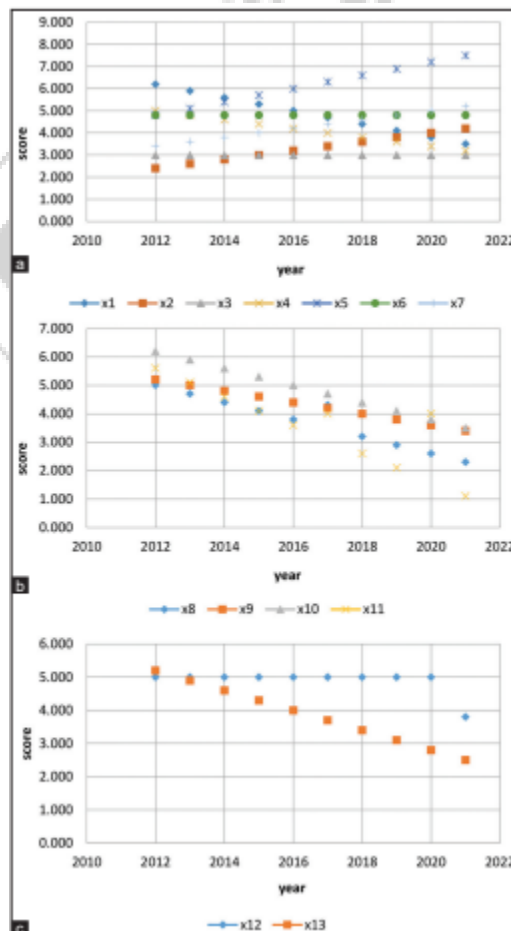


Product Sales Analysis

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 $\times 1$ (Product elements) and $\times 10$ (Currency Exchange), related to the P1.
- However, during 2015 and 2020, $\times 5$ (Price) play a significant role as an effective variable on the P1.
- Finally, it is clear that in 2021, $\times 3$ (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 $\times 3$ (promotion) and then the variable $\times 5$ (price). Also, the lowest value is obtained for the variable $\times 11$ (interest rate) in 2020.
- The variable $\times 2$ (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.