

USING A SOFTWARE APPLICATION TOOL TO IMPROVE MARKETING ACTIVITIES

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Merchants need to know how elastic the demand is for a price change. The higher the elasticity, the higher the volume resulting from the one-percent drop in price. It is proposed to develop an IT application to improve marketing activities by analyzing the variations in percentage of sales, sales revenue, average price and number of units sold. The application is addressed to any company that has multiple sales points and companies that own a wide range of products that make a difference in turnover. A case study has been carried out for several products within a chain of stores by processing the data obtained from the company. A chart was created using the IT tool which identifies the variations in sales and sales revenue and a chart which indicates variations of the average price and number of units sold. By analyzing these charts, it can be concluded about the amount of attention that needs to be given to a product.

Keywords: elastic demand, inelastic demand, software application.

THE INFLUENCE OF THE DEMAND ELASTICITY

It is important for an economist to master concepts such as demand curve and demand elasticity. The way that supply and demand interact helps to determine the size and price level of a market (Perreault and McCarthy, 2002).

Elasticity measures the willingness and ability of buyers and sellers to change their behavior based on economic changes. Companies are trying to estimate price elasticity of demand for their products (McEachern, 2016).

The demand curve shows the potential purchase volume of the market at alternative rates. This summarizes the reaction of many individuals with different sensitivity to price. The first step estimating demand is understanding the factors that affect price sensitivity. In general, the customers have a lower sensitivity to cheap or rarely purchased products. They are also less price sensitive when: *the number of available substitutes and competitors is limited, do not recognize easily higher prices, being slow changing their buying habits, thinking that higher prices are justified, the price is only a small part of the total cost of obtaining, operating and selling the product.*

Price elasticity depends on the magnitude and direction of the reference in the price changing. This may be negligible at a small price change or, on the contrary, a big change. It may vary a lot for a price drop compared to a price increase, but there may be also an indifference interval where the price changes have a small or no effect (Kotler and Keller, 2012).

The following table highlights the effects of a 10% rise in price.

Table 1. The effects of a 10% rise in price

Demand elasticity by price	Type of request	Change the required quantity	Change in total revenue
$E_{cp} = 0$	Perfectly inelastic	No changes	Increase by 10%
$E_{cp} < 1$	Inelastic	Decreases by 10 %	Increase with less than 10%

Demand elasticity by price	Type of request	Change the required quantity	Change in total revenue
$E_{cp} = 1$	Uniform elasticity	Decreases by 10 %	No changes
$E_{cp} > 1$	Elastic	Decrease by more than 10%	Decrease by 10 %
$E_{cp} = \infty$	Perfectly elastic	It drops to 0	It drops to 0

Source: adaptation after McEachern, 2016, p. 98.

Develop an IT Application in order to Identify the Type of Product Elasticity

In order to improve the marketing activities and the management of the company's products, an application can be developed for any company that has several outlets. In the same time, the application may be implemented for companies that have a wide range of product, which make different contributions to turnover. This will have the following advantages:

- Products monitoring tool
- A tool for improving decision-making as it is used in defining the marketing strategy.
- No human resource training is required to use the application.
- Accessible from anywhere - requires just user and password.
- It helps to standardize the format for data collection and interpretation.
- Evaluation tool for elasticity products and percentage changes in sales revenue.
- Collecting data - creating databases for storing or updating data.
- Updates data in real time.
- Helps identify percentage variations on: sales share, sales income, average price, and unit sold.
- Helps identify elasticity based on average price variations and unit sales.
- Graphic representation of:
 - the percentage change in the share of sales
 - the percentage change in sales revenue
 - percentage change in average price
 - the percentage change in the number of units.
- Possibility to save the graphic image as PNG image, JPEG image, PDF document, SVG vector image and helps to make reports easy.

Application Working Scenario

I. The person employed by the firm logs into the application through a username and password.

II. After login, the person can choose certain activities, depending on the purpose of the operation. The operation are:

- 2.1. Inserting data on the share of sales and sales revenue;
- 2.2. Inserting average price data and number of units sold
- 2.3. Updating sales and sales revenue share data
- 2.4. Updating data on average price and number of units;
- 2.5. Analysis of the percentage change in the share of sales in total revenue and percentage change in revenue;
- 2.6. Analysis of price elasticity of demand.

2.1. Inserting into the database the sales of share data and sales revenue data.

For this stage, create a table specifying:

- The category of the product
- Product name
- The percentage of sales in year *n-1*, for the product chosen, of the total turnover achieved by the store.
- The percentage of sales in year *n*, for the chosen product, of the total turnover achieved by the store.
- Income earned by the company in year *n-1*.
- Income earned by the company in year *n*.

2.1.1. inserting into database (I)

- Calculation of the change in the share of sales and percentage change in revenue.
- Inserts data from step 2.1 into the database. and the results of the calculations.

At this stage, the following formulas are used:

To determine **the weight variation** bad sales:

To determine the percentage change in revenue:

$$\frac{\text{Share of sales } n - \text{Share of sales } (n-1)}{\text{Share of sales } (n-1)} \quad (1)$$

To determine the **percentage change in revenue**:

$$\frac{\text{Revenue } n - \text{Revenue } (n-1)}{\text{Revenue } (n-1)} \quad (2)$$

2.2. Inserting into the database the data on the average price and the number of units sold

For this stage, a table will be created specifying:

- The category of the product
- Product name
- Average price in year *n-1* for the product chosen
- Average price in year *n* for the product chosen
- Number of units sold in year *n-1*, on the product chosen
- Number of units sold in year *n* on the product chosen.

2.2.1. inserting into the database (II)

- Calculation of the percentage change in the average price and the percentage change in the number of units.
- Makes the data in step 2.2 entered into the database. and the results of the calculations.

At this stage, the following formulas were used:

To determine the **percentage change in average price**:

$$\frac{\text{Medium price } n - \text{Medium price } (n-1)}{\text{Medium price } (n-1)} \quad (3)$$

To determine the percentage change in the number of units :

$$\frac{\text{Number of units } n - \text{Number of units } (n-1)}{\text{Number of units } (n-1)} \quad (4)$$

2.3. Updating share of sales and sales revenue data

2.4. Updating average price and number of units data

2.5. Analysis of the percentage change in the share of sales in total revenue and percentage change in revenue

2.5.1. Choosing products to analyze sales and sales revenue

For this stage there will be a table listing ten products. With the *Step 2.5.2. Forming the sales and revenue analysis charts*, the products listed in the table will be read from the database.

2.5.2. Forming the sales and revenue analysis charts

At this stage:

- are read from the database - "graph_1" - the products that were selected in the table in step 2.5.
- Depending on the products read from the database, the following charts are generated:
 - the chart represent sales for their chosen products;
 - the chart represent the income for their chosen products;
 - the chart represent sales and revenue for products they have chosen.

In the "graph_1" the data about:

- the percentage of sales in years $n-1$ and n for each product
- sales share variation for each product
- revenue in years $n-1$ and n for each product
- the percentage change in revenue for each product.

2.6. Analysis of price elasticity of demand

2.6.1. Choice of products for price elasticity analysis

For this stage there will be a table listing ten products.

With the *Step 2.6.2. Developing graphs for demand elasticity analysis based on price*, the products listed in the table will be read from the database.

2.6.2. Developing graphs for demand elasticity analysis based on price

At this stage:

- read from the database, in the table "graphic_2", the products that were selected in the table in step 2.6.
- Depending on the products read from the database, it generates:
 - the graphical representation of the percentage change in average price and the percentage change in the number of units
 - representation of the type of elasticity for each product.

In the graph "2" the data about:

- average price for each product in years $n-1$ and n
- the percentage change in the average price for each product
- number of units sold in $n-1$ and n years, for each product
- the percentage change in the number of units per product.

For products with a large variation on the number of units sold, the stock needs to be analyzed, as there is a risk of stagnation.

CASE STUDY FOR THE PRODUCTS OF THE INMEDIO STORE

Comparative Presentation of the Percentage Change in the Share of Sales in Total Revenue and Percentage Change in Revenue

Figure 1 shows the chart which highlight a comparison between the percentage change in sales of share and the percentage change in sales revenue.

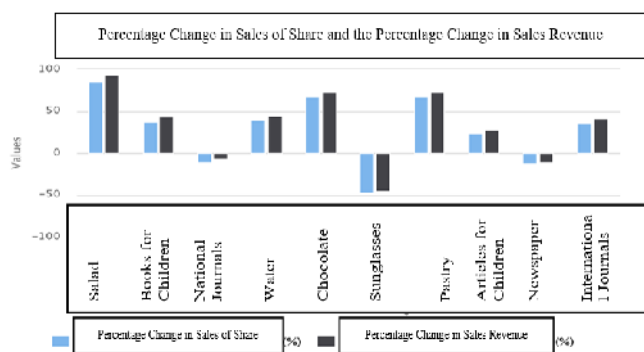


Figure 1. Comparative presentation of the two variables analyzed

It is noticed that no significant imbalance is identified for the analyzed products. The change in sales of shares and the percentage change in sales revenue are positively correlated, both changing in the same sense. In case of:

-  increase revenue and  decrease sales of share → the product has a small impact on turnover
-  decrease revenue and  increase sales share → the product requires increased attention from the company that can decide to change marketing strategies.
-  increase revenue and  increase sales share → the product is very important, the company will take action to stimulate this trend.
-  decrease revenue and  decrease sales share → product elimination, if you can not find a way to increase revenue.

Analysis of Demand Elasticity Depending on the Price

Processing data for ten products, related to the percentage variation of the average price and the percentage change in the number of units sold, the following results are obtained:

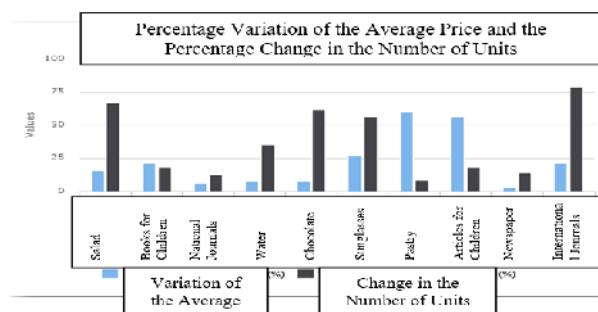


Figure 2. Comparative representation of price variations and number of units

For products with a large variation, on the number of units sold (such as chocolate or salad), the stock needs to be analyzed, as there is a risk of being out of stock.

The application provides results which highlights the type of demand - next to each product is mentioned whether the demand is elastic or inelastic.

Interpretation of Results

1. It can be seen that the *salad* has a strong **elastic** demand . A price variation has a large impact on the required quantity, the percentage change in the number of units of 67% exceeding the percentage change in the average price of 16%.
2. *Pastry* products have a strong **inelastic** demand . This is due to the percentage change in the average price which has a small effect on the percentage change in the number of units so that the percentage variation of the required quantity (the percentage change in the number of units of 8%) is less than the percentage change in the average price of 60%.
3. The **strong elasticity** of the ten analyzed products is for *international magazines*. This indicates that a 21% price drop has a relatively large effect on the quantity required, so that the percentage change in the quantity requested (the number of units = 79%) exceeds the percentage change in the average price.

CONCLUSION

The evaluation of the elasticity function allows a more complex analysis of the consumer's purchasing behavior as opposed to the single income / sales evaluation.

A modeling of ten products randomly selected has been carried out after the implementation of the IT application for improving marketing activities and efficient product management. After the application run, we identified: the change in sales share, the variation in sales revenue, the variation in the average price and the change in the number of units. At the same time, the application identifies the type of elasticity of demand in terms of price for each product.

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