199	0	0	0	0	4160	1662
1744192	201830	CA	356	Department_F	Section_03	36	199	0	0	0	0	3804	1306
1744192	201831	CA	336	Department_F	Section_03	36	199	0	0	0	0	3468	970
1744192	201818	DE	32	Department_F	Section_03	36	199	18826	14927	1705	10182	18826	14927
1744192	201819	DE	73	Department_F	Section_03	36	199	0	0	0	0	18753	14854
1744192	201820	DE	136	Department_F	Section_03	36	199	0	0	0	0	18617	14718
1744192	201821	DE	189	Department_F	Section_03	36	199	0	0	0	0	18428	14529
1744192	201822	DE	391	Department_F	Section_03	36	199	0	0	0	0	18037	14138
1744192	201823	DE	884	Department_F	Section_03	36	199	0	0	0	0	17153	13254

* NB: Stock for a specific week = Stock from last week + order levels for current week - sales for current week

Sales Predictions Analysis

Objective Recap

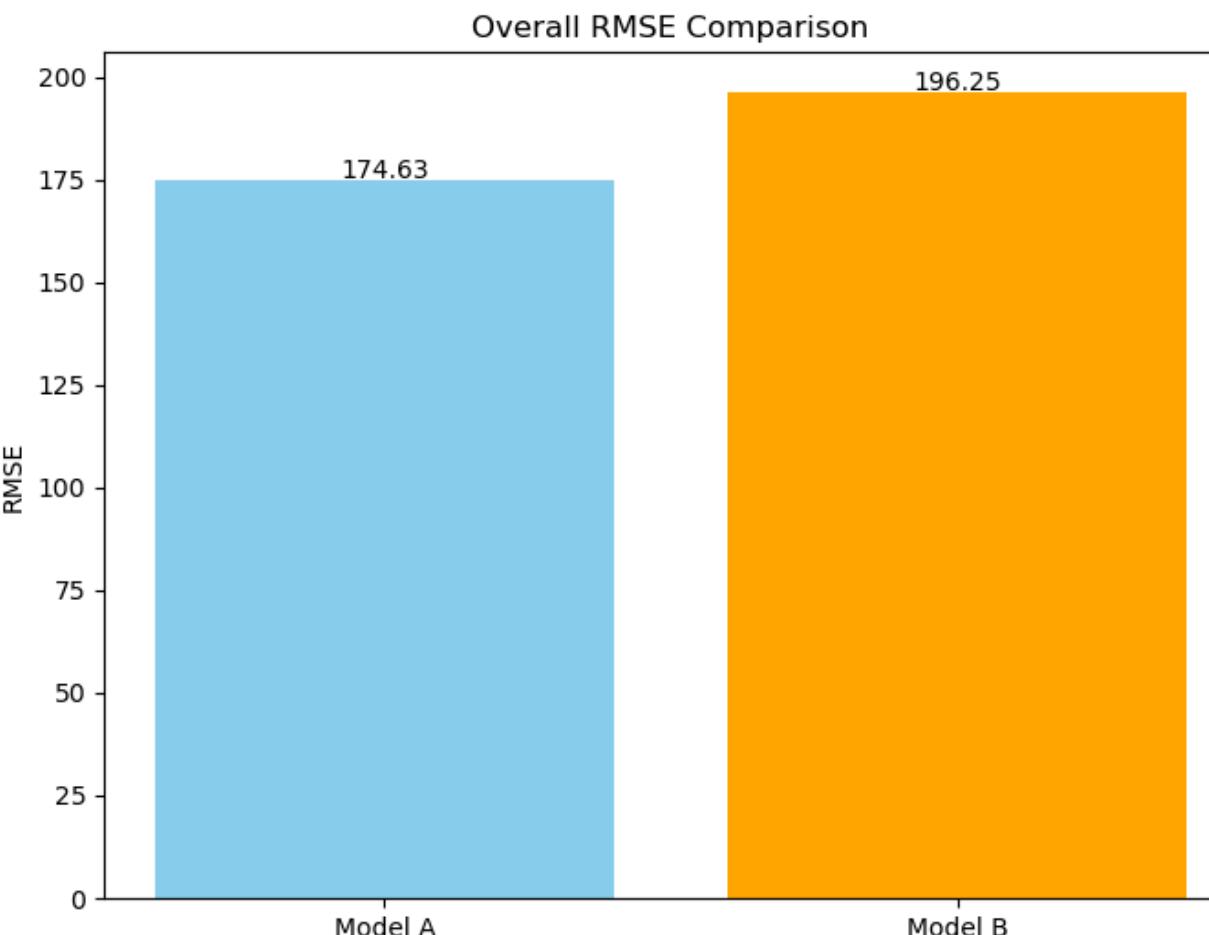
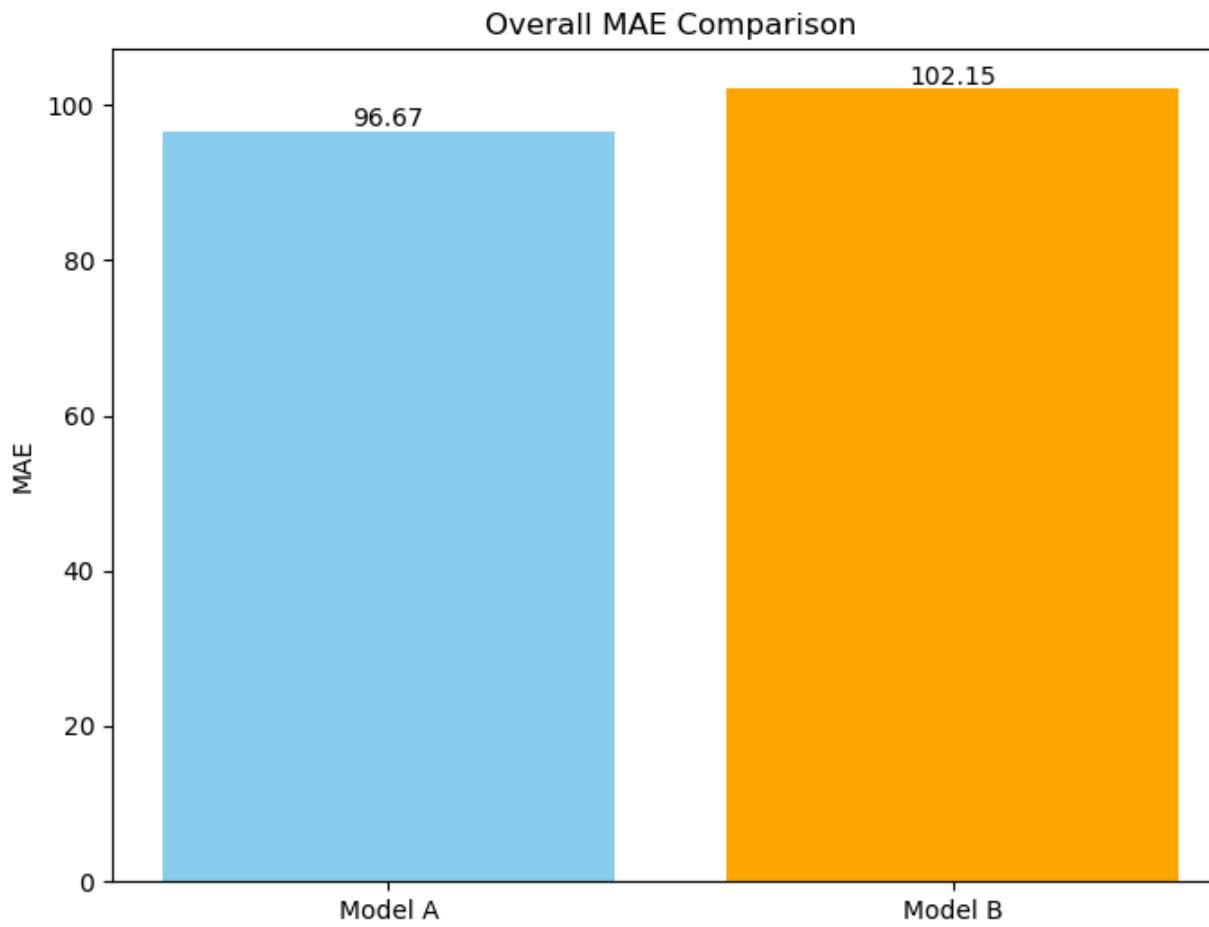
Identify the model with superior sales forecasting accuracy.

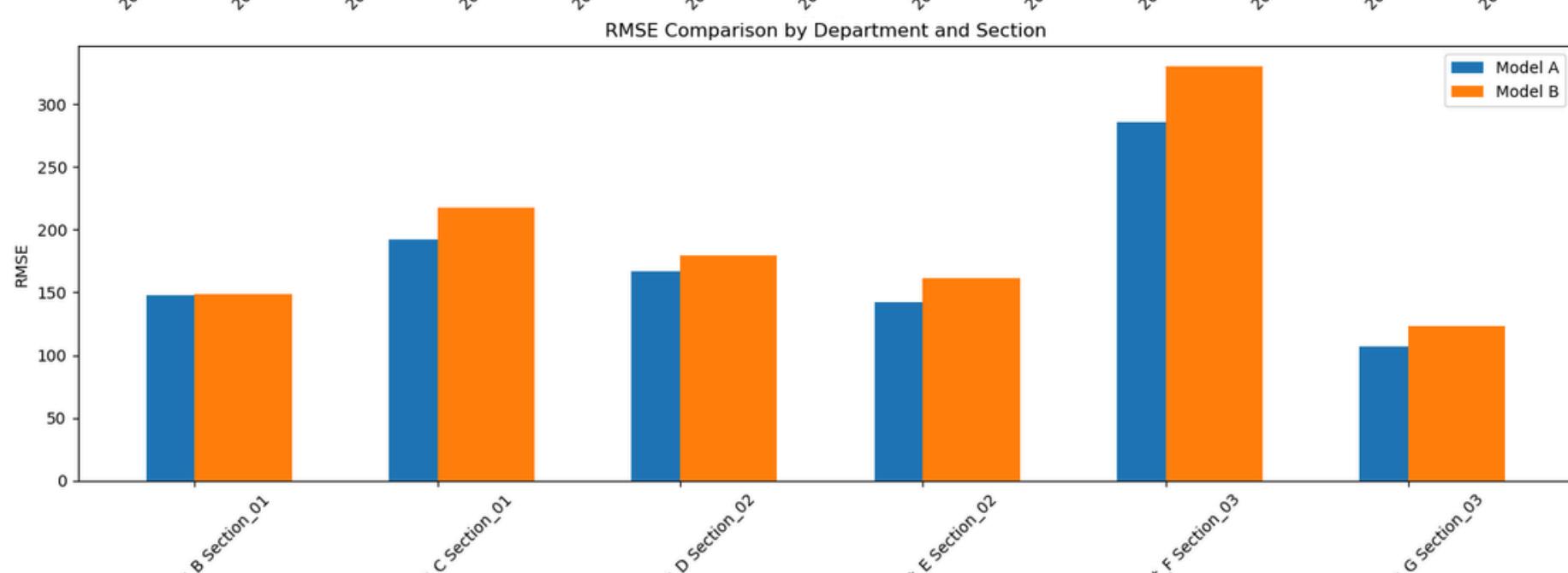
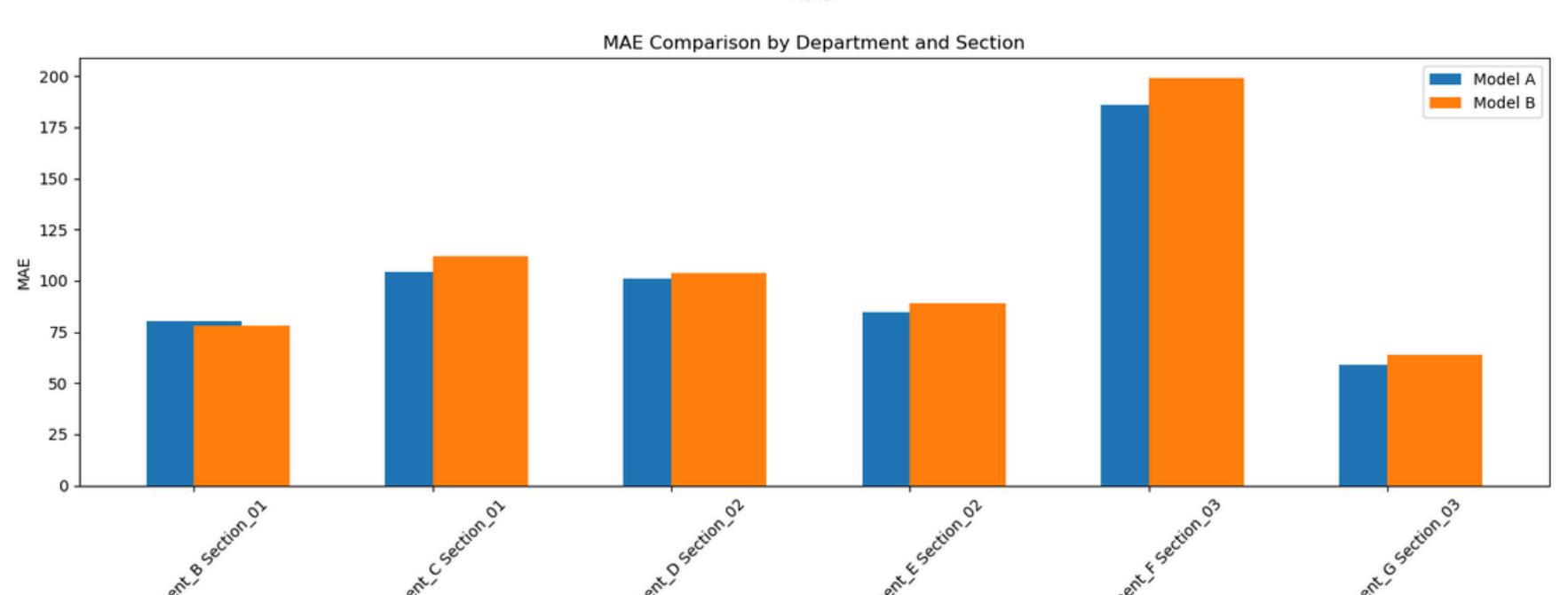
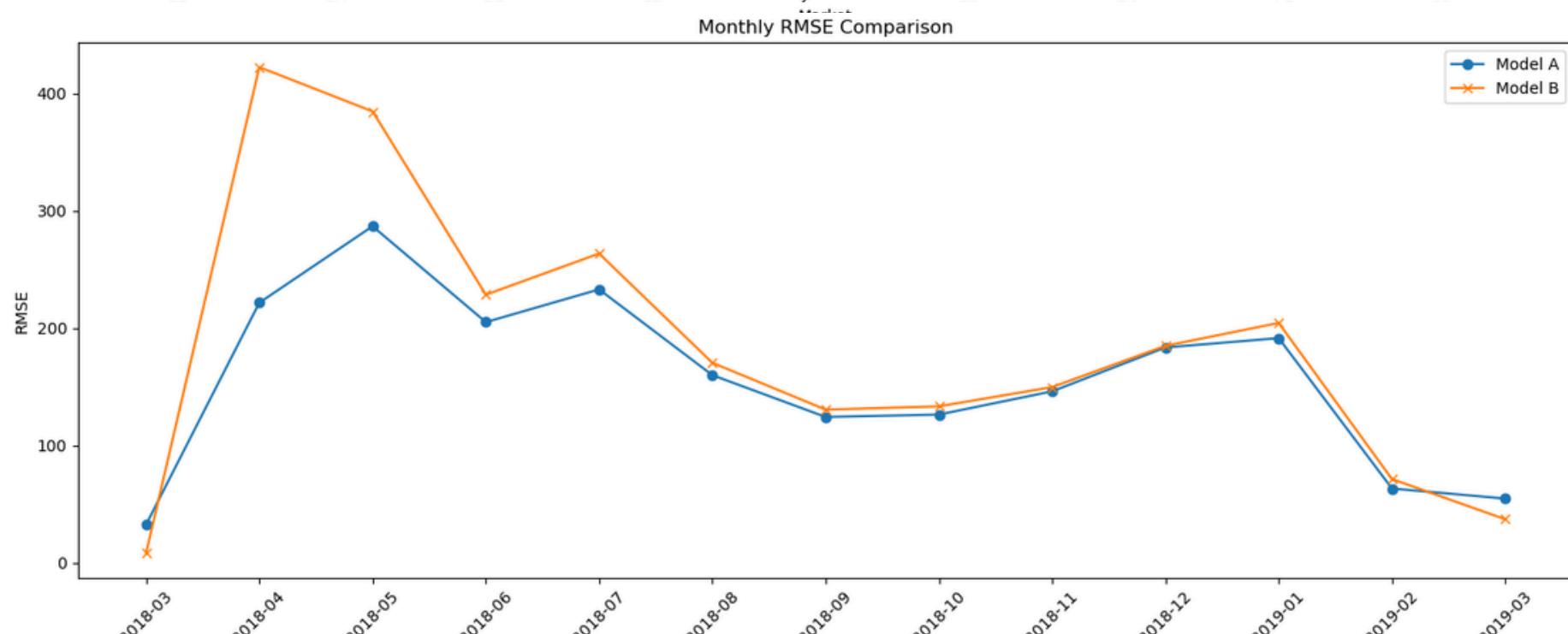
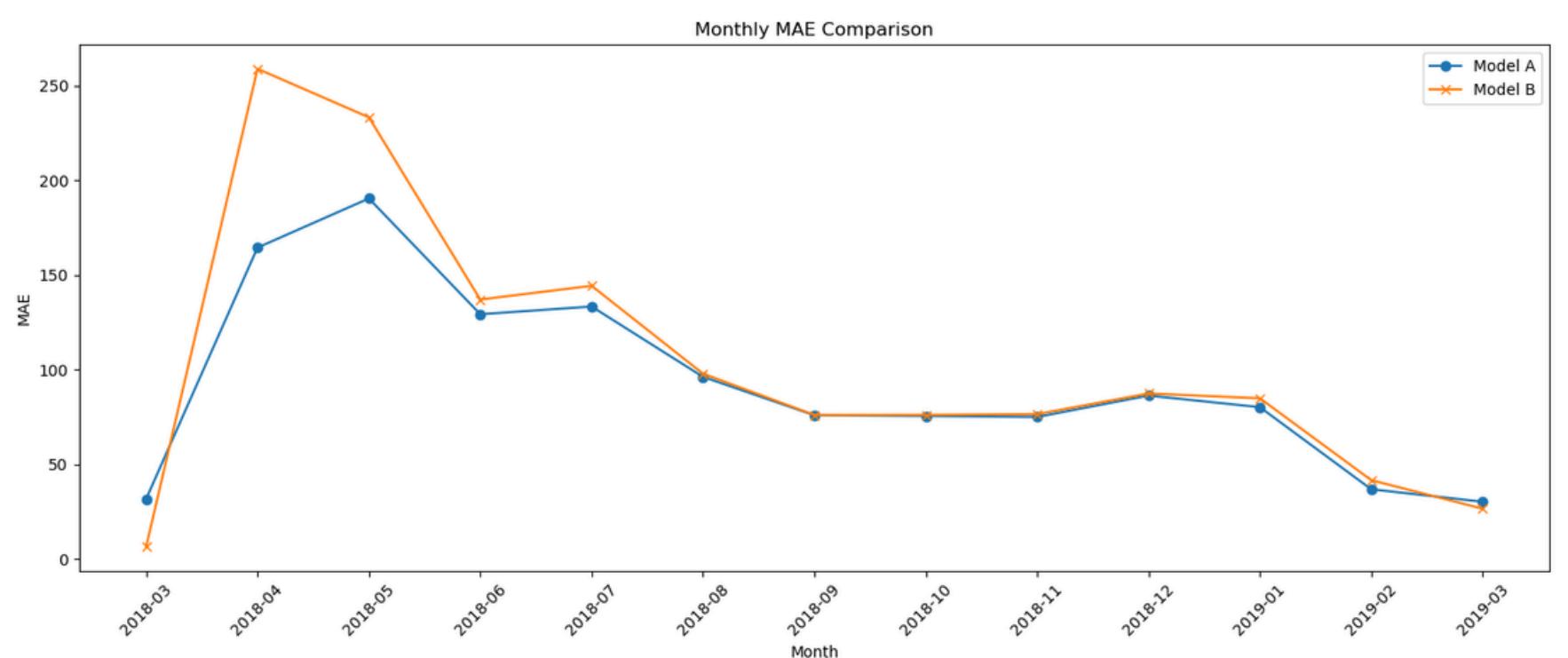
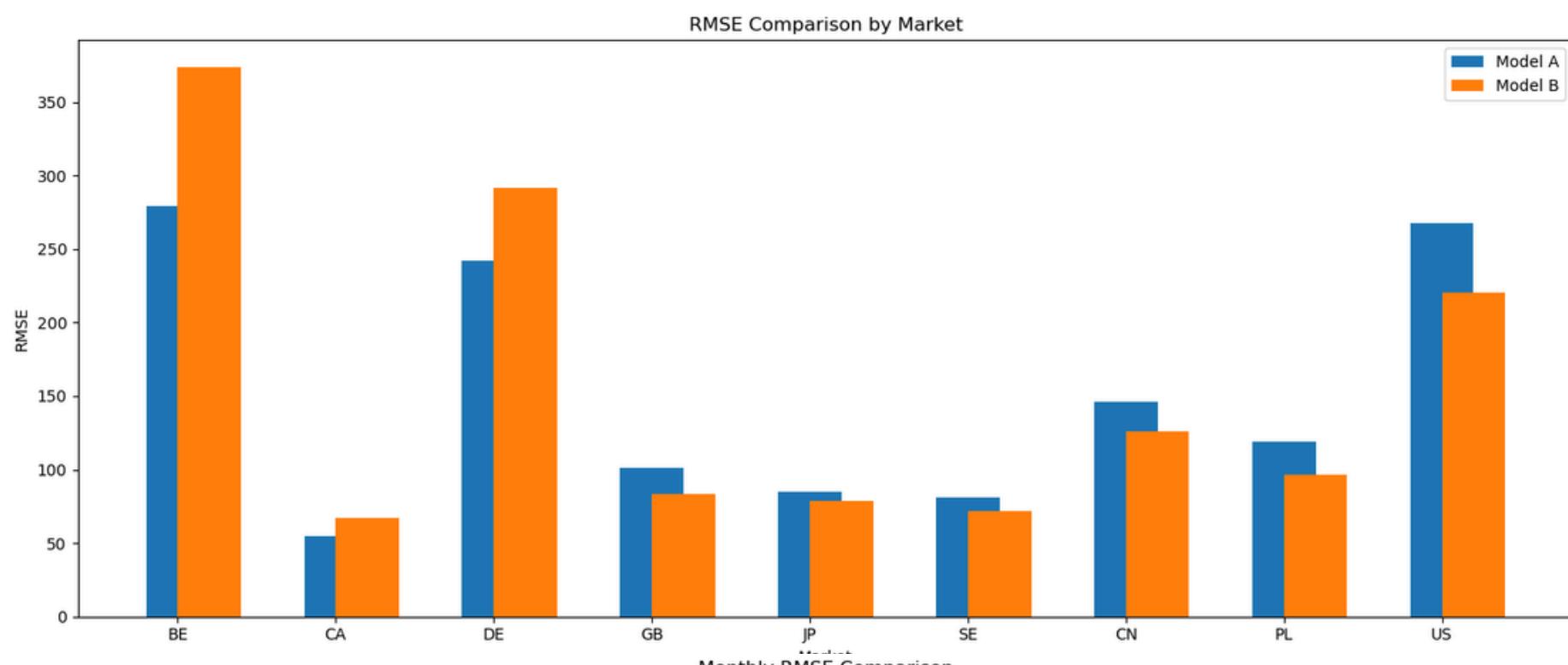
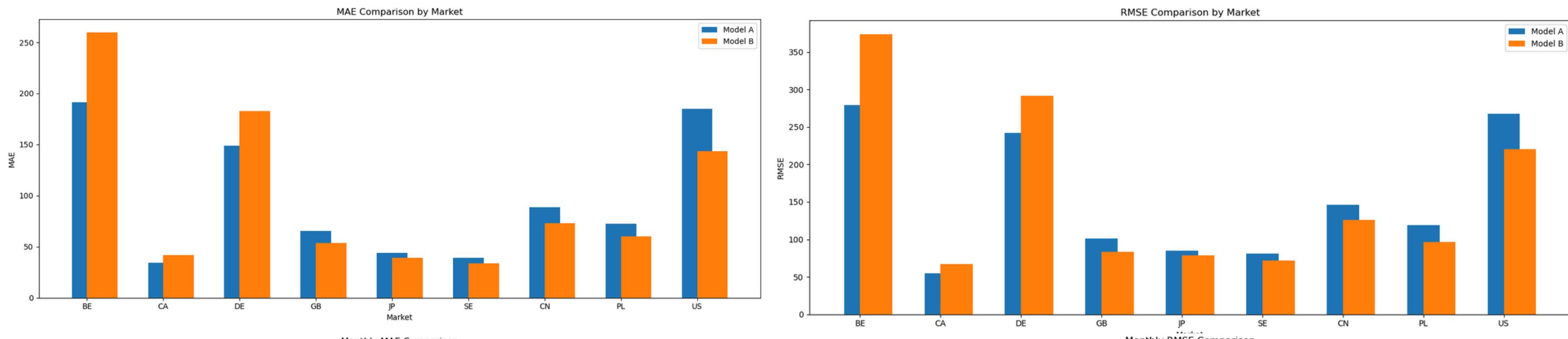
Methodology Highlights

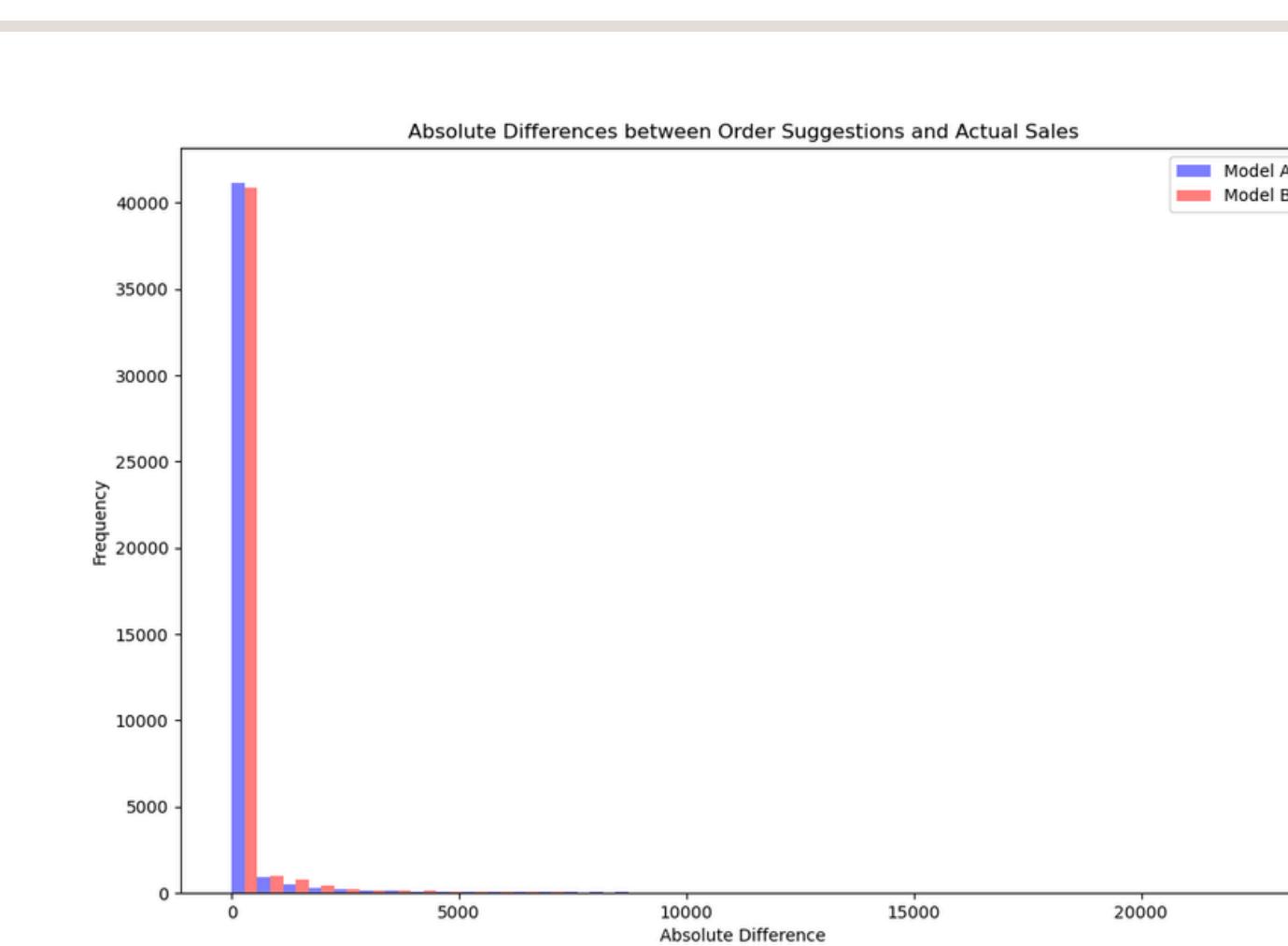
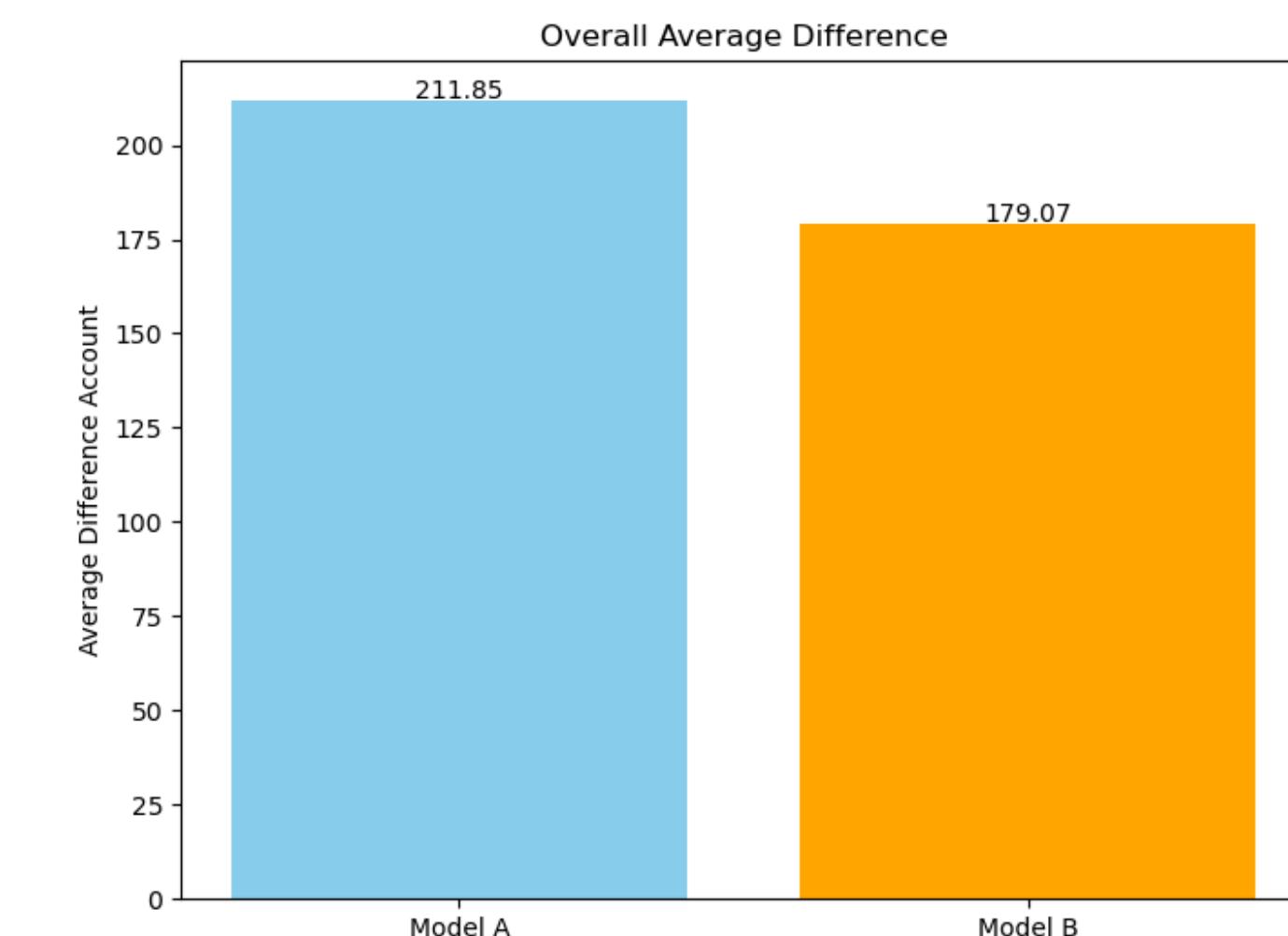
Utilized RMSE and MAE to measure forecast accuracy.

Key Insight

Model A demonstrates superior accuracy in sales forecasting across key metrics, outperforming Model B in most scenarios.







Order Suggestions Analysis

Objective Recap

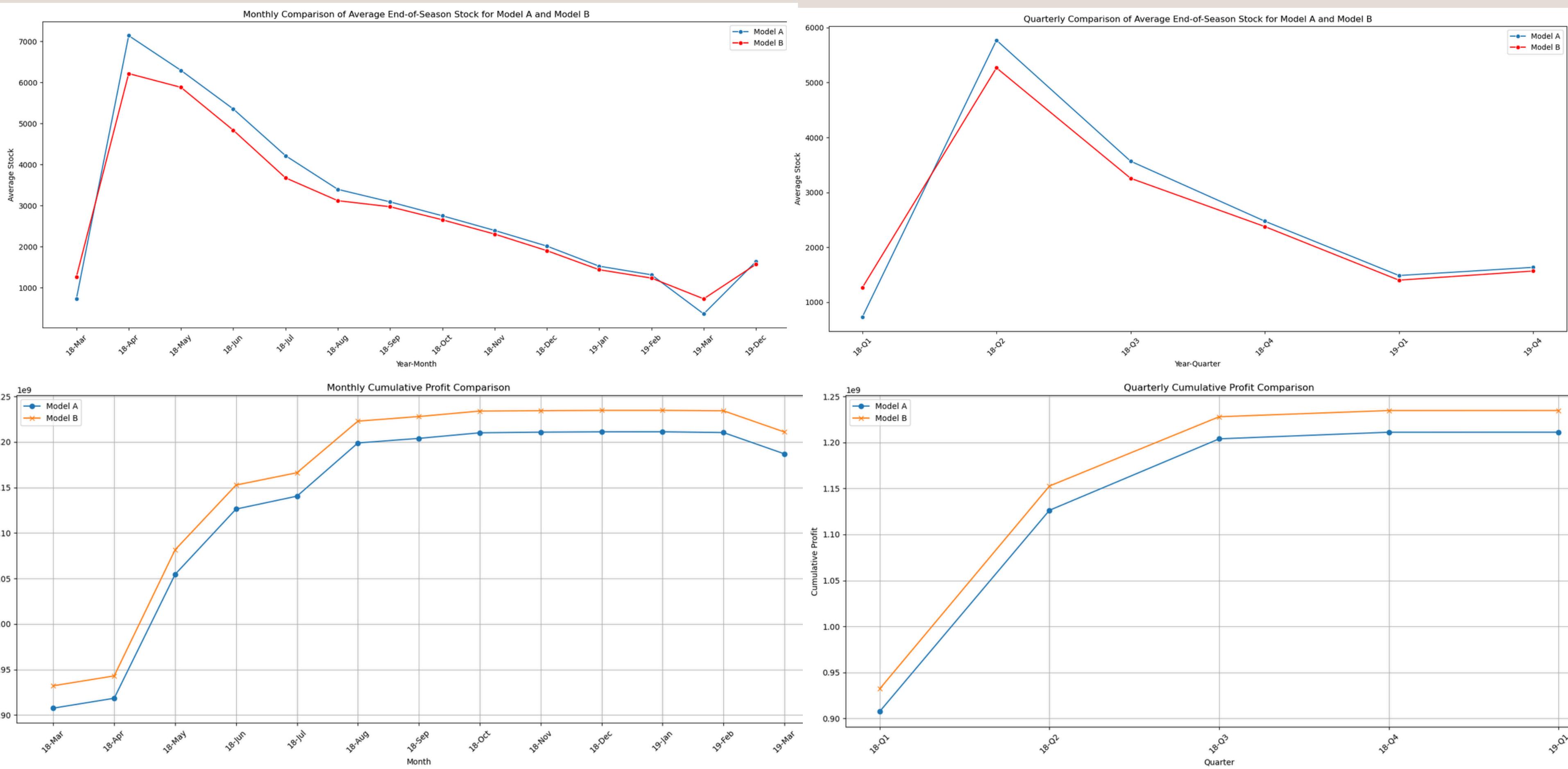
Assess the Alignment of Order Suggestions with Actual Sales and Inventory Needs.

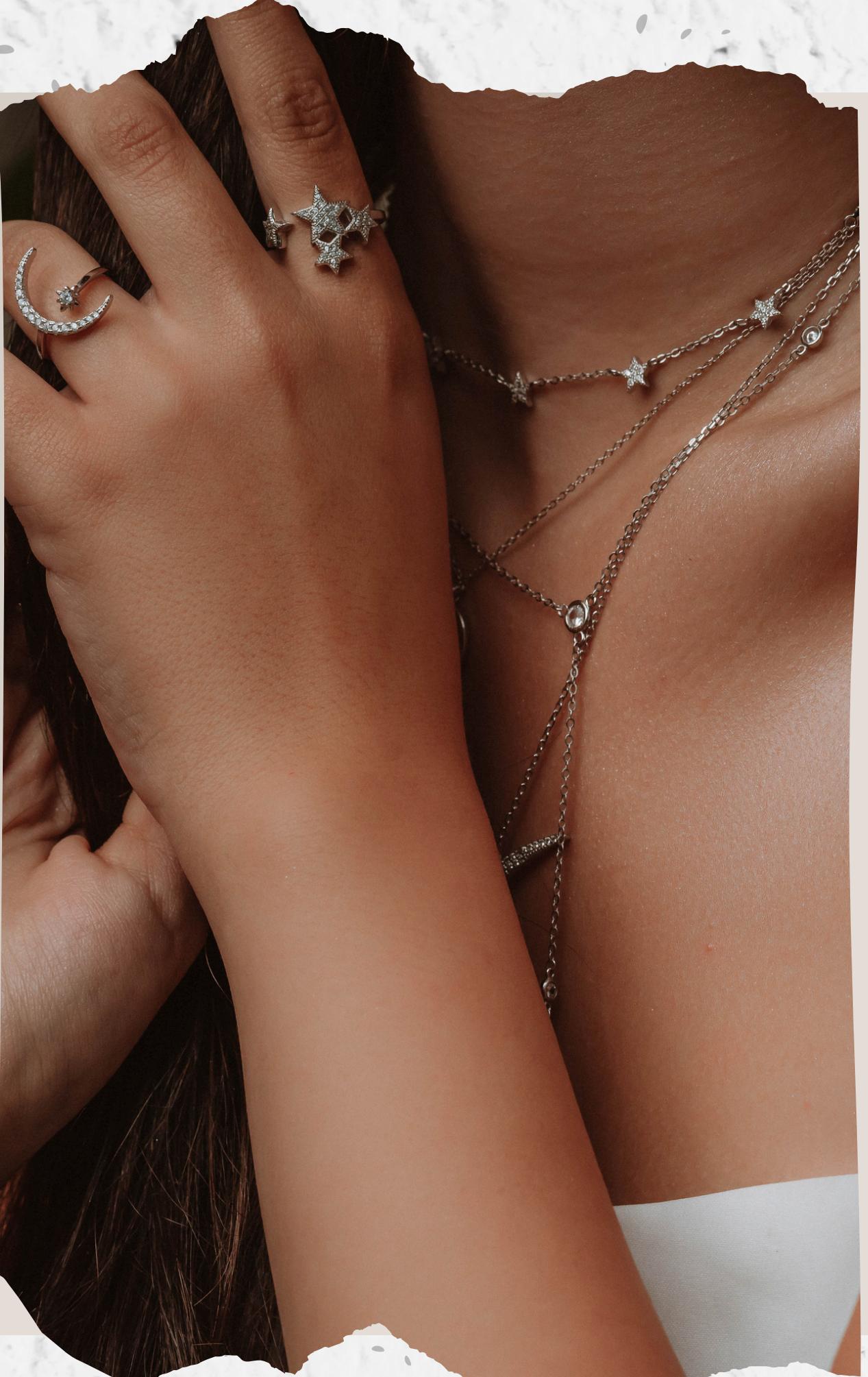
Analysis Approach

Analyzed how closely each model's order suggestions matched actual sales to prevent overstock and stockouts.

Key Finding

Model B's order suggestions were more closely aligned with actual sales, leading to optimal stock levels and efficiently minimizing both overstock and stockouts.





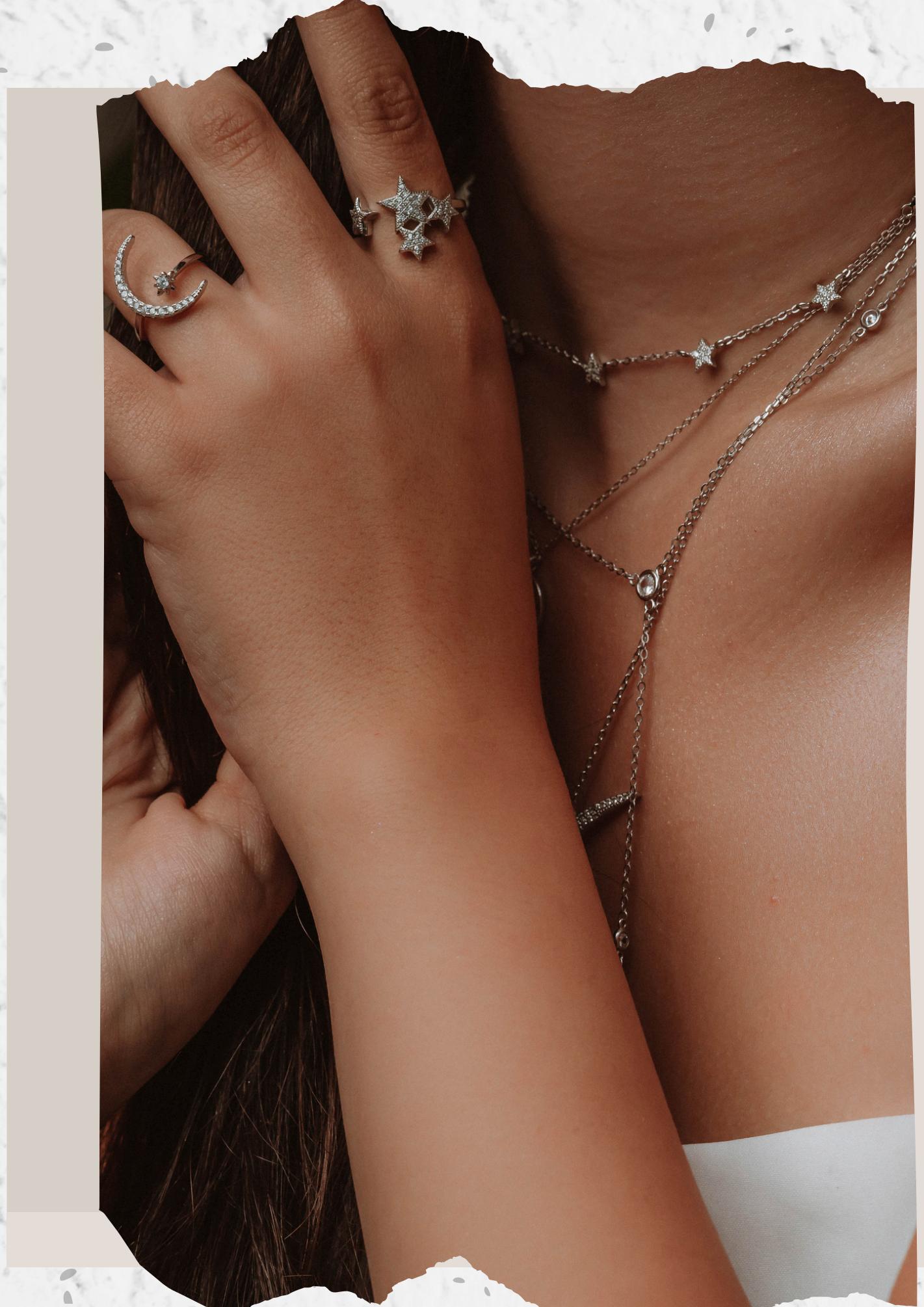
Recommendations

Preferred Model

- Using both Model A and Model B.

Justification

- **Model A for Sales Predictions:** Superior accuracy ensures reliable forecasts, minimizing the risk of underestimating market demand.
- **Model B for Order Suggestions:** More aligned order suggestions lead to optimal inventory levels, reducing the risks of overstock and stockouts.
- **Hybrid Approach:** Leverage Model A's predictive accuracy and Model B's operational efficiency for a comprehensive solution.

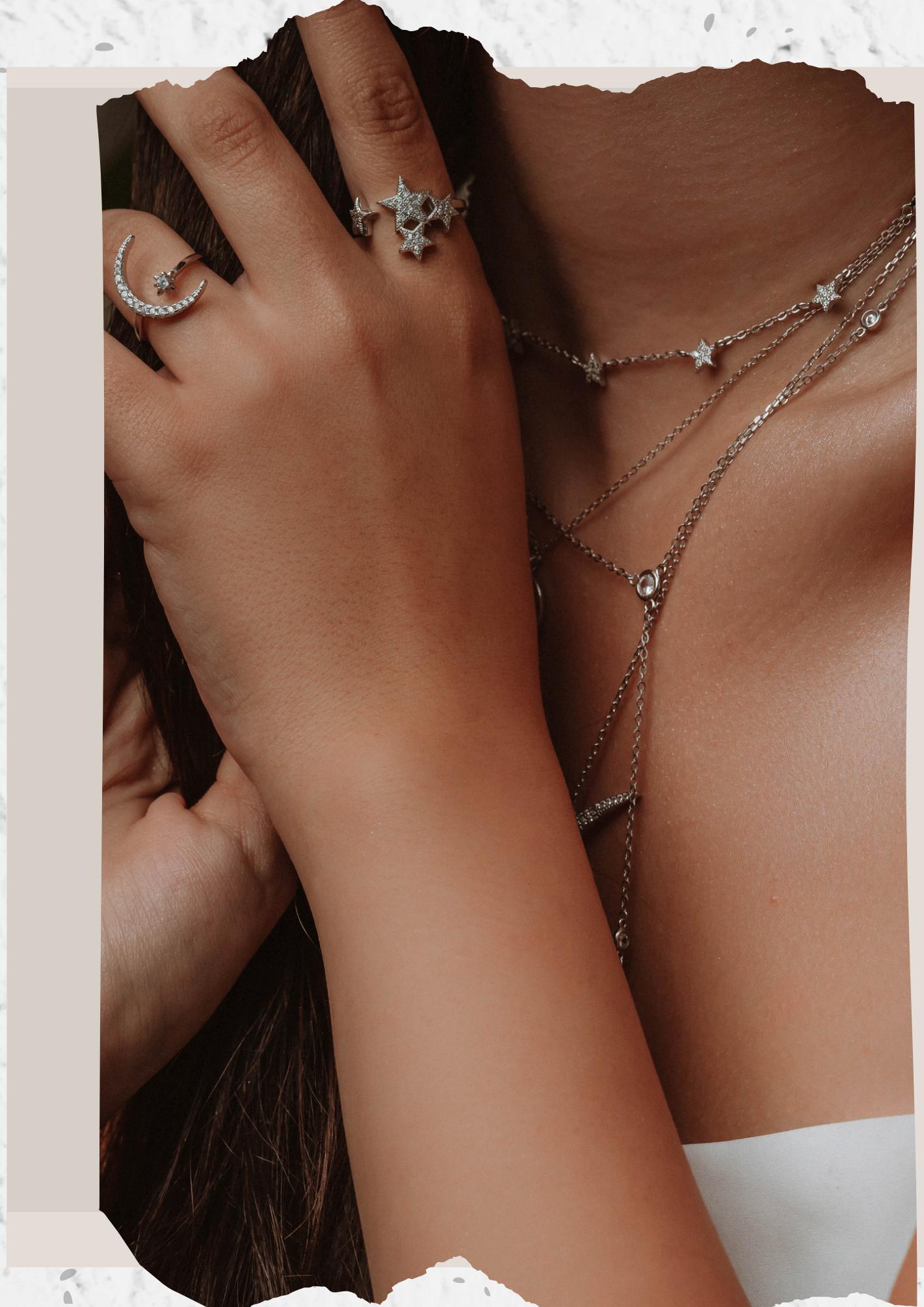


Strategic Implications

Efficiency through Precision: Use Model A to adapt quickly to market demands with accurate sales predictions.

Optimized Inventory Management: Employ Model B to fine-tune order quantities, minimizing waste and ensuring product availability.

Sustainability & Profitability: The dual-model approach aligns with sustainability goals by reducing overproduction and enhances profitability through better stock management.



Next Steps

Model Integration: Develop a framework for integrating Model A's predictions with Model B's order suggestions.

Regional Customization: Explore opportunities to tailor model deployment based on regional market dynamics.

Continuous Improvement: Implement a cycle of continuous monitoring, feedback, and model refinement to adapt to changing market conditions.

Pilot Program: Launch a pilot program to test the hybrid model approach in selected markets.



A close-up photograph of a person's shoulder and neck. They are wearing a light-colored, possibly beige or cream, button-down shirt. A long, elegant necklace made of large, light-colored pearls (possibly white or cream) with small gold spacers hangs around their neck. The background is a plain, light-colored wall.

Thank You For Watching

Jieda Wang

Jiedaawang@gmail.com
www.linkedin.com/in/jieda-wang-431334283