Product Sales Analysis

ABSTRACT

There are several factors associated with the sale of cosmetic products which contribute to gaining market share for related companies in this industry. Furthermore, sales forecasting is indispensable in all levels of a company's supply chain including production, distribution and logistics, marketing, and sale. This article mainly focuses on the analysis of characteristics affecting sales and sales forecasting in the cosmetics industry in which it will be helpful in determining sales strategies of cosmetics companies. Therefore, as a case study in this study, the main factors affecting the sale of cosmetic products were determined and categorized; accordingly. Three products including moisturizing cream, perfume, and sunscreen were examined using a statistical method. The effect of factors on product sales was predicted using the spline smooth prediction method and based on the predicted values, using the non-parametric Friedman test and Mean Rank, the effective factors were ranked in each of the three products. Moreover, the company's sales volume in each of the three products was forecasted by using ARIMA models. The results demonstrated that factors such as "price" and "product" elements are the main drivers influencing the sales of moisturizing creams and "promotion" and "Inflation rate" factors play the most effective role in the sales of the perfume. Also, the compound aggregated growth rate (CAGR) for moisturizers, perfumes, and sunscreens over a 5-year period in the study company are 30%, 29%, and 45%, respectively. It is very clear that to achieve ideal sales, paying attention to these influential factors and forecasting product sales lead to predicting material procurement of manufactures, distribution channels, and sales which finally provides business with customer satisfaction.

Keywords: Cosmetic Industry, Marketing, Sale Forecasting, Purchasing Power, Time Series, ARIMA Model

JEL Classifications: C32, C39, D49, D53

INTRODUCTION

The cosmetic industry grows in developed and developing countries throughout the world. Such constant growth and development in the cosmetic industry may provide a good opportunity for fans of this trade to introduce their cosmetic products. The Asian cosmetic market has been turned into one of the attractive and ever-growing markets in the world. The size of Asian and Oceania markets has been increased to more than 70 billion USD that is the second premium market after the western European market in the world (Hassali, 2015). At present, attitudes may vary toward the use of cosmetics among people. Personally, the females have attached great importance to cleaning and also the employed women and those with higher income are often interested in purchasing the premium personal caring products (Swidi, 2010).

Some of the cosmetic artifacts, which have been probably used for ornamentation of the eye and as perfumes, may indicate the first archeological pieces of evidence of cosmetics in Egypt for over 4000BC. At that period, cosmetics were assumed as an important part of dressing for the Egyptians. In addition, cosmetics were created for personal care and health because of hot and dry sunlight and weather and sandy land in Egypt. Cosmetics were consumed almost widely in all items throughout the world in the middle of the twentieth century. Following to rising number of employed women and increase in urbanism sales of beautification products was continued (Eze, 2012).

Conducting a study on the cosmetic industry is not only vital to the world's Gross National Product (GDP) but also essential because of its noticeable impact on the social life of humans in the world. As people talk about the cosmetic industry, they mainly refer to cosmetic tools that comprise a bit higher than 18% of the total market for the personal care industry (Kumar, 2005).

The US is the largest cosmetic market and France acts as the greatest exporter of cosmetic products in the world. The growth of this market has been transferred from the western hemisphere to the developing regions in South America, Eastern Europe, and Asia, especially China. Despite the world economic crisis, with an average growth rate of over 5% in this industry, the cosmetic industry has experienced good performance (Kumar, 2005). This industry has recorded a recession in growth for sales and peerless revenue in other economic resources. The great and private enterprises are still active in this field as well. Most of the given reports from sales and revenue may show that the previous growth is going to progress, while one could surely look at growth objectives in the long run (North, 1963).

Some of the well-known foreign manufacturers have devoted the relatively great market share in this industry at world level, but new rivals have affected the share market of these enterprises by manufacturing products proportional to the needs and requests of consumers, affordable prices, modern techniques to supply products, and extensive promotions, etc. The present paper is focused on the study and analysis of key effective factors on three selected products from one of the middle east's enterprises. As a result of this study, effective factors on sales of products have been ranked throughout the country and the rate of sales is estimated for a 5-year period conceptual model of the study is evaluated. This study has been prepared in 5 sections. Section 2 discusses the theoretical bases of research and related concepts. In Section 3, the selected products and methodology are explained in detail. Then, the analytical results are interpreted in Section 4 and our concluding remarks are presented in the final section.

Related Concepts

The foremost effective factors on consumer's sales have been assumed as effective factors of sales and they are classified into three categories of Marketing, Purchasing Power, and Time-effect as follows:

Marketing category

Regarding to Marketing standpoint, one of the critical factors of decision making and business evaluations for companies is the marketing mix from which essential elements for planning and operation process have come; besides, marketing mix elements

Have interdependent factors affected mutually. As a result, making a decision about one of them might profoundly affect others which means if these marketing mix elements combine effectively, it can end up with a decent marketing system Conventionally, the pillars of marketing were known as 4Ps demonstrating Product, Price, Place, and Promotion. However, as the customers are becoming more sophisticated, three further "Ps" were added which are included People, Process, and Physical Environment. These considerations are called 7P's marketing mix, which is related to the company's sales based on marketing strategies raised from them to increase sales. □ Product elements-Service products consist of core and supplementary (value-added) elements

- Place and time-service distribution through physical and non- physical channels
- Price and other user outlays-generation of incomes and profits With consideration of other customer costs
- Promotion and education-Provide information, persuade customers and teach customers to become effective through the service process
- Process-The operation of inputs and outputs from marketers/ sellers to customers.
- Physical environment-design services cape (physical appearance) and provide tangible evidence of service performance
- People-Interactions between customers and contact personnel can affect their satisfaction.

Considering the purchasing power, it should be noted that this criterion determines the value of a currency expressed in terms of the number of services or products that a specific amount of a currency can buy. Purchasing power is considered a relative factor that is significantly influenced by both macroeconomic and microeconomic factors over time. The consumer buying and purchasing decision significantly depends on their purchasing power which is caused by the economic situations of a market. In this regard, whenever a nation's purchasing power is strong it is associated with the country's economic factors including employment, wages, prices/inflation, and so forth. Whereas, a sluggish economy determines a situation in which the purchasing power has been become weak due to poor economic factors. Under these circumstances, companies' sales would experience a drastic decline raised from an incoherent existence between sales and customers' purchasing power; accordingly, the economic factors that most affect the demand for consumer goods directly related to sales are taxation and interest rates, inflation rate and currency exchange. In this study, the most effective economic factors associated with purchasing power consider as a category that correlates highly with a company's sales. The following list is provided for further information about the related factors in purchasing power category.

Purchasing power category

Currency exchange
Economists proposed that floating rates have an adverse impact on the economy since every country uses the currency as an intermediate for purchasing goods and services in international
trade. Hence, once the exchange rate becomes volatile, the market is faced with uncertainty regarding the unpredictable changes over time that can be defined as volatility. Generally, the causes of currency exchange rate volatility can be categorized into domestic and external real shocks affecting supply and demand and nominal shocks reflecting changes in the money supply. Therefore, shocks are the main source of unpredictable fluctuations that can affect the price of consumer goods directly influence a company's sales.

Interest rates
Changes in interest rates contribute to different impacts on consumer purchasing behaviors depending upon a number of factors including current rate levels, short term, and long term, consumer expectations about the future rate, and the healthy economy. Study demonstrates that an increase of basis points in the interest rate on deposits leads to an immediate decline in consumption of household expenditures in which once the interest rates rise, consumers may be more prone to saving costs so as to gain from higher interest rates rather than spend.

Inflation rate

Inflation demonstrates a decline of purchasing power of people for a given currency over a period of time. Maintains price inflation causes each unit of currency to purchase fewer goods and services; subsequently, inflation reflects that consumers lose purchasing power per unit of money which means a loss of real currency exchange value within the economy.

Tax (goods and services tax)

Purchasing power has a profound effect on the purchase decisions of consumers; besides, the purchasing power of consumers is affected by taxes imposed on the prices of goods and services. Consequently, taxes have a direct positive correlation with the disposable income of consumers in which it is so crucial that companies develop their marketing strategies and price planning aligned with the changes in the tax policies. This is because often taxes contribute to reducing a consumer's purchasing intention insofar as the company's sales would be influenced by losing customers.

And finally, concerning the Time outlook, it is a paramount element which customers give up so as to purchase goods and services. Time plays an inextricable dimension of consumer behavior and consumer purchasing. Maintained that consumers benefit from time as an available resource for making decisions in their purchases. Time has effects on consumption in two main forms as following which means these forms would indirectly impact on company's sales originating from consumer purchasing behaviors.

Time Effect

Seasonal factor

One paramount context which has been recognized as a vital factor for modeling consumers purchasing patterns is seasonality effects which refer to the existence of variations that occur at certain regular intervals including weekly, monthly, or quarterly.

Moreover, seasonality is associated with stable patterns and well-established forms in which occasional irregularities have not existed. Various factors might cause seasonality like natural calamities, weather, holidays, vacation, and so forth. Consumers purchasing behavior tremendously has been affected by such a prominent factor-like seasonality that impacts the company's sales.

Time pressure

Most merchants employ sales with limited purchase time to increase sales and boost profits in which they provide customers with deep discounts strategies and promotion plans for a limited time duration. This time limitation makes a sense of urgency for purchasing which drives customers to buy either products or services.

Conversely, exposed to make a purchase decision in a short time, customers are more prone to become anxious and stressed insofar as this perceived time pressure would have a negative impact on their decision making in terms of purchasing; therefore, the time pressure would also have compromising effect on the relationship between sales promotion and purchase intention. Thus, the product category is a relevant factor in determining the time pressure effect on consumer purchasing which indirectly influences a company's sales. The effective factors on sales are summarized and classified as research variables in Table 1

Product Sales Analysis

MATERIALS AND METHODS

- Three selected cosmetic products from the selected company consist of Moisturizer (P1), Perfume (P2), and Sun Cream (P3).
- Thirteen effective variables on sales were classified into three groups: Marketing, Purchasing Power, and Time-Effect.
- Based on a survey during a 5-year period (2012-2016) at this study that was conducted as cross-sectional, 20 experts in the fields of marketing and corporate sales were asked in polling about the impact of each of 13 effective factors on sales of Company's products within the Likert 5-scale spectrum.
- The rounded value of mean responses from interviewees was considered as a criterion score about pricing for sales of products per year.

Table 1: Classification of effective factors on sales

Characteristics	Category
Marketing	Product elements
	Place
	Promotion
	People
	Price
	Process
	Physical environment
Purchasing power	Tax (GST)
	Inflation rate
	Currency exchange
	Interest rate
Time effect	Seasonal factor
	Time pressure

- To determine validity through the Delphi technique, the aforesaid tools were given to 20 experts in marketing and sales and their comments were implemented at the first turn, and then the results were returned to them for their reconfirmation.
- To analyze Delphi's results at the first round, content analysis was done to identify the main themes in the initial questionnaire and the results of the given questionnaire were converted into the final questionnaire.
- Cronbach alpha coefficient was utilized to measure the reliability of research variables.
- The reliability value was $\alpha = 0.88$; therefore, research variables are highly reliable and one could ensure from internal consistency of these variables.
- Similarly, the rate of sales of three products was measured within a 9-year period and during years (2012-2020).
- Spline Smooth Prediction was used in the first round of analysis for the prediction of values of 13 variables within years (2017- 2020).
- In the second round, Friedman's nonparametric test was employed for ranking 13 variables in terms of impact on sales of each of selected products using mean rank and based on the predicted value at the first round of analysis.
- As a result, when the hypothesis of the Mean Rank equality for variables is rejected, this criterion will be used to rank the variables.
- By fitting of appropriate ARIMA model at the third round, sale values are forecasted for either of the selected products in a 5-year period (2021-2025). Statistical analyses were done in R-software.

Table 3: Mean rank of factors for moisturizer cream (P1)

Variable	Mean rank
×1	5.299
×2	2.999
×3	3.000
×4	4.399
×5	5.700
×6	4.800
×7	3.999
×8	4.172
×9	4.599
×10	5.299
×11	4.2693
×12	4.978
×13	4.299

Table 4: Mean rank of factors for perfume (P2)

Variable	Mean rank
×1	2.700
×2	2.599
×3	4.699
×4	2.700
×5	4.100
×6	2.000
×7	3.899
×8	3.554
×9	4.299
×10	4.100
×11	3.925
×12	3.831
×13	4.000

- Concerning the forecast of sales, the rate of sales is predicted in 5-year period (2021-2025) based on sales at an interval of years (2012-2016).
- To this end, the ARIMA model is fitted automatically by suitable parameters on data using the forecast package in R-software.
- Whereas the diagram of sales includes increasing trend, therefore, the logarithmic transform was used for obtaining stationary time series.
- Time series diagram is shown for data relating to three products along with confidence interval concerning the forecast values in Figure 2.
- In Figure 2, for forecast points over a 5-year period between 2021 and 2025, two confidence intervals are shown, one 80% in bright blue and the other 95% in light blue.
- It can be seen that the forecasted values also have an increasing trend and the width of the confidence interval in Figure 1a and 1b is less than Figure 1c.
- This may indicate a slight increase in forecast accuracy.
- In order to determine the goodness of the fitting model, autocorrelation function (acf) and partial autocorrelation function (pacf) diagrams were used for the rest of the models. Diagrams related to time series model are shown in Figure 3.
- It is seen in acf diagram the values are placed within the confidence interval after the first lag and pacf diagram is also included in the confidence interval.
- Usually, acf and pacf graphs are plotted for different lags for the data, and by comparing the graphs, the auto regressive order (AR), moving average (MA) and a combination of auto regressive and moving average are identified and the model order will be determined.
- It is clear from Figure 2 that ARIMA (0, 1, 0) is the best choice for the goodness of fit of time series belong P1 and P2, and ARIMA (0, 2, 0) is the best choice for the goodness of fit of time series belong P3.
- In order to analyze the hypothesis of independence of residuals, the Ljung-Box test is used. Results are shown in Table 5.
- It is observed from the results of all three tests that there is no reason to reject the hypothesis of independence of residuals with $P > 0.05$ at the significance level of 0.05.
- Table 6 shows the forecast values for sales of the product in a 5-year period.

Product Sales Analysis

RESULTS

- To predict the values of variables, the year and product's type (P1, P2, P3, and P4) as the repressors has been included and input the 13 qualificative characteristics as the response variable to the model.
- By the means of the values of the qualitative features through 2012 and 2016, a prediction is accomplished for corresponding items in years between 2017 and 2021.
- Whereby a comprehensive package of simulated data between 2012 and 2021 is obtained.
- At this phase, the TTR and the graphics packages of R-software have been utilized for data analysis.
- Table 2 shows the output of the prediction Table 2.
- Variable relating to i variable in Table 2 is shown as x .
- represents that from 2012 up to 2014, the most effective variables are ×1 (Product elements) and ×10 (Currency Exchange), related to the P1.
- However, during 2015 and 2020, ×5 (Price) play a significant role as an effective variable on the P1.
- Finally, it is clear that in 2021, ×3 (Promotion) for P2 is the most effective variable.
- It can be seen from Table 2 that the greatest impact on sales occurred in 2021 for the variable ×3 (promotion) and then the variable ×5 (price). Also, the lowest value is obtained for the variable ×11 (interest rate) in 2020.
- The variable ×2 (place) also has very small values, so that the maximum value is 4.501 and the lowest value is 1.398 in 2021.
- In Figure 1, based on Table 2, scatter plot is depicted to make it possible to compare the effect of variables on sales.
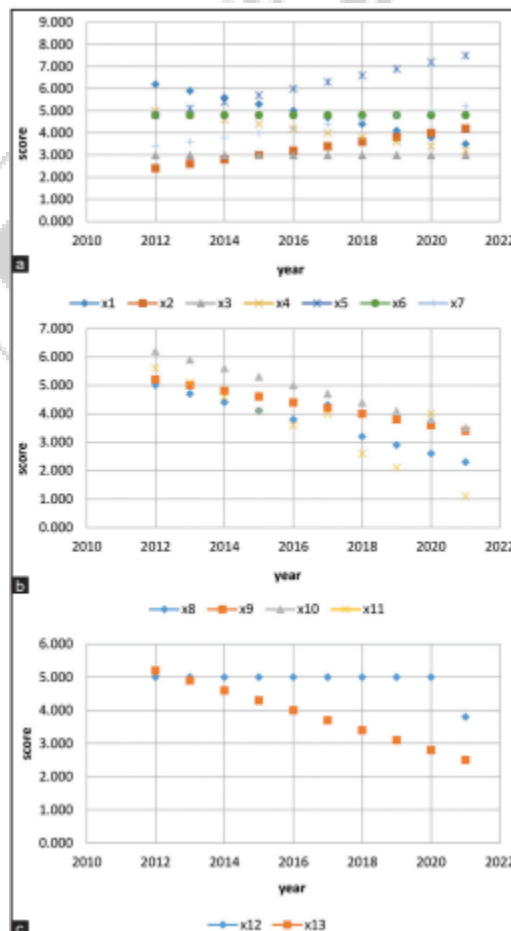
- Figure 1a shows that the scores of the variables $\times 2$ (Place), $\times 5$ (Price) and $\times 7$ (Physical environment) have an increasing trend and the scores of the variables $\times 1$ (Product elements) and $\times 4$ (People) have a downward trend.
- Also, the score of variable $\times 3$ (Promotion) has a fixed value of 3 and variable $\times 6$ (Process) has a slight downward trend.
- The largest impact on sales in the Marketing category belongs to the variable $\times 5$ (Price) in 2021.
- Figure 1b shows that the score of all variables is decreasing in total and the highest impact on sales is related to the variable $\times 10$ (Currency Exchange) in 2012 and the lowest impact on sales is related to the variable $\times 11$ (Interest rate) in 2021.

CONCLUSIONS

- The present study aims to identify and analysis of effective factors on sales of cosmetic products and to forecast the rate of sales of selected products in a typical manufacturing company of cosmetic products using statistical methods.
- This study concludes that factors of price, product elements, currency exchange, and seasonal factor have the highest impact on sales of moisturizer, and variables of promotion, inflation rate, price, and physical environment have the greatest effect on sales of perfumes. Out of all the elements, it is obvious that one of the most important leverages is, of course, the price.
- Price refers to the value that is put for a product. It depends on costs of production, segment targeted, abilities of the market to pay plus a host of other direct and indirect factors.
- This conclusion is also aligned with the study's results of Jamal Uddin and Esa (2020).
- Moreover, the marketing mix contributes to the set of tools, all of which are qualified for increasing the company's sales performances and promoting the goods and services in the mind of customers.
- This result is also compliant with Gituma study in terms of effects of marketing mix on sales performance (2017).
- As the previous studies such as Kapoor and Shamika (2009) showed, the interest rate has impact on purchasing behaviors concerning the household expenditures, though fast moving consumer goods like cosmetic products are not included high-end consumer goods, such as jewelry, automobiles and so forth, which are often purchased by credits via consumers.
- Higher interest rate means a rise in borrowing costs for consumers purchasing on credits while often high-end consumer goods are purchased under this circumstances.
- As a result, the customers might not be affected profoundly by "Interest rate" in terms of purchasing goods like cosmetic products; accordingly, as the study's results showed the interest rate factor has a little impact on purchasing of cosmetic products.
- Forecasting of sales is deemed as an important subject in the management of product and supply chains.
- Lack of forecasting may influence the trend of materials, sales, and customer satisfaction. The ARIMA models were used for forecasting of sales of three selected products in this study.
- As a result, the forecast values for Compound Aggregated Growth Rate (CAGR) to moisturizer, perfumes, and sun cream are 30%, 29%, and 45% respectively for a 5-year period.
- Three variables, including wage, customer confidence, and employment, are those factors that may affect sales of cosmetic products.
- Thus, analysis of the effect of these factors on sales will be an appropriate subject for future studies.