# The importance of sales forecasting in establishing marketing strategies

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**Abstract:** *This paper contains a research aiming at identifying the factors that have a significant influence on the sales of a company. Starting from the literature review, we defined a theoretical model by considering along with the causal variables some factors that could lead to the existence of various outliers (changes in the level of dependent variable and seasonal pulse). Using the Multiple Regression we tested the theoretical model and retained in the analysis only the significant factors, which can help the decision makers to design the marketing strategies according to the sales' forecast for the next period of time.*

**Key-words:** *marketing strategies, sales forecasting, Multiple Regression, Dummy variables*

## 1. Introduction

Establishing marketing strategies is a crucial process for the future planning of the business activity of a company, being one of the most important jobs of the decision makers. But the strategies should be supported by solid information about the past activities of the companies and the development perspectives starting from the current position on the market. In this context, the sales forecasting can help the decision makers to put in practice proper strategies.

The goal of our research is to identify the main factors that influence the sales of a copy-shop that is placed in a student campus, near the classrooms. The results show that the sales depend to a large extent on daily seasonal pulse, which has to be taken into consideration in the process of establishing marketing strategies.

## 2. Literature review

The marketing strategies are necessary because they establish the ways of achieving the company's goals on medium and long term (Kotler and Keller, 2006). At the same time, these strategies are meant to reduce the risks in the market activity and to

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serve better the target segments (Lefter, et al., 2006). One of the best ways to reduce the risks is forecasting and marketing decision makers are interested to have good forecasts of the turnover and profit evolution in order to establish proper strategies. The sales forecasting has to take into consideration the patterns of the target segments and can be no greater than market potential. It can be made by using judgmental methods or advanced econometric methods (Cravens and Piercy, 2006).

The main objective of forecasting is to look ahead and to assess the future implications that could affect the predicted variable or to find answers to various "what-if" scenarios. Thus the well-known managers' remark "If I had only known, I would have chosen a different strategy" could be at least partially avoided. (Klein, 1995). But generally it is recognised that the managers and practitioners have poor formal education in business forecasting and they tend to refuse the application of those models based on mathematical techniques (Chase, 1995). Despite of this tendency to reject the business forecasting, a revolution has been known over the last years. As Reilly, T. (1994) states, "although forecasting remains more of an art than an exact science, most advancements in business forecasting result from the application of information technology".

In accordance with different issues debated in literature, the business forecasting have to take into consideration 3 categories of factors: the organisational and environmental variables known to affect forecasting; the impact of additional firm-specific and environment-specific variables; and the neglected interlinking between different aspects of organisational forecasting (Winklhofer, Diamantopoulos and Witt, 1996). Usually, in addition to the known factors that can influence a dependent variable, some outliers have to be considered: pulse (outliers that can appear occasionally), seasonal pulse (pulses that are repeated regularly on daily, weekly, monthly basis etc.), level shift (the variable changes its values on another level), local time trends that change the slopes. The action of the historical values (memory) has to be also considered. Thus a forecasting model uses three categories of independent variables: causal, memory and dummy (Reilly, D.P, 2012).

## 3. Objectives, materials and methods

The main scope of our research is to create a forecasting model of daily sales of a company starting from the evolution of historical values. The specific objectives are: to identify the sales trend; to measure the influence of the main categories of factors: causal, sales trend, memory and outliers; to design proper marketing strategies for the company. These objectives are established for a small copy-shop situated in the campus of Transilvania University of Brasov, Romania. The target consumers of this shop are the students that come into campus for different educational activities.

In order to make the forecasting, the shop's daily sales have been recorded between 05.09.2013 and 01.04.2016. The days without sales that correspond to non-

working days and vacations have been eliminated from the analysis, so that finally we obtained a number of 569 observations. The evolution of sales is represented in Figure 1.
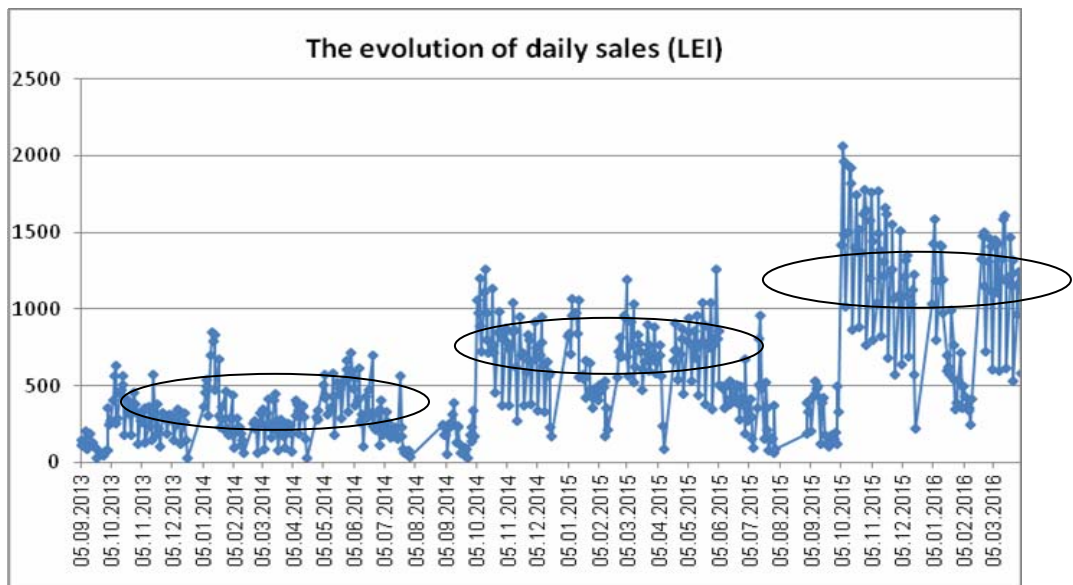


Figure1. The evolution of daily sales between 05.09.2013 and 01.04.2016

It can be noticed that the sales evolution recorded two level shifts during the analysed period, starting with every academic year. These shifts are marked on the chart.

As copy and printings are among the main activities of the company, a hypothesis can be stated regarding the dependence relationship between the sales and the number of copies. If we look at the evolution of this number it seems to have the same pattern as the sales during the week days but there is no level change (see Fig. 2). It means that probably the above hypothesis is only partially confirmed and other influence factor should be considered. In this respect, the daily fluctuations indicate the possibility to have a seasonal pulse that gives outliers in some days of the week.

The method used for sales forecasting is the Multiple Regression, which was applied using the SPSS system. Starting from the literature review we have taken into consideration the following components: causal (number of copies), trend, memory, level shifts and seasonal pulse (daily). In order to put in evidence the memory, the sales level of lag 1 ($Y_{t-1}$) has been used as predictor. For the two level shifts identified in Fig. 1, two Dummy variables have been used. These ones received value 0 for the period before level shift and 1 for the period after level shift. For the seasonal pulse, 5 Dummy variables have been also used, which received

value 1 for the corresponding weekday and 0 for the other days. The following theoretical model resulted:

$$Sales\ (Y_t) = \beta_0 + \beta_1 \cdot Number\_copies + \beta_2 \cdot Trend + \beta_3 \cdot Y_{t-1} + \beta_4 \cdot Ch\_level1 + \\ + \beta_5 \cdot Ch\_level2 + \beta_6 \cdot Mon + \beta_7 \cdot Tue + \beta_8 \cdot Wed + \beta_9 \cdot Thu + \beta_{10} \cdot Fri + u_t \tag{1}$$

where:
- Sales = daily sales (dependent variable)
- $\beta_0 \dots \beta_{10}$ – model parameters
- Number_copies = number of copies and printings
- Trend = the influence of time
- Yt-1 = sales value of lag 1 (memory influence)
- Ch_level 1 and 2 = level shifts of the dependent variable (Dummy variables)
- Mon, Tue, Wed, Thu, Fri = Dummy variables for every weekday (seasonal pulse).
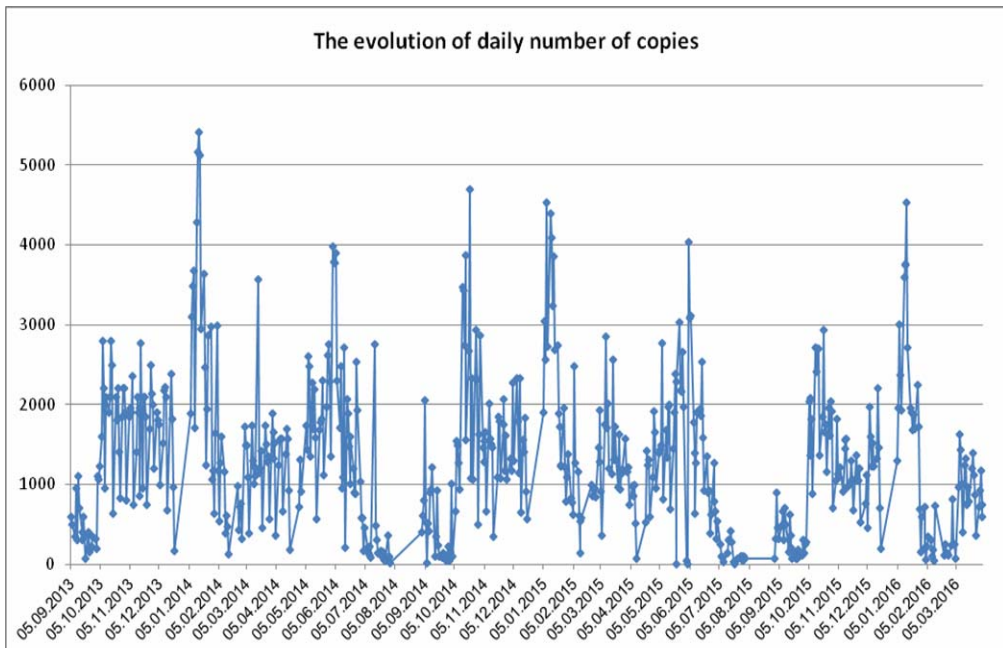- $u_t$ = specification error



Figure 2. The evolution of daily number of copies between 05.09.2013 and 01.04.2016

A Stepwise Regression Model has been used in order to select the relevant variables, with a significant influence on the dependent variable.

## 4. Results and discussions

The results are presented in Table 1. It can be seen that from the variables initially considered in the model only 7 have been retained, the rest of 4 variables being rejected. These ones explain the sales' variance in a proportion of 79% ($R^2 = 0.79$).

| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| (Constant) | 72.094 | 20.539 | | 3.510 | .000 |
| Yt-1 | .467 | .033 | .473 | 14.315 | .000 |
| Friday | -202.611 | 22.326 | -.195 | -9.075 | .000 |
| Ch_level2 | 273.691 | 27.811 | .265 | 9.841 | .000 |
| Number_copies | .093 | .009 | .221 | 10.038 | .000 |
| Ch_level1 | 178.455 | 20.625 | .212 | 8.652 | .000 |
| Thursday | -91.370 | 22.010 | -.088 | -4.151 | .000 |
| Monday | 46.695 | 23.204 | .045 | 2.012 | .045 |

a. Dependent Variable: Sales, **R square = 0.79**

Table 1. The parameters of the model and their statistical significance

The following empirical model resulted by using the above parameters:

$$Sales\ (Y_t) = 72.094 + 0.093 \cdot Number\_copies + 0.467 \cdot Y_{t-1} + 178.455 \cdot Ch\_level1 + 273.691 \cdot Ch\_level2 + 46.695 \cdot Mon - 91.370 \cdot Thu - 202.611 \cdot Fri + u_t \quad (2)$$

According to this model the company should expect to a small increase of sales in the first day of the week and to significant decreases in the last days (Thursday and mainly Friday). The two shifts of level increased significantly the sales and the memory has also a positive effect on the dependent variable. As the time has been rejected from the model, we accept that the dependent variable has no trend and the sales increasing is given only by the two level shifts recorded during the analysed period of time. These shifts have been produced as result of product range development, by introducing some products of current necessity like: soft beverages, snacks, sweets etc. On another hand, the number of copies has a significant positive influence on the sales but, as it can be observed in Fig. 2, this variable is also stationary so that it has not produced an increasing in sales.

## 5. Conclusions

Taking into consideration the above mentioned patterns, the marketing strategy of the analysed copy-shop has to be mainly focused on the product development and in a certain measure on market penetration. As the consumers are the same, with small

fluctuations, market penetration can be made by stimulating these ones to consume the current products and especially to increase the number of copies. This increasing could be sustained by a price decreasing but such a strategy could lead to a loss of profit without a significant influence on daily sales. A proper approach could be to shorten the time of copy processing in order to assure a good flow of clients. Promotional techniques could be also used, including social media, which are used on a large scale by students (Chitu and Tecau, 2012). Additionally, new products should be offered in order to determine a new level shift meant to increase the sales.

As regards the forecasting model used, there are some shortcomings caused mainly by the absence of variables which measure the monthly pulse that can be observed on the charts above. This pulse can be better measured when there are enough observations for every month. Therefore further researches should to take into consideration this influence. Also the forecasted values with the model should be verified in time by comparing them with the actual values that are to be recorded.

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