House of 28 Fashion Trend Analysis

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HOUSE OF 28

Company Background

Fashion Beauty Home

House of 28 (previously known as KF Channel (S) Pte Ltd) is a multi-faceted company that retails products across 3 categories - fashion, beauty and home. The company manages both online and offline retail stores. The company's main objective is to help elevate many established and/or emerging fashion brands onto a global platform, making them more accessible to consumers around Asia, and the world.

Project Background

House of 28 would like to determine various trends in each of the industries in order to cater to their customers better and adjust their inventory based on the demand. We were required to analyse data based on sales from 2019 to 2021 and to come up with insights and recommendations.

Tableau Excel R SQL

Tools used

Project Requirements

- Determine trends in sales on a quarterly, categorical, regional and monthly basis and generate forecasts on future monthly revenue
- Identify the respective price ranges and the discount ranges of items that caused the biggest increase in both online and offline sales
- Determine the current stock trend and generate demand forecasting model to ensure that there will be sufficient stock available to meet the demand of the customers for a particular month

Assumptions

- No delay in the releasing of new products in March & August
- Annual pricing, discounts and stock strategies remain constant
- In the next five years, House of 28 will not be expanding into new sectors of the industry
- Assume seasonality of period 12 in Holt-Winters forecasting models
- Monthly level granularity provides a sufficient level of analysis

Methodology

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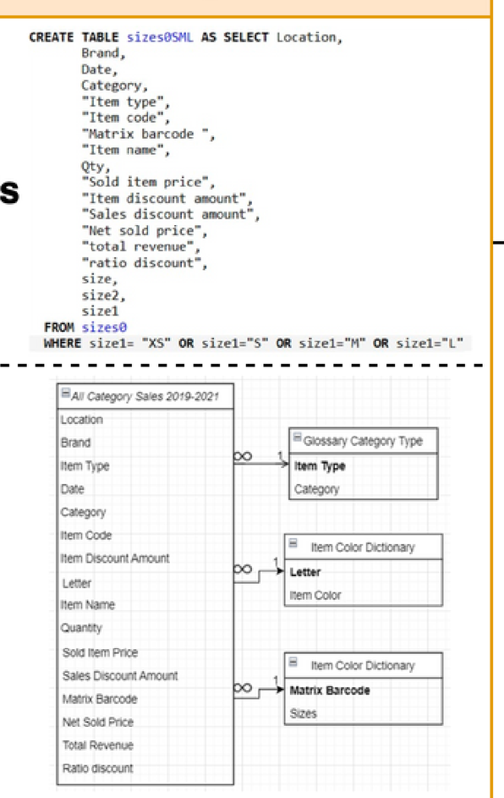
1 Data Cleaning

Create calculated fields

Inner Join Table



2 Data Analytics

Sales Analysis
- Monthly/ quarterly sales analysis
- Regional analysis
- Popular category/ item type analysis

Price and Discount Analysis
- Popular price point and price range
- Suggested discount range to boost sales

Stock Availability Analysis
- Figuring out the common size in each size type
- Demand analysis of stock

3 Forecasting

Future sales
- Holt Winters
- Double smoothing
- Exponential smoothing

Stock demand
- Holt Winters
- Double smoothing
- Exponential smoothing

4 Recommendation

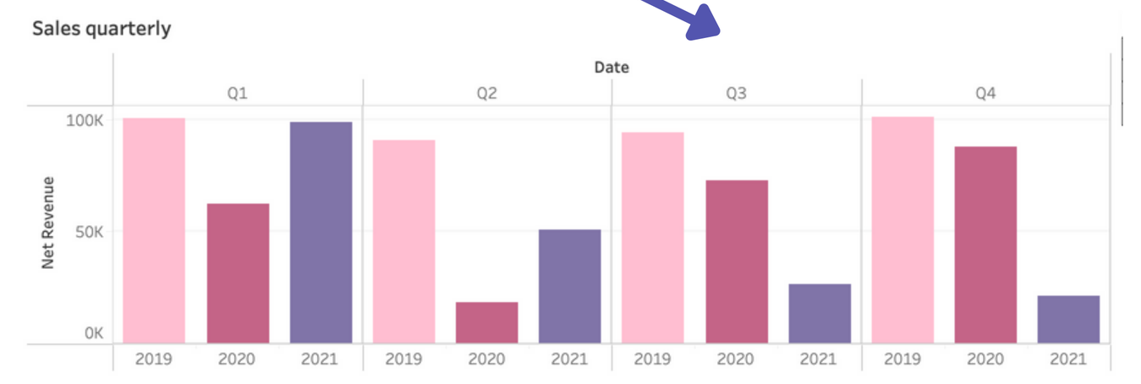
Insights on sales analysis
- Reason behind the decreasing sales in 2021

Insights on price & discount analysis
- Apply the appropriate discount range for different month

Insights on stock availability analysis
- Ensure sufficient stock in Q1, and reduce supply in Q2

Sales Analysis

Quarterly sales analysis — 2021: Downwards Trending



Category	Boutique Q1	Q2	Q3	Q4	E-commerce store Q1	Q2	Q3	Q4
1-Apparel	113,428	84,563	84,606	59,578	34,292	24,862	36,956	26,605
2-Accessories	10,205	5,449	8,694	4,604	1,720	1,960	2,614	1,059

Dropped 47.5% - 54.9% Dropped 22.4% - 38.4%

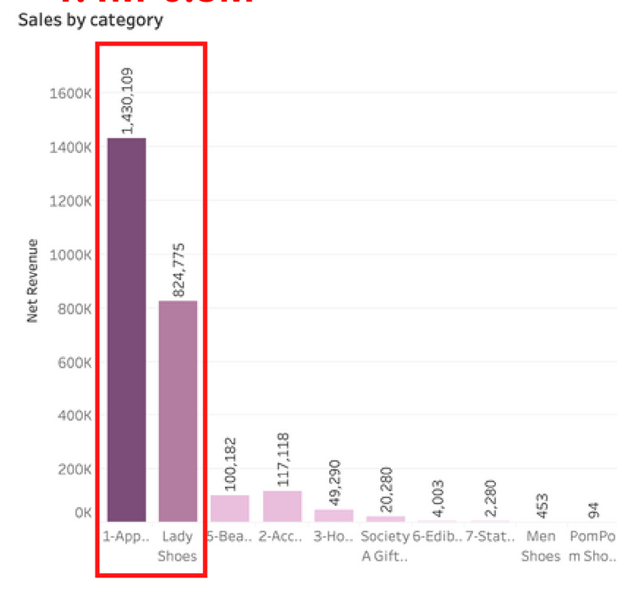
Year 2019: Maintain high revenue of at least 91K
Year 2020: Huge dip to revenue of 18K at Q2
Year 2021: Downward trend of revenue from 100K in Q1 to 21K in Q4.

By comparing Q1 and Q4, 1-Apparel revenue in 2021 in the boutique dropped by 47.5%, while revenue at the e-commerce store dropped only 22.4%

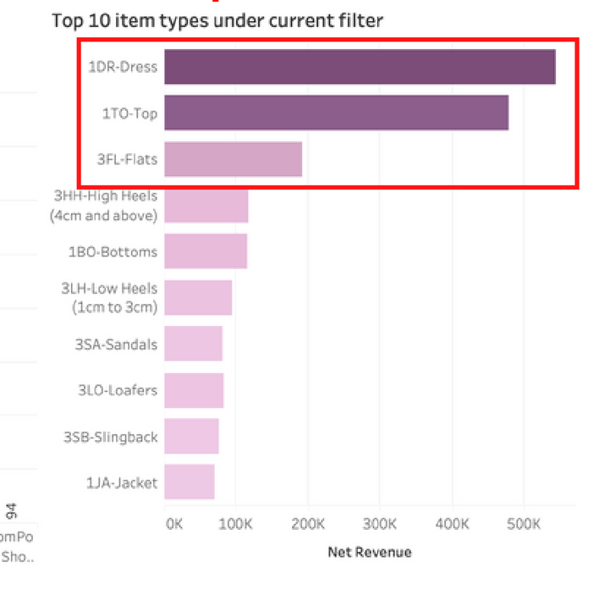
By comparing Q1 and Q4, 2-Accessories revenue in 2021 in the boutique dropped by 54.9%, while revenue at the e-commerce store dropped by only 38.4%.

Category sales analysis

1.4M 0.8M

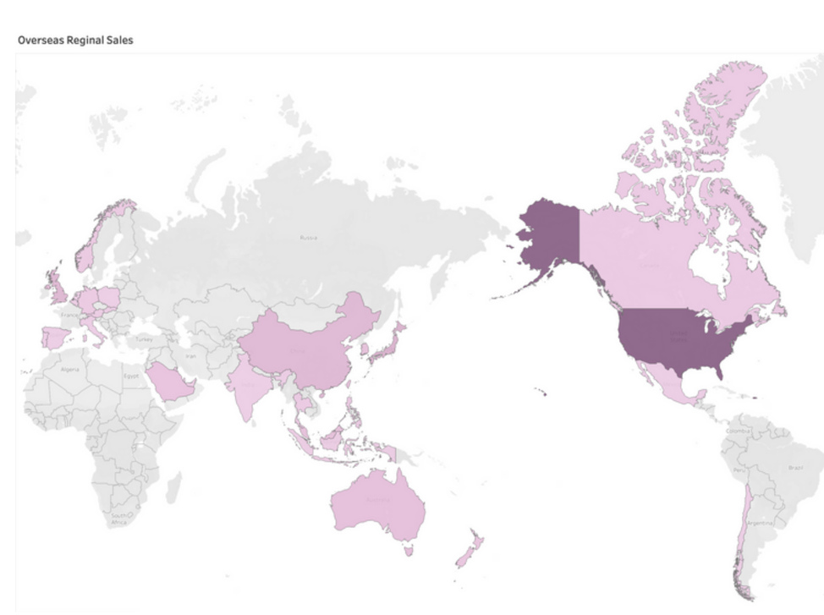


Top 3 items Sold



"Apparel" is the single most profitable category of all years, with a total revenue of 1.4M, followed by "Lady shoes" with a total revenue of 0.8M. Top 3 item types sold are 1DR-Dress, 1TO-Top and 3FL-Flats

Regional sales analysis



80% of revenue

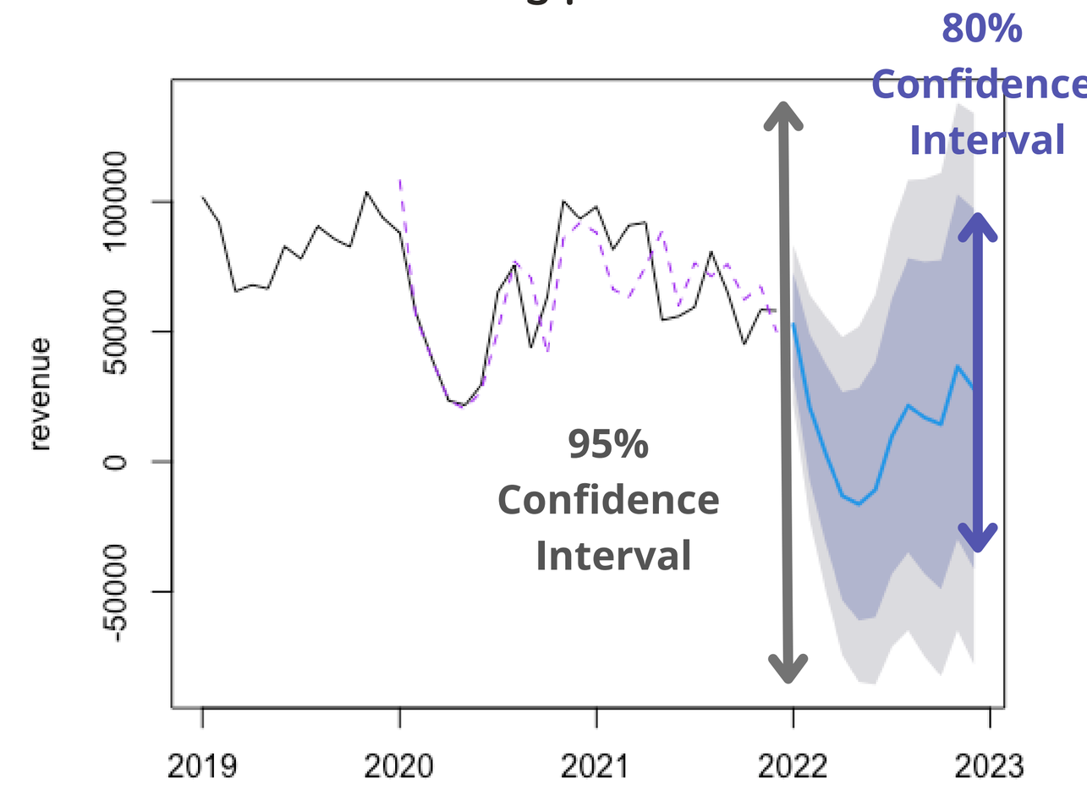
Shipping region	Order Total	Cumulative percentage
SG	179315	54.70%
US	42578	67.69%
HK	40908	80.17%
JP	9459	83.06%
GB	8102	85.53%
CN	7585	87.84%
AU	5132	89.41%
TW	4684	90.84%
KR	4502	92.21%
MY	4435	93.56%
SA	3886	94.75%
NZ	2926	95.64%

Data Segmentation: A-B-C Analysis: Over 80% of revenue comes from Singapore, United States and Hong Kong

Monthly revenue forecasting

We forecasted the monthly revenue for year 2022 based on past data in year 2019 to 2021 by choosing the forecasting model with the least Weighted Average Percentage Error (WAPE) and using the model to make 12 months predictions on the monthly revenue

→ revenue forecasting plot



→ WAPE of different forecasting models

Forecasting model	Exponential Smoothing	Double Smoothing	Full Holt Winters
WAPE	18.72652	20.4813	18.26099

→ Correctness of Holt-Winters Model

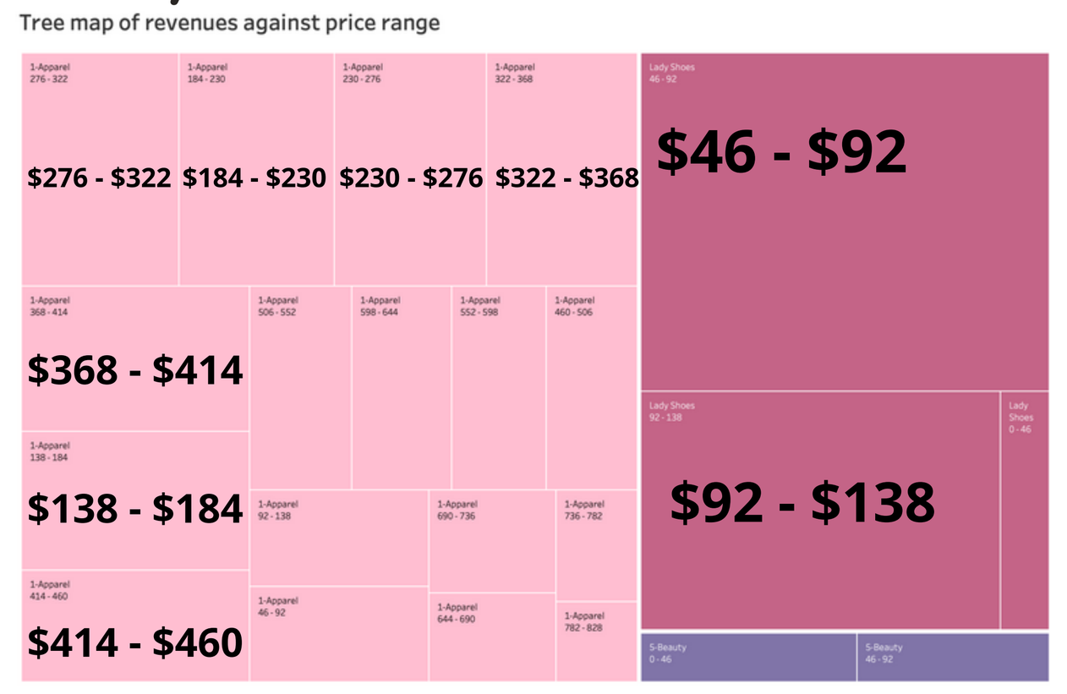
To verify the correctness of our model, we checked the actual revenue in Jan 2022 and Feb 2022 with our client, and compared the actual revenue with the predicted revenue from our forecasting model.

Month	Predicted revenue	95% Confidence interval	Actual revenue
Jan-22	73.595 K	[40.496 K, 106.693 K]	79 K
Feb-22	42.118 K	[0, 86.178 K]	50 K

Our model gives statistically reliable predictions on the future monthly sales, based on Jan & Feb data.

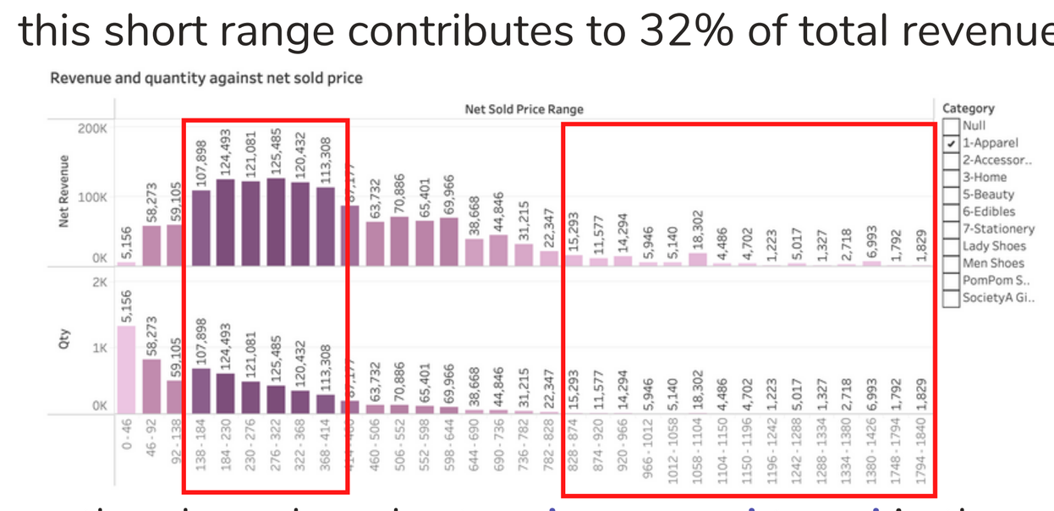
Price & Discount Analysis

Price Analysis



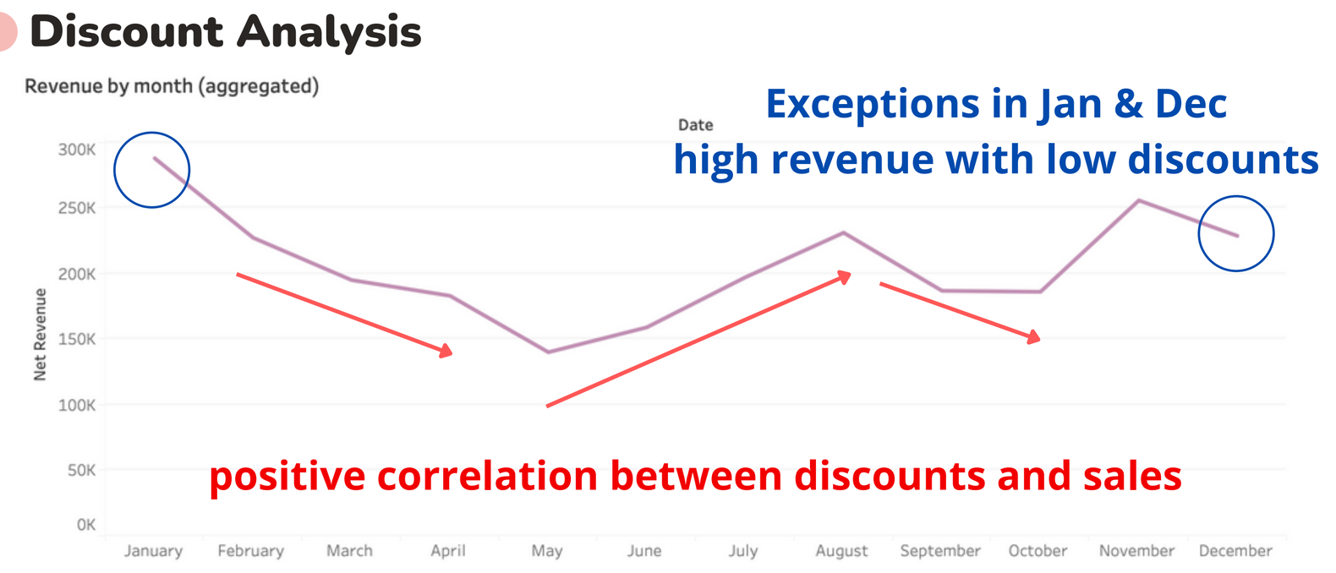
→ The above tree map of revenue against net sold price, highlights the popular price ranges for the different categories.

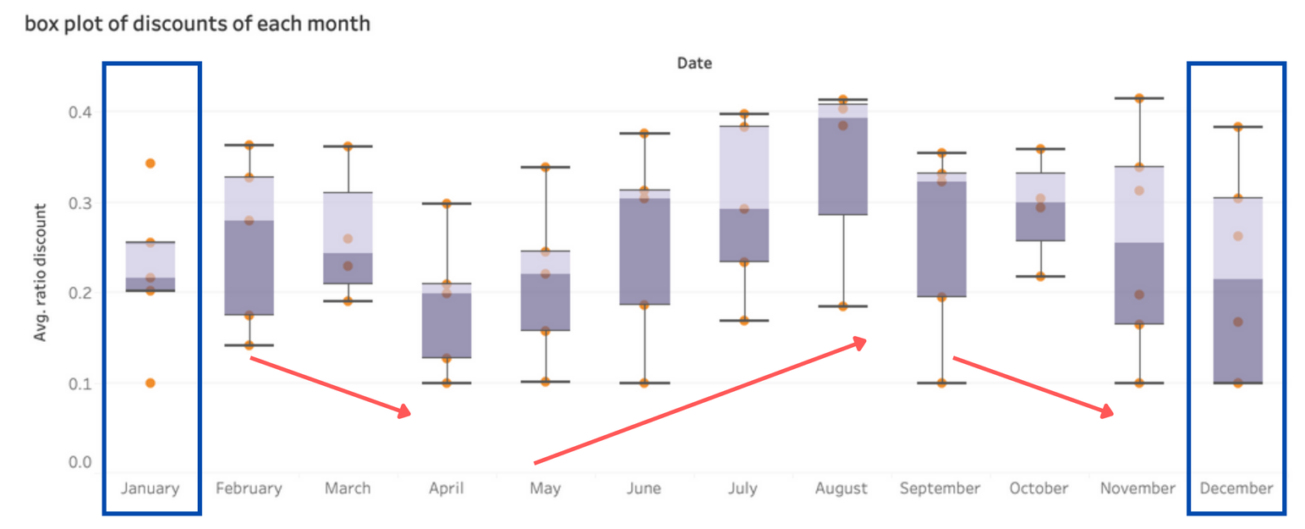
- 1-Apparel category with price range from 138 to 414, covers 15% of the price range which contributes to 28% of total revenue in this category.
- Lady shoes category, the price range only covers 0 to 138, but this short range contributes to 32% of total revenue.



→ From the above bar chart, a downward trend in the quantity sold can be observed as the price rises, and products with prices from 138 to 414 cover 44% of quantity sold, and prices above 800 only cover 0.4% of total quantity sold.

Discount Analysis



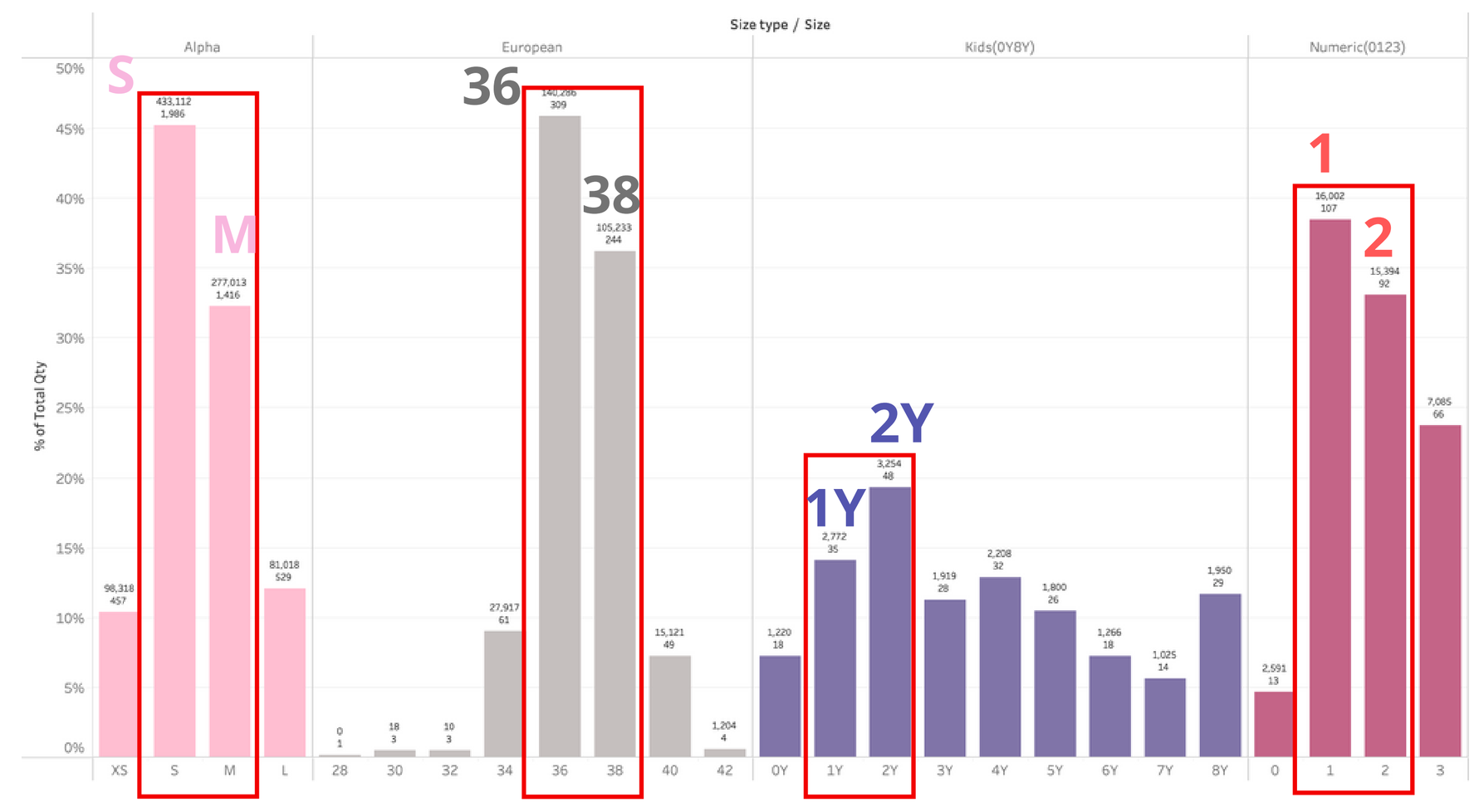


→ A positive correlation between the discount rate and revenue which indicates that the increase in the quantity sold due to discounts outweighs the decrease in price of item sold in the category. 10% to 40% discount range.

→ In January and December, however, the revenues are still high even though the discounts offered during the two months are of the lowest in a year.

Stock Availability Analysis

Current stock trend



→ For "Alpha", "Numeric" and "European" sizes, the stock demand generally peaks around the middle section. But for "Kids" category, the stock demand is roughly uniformly distributed

→ Alpha sizes: The common sizes are S and M
Numeric: The common sizes are 1 and 2
European: The common sizes are 36 and 38
Kids: The common sizes are 1Y and 2Y

Demand Forecasting Model

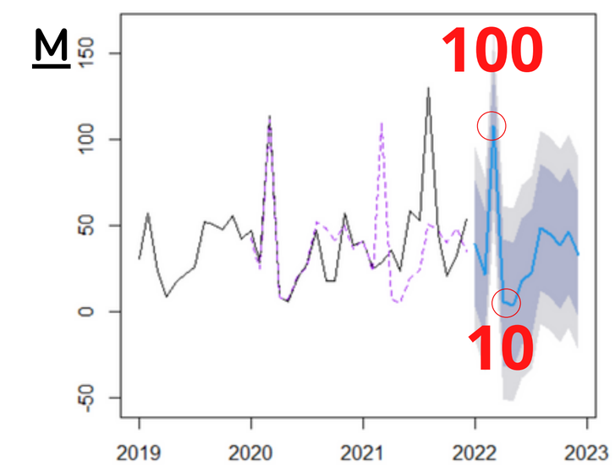
We built these forecasting models to predict the stock demand for each size category in the year 2022 to ensure sufficient inventory.
The chosen models resulting in the lowest WAPE are highlighted in yellow.

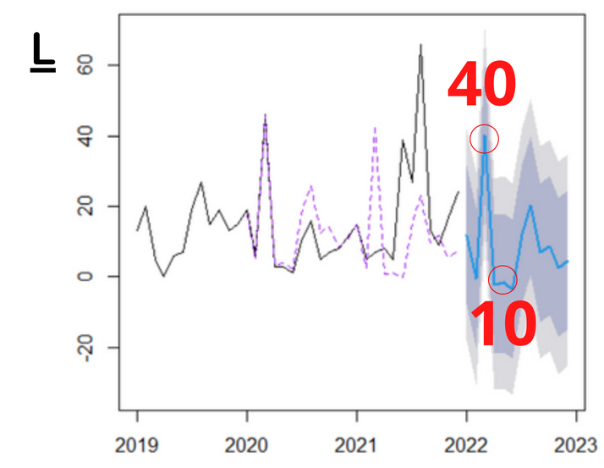
WAPE of forecasting method	XS	S	M	L	Freesize
Exponential smoothing (ES)	59.815	34.648	46.682	61.435	78.946
Double exponential smoothing (DS)	61.771	41.050	64.923	81.493	106.637
Holt Winters (HW)	64.054	38.696	42.416	58.729	90.914

→ Forecasted demand of "XS, S, Freesize" by Exponential Smoothing

Size	XS	S	Freesize
forecasted monthly demand	13	52	8

→ Forecasted demand plot "M, L" by Holt-Winters





The monthly stock demand for "M, L" sizes follows a strong seasonality trend: with the highest demand in Q1, extremely low in Q2 (April, May and June), and a steady increase in the demand during Q3 and Q4

Recommendation

Insights taken from sales Analysis

→ House of 28 can find the reason why 1-Apparel and 2-Accessories dropped by over 47.5% between Q1 and Q4 in their physical stores, which contributed to the downward sales trend in 2021

→ Based on the A-B-C analysis, House of 28 can consider allocating more resources to the "B Tier"

→ According to our forecasting model, House of 28 could apply reasonable discounts (10% to 40%) in the low-sale months (March, April and May) to advertise their new releases and boost sales.

Insights taken from price & Discount Analysis

→ House of 28 could collaborate with more apparel brands whose price range is between 100 to 400

→ Since customers are very responsive to the three price ranges of lady shoes (0-46, 46-92, and 92-138), House of 28 can consider introducing more shoe products of diverse price ranges.

→ Based on the positive correlation between discount percentages and revenue, when the company notices a drop in revenue, it is suggested to immediately introduce discounts in the following month to offset the sales loss.

→ Given that January and December are the two peak purchase months, House of 28 can potentially have higher revenue by increasing the product prices or giving less discounts while still maintaining the quantity of products sold.

Insights taken from Stock Availability Analysis

→ Based on the forecasted demand, House of 28 can look for more suppliers before Q1 and reduce suppliers before Q2

Conclusion & Limitation

We can see that the 1-Apparel and Lady Shoes categories are the two main revenue streams for House of 28. Hence the overall revenue would be sensitive to the price and discounts on these two categories. Furthermore, customers are very responsive to the 138 to 414 price range for 1-Apparel and 0-138 price range for Lady Shoes. For all the categories, a 10% to 40% discount range can be applied to achieve higher revenue.

House of 28 can use these price and discount ranges to boost their revenue in Q1, and refer to our forecasting model as a benchmark for their monthly revenue.

House of 28 can apply for short term contracts between Q1 and Q2 to accommodate for the drastic changes during the first half of the year.

However, the findings above only provide limited insights since the scope of analysis is centred around House of 28 alone. For future work, we could conduct the similar analysis on an industry level.