VISUAL REPRESENTATION OF SOFTWARE MODELS FOR MARKETING PLAN DEVELOPMENT

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Abstract: Information visualization is very important for decision making, especially for comparing the results of different methods of predictive analysis. In this paper, we made marketing predictions which can be done with objective or subjective methods and with the use of computer technology and application software for sale prediction as a part if marketing plan and finally Business plan. The aim of this work is to give a visual representation of used statistical methods for sale prediction as a part of Business plan with software tools for decision making. Depending of manager's decision which statistical method is more convenient for specified market conditions, the parts of Business plan are recalculated. For this purpose we used MS Excel tool with charts, which is the most desirable user friendly tool for managers. Also, all spreadsheets are connected with some Excel functions and formulas which are he subject of recalculation depends of chosen statistical method.
Key Words: Information visualization, decision making, software model, sale prediction, business plan

I. INTRODUCTION

Successful company management demands structuring a business plan, which is an instrument of the managers in the decision making process. The structure of the business plan includes many plans of action, including the sale plan which will be the topic of our interest in this paper. The development of the sale plan is happening through market research and predictions. This brings knowledge for influence of different factors to sale of some products in the globalization. The positioning in the market is the strategic aim of the companies and they use all instruments to realize it. In this case, the visual information representation is very important. For these reasons, top-down analysis for the visualization technique must be made. Also, some additional data bases with aggregated data for effective information visualization must be creating. Different techniques for extracting, transforming and loading data must be used. In this case, the OLAP Analysis services and SQL server views with Excel pivot table for importing data was used in the specialized tables for sale prediction as a base of business plan was create.

The marketing researches can be done with objective or subjective methods and with the use of computer technology and application software for sale prediction, visualization and decision support systems for management. Sometimes, for sale

prediction, we use subjective method, especially when we have experienced managers and objectives methods when we do not. Also, we use objective methods when we have data for the last few years and same statistic and mathematical methods. In the end, we can see visual representation of given results.

2. PROBLEM DEFINITION AND AIMS OF THE PAPER

Creating a sale plan as a base of Business plan is essential for company. For this reasons, it is very useful to have realistic, pessimistic and optimistic sale plan which will be the topic of decision making for managers. When the managers decide which method is the most convenient for sale plan, this sale plan will be the base for creating the other parts of business plan. For this reason, the visual representation of used methods for creating sale plan is important because the managers can use the eye as a decision making tool and see immediately which method is the best for sale prediction. For this purpose, the histogram bar graphic is the most convenient [3].

The aim of this work is creating applicative support software tool for sale prediction as a part of marketing plan with application of mathematical and statistical methods of mobile average, trend analysis and its combination, with decision making possibility for managers. We can use this software in any firm for sale prediction in one or more regions and one or more products and also for recalculating all other parts of business plan. We can see that prediction methods give us different results for different products. The visual representation of results and our experience shows that we can use all of these methods for different condition of the market. First, we have to analyze the market condition and market factors and than we can make a decision what method is more convenient for making a sale prediction for business plan. Visualization tools help us in decision support process which method will be applied.

3. METHODOLOGY OF RESEARCHING

In this paper, visualization, calculation methods and decision making possibility are used as methods. For sale plan which is a part of business plan, we use data from company transactional information databases from the last three years. Also, in the other parts of business plan, we use the company's data for production and purchasing databases and financial data. The volume and contents of sale plan depends on its intention: external or internal use. If its use is for external intention, it isn't necessary to specify the activities. But, if we use sale plan internal, we must have better analyzing and specification of sale concept. In this paper, we create specific Excel files with visual representations of results of three used statistical methods for sale prediction with possibility to choose one of them to be the base for business plan calculations.

Sale plan development is obligatory for sale management. First, the explicit and realistic aims must be defined as well as the strategy for the future period. Then,

a sale plan with disposal internal information and subjective or objective methods must be developed. In the end, the market information for market potential and trends has to be available [5]:

- Expected demands for the product of the market
- The level of demands in the specific market conditions
- Expected volume of sale in the specific market conditions

Sale prediction in the company can be successful with many statistical and mathematical objective methods. The used methods are a part some of objective methods for sale prediction, like the method of mobile averages, trend analysis and combination of both methods. These methods have an aim to discover the basic sample and make it more visible.

In this work, we created three spreadsheets based of three used methods:

1. With trend analysis of last three years, average of two trends in relation with the last year production, we find the prediction coefficient and predict the product sale. In the example, we used spreadsheets for three regions. Data for the first region is shown in the Table 1 and its visual representation in the Figure 1.

Table 1

Sale prediction using method of trend analysis-2008

Period	2005	2006	2007	Trend analysis	Trend analysis	Average of Trends	Coeffic.of prediction-%	Predicted value
Product 1	63.690	48.980	19.250	-29.730	-14.710	-22.220	**-115,43**	**-2.970**
Product 2	76.040	82.700	60.400	-22.300	6.660	-7.820	**-12,95**	**52.580**
Product 3	36.020	47.720	43.550	-4.170	11.700	3.765	**8,65**	**47.315**
Product 4	51.380	61.770	30.970	-30.800	10.390	-10.205	**-32,95**	**20.765**
Product 5	113.760	89.830	64.390	-25.440	-23.930	-24.685	**-38,34**	**39.705**
Total	340.890	331.000	218.560	-112.440	-9.890	-61.165	**-27,99**	**157.395**

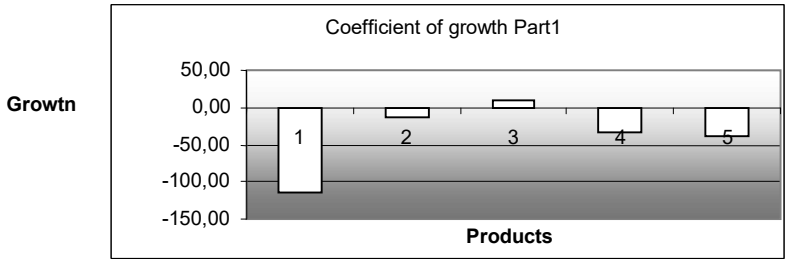

Fig.1 Coefficient of sale prediction using trend analysis method for region 1

2. With method of mobile average, we have the average value of sale in last three years and when we find the difference between the last year sale value and the average value, we can calculate the percent of growth coefficient and then calculate sale prediction. Data for the first region for this method is shown in Table 2 and its visual representation in the Figure 2.

3. With the third method, we calculate the trend in the two last years and the average value of the last three years. After that, we calculate and percent the growth with dividing trend with average value. Then, we calculate the sale prediction. Table 3 shows data for region 1 for this method and Figure 3 shows visual representation of results

Market share for the three used methods for predicting data for sale plan as a part of marketing plan is shown in Figure 4. The most appropriate visualization method for presentation of market share is the pie diagram. Also, 3D histogram can be applied in this case.

Table 2

Sale prediction using method of mobile averages-2008

Period	2005	2006	2007	Average	Growth	Growth %	Coeffic.of prediction-%	Predicted value
Product 1	63.690	48.980	19.250	43.973	-24.723	-128,43	**-0,67**	**19.122**
Product 2	76.040	82.700	60.400	73.047	-12.647	-20,94	**-0,03**	**60.379**
Product 3	36.020	47.720	43.550	42.430	1.120	2,57	**0,01**	**43.553**
Product 4	51.380	61.770	30.970	48.040	-17.070	-55,12	**-0,18**	**30.915**
Product 5	113.760	89.830	64.390	89.327	-24.937	-38,73	**-0,06**	**64.351**
Total	340.890	331.000	218.560	296.817	-78.257	-35,81	**-0,02**	**218.524**

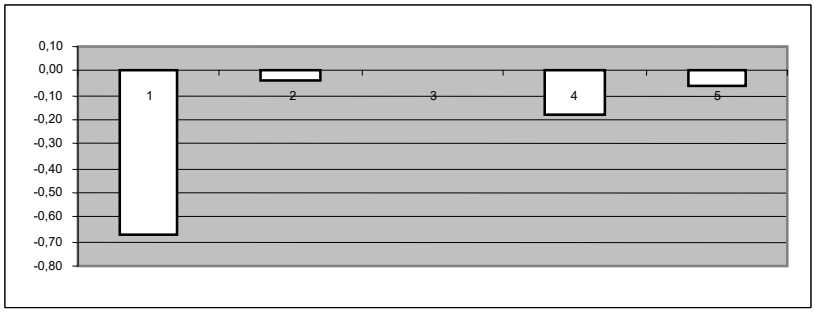

Fig.2 Coefficient of sale prediction using mobile averages method for region 1

Table 3

Sale prediction using method of trend/mobile averages combination -2008

Period	2005	2006	2007	Trend growth	Average	Trend/ Avg	Prediction coeffic.%	Prediction value
Product 1	63.690	48.980	19.250	-29.730	43.973	-0,676	-67,609	**14.243**
Product 2	76.040	82.700	60.400	-22.300	73.047	-30,528	-30,528	**50.747**
Product 3	36.020	47.720	43.550	-4.170	42.430	-9,828	-9,828	**38.260**
Product 4	51.380	61.770	30.970	-30.800	48.040	-64,113	-64,113	**17.240**
Product 5	113.760	89.830	64.390	-25.440	89.327	-28,480	-28,480	**63.887**
Total	340.890	331.000	218.560	-112.440	296.817	-37,882	-37,882	**184.377**

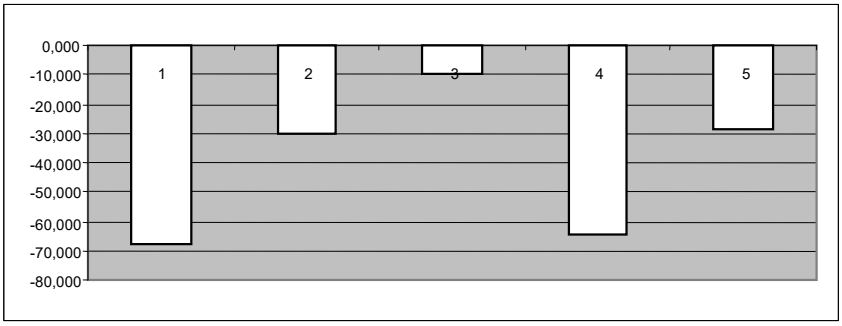

Fig.3 Coefficient of sale prediction using combination of two methods for region 1

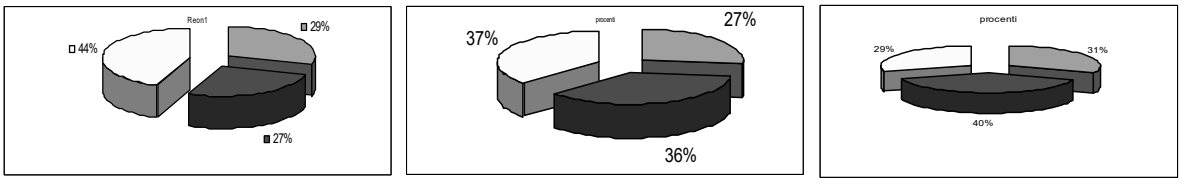

Fig.4 Prediction of market share for2008 in three regions using three different methods

4. RESULTS

The usage of visualization results for this purpose is very useful for managers, as well as sale and marketing plan developers. This user-friendly software is the most appropriate for easy creation of some variants of the sale plan. For this purpose, we must have sale data for the last three years for products and parts of the market (if we do not have market segmentation, we can use only the first table of the spreadsheets) and the sale prices (product prices is optional for additional analysis). Also, we must have experience and statistical data for market conditions including political, law and demographic conditions.

1. The use of the first method is more convenient for stable markets where there is no large growth or depression of sale quantity and the prices are not changed. In this case, we have good results of sale prediction (Table 1 and Fig.1).

2. When there are variable market conditions, larger market and sale differences (growths and depressions), migrations, variable prices, the second method of mobile average is better sale prediction method (Table 2 and Fig.3).

3. If we do not have enough data for marketing and sale conditions in different regions, migration and prices changes, the third method – combination of trend analysis and mobile average is the best method for sale prediction, because it gives the average results of first method of trend analysis and second method of mobile averages. This method is the most convenient for all countries in transition that are attacked by globalization and market share. The number one factor is the quality of products, prices and habits of customers. Fighting for the place in global market is an obligation of all local firms (Table 3 and Fig.3).

In the sheets of the created program, we have quantity and financial prediction results. We have updated sales data in all regions (Part 1,2,3) and all products (Product 1,2,…) for the last three years only in the first spreadsheet names Trend Analysis and also the sale prices of products. Than, we gained all the quantity and financial sale predictions. Our knowledge of market conditions will be the factor which method is more convenient for our sale prediction. Also, a graphic view is enabled. If we have another graphic view, we can change the Chart type (Table 4 and Fig.5).

Table 3

Sale prediction using three methods: trend/mobile averages and combination

	Sale price	Cost price	Trend analysis sale prediction	Mobile average sale prediction	Combinated method sale prediction	Trend analysis value (Den)	Mobile average value (Den)	Combinated method value (Den)
Product 1	1200	591,6	-43.925,00	99.305,28	18.566,67	-52.710.000	119.166.338	22.280.000
Product 2	1500	761,25	202.660,00	201.853,63	167.346,67	303.990.000	302.780.450	251.020.000
Product 3	1600	817,8	245.190,00	233.463,79	157.670,00	392.304.000	373.542.071	252.272.000
Product 4	2000	1044	81.245,00	107.344,48	56.666,67	162.490.000	214.688.966	113.333.333
Product 5	1300	648,15	54.060,00	168.998,93	189.916,67	70.278.000	219.698.603	246.891.667
						876.352.000	**1.229.876.428**	**885.797.000**

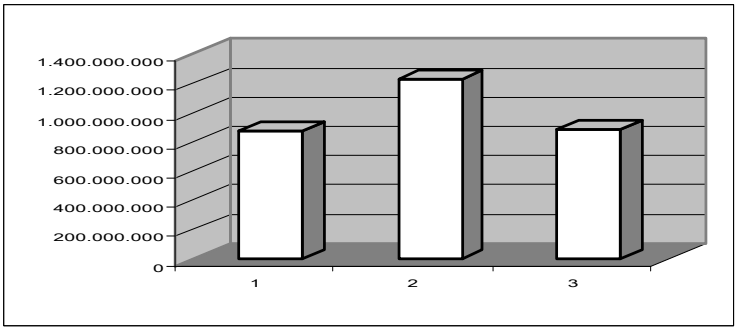

Fig.5 Financial Prediction amount for three suggested sale plan prediction methods

5. CONCLUSION

The usage of this software tool for calculation and visualization result of predicted sale plan is very simple. It can be used in any company with one or more sale regions. What prediction will be considered for business plan depends on sale managers, because they are responsible for sale plan development. When we develop the sale plan, we must develop other parts of the business plan, marketing plan, financial plan, human resources plan, production plan, which will depend on sale plan prediction. For this reasons, the sale plan development is very important for whole business plan of the company.

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