



# FMCG Competition Project

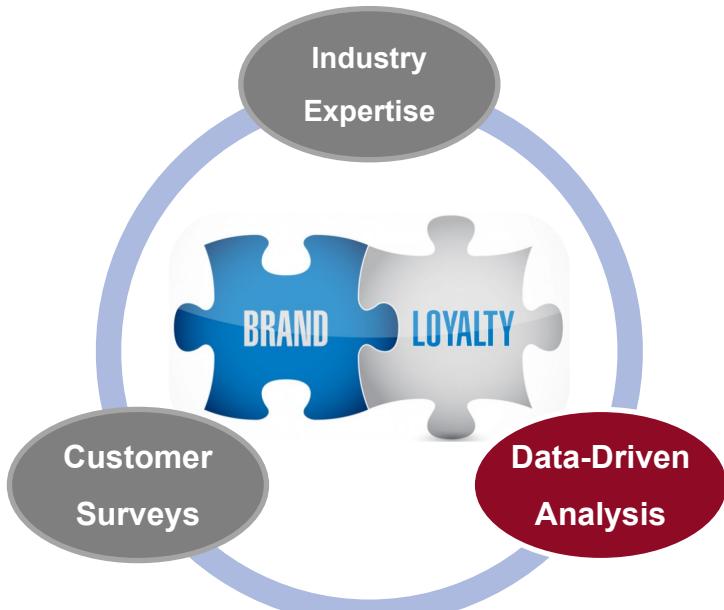
-- Brand Loyalty & Sales Forecasting

By: Lin Zhang, Yuang Guo, Yixuan Huang

# Agenda

- **Brand Loyalty**
- Forecast
- Recommendations

# Overall Thoughts on Brand Loyalty Analysis



- Brand Loyalty Analysis comprises three essential components:
  - Industry Expertise
  - Customer Surveys
  - Data-Driven analysis
- In this project, our primary focus will be on 'Data-Driven Analysis,' and we will adhere to the following core principles:

- Structured Approach
- Correlation
- Multi-Point Verification
- Dynamic
- Relative value

Vs.

- Discrete Approach
- Causation
- Single-Point Analysis
- Static
- Absolute value



# Structure Approach – The Framework of Analysis

## Brand Loyalty

### Collectively –

The Entire Company / Brand Perspective

- 1. Market Performance** (Incl. Market Share & Growth Trend)
- 2. Customer Retention Rate**
- 3. Customer Lifetime Value** (Incl. Average Spending per Purchase & Units per Purchase)
- 4. Repeat Purchases**
- 5. Cross-selling**
- 6. Up-selling**
- 7. Customer Effort Score**

### Individually –

Each consumer's Loyalty

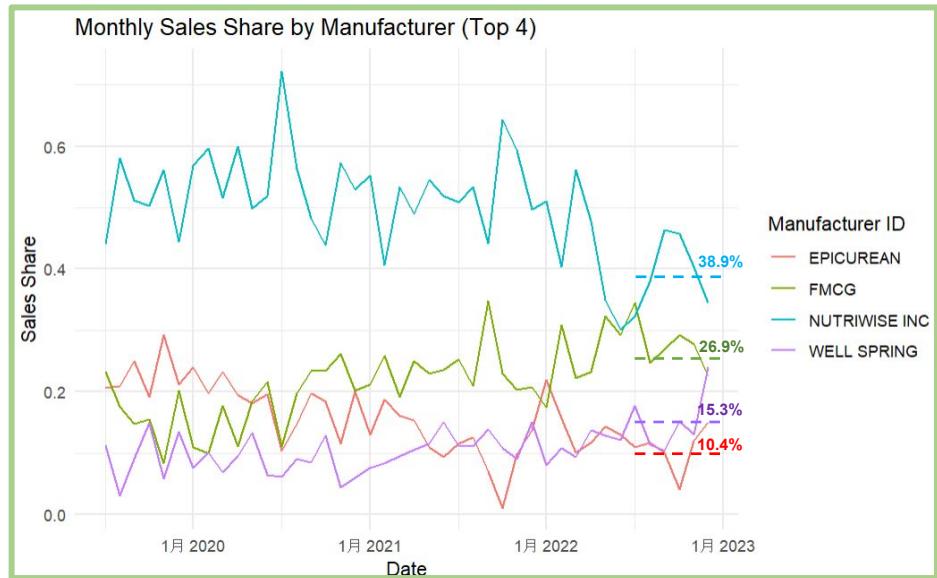
### 8. Individual Customer Loyalty Index

- **Customer NPS** (Net Promotion Score)
- **Customer Satisfaction**
- **Customer Referrals**

(Normally get these information via customer surveys, it's NOT addressed in this project)

We will analyze the eight points above and calculate brand loyalty by using their weighted average.

# I. Market Performance – Market Share



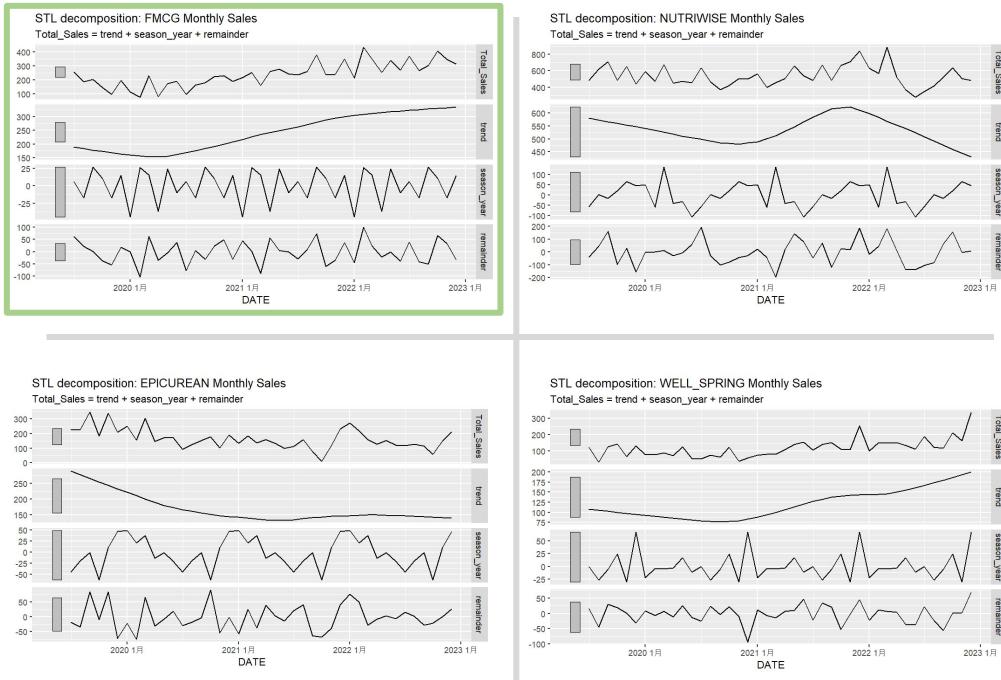
- The **top four** manufacturers hold about **91.4% of the market share**. We have chosen to concentrate on the following four companies:

- NUTRIWISE INC (38.9%)
- **FMCG (26.9%)**
- WELL SPRING (15.3%)
- EPICUREAN (10.4%)

\* Based on the most recent 6 months sales.

Company	FMCG	EPIC	NUTRI	WELL_SP
Score	3	1	4	2

# I. Market Performance – Growth Trend

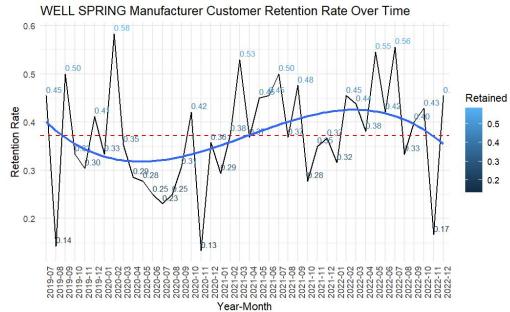
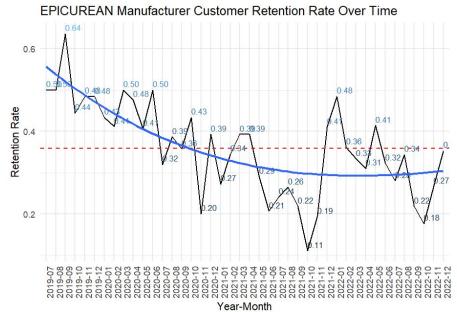
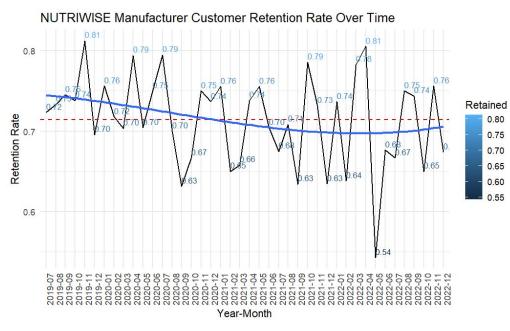
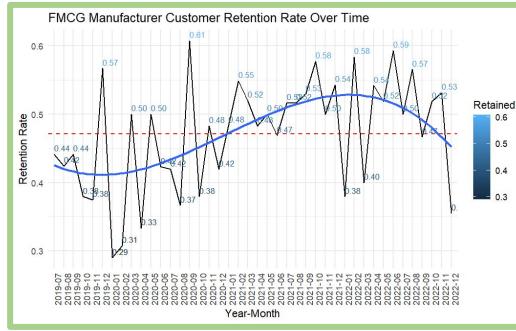


- **WELL SPRING** is experiencing the fastest growth trend.
- **FMCG** has **shown a slow down growth rate** in 2022.
- **EPICUREAN** experienced a sharp decline in 2020 but has maintained stability in 2021 and 2022.
- **NUTRIWISE** is currently facing sales fluctuations.

Company	FMCG	EPIC	NUTRI	WELL_SP
Score	3	2	1	4



## II. Customer Retention Rate\*



- **NUTRIWISE** maintains the highest average customer retention

rate at **71.4%**, with relatively small fluctuations.

- **FMCG** follows with the **second-highest customer retention**

rate at **47.1%**, although it has been on a declining trend in recent months.

- **WELL SPRING** maintains an average customer retention rate

of **37.2%** and is also experiencing a decline, although not as steep as FMCG.

- **EPICUREAN** faced a significant decline in 2020 and early 2021

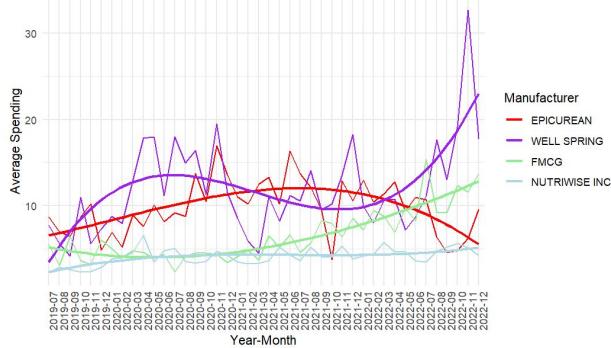
Company	FMCG	EPIC	NUTRI	WELL_SP
Score	3	1	4	2

\* The percentage of customers who made a purchase last month and continued to make a purchase this month.

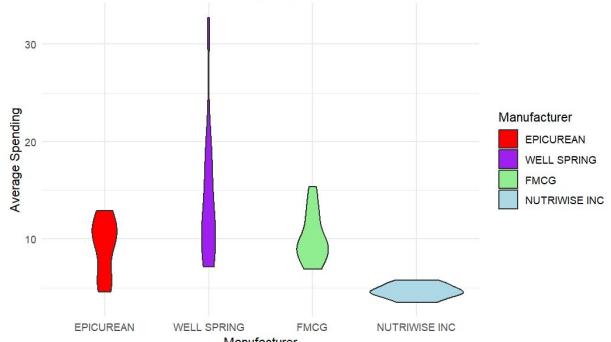


### III. Customer Lifetime Value – Average Spending\*

Average Monthly Spending per purchase



Violin Plot of Average Spending per purchase (2022.01 - 2022.12)

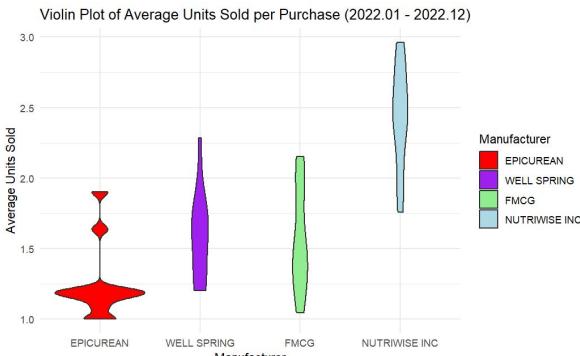
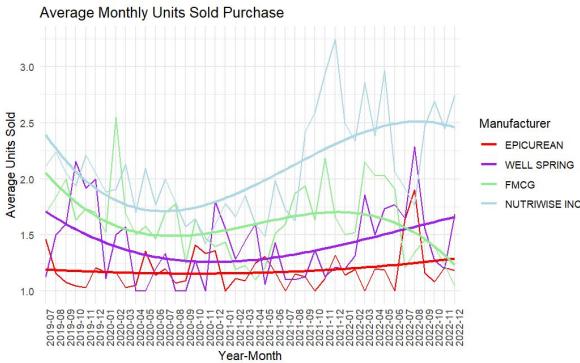


- **WELL SPRING** has exhibited robust growth in terms of the average monthly spending value, **surpassing \$30** at November, 2022, which is significantly higher than the other three competitors.
- **FMCG** follows with the second-highest average monthly spending, **around \$14**, and has maintained steady growth since the beginning of 2021.
- **EPICUREAN** has experienced a continuous decline since the end of 2021. While there was **a rebound to about \$10** in December 2022, more data is needed to determine whether it can reverse the declining trend and return to a growth path.

Company	FMCG	EPIC	NUTRI	WELL_SP
Score	3	2	1	4

\* Average monthly spending per customer.

# III. Customer Lifetime Value – Average Units Purchased\*



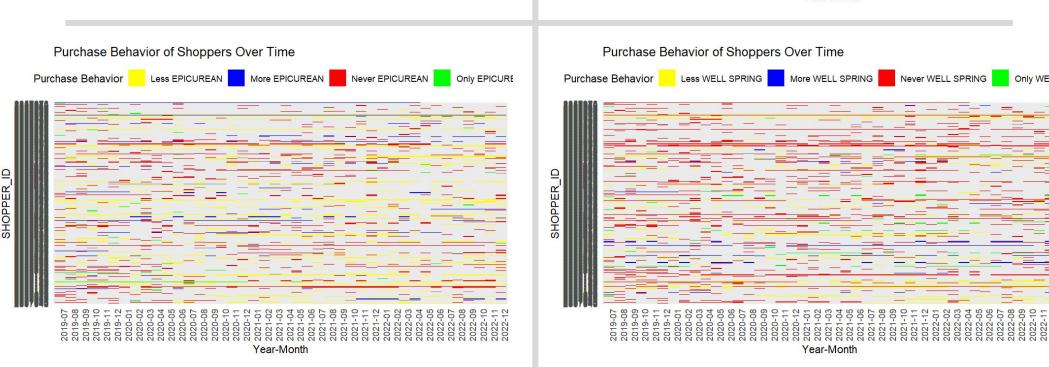
- **NUTRIWISE** maintains the highest average monthly units purchased value (~2.5 units), with relatively small fluctuations.
- **WELL SPRING** recorded steady growth since middle of 2021, and now rebound to the second highest average units purchased (~1.7 units).
- **EPICUREAN** maintained steady, small change in the whole time periods (~1.3 units).
- **FMCG** dropped significantly since middle of 2022, has the lowest average units purchased

in all 4 players (~1.3 units) at December 2022

Company	FMCG	EPIC	NUTRI	WELL_SP
Score	1	2	4	3

\* Average monthly purchased units per customer.

# IV. Repeat Purchase\*

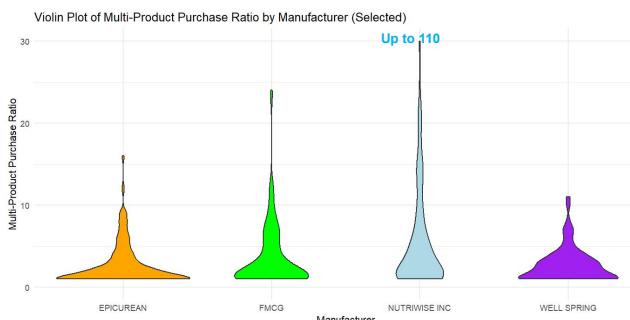
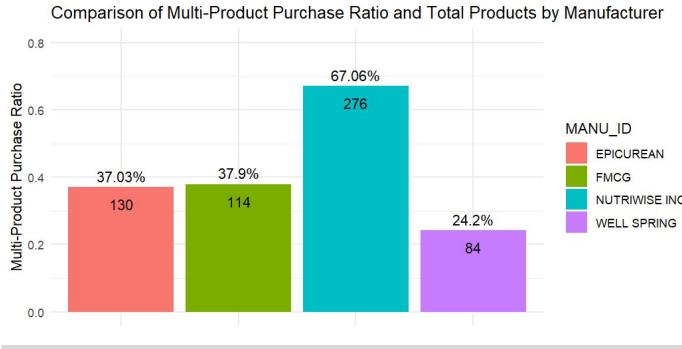


- **NUTRIWISE** exhibits the strongest repeat purchase characteristics.
- **FMCG** comes next with the **second-highest repeat purchase** feature.
- **WELL SPRING**, while still trailing behind the top performers, notably improved its repeat purchase behavior in 2022.

Company	FMCG	EPIC	NUTRI	WELL_SP
Score	3	2	4	1

\* A customer buys the same brand's product multiple times at different times

# V. Cross-Selling\*

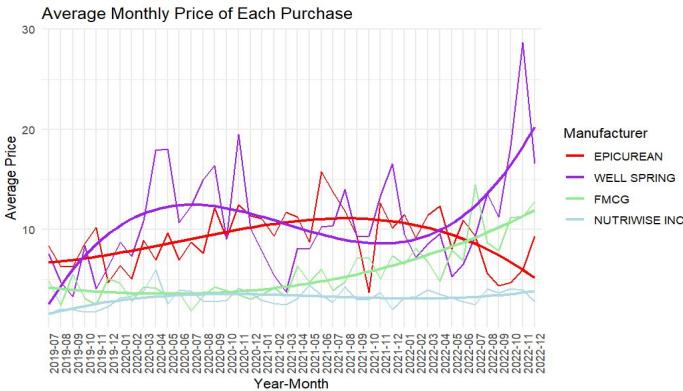


- **NUTRIWISE** boasts the highest cross-selling characteristics, with **67%** of customers purchasing more than one different product in the same month. Notably, NUTRIWISE offers a wide range of products in the market (276).
- **FMCG** has a slightly higher cross-selling rate (**37.9%**) than EPICUREAN, with less than a 1% difference.
- **EPICUREAN** secures the third position, closely trailing FMCG at **37.03%**.
- **WELL SPRING** has the lowest cross-selling rate at **24.2%**, and it also offers the

Company	FMCG	EPIC	NUTRI	WELL_SP
Score	3	2	4	1

\* Offering additional or related products or services to a customer in addition to their initial purchase

# VI. Up-Selling\*

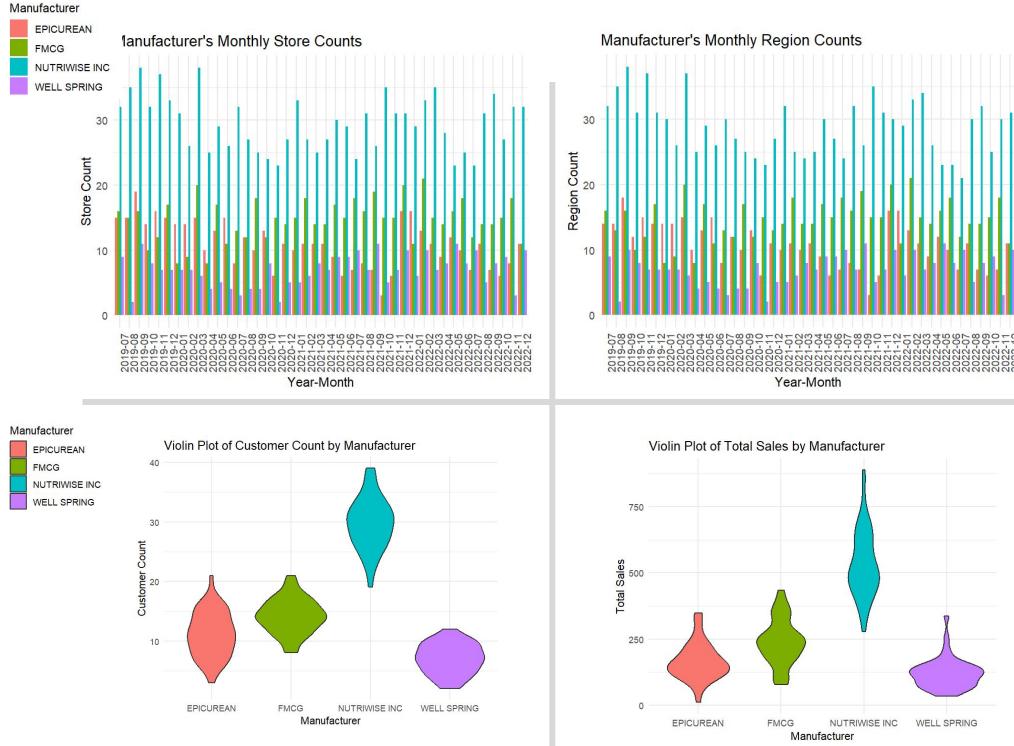


- **WELL SPRING** plays very well regards to **average price (\$12.04, 2022.01 – 2022.12)**, it offers obvious higher price than other 3 competitors. And its average price has increased very fast since beginning of 2022.
- **FMCG** has a increasing trend since end of 2020, it past over EPICUREAN in middle of 2022 (**\$8.97, , 2022.01 – 2022.12**).
- **EPICUREAN** used to show well in average price, but it start decline in middle of 2022 (**\$8.58, , 2022.01 – 2022.12**), and be by passed by FMCG.
- **NUTRIWISE** maintains the lowest average price level (**\$3.44, , 2022.01 – 2022.12**),

Company	FMCG	EPIC	NUTRI	WELL_SP
Score	3	2	1	4

\*Offering higher-tier or more expensive products or services to customers to increase their purchase amount

# VII. Customer Effort Score\*



- **NUTRIWISE** has **most store and region coverage**, which record the highest customer and total sales.
- **FMCG** pass over the other 2 players since end of 2020.
- **EPICUREAN**'s coverage seems continuously decline since middle of 2022, if it can't change the situation, **it may be surpassed by WELL SPRING** in short time.
- **WELL SPRING**, has the **least coverage** in all top 4 players.

Company	FMCG	EPIC	NUTRI	WELL_SP
Score	3	1	4	2

customer number and total sales.

\*The level of effort a customer perceives when completing a task or interacting with a company.

# VIII. Individual Customer Loyalty Index

## 2. Measures based on individual-level data

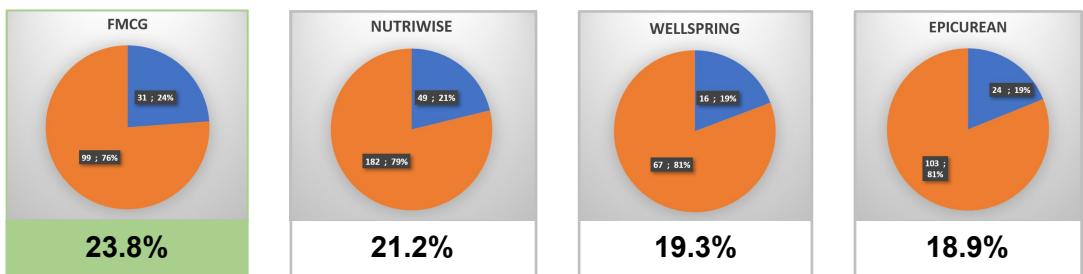
So far, individual behavior has been aggregated (either in switching matrices or market shares) before deriving brand-loyalty estimates. In the last decade, several measures based on individual-level data have been developed. We discuss brand-loyalty measures that are included as an independent construct in discrete-choice models to predict brand choice<sup>10</sup>.

Discrete-choice models are used increasingly to model the selection of brands out of a finite set of alternatives. A particularly prominent model is the one developed by Guadagni and Little (1983). They used an individual's sequence of purchases to derive a brand-loyalty estimate for that individual for each brand on every purchase occasion<sup>11</sup>. Brand  $j$ 's loyalty measure for individual  $h$  on purchase occasion  $n$ ,  $BL_j^h(n)$ , is defined as a weighted average of this value at the previous purchase occasion ( $n-1$ ) and the previous purchase decision. Stated formally:

$$BL_j^h(n) = \alpha BL_j^h(n-1) + (1 - \alpha) HISTORY, \quad (1)$$

where *HISTORY* is a dummy variable which equals one if alternative  $j$  is chosen by individual  $h$  at purchase occasion  $n-1$  and zero otherwise. The implication of equation (1) is that at a given purchase occasion the purchase history of an individual is exponentially weighted<sup>12</sup>. Brand loyalty is high for a particular brand, if that brand is bought frequently on recent purchase occasions. The relative influence of the most recent purchase is given by the parameter  $\alpha$ . If  $\alpha$  is zero, the first factor in equation (1) vanishes, and only the last purchase decision determines the value of the brand-loyalty measure: i.e. the most recently bought brand has a brand loyalty of one, and all others have a brand loyalty of zero. In contrast, it is only determined by the very first

Values	Column Labels					Grand Total
	epicurean	fmcg	nutriwise	wellspring		
Sum of number of loyal customer		24	31	49	16	120
Sum of number of non loyal customer		103	99	182	67	451
Sum of total customer		127	130	231	83	571
Sum of Loyalty Rate	0.188976378	0.238461538	0.212121212	0.192771084	0.832330213	
Sum of Average individual index	34.1937	38.47780645	51.68134694	38.87535	163.2282034	
Sum of total index	820.6488	1192.812	2532.386	622.0056	5167.8524	



Company	FMCG	EPIC	NUTRI	WELL_SP
Score	4	1	3	2

# Summary -- The Overall Customer Loyalty

		FMCG	EPIC	NUTRI	WELL_SP
Market Performance	Market share	3	1	4	2
	Growth	3	2	1	4
Customer Retention Rate		3	1	4	2
Customer Lifetime Value	Average Spending	3	2	1	4
	Average Units Purchased	1	2	4	3
Repeat Purchase		3	2	4	1
Cross-Selling		3	2	4	1
Up-Selling		3	2	1	4
Customer Effort Score		3	1	4	2
Individual Customer Loyalty Index		4	1	3	2
Weighted Average		2.9	1.6	3.0	2.5

- Based on our analysis, **FMCG is ranked second** in terms of overall customer loyalty. Its primary weakness lies in the 'Average Units Purchased,' indicating that the quantity of products sold every time needs improvement.
- In comparison to the other three competitors, FMCG demonstrates a well-rounded performance across most aspects, except for the 'Average Units Purchased,' as mentioned in first point. **FMCG has a significant opportunity to surpass the current leader, NUTRIWISE.**
- However, **WELL SPRING is also displaying a robust growth trend**, and the gap between it and FMCG is minimal. Both FMCG and WELL SPRING have a strong chance of claiming the top position in terms of overall customer loyalty.
- On the other hand, **NUTRIWISE and EPICUREAN are both showing clear signs of decline.** Without significant improvement, and relying solely on low prices, **NUTRIWISE may face challenges in the near future.**

We assigned equal weight to each item here, which can be adjusted based on the opinions of industry experts.



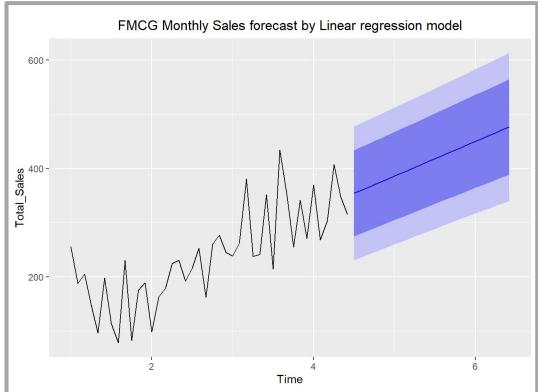
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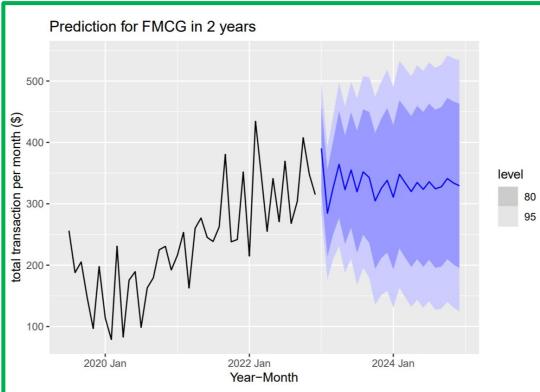
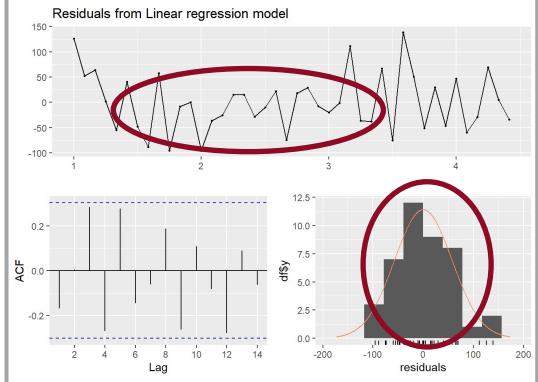
# Agenda

- Brand Loyalty
- Forecast
- Recommendations

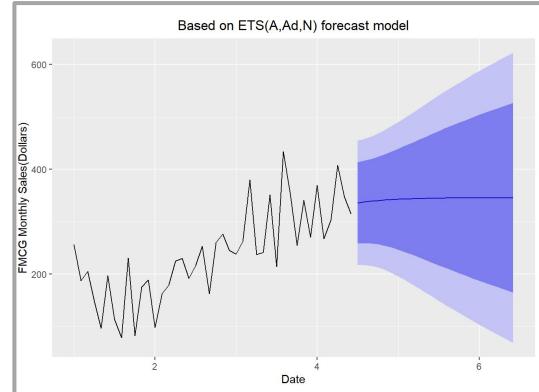
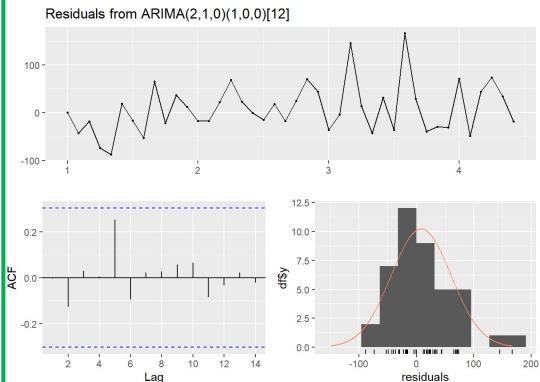
# Forecast – Models Comparation



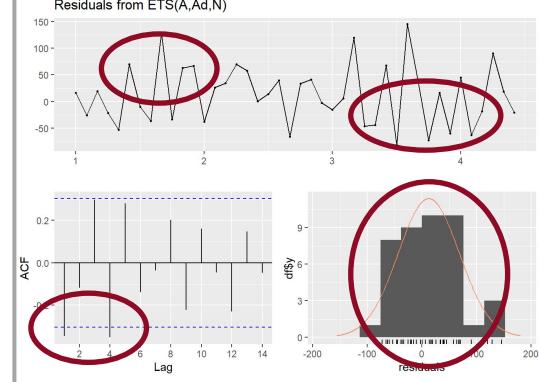
**Time Series Linear Regression**



**ARIMA(2,1,0)(1,0,0)[12] Model**



**ETS(A, Ad, N) Model**



# Forecast – Model Evaluation

The monthly sales forecast data from the selected ARIMA(2,1,0)(1,0,0) model shows **a relatively stable sales amount in next two years**, with smaller fluctuations compared to previous years. However, we **strongly recommend using this forecast data with caution** for the following reasons:

- **The sample size of the training data is relatively small and of short duration**, which may not be sufficient for the model to capture long-term trends and seasonal patterns.
- It is **highly recommended to have sales experts review and make necessary adjustments** to the forecasts to ensure their accuracy and relevance to the business.
- **Consider repeating the modeling and forecasting task regularly**, for example, every 12 months. This can help improve prediction accuracy and adaptability to real business conditions.
- **The forecast models and data mining methods** used are well-practiced and **can be reused in the future** when more robust data becomes available.

# Linear Regression Results

	Factors	Coefficient	p-Value	Contribute to Monthly Sales
Statistically Significant	ZIP_CODE Numbers	20.30575	***	
	Average Price	27.98096	***	
	UNITS	1.92000	***	
	SPECIES_DOG	6.39034	***	
	Lifestage_KITTEN	43.95937	.	
	Store Numbers	-13.11766	***	
	Promotion	-0.99691	***	
	Natural	-14.23833	***	
	Lifestage_PUPPY	-14.71388	*	
Statistically NOT Significant	FOOD_TYPE, FEEDING PHILOSOPHY, TEXTURE_FORMAT			

```

Call:
lm(formula = Monthly_Sales ~ STORE_COUNT + ZIP_CODE_COUNT + Average_PRICE +
    PROMO_FLAG + UNITS + SPECIES_DOG + NATURAL_CLAIM_NATURAL +
    LIFESTAGE_PUPPY + LIFESTAGE_KITTEN, data = manufacturer_data)

Residuals:
    Min      1Q   Median     3Q    Max 
-55.969 -20.851  2.421  17.041 74.012 

Coefficients:
            Estimate Std. Error t value Pr(>|t|)    
(Intercept) 136.59954  4.56533 -29.921 < 2e-16 ***
STORE_COUNT -13.11766  1.59952  -8.201 4.76e-16 ***
ZIP_CODE_COUNT 20.30575  1.55394 13.067 < 2e-16 ***
Average_PRICE 27.98096  0.34184 81.855 < 2e-16 ***
PROMO_FLAG   -0.99691  0.08504 -11.723 < 2e-16 ***
UNITS        1.92000  0.04986 38.508 < 2e-16 ***
SPECIES_DOG   6.39034  1.38937  4.599 4.56e-06 ***
NATURAL_CLAIM_NATURAL -14.23833  3.36869 -4.227 2.50e-05 ***
LIFESTAGE_PUPPY -14.71388  6.88345 -2.138 0.0327 *  
LIFESTAGE_KITTEN 43.95937 25.56210  1.720 0.0857 .  
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 25.53 on 1637 degrees of freedom
Multiple R-squared:  0.9003, Adjusted R-squared:  0.8997 
F-statistic: 1642 on 9 and 1637 DF, p-value: < 2.2e-16

```

- Utilizing **linear regression** with the dependent variable '**Monthly\_Sales**' and independent variables such as 'Store\_Count,' 'Zipcode\_Count,' 'Average Price,' and more, the findings can provide **valuable insights for business planning**.



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# Agenda

- Brand Loyalty
- Forecast
- **Recommendations**



# Recommendations for FMCG

- Based on our forecast, **FMCG is expected to experience slight growth in 2023/2024**, providing a **favorable environment for further investments** in business management improvements to address the challenges in customer loyalty.
- The data indicates that **FMCG is now transitioning to a higher-priced market segment**. However, this progress has **led to a decline in both monthly customer numbers and the quantity of products sold each month**. It is essential to closely monitor this trend, as these are typical side-effects of entering a higher-priced, higher-profit market. Maintaining your current customer base while exploring new markets presents a significant challenge for every company.
- Our analysis shows that **promotional efforts have not yielded any sales increases**; in fact, there has been a slightly decline. We recommend reconsidering the allocation of resources for promotions. It is essential to assess and improve promotional events before investing more resources in them.
- Furthermore, based on the data, we suggest that **FMCG prioritize expanding sales coverage**, particularly by **focusing on regional coverage**. Our regression analysis indicates that this approach could be more beneficial than expanding more stores in the same region.
- **Loyalty memberships** are a common method for enhancing customer loyalty. If you haven't implemented one, it's worth considering. If you

# Limitations and Constraints

- The analysis is conducted on **relatively small sample sizes of only 42 for each major manufacturer**, covering a **time span of 3.5 years**. As a result, **predictions** made based on this data **may deviate from actual circumstances**.
- This analysis is strictly **data-driven** and seeks to **identify correlations** within the dataset. However, it is important to note that correlation **does not imply causation**, and the study cannot definitively establish cause-and-effect relationships.
- Insights and recommendations derived from this analysis should be **regarded as preliminary findings** that require thorough **evaluation and validation by industry experts** in the pet food sector.
- Furthermore, it is essential to acknowledge that the **method of calculating the Individual Customer Loyalty Index** involved aggregating individual customer loyalty data, which **might introduce biases**. This factor should be taken into consideration when making business decisions based on this data.

Readers should approach the recommendations in this paper cautiously, as it lacks customer surveys and industry expertise.



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# Q&A

## Questions

## Suggestions & Comments

- We would like to express our **sincere gratitude to FMCG team** for providing us with the opportunity to apply our course knowledge to a real business scenario.
- We also extend our heartfelt thanks to **Professor Sharma, Professor Fulton, and Professor Tomic**. Without your unwavering support and guidance, our team would not have been able to successfully complete this competition and deliver today's presentation.
- **We truly value the chance** we've been given and have gained invaluable business experience through this opportunity.

# Thank you!