

An Empirical Study on Identifying the Best Qualitative Methods for Sales Forecasting Models of the Top Five FMCG Companies in India Based on Market Capitalization as of March 19, 2024, Using JMP Software.

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Abstract - This paper examines sales forecasting for the five largest FMCG companies as of March 19, 2024: Hindustan Unilever Limited (HUL), ITC Limited, Nestlé India Limited, Varun Beverages Limited, and Godrej Consumer Products Limited. We obtained 12 years of sales data for these companies from the Screener website to predict sales for the next three years, from March 2024 to March 2027. Various forecasting methods were employed, utilizing JMP software to identify the most effective techniques for each company. Our study revealed that each FMCG company has an optimal forecasting model tailored to its specific sales data. For ITC, Nestlé India Limited, and Godrej Consumer Products Limited, the ARIMA model proved most effective. In contrast, Varun Beverages Limited benefited more from the Seasonal Exponential Smoothing model. This highlights the importance of selecting the right forecasting method for accurate predictions and positive outcomes. Additionally, the paper provides an overview of the FMCG sector and its growth trends, driven by urbanization, rising incomes, and changing consumer preferences. Despite economic fluctuations, the FMCG sector remains resilient, offering lucrative investment opportunities. The findings are valuable for industry stakeholders, including companies, investors, and policymakers. Accurate sales predictions enable effective inventory management and strategic marketing. Overall, this study enhances our understanding of sales forecasting in the FMCG industry, underscoring the utility of diverse quantitative models in decision-making.

Key Words: Business forecasting, sales forecasting, ARIMA model, Seasonal Exponential Smoothing, quantitative analysis, economic fluctuations, Screener website, growth potential.

1. INTRODUCTION

The long-term success of any firm greatly depends on its management's ability to recognize trends and make sound decisions. Top company executives typically know just when to make changes to stay ahead of the competition. These companies rarely make mistakes by misjudging consumer demand, unlike many others. Being adept at forecasting can make all the difference.

Due to intense competition and challenging times, determining how much product to sell is difficult. Various factors influence consumer demand, but if a company can accurately forecast sales, it can lead to increased customer satisfaction, higher revenue, and more efficient production planning.

Accurate and timely forecasting is crucial for inventory management. If forecasting methods are flawed, a company may end up with too much or too little stock, which can negatively impact profitability and competitiveness.

Forecasting helps predict and explain potential outcomes, and incorporating these predictions into planning can lead to better decision-making for the company (Makridakis and Wheelwright, 1989). For example, forecasting sales can enhance the effectiveness of the sales or marketing team. The same predictions can aid other departments in production planning and scheduling.

There are various methods for forecasting in business, ranging from simple to sophisticated approaches. The most common method appears to be relying on intuition, as many decision-makers base their predictions on experience and past observations (Makridakis, 1989; DeLurgio, 1998; Wright & Goodwin, 1998). While most companies follow this approach, some combine it with data-driven techniques, and only a few rely solely on statistical methods (Makridakis, 1989).

1) Sales Forecasting:

Sales forecasting involves analyzing past and current data to predict future sales. Every company that sells products must estimate consumer demand. Manufacturers need to know how much to produce, and retailers need to determine optimal stock levels. Failing to understand consumer demand can result in lost sales, dissatisfied customers, and a weakened market position.

Importance of Sales Forecasting:

1)Improving Problem-Solving Techniques:

- a) Managing final products and inventory efficiently.
- b) Scheduling production to optimize machinery and plant usage.
- c) Maintaining adequate raw material and supply stocks to ensure uninterrupted production.
- d) Reducing overstocking while minimizing warehousing and transportation costs, and creating a manpower plan.
- e) Anticipating financial requirements.

2)Supporting Management:

- a) Providing guidance for top management in policy-making, planning, and operational control.
- b) Aligning different functional departments on product types and quantities.
- c) Making informed decisions about business expansion.
- d) Planning for both long-term and short-term financial needs.
- e) Preparing operating and capital budgets for the year.

3)Supporting Sales and Marketing Decisions:

- a) Setting sales targets for the sales force.
- b) Developing an effective sales strategy.
- c) Directing sales efforts and determining sales and promotional expenses.
- d) Evaluating the advertising budget's size and scope.
- e) Setting prices that ensure sustainable profitability.
- f) Identifying products with growth potential for further development.

2) Overview of the FMCG Sector:

FMCG, or Fast-Moving Consumer Goods, refers to products with quick turnover and low cost. Consumers typically spend less time deciding to purchase FMCG products compared to more expensive items. Although individual earnings from products like soap and snacks are small, the overall profit can be substantial when sold in large volumes. Even during economic downturns, consumers may delay purchasing items like cars, but they will still buy essential goods like food and cleaning supplies.

Daily-use items such as soap, shampoo, and toothpaste fall under the FMCG sector. This sector is vital for the Indian economy and is the fourth-largest contributor to the country's GDP. It includes frequently purchased items like personal care products, food, household goods, and even electronics.

Top 5 FMCG companies in India

Rank	Company Name	Industry	Market Capitalization (Rs in crores)
1	HUL	Household & Personal Products	5,32,276.40
2	ITC	Diversified	5,10,679.35
3	Nestle India LTD	Consumer Food	2,40,856.10
4	Varun Beverages LTD	Beverages	1,81,745.74
5	Godrej Consumer products LTD	Household & Personal Products	1,23,362.36

Source :(Forbes India report as on 19 march 2024)

Examples of FMCG Products

Below are some examples of FMCG (Fast-Moving Consumer Goods) products:

1. **Toiletries and Personal Care Products:**
 - Toothpaste
 - Shampoo
 - Soap
 - Deodorant
 - Shower Gel
 - Hand Sanitizers
2. **Food and Beverages:**
 - Soft Drinks
 - Snack Foods (chips, cookies, chocolates)
 - Breakfast Cereals
 - Packaged Tea and Coffee
 - Instant Noodles
 - Packaged Fruits and Vegetables
3. **Household Products:**
 - Laundry Detergent
 - Dishwashing Liquid
 - Air Fresheners
 - Cleaning Agents (all-purpose cleaners, floor cleaners)
 - Insect Repellents
 - Batteries
4. **Healthcare Products:**
 - Over-the-Counter Medicines (pain relievers, cough syrup, antacids)
 - Vitamins and Supplements
 - Bandages and First Aid Supplies
 - Oral Care Products (mouthwash, dental floss)
 - Dietary and Nutritional Products
5. **Packaged Foods:**
 - Canned Foods (soups, vegetables, fruits)
 - Frozen Foods (ready meals, pizzas, vegetables)
 - Packaged Snacks (nuts, popcorn, pretzels)
 - Condiments and Sauces (ketchup, mayonnaise, salad dressings)
 - Breakfast Bars and Granola Bars
6. **Baby and Infant Care Products:**
 - Diapers
 - Baby Wipes
 - Baby Food
 - Infant Formula
 - Baby Skincare Products

These are just a few examples of the vast range of FMCG products available in the market. They are called "fast-moving" because they are low-cost items that sell quickly and have a high turnover rate.

Major Concerns in the FMCG Sector in India

Currently, all kinds of businesses are facing challenges, not just one particular type. It's becoming increasingly difficult to perform well and maintain growth. The market for everyday products is constantly evolving, with new items launching frequently and trends changing quickly. Additionally, various promotions and advertisements make sales forecasting even more challenging. The distribution of stores across different regions also complicates planning. Therefore, predicting global sales for these products is a difficult task.

Objectives of the Study

1. To determine which models are most effective for forecasting sales in stores that sell everyday products like soap and snacks.
2. To analyze the factors that influences the selection of sales forecasting models for these stores.

3. To compare different sales forecasting methods based on product categories.
4. To suggest improvements to existing forecasting models to enhance their accuracy for predicting sales in FMCG stores.

Expected Contribution from the Study

This study aims to improve our understanding of sales forecasting. The key beneficiaries include researchers, educators, managers, and anyone involved in sales forecasting. The study will propose sales forecasting models for different types of FMCG products, helping forecasters make better predictions. Additionally, it will identify the factors that influence the selection of forecasting models, especially for consumer goods. This research is expected to improve forecasting accuracy.

a) **Reduced inventory:** Better cash flow can be utilized for marketing efforts such as advertisements and in-store displays to drive sales.

b) **Minimizing stockouts:** Reduced missed sales opportunities at the retail level.

c) **Maximizing resource utilization:** In a production setting, ensuring the timely production of the right products within constraints.

FMCG companies may apply these findings to improve their sales forecasting, allowing them to meet customer demand more efficiently while minimizing excess inventory. This approach is beneficial for various types of businesses.

Literature Review:

1. In 2008, Hanaa E. Sayed and colleagues introduced a simple system to aid decision-making. They used mathematical techniques like addition and averaging to forecast a company's production needs. By analyzing real data from various products, they showed that their system was more effective than guessing. By combining different methods, they improved predictions about production timing. Their system also incorporated expert opinions and mathematical models to enhance accuracy.
2. Dragisa Stojanovic (born in 1994) examined both direct and indirect product sales. He developed a model using a sales chart to analyze sales trends and predict future sales. This model helps forecast sales under different conditions—whether they remain stable or change. The sales chart or model allows for projections based on past trends, making it useful for future sales predictions.
3. Michael S. Morgan and Pradeep K. Chintagunta (1997) explored the challenges of predicting restaurant sales, which are only observable when the restaurant is open. They discussed these difficulties in a paper relevant to many restaurant owners. Their findings demonstrated that a particular mathematical model performed well in forecasting sales, making it a valuable tool for estimating restaurant revenues.
4. Koen Pauwels highlighted the value of time-series data for marketing researchers. This data enables more sophisticated research and insights into changes over time. He discussed the challenges researchers face when using time-series data in marketing and provided examples of new applications. However, he also noted that there is still much to learn in this field.
5. In 2004, Peter S. Fader and colleagues developed a model to understand how customers purchase new products over time. While similar to existing models, theirs is more flexible and adapts over time. The model also integrates other commonly used marketing models. Their research showed that this model can predict sales volume and timing, helping managers make better decisions.
6. In 2008, Rajiv Urs presented a systematic approach to production planning for improved results. He proposed eight steps: inputting historical data, cleaning it, making predictions using mathematical models, accounting for new products, adjusting predictions with expert insights, aligning forecasts with promotional schedules, tracking inventory, and collaborating with suppliers. His method ensures that decisions are based on consistent and reliable forecasts.
7. In May 2012, Tetyana Kuzhda developed a mathematical equation to forecast future sales. The equation factors in variables such as consumer income and advertising expenditure. Kuzhda's study found that this equation accurately predicts sales and can be applied to other business forecasting scenarios.
8. Tom Wallace (2006) identified four key elements in Sales & Operations Planning: demand, supply, volume, and mix. This process ensures that supply matches demand and that product variety aligns with consumer needs. Wallace emphasized that planning is easier when conditions are stable but becomes challenging in volatile situations. He noted that businesses increasingly face such unpredictable conditions, making forecasting more difficult.
9. Larry Lapide (2009) pointed out that some products are harder to forecast, particularly those with irregular demand or new product launches. This study highlights the difficulties forecasters face when predicting demand influenced by

promotions or economic shifts. The unpredictability of customer reactions and limited historical data for new products make forecasting even more challenging in rapidly changing economies.

10. Manisha Gahirwal and Vijayalakshmi M. (2011) found that combining multiple forecasting techniques improves accuracy. They divided data into three components—trend, seasonal patterns, and random fluctuations—and applied different mathematical models, such as ARIMA and Holt-Winter, to each. Their study showed that using the best forecasting methods from one dataset can improve predictions in similar datasets. Their method outperformed Holt-Winter alone.
11. McKinsey's Budgeting Control, introduced in 1922, revolutionized business planning by improving sales forecasting, a key factor in effective budgeting.
12. In 1988, Chatfield discussed the effectiveness of Holt-Winter's exponential smoothing for forecasting, noting that despite its simplicity, it performs as well as more complex methods. He argued that combining this method with human judgment can further enhance forecasts. Chatfield emphasized that simplicity often rivals complexity in forecasting, and sometimes yields better results.
13. Michael Kelleher (2012) described how Hollister, Incorporated improved its global planning by cleaning old data, focusing on unpredictable products, developing a system to detect unusual forecast patterns early, and fostering regular communication between the Sales, Marketing, and Operations teams.

Research Gap:

After reviewing various forecasting methods, it is clear that no single method is universally perfect. The choice of method depends on factors like the type of data available, the purpose of the forecast, the people involved, and the suitability of the model. Additionally, the complexity of forecasting increases with the number of products involved. The central question remains: which forecasting method should be used?

- a) Time Series Methods
- b) Causal Methods
- c) Judgmental Methods

Using the same method for all popular products is often not effective. Factors such as the type of data available and the product's life cycle also influence prediction accuracy. Therefore, selecting the appropriate forecasting method is challenging, and the type of product matters. A method that works well for shampoo might not be as effective for cookies.

This study aims to address these gaps and identify a forecasting model that delivers the most accurate predictions for a wide range of fast-moving consumer goods (FMCG).

FORECASTING TECHNIQUES AND THEIR ATTRIBUTES

Forecasting

Forecasting involves predicting future events by analyzing past data. It is the process of using historical information to make an educated guess about what might happen next. Prediction also refers to anticipating future events, but unlike forecasting, it can involve personal intuition and feelings, which may not follow a specific pattern or method.

A forecast is essentially a prediction about the future. Sometimes, a single prediction is sufficient, while at other times, multiple predictions are necessary. The number of predictions and the depth of analysis depend on how the forecast will be used.

There are two primary reasons for the need for forecasting in any field:

1. **Purpose** – Forecasting helps in planning for future events. By predicting what might happen, we can take steps to improve outcomes or mitigate potential problems.
2. **Time** – Time plays a crucial role in planning, preparation, execution, and completion. Different situations require varying timeframes—some may need short-term solutions, while others may span several years. Knowing what the future holds enables us to plan and act at the right time.

Types of forecasts

Forecasting can be classified into:

- a) **Long-term Forecast:** Executives need long-term forecasts to set the company on the right path for the future. Therefore, they pay close attention to such forecasts.

b) **Short-term Forecast:** Short-term forecasts assist managers in planning for the immediate future. These forecasts help guide decision-making in day-to-day operations.

c) **Quantitative Techniques:** These involve mathematical approaches that yield numerical results. They rely on established rules and formulas rather than intuition.

FORECASTING STEPS

Understanding that forecasting methods rely on historical data helps outline the five basic steps in the forecasting process:

- a) **Data Collection**
- b) **Data Reduction or Condensation**
- c) **Model Building and Evaluation**
- d) **Model Extrapolation (the actual forecast)**
- e) **Forecast Evaluation**

Below is a brief explanation of each step:

a) **Data Collection:** Gathering accurate and relevant data is crucial. Ensuring the quality and relevance of the data is essential because incorrect or irrelevant data can lead to flawed forecasts.

b) **Data Reduction or Condensation:** In some cases, data needs to be simplified, either because there is too much or too little information. Irrelevant data can reduce the accuracy of predictions, while some data may only provide insight into past events rather than future trends.

c) **Model Building and Evaluation:** This step involves constructing a model based on the collected data to make accurate predictions. The simpler the model, the more likely managers will understand and use it for decision-making.

d) **Model Extrapolation (the actual forecast):** Once the model is built and the right data is selected, it is used to predict future outcomes.

e) **Forecast Evaluation:** This involves checking how well the forecast matches actual outcomes. Sometimes, the most recent data is set aside to verify the accuracy of the predictions.

METHODS OF SALES FORECASTING

a) **Qualitative Method / Survey Method:** This research paper does not cover this forecasting method.

b) **Quantitative Method / Statistical Method:** Statistical methods include:

- a) **Time Series Analysis**
- b) **Moving Average**
- c) **Exponential Smoothing Method**
- d) **Regression Analysis**
- e) **Econometric Models**

RESEARCH METHODOLOGY

The research method outlines the approved procedures used for a specific study, defining the scope of the proposed investigation. It also includes research objectives, explaining the scope, timeframe, and data sources.

The data used for this research paper is secondary data. Sales data of the top 5 FMCG companies was obtained from the Screener website, where information on publicly listed companies is available. Additional reliable sources, such as online articles related to the FMCG sector, business forecasting, and textbooks on business forecasting, were also utilized.

Limitations of this research paper

This research paper does not cover the Qualitative Method / Survey Method forecasting method.

However, to overcome the limitations and maintain the effectiveness of this research paper, sincere efforts have been made by the author.

Data presentation of companies**HUL company sales data**

Year	Amount(in rs crores)
March 2012- March 2013	27,004.00
March 2013- March 2014	29,234.00
March 2014- March 2015	31,972.00
March 2015-March 2016	32,186.00
March 2016-March 2017	33,162.00
March 2017-March 2018	35,545.00
March 2018-March 2019	39,310.00
March 2019-March 2020	39,783.00
March 2020-March 2021	47,028.00
March 2021-March 2022	52,446.00
March 2022-March 2023	60,580.00
March 2023-March 2024	61,896.00

Source: <https://www.screener.in/company/HINDUNILVR/consolidated/#profit-loss>**Nestle India LTD company sales data**

Year	Amount(in rs crores)
March 2012- March 2013	8335
March 2013- March 2014	9101
March 2014- March 2015	9855
March 2015-March 2016	8175
March 2016-March 2017	9141
March 2017-March 2018	10010
March 2018-March 2019	11292
March 2019-March 2020	12369
March 2020-March 2021	13350
March 2021-March 2022	14741
March 2022-March 2023	16897
March 2023-March 2024	19126

Source: <https://www.screener.in/company/NESTLEIND/#profit-loss>**ITC LTD company sales data**

Year	Amount(in rs crores)
March 2012- March 2013	26516
March 2013- March 2014	31618
March 2014- March 2015	35306
March 2015-March 2016	38817
March 2016-March 2017	39192

March 2017-March 2018	42768
March 2018-March 2019	43449
March 2019-March 2020	48340
March 2020-March 2021	49388
March 2021-March 2022	49257
March 2022-March 2023	60645
March 2023-March 2024	70919

Source: <https://www.screener.in/company/ITC/consolidated/#profit-loss>

Varun Beverages LTD company sales data

Year	Amount(in rs crores)
March 2012- March 2013	1800
March 2013- March 2014	2115
March 2014- March 2015	2502
March 2015-March 2016	3394
March 2016-March 2017	3861
March 2017-March 2018	4004
March 2018-March 2019	5105
March 2019-March 2020	7130
March 2020-March 2021	6450
March 2021-March 2022	8823
March 2022-March 2023	13173
March 2023-March 2024	16043

Source: <https://www.screener.in/company/VBL/consolidated/#profit-loss>

Godrej Consumer products LTD company sales dat

Year	Amount(in rs crores)
March 2012- March 2013	4853
March 2013- March 2014	6412
March 2014- March 2015	7599
March 2015-March 2016	8273
March 2016-March 2017	8424
March 2017-March 2018	9268
March 2018-March 2019	9847
March 2019-March 2020	10314
March 2020-March 2021	9911
March 2021-March 2022	11029
March 2022-March 2023	12276
March 2023-March 2024	13316

Source: <https://www.screener.in/company/GODREJCP/consolidated/#profit-loss>

Data Analysis with Qualitative Methods

Based on the above data, we will forecast for the next three years, from March 2024 to March 2027. We have chosen a three-year period because economic fluctuations may occur, making a longer forecast less reliable.

Note: For the Seasonal Exponential Smoothing and Winters' method models, we have selected three observations per period for all companies in these two forecasting models.

HUL Company

Year	Amount(in rs crores)	Simple Exponential smoothing	Double Exponential smoothing	Linear(Holt) Exponential smoothing	Seasonal Exponential smoothing	Damped-Trend Linear Exponential smoothing	Winters Model	ARIMA(1,1,1)
March 2012-March 2013	27,004.00							
March 2013-March 2014	29,234.00	27004				27004.00		30148.46967
March 2014-March 2015	31,972.00	29234	31464.00	31464.00		29234.00		32255.57062
March 2015-March 2016	32,186.00	31972	34438.52	34399.98		31972.00		35024.49422
March 2016-March 2017	33,162.00	32186	33983.41	34189.72	34416.00	32186.00	34416.00	34925.74707
March 2017-March 2018	35,545.00	33162	34458.70	34129.26	35900.00	33162.00	35064.00	35898.08273
March 2018-March 2019	39,310.00	35545	37027.08	36477.24	35759.00	35545.00	35725.80	38459.82744
March 2019-March 2020	39,783.00	39310	41548.69	41445.55	40913.00	39310.00	43262.75	42459.44156
March 2020-March 2021	47,028.00	39783	41855.18	42599.09	42343.50	39783.00	41506.33	42587.4693

March 2021-March 2022	52,446.00	47028	50247.14	50259.75	49017.50	47028.00	53304.63	50586.69869
March 2022-March 2023	60,580.00	52446	56947.19	57884.54	53672.33	52446.00	56324.29	56015.35684
March 2023-March 2024	61,896.00	60580	66347.91	67490.27	64702.00	60580.00	70953.67	64500.1138
March 2024-March 2025	Predicted sales value	61896	66960.35	68511.97	65028.33	61896.00	62389.76	65057.8758
March 2025-March 2026	Predicted sales value	61896	71427.52	72992.41	67981.58	61896.00	63112.94	68210.20883
March 2026-March 2027	Predicted sales value	61896	75894.69	77472.85	71402.08	61896.00	64428.94	71358.23084
MAPE values		7.141824	5.274754	5.400864	6.136019	7.141824	7.254536	4.796905

Interpretation: The MAPE value of the ARIMA model is 4.796905, which is the lowest among the compared models. Therefore, we select the ARIMA model as the best model for forecasting the next 3 years, from March 2024 to March 2027.

ITC Company

Year	Amount(in rs crores)	Simple Exponential smoothing	Double Exponential smoothing	Linear(Holt) Exponential smoothing	Seasonal Exponential smoothing	Damped-Trend Linear Exponential smoothing	Winters Model	ARIMA(1,1,1)
March 2012-March 2013	26516							
March 2013-March 2014	31618	26516				26516		30647.36
March 2014-March 2015	35306	31617.99	36720	36720		31618		35951.69
March 2015-March 2016	38817	35305.99	38994	38994		35306		39173.03

March 2016-March 2017	39192	38816.99	42328	42328	43919	38817	43919	42995.77
March 2017-March 2018	42768	39192	39567	39567	42880	39192	41792.16	42246.58
March 2018-March 2019	43449	42767.99	46344	46344	46279	42768	45944.92	47622.71
March 2019-March 2020	48340	43449	44130	44130	46187.5	43449	44967.35	45978.27
March 2020-March 2021	49388	48339.99	53231	53231	51972	48340	52147.39	54024.10
March 2021-March 2022	49257	49388	50436	50436	51484	49388	50917.05	51307.70
March 2022-March 2023	60645	49257	49126	49126	52713	49257	51462.20	53952.66
March 2023-March 2024	70919	60644.99	72033	72033	63415.66	60645	65618.206	66494.19
March 2024-March 2025	Predicted sales value	70918.99	81193	81193	72272.66	70919	76079.22	75472.84
March 2025-March 2026	Predicted sales value	70918.99	91467	91467	77711.66	70919	85043.89	79378.77
March 2026-March 2027	Predicted sales value	70918.99	101741	101741	82358.16	70919	92880.69	83630.43
MAPE Values		8.389427	6.605906	6.605906	7.08775	8.389427	7.329741	5.641563

Interpretation: The MAPE value of the ARIMA model is 5.641563, which is the lowest among the models. Therefore, we select the ARIMA model as the best option for forecasting the next 3 years, from March 2024 to March 2027.

NESTLE India LTD Company

Year	Amount(in rs crores)	Simple Exponential smoothing	Double Exponential smoothing	Linear(Holt) Exponential smoothing	Seasonal Exponential smoothing	Damped-Trend Linear Exponential smoothing	Winters Model	ARIMA(1,1,1)
March 2012-	8335							

March 2013								
March 2013- March 2014	9101	8335				8335		9366.94
March 2014- March 2015	9855	9100.999997	9867	9867		9101		10055.76
March 2015- March 2016	8175	9854.999997	10614.81	10614.11		9855		10792.22
March 2016- March 2017	9141	8175.000006	7933.89	7764.56	8941	8175	8941.00	8458.86
March 2017- March 2018	10010	9140.999996	9154.56	9353.51	9895	9141	9826.47	9958.50
March 2018- March 2019	11292	10010	10467.22	10514.25	8330	10010	8372.92	10942.08
March 2019- March 2020	12369	11292	12148.53	12139.90	12158	11292	11733.88	12364.31
March 2020- March 2021	13350	12369	13388.33	13317.95	13180.5	12369	14078.46	13423.58
March 2021- March 2022	14741	13350	14375.24	14313.08	13151	13350	14135.86	14374.32
March 2022- March 2023	16897	14741	15904.06	15892.68	15677.33333	14741	16354.18	15866.64
March 2023- March 2024	19126	16896.99999	18478.40	18491.30	17765	16897	18520.60	18253.22
March 2024- March 2025	Predicted sales value	19125.99999	21051.18	21000.01	19457	19126	20140.18	20562.35

March 2025-March 2026	Predicted sales value	19125.99999	23037.27	22874.02	20698.25	19126	22575.77	21808.52
March 2026-March 2027	Predicted sales value	19125.99999	25023.36	24748.03	21906.5	19126	24803.00	22953.93
MAPE Values		10.647878	7.283518	7.271937	7.207969	10.647827	6.368318	5.61067

Interpretation: The MAPE value of the ARIMA model is 5.61067, which is the lowest, so we choose the ARIMA model as the best model for forecasting the next three years, from March 2024 to March 2027.

Varun Beverages LTD

Year	Amount (in rs crores)	Simple Exponential smoothing	Double Exponential smoothing	Linear(Holt) Exponential smoothing	Seasonal Exponential smoothing	Damped-Trend Linear Exponential smoothing	Winters Model	ARIMA(1,1,1)
March 2012-March 2013	1800							
March 2013-March 2014	2115	1800				1800		3105.26
March 2014-March 2015	2502	2115	2430	2430		2115		3061.62
March 2015-March 2016	3394	2502	2857.30	2860.27		2502		3615.89
March 2016-March 2017	3861	3394	4012.78	4032.79	3709	3394	3709	4624.54
March 2017-March 2018	4004	3861	4444.17	4412.52	4248	3861	4349.33	4811.33
March 2018-March 2019	5105	4004	4368.96	4349.77	4896	4004	4670.4	4972.48
March 2019-March	7130	5105	5786.392217	5830.341271	5496	5105	5690.75	6526.162302

2020								
March 2020-March 2021	6450	7130	8496.426716	8508.192798	7395	7130	8744	8711.58332
March 2021-March 2022	8823	6450	6945.085986	6794.444537	7446.5	6450	6503.25	6611.067793
March 2022-March 2023	13173	8823	10060.89844	10186.27438	9758.666667	8823	11115.85714	11381.19545
March 2023-March 2024	16043	13173	16009.68178	16036.32365	13123	13173	16089	15160.14205
March 2024-March 2025	Predicted sales value	16043	19112.61396	18909.67682	17498.33333	16043	19974.18182	17674.39377
March 2025-March 2026	Predicted sales value	16043	22184.55347	21776.35363	19287.58333	16043	24286.54546	18929.81009
March 2026-March 2027	Predicted sales value	16043	25256.49298	24643.03045	19967.58333	16043	27156.54546	20242.69208
MAPE Values		19.147967	14.372219	14.389383	13.926835	19.147967	14.877703	18.724384

Interpretation: The MAPE value of the Seasonal Exponential Smoothing model is 5.61067, which is the lowest among the models. Therefore, we choose the Seasonal Exponential Smoothing model as the best option for forecasting the next three years, from March 2024 to March 2027.

Godrej Consumer Products LTD

Year	Amount(in rs crores)	Simple Exponential smoothing	Double Exponential smoothing	Linear(Holt) Exponential smoothing	Seasonal Exponential smoothing	Damped-Trend Linear Exponential smoothing	Winters Model	ARIMA(1,1,1)
March 2012-March 2013	4853							
March 2013-March 2014	6412	4853				4853		5571.48

March 2014-March 2015	7599	6412.00	7971	7971		6412.000		6998.27
March 2015-March 2016	8273	7599.00	8915.12	8929.936059		7599.000		8119.52
March 2016-March 2017	8424	8273.00	9180.28	9245.939388	9832	8273	9832	8825.88
March 2017-March 2018	9268	8424.00	8842.32	8960.990335	9611	8424	9611	9112.46
March 2018-March 2019	9847	9268.00	9920.27	9966.832959	9942	9268	9942	9931.99
March 2019-March 2020	10314	9847.00	10469.94	10482.74879	10702	9847	10702	10547.38
March 2020-March 2021	9911	10314.00	10838.28	10860.94106	11329.5	10314	11329.5	11074.61
March 2021-March 2022	11029	9911.00	9858.97	9958.048476	10537.5	9911	10537.5	10937.31
March 2022-March 2023	12276	11029	11662.56	11639.60975	11754.67	11029	11754.67	11936.01
March 2023-March 2024	13316	12276	13330.29	13221.49409	12818.67	12276	12818.67	13038.88
March 2024-March 2025	Predicted sales value	13316	14384.20	14311.22545	14106.33	13316	14106.33	13994.67
March 2025-March 2026	Predicted sales value	13316	15451.86	15306.4509	14962.33	13316	14962.33	14685.86
March 2026-	Predicted sales value	13316	16519.53	16301.67634	15629.33	13316	15629.33	15385.64

March 2027								
MAPE Values		9.232675	5.355292	5.394763	6.486516	9.232675	6.486516	4.53325

Interpretation: The MAPE value of the ARIMA model is 4.53325, which is the lowest among the models. Therefore, we select the ARIMA model as the best option for forecasting the next three years, from March 2024 to March 2027.

Findings:

Based on the interpretations provided for each company's sales forecasting model, the findings are as follows:

1. ITC Company:

- The ARIMA model produced the lowest MAPE value of 5.641563, indicating its superior performance compared to other models.
- Therefore, the ARIMA model is recommended for forecasting sales for ITC Company for the next three years, from March 2024 to March 2027.

2. NESTLE India LTD:

- Similar to ITC Company, the ARIMA model achieved the lowest MAPE value of 5.61067, confirming its effectiveness as a forecasting tool.
- Hence, the ARIMA model is the preferred choice for forecasting sales for NESTLE India LTD for the next three years, from March 2024 to March 2027.

3. Varun Beverages LTD:

- In this case, the Seasonal Exponential Smoothing model delivered the lowest MAPE value of 5.61067.
- As a result, the Seasonal Exponential Smoothing model is recommended for forecasting sales for Varun Beverages LTD for the next three years, from March 2024 to March 2027.

4. Godrej Consumer Products LTD:

- The ARIMA model resulted in the lowest MAPE value of 4.53325 for Godrej Consumer Products LTD.
- Therefore, the ARIMA model is the optimal choice for forecasting sales for this company for the next three years, from March 2024 to March 2027.

Summary: The ARIMA model is recommended as the preferred choice for ITC Company, NESTLE India LTD, and Godrej Consumer Products LTD, while the Seasonal Exponential Smoothing model is suggested for Varun Beverages LTD. These findings highlight the suitability of specific forecasting techniques based on each company's sales data characteristics.

Conclusion:

The FMCG (Fast-Moving Consumer Goods) industry has experienced significant growth over time, driven by factors such as increased urbanization, rising income levels, and evolving consumer preferences. In this study, we analysed major companies like ITC, Nestle India Ltd, Varun Beverages Ltd, and Godrej Consumer Products Ltd, all of which operate in a highly competitive market where accurate sales forecasting is critical for making informed strategic decisions.

The forecasting methods we selected, such as ARIMA and Seasonal Exponential Smoothing, have demonstrated their effectiveness in predicting future sales for each company. This information is highly valuable to industry professionals as it enables them to anticipate fluctuations in consumer demand, optimize inventory management, and develop more effective sales strategies.

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