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DACIA DOMESTIC MARKET CAR SALES ANALYSIS BY EMPLOYING TECHNOLOGIES LIKE SPSS AND @RISK

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Abstract

In this paper, we started a research which is focused on the possibilities and availability of people to buy new Dacia cars, and also an analysis of the risks that the company faces in the selling activity. According to statistics the demand for new cars is constantly decreasing. Thus, we have proposed to discover information about potential customers of the Automobile Dacia company, we realized predictive analysis for reliable forecasts to underpin the adoption of the most intelligent decisions. We have also examined how various factors influence the sales of Dacia cars on the domestic market in order to find the best solutions to increase sales volume. For predictive analytics we used the software package specialized in statistical analysis SPSS v.24 (Statistical Package for the Social Sciences) and in order to achieve an estimate of the future sales we used @RISK module from the Palisade software package.

Keywords: predictive analysis, risk, decision, sensitive analysis, simulation
JEL Classification: **C15, C88, C63, D81, M10, O12**

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1. Introduction

The wide proliferation of computer science, has influenced the decision-making processes so the companies resort to specialized software capable of substantially increase the speed and effectiveness of decision-making, permitting decision makers to achieve complex analysis, by providing a range of options for simulation and by flexible and dynamic character of applications.

With globalization, the adoption of decisions in companies is becoming more and more complex, being generated by both the amplified uncertainty of the decisional parameters and the variability of the system in which we adopt those decisions. Companies must adapt to new trends and constraints imposed by circumstances and economic and financial crises, and by predictive analysis and risk analysis models must be capable to forecast what may happen in the future so that they can take the best decisions, leading to business development, costs reduction and increased customer loyalty. At the same time companies have to change their market strategy to target the consumer and to have the capacity to meet the needs and desires of customers by creating and delivering their adequate goods and services.

The presented subject is of urgent actuality because modern management should be concerned to permanently identify customers' needs by obtaining relevant information and analyzing the risks related to sales activity.

Modern techniques based on more and more efficient softwares provide a strong informational support for managers in order to better manage any action and to ensure their competitive edge over other competitors in the market.

The main challenge to study the use of modern technologies for the analysis of sales on the domestic market for Automobile Dacia was based on the significant changes which occurred in the activity of companies from the automotive sector (production and distribution) on the Romanian market, which consisted of massive decreases, mainly because of the crisis and were maintained during the coming years, mainly due to massive trade with second-hand cars.

We chose as an area of study the company Automobile Dacia because it is a strong company and the most representative in selling cars in Europe, on a declining trend of purchasing new cars, which raised a number of issues for the management to find the best solutions to increase the sales volume in a more and more declining market demand. We propose that through modern technology - Statistical Package for the Social Sciences (SPSS) and @Risk from the Palisade Decision Tools package, to achieve predictive analytics for

identifying valuable information about customers and potential customers and to realize an analysis of risks related to sales activity.

The research will be based on a significant volume of data and information, based on a series of reference works in the field of data analysis, on the Statistical Package for the Social Sciences SPSS, software for data analysis and @Risk from Palisade Decision Tools, package for risk analysis, on Dacia website and in many articles in the specialized press, in order to achieve predictive analytics for managers to identify valuable information about customers and potential customers and to realize an analysis of risks related to sales activity.

In an extremely dynamic, hyper-connected and highly mobile environment, the company needs real-time information and very small response times in order to be able to act on market requirements to satisfy their customers and so, to be able to expand their client portfolio and thus to increase profits. Through SPSS package we will highlight the potential customer profile and through @Risk module we will identify the best scenarios to increase the sales of Dacia.

2. Literature review

The analysis of the data generated by corporate activity is a demanding activity that involves considerable time and human resources, especially because the amount of information is very high. In these circumstances we considered appropriate to emphasize on the contribution that the intelligent information systems bring to the management of companies to improve its overall performance (information updated in real time, secure access to data from any location, simple analysis made by any user etc.). To do this, first we will review the main materials underlying the documentation and the study.

Data analysis involves "research, examination, investigation, interpretation of scientifically established facts, facts that constitute the starting point for researching a problem, in taking a decision" (Pomohaci, C., Pârlea, D., 2008).

According to Gheorghe (2001), data analysis follows as main objective the selection of relevant and significant information. Pintilescu (2003) believes that the purpose of data analysis is the analysis of the statistical distribution units based on a set of variables. According to Saporta and Stefanescu’s theory (1996,) data is analyzed in terms of the differences and similarities between individuals (women and men); their profiles could be sketched according to different features, which allow grouping them into homogeneous categories.

In a particularly dynamic market the concept of risk is becoming more common, because there are multiple actions with a multitude of possible outcomes. The risk arises from our

inability to see the future and indicates a certain degree of uncertainty. At the company level every decision involves a certain degree of risk, so the decision maker must learn to take risks and to manage so as to be favorable (Craioveanu, M. T., 2004). Developments in recent decades has led to the need to address adequately the issue of risk and there must be considered the increase at an unprecedented rate of the situations of risk and uncertainty, due to globalization, enlargement of the phenomenon of activities' internationalization, outsourcing certain components, diversification of financial instruments, financial crises and economic, increasing competition, etc. (Răduţeanu, M., 2014).

For marketers it is important to study the uncertain attitudes of consumers, given the existence of quite difficult to manage information. Needs and motivation are examples of uncertainties that increase the risk (Gabor, M., R., 2010).

For the analysis of the data concerning the evolution of sales in recent years we have studied the Dacia website and the articles in the specialized press.

Automobile Dacia sold in 2015, 550.920 cars, by 7.7% more compared to 2014, being a trading record for the company. Foreign market sales in 2015 increased by 6% (513 974 cars) from 2014, the European continent recorded the highest sales (75% of cars sold by Dacia), while France, Germany and Spain were in the top positions, cumulating about 190,000 cars sold. Therefore Dacia brand market share is 4.36%, ranking in the top five most sold Hexagon brands right after Volkswagen (AGERPRESS, 2016).

In Romania, the company strengthened its market, sales increased by 24.5% compared to 2014 (36 946 cars), with a market share of 33%. The best-selling vehicle (43% of total sales) is Logan sedan (16,100 units), followed by Duster (7271 units sold) and Sandero (Stepway version included - 5,600 units). An increase in sales was seen at Lodgy and Dokker models, supported by the success of new versions Stepway (dacia.ro).

The increase in the internal market was due to the "Rabla" program but mainly because of the renewal of the cars fleet in a number of public institutions. The majority of the sales (over 80%) are made to individuals through the scrap page program and because the program starts in April-May and runs until November, it creates certain disproportions in the sales which are not beneficial to the company.

Despite these results, it can be observed that Dacia has lost ground in France (5,100 cars) and Germany (3,100 cars), customers turning to more expensive cars, but increased strongly in Spain, where they sold an extra of 8,000 cars compared to 2014. Among the ten biggest markets for the brand Dacia, Romania and Morocco have the highest market share (around 30%), while France is number one in volume, with 100,000 units. Four of the five Dacia models sold in Europe are in the top ten most sold and two are in the top five at the European level (Financial Newspaper, 18.01.2016).

It is ascertained that Romanians' preference for the national mark matters rather less, for example Dacia sells more cars in the Czech Republic than Skoda in Romania, which shows that market positioning is more important than preference for a national builder. At the Geneva Motor Show, Dacia has not presented any new vehicle, but presented the vehicles equipped with a new gearbox, Easy-R, a waiver of an automatic gearbox (both on diesel engines and on those powered by gasoline) (Capital Magazine, March 2016).

Within a multinational company such as Automobile Dacia, threats can occur at any level and can be very varied. In the evolution of car sales, especially in the domestic market, the company Automobile Dacia faces a number of risks related to competition, financing risks, technological risks, risks relating to human resources and not the least, political risks. Also, major problems may constitute the withdrawal of products when they are not prepared in advance, or delay in delivery of vehicles (can face many risks apparently hidden).

The problem of proper evaluation and real-time probability of risks and their intensity is complex and the development or the emergence of any new technology leads to a permanent increase of risks, so that each company will seek solutions and methods of action to eliminate or at least to diminish the threats (Răduţeanu, M., 2014).

According to Guenter Verheugen (2009) "the risks and the challenges facing the automotive industry are reflected in the European economy". As this sector has been badly hit by the economic and financial problems, they were passed in the industries that supply raw materials and in the distribution sector, which affected more than 12 million employees.

Neelie Kroes, competition commissioner, believes that the industry recovery responsibility lies with the EU members governments, so that to avoid a race of subsidies and adoption of protectionist measures. In times of economic uncertainty, usually increases the likelihood that countries try to protect their industries through erecting trade barriers (http://www.ccib.ro/afacerea/Stire-1318-.htm).

According to the analysis made by the company Coface, the automotive sector is rated with a "medium risk" in Europe, which implies a favorable perspective supported by a 10.1% growth in the sales of new vehicles (for the financial year ended in late February 2016), by future renewal of inventories or aging of equipment’s (http://floteauto.ro/news/coface-sectorul-auto-are-o-perspectiva-favorabila/).

ICT affects both producers and consumers, creating opportunities and new markets. Thus, marketers are forced to realize the importance of modern technologies in upgrading the business process. Companies are forced to monitor the changes in the technological environment and to determine how they affect the ability of their products to satisfy the consumers' needs. Thus, companies must make creative efforts to launch new products at the right time and capitalize on favorable market opportunities (Raboca, H., M., 2011).

The presence of advanced software programs can lead to the extraction of data sets, generally large, which are suitable for data analysis techniques (Starr, C., 1969). According to Ioan Hosu and Mihai Deac (2013) by using the specialized SPSS package the information obtained from statistical analysis of all operations provided by this package are used to explain a variety of phenomenon's, SPSS applications being practically endless.

Jabă, E. and Ana Grama (2004) believe that SPSS is a modern calculation and analysis instrument of statistical data, being used for applying different statistical methods of data processing, especially in economics, sociology, medicine and interpretation in conditions of uncertainty of the statistical results.

Risk analysis and risk assessment were and are part of human activity since the advent of the species. C Starr (1969) brings for the first time the argument of modern technology in risk analysis (quantitative risk assessment). Simulations constitute an advanced risk measurement method using a model to analyze the system performance or behavior.

For the risk analysis, @ RISK is an easy to use tool, developed since 1984, first as a standalone package, and since 1987 has been transformed into a powerful integrated system added to the spreadsheets (Lotus 1-2-3, Microsoft Excel). Permanently the Palisade company has improved the products range from simply adding extremely fast computing functions to the possibility of using multiple processors in parallel, dynamic charts, libraries, functions etc. Since 2008, the Palisade package has introduced dynamic analysis tools for data input, allowing improvements during runtime process, which opened several perspectives. In the following years updates were made that brought new features, functions, graphics, interface improvements, simulations based on data from previous limitations etc. For the risk assessment there will be considered several possible outcomes and because they do not have the same probability of realization, each output data will be associated with a certain probability of occurrence (http://www.palisade.com).

@RISK brings an advanced modeling and risk analysis for Microsoft Excel. Modeling usually means the creation of a model for any real-life situation. We will use the model to help us predict, by simulating various scenarios, what could happen in the future, so that company managers can adopt the best strategy for market success.

3. Research goal and methodology

3.1. Research goal

The purpose of the undertaken study will track the analysis of how various factors influence the sales of Dacia cars on the domestic market. Starting from the importance, the dynamics and the need to substantiate and to adopt decisions in an efficient manner, in this

paper we set out to find the best solutions to increase the sales volumes in the conditions of a more and more declining market demand due to both competition and customers' propensity for second hand cars.

As the relevance of the results, whatever their nature, is closely linked to the state and depth of the knowledge, in a first stage we will review the methodology and the tools used in the data analysis. The structural objectives of the study will materialize in: identifying the types of vehicles in the Dacia range; choosing a sample of customers from which to collect data regarding many aspects necessary for the study; analyze the company's sales in the period of 2014-2015; the risk analysis in selling.

We will start this research by identifying opportunities and the availability of the people to buy new cars from the Dacia range, then we will continue with an analysis of the risks involved in selling and with successive simulations we will identify the best scenarios to increase the sales.

To achieve these objectives it will be necessary to collect information on: Automobile Dacia company; types of vehicles produced by Dacia; vehicle sales; customers and potential customers by choosing a sample of customers for which we collected data on several aspects; risks involved in sales activity.

For predictive analysis which will help us uncover valuable information about potential customers we will use the SPSS (Statistical Package for the Social Sciences) software package specialized in statistical analysis.

To achieve an estimate of future sales based on the situation in car sales under the Dacia brand in the years 2014 and 2015, we will use the module @RISK from the Palisade package, a dynamic analysis tool for data entries that will allow us to combine all the uncertainties identified in the model.

3.2. Methodology

Drafting the paper, due to the interdisciplinary nature, requires a careful and thorough documentation, which will be achieved by reviewing a large number of publications and specialized links related to areas of management, statistics and computer science. Theoretical research will be based on empirical knowledge and data processing, using analysis and synthesis, induction and deduction. The documentation taken under the scientific research activity will result in bibliographic documentation, which will allow us to know about literature and specific documents prepared and published by various bodies.

In order to identify the availability of people to buy Dacia cars there will be used an aggregate of methods, like the interview (in dealings with various clients), as well as the

realization of a questionnaire that will collect data on several issues including: the option for a particular Dacia model, preferred fuel type, sex, age, monthly salary, other monthly income, installments for various loans, monthly expenses, the amount one would be willing to allocate as monthly installment for purchasing a car in the range presented.

The achievement of the objectives in the research will also involve a direct documentation, like collecting information directly from its bearers, statistical data processing, research and consulting the professionals in the field (SC Automobile Dacia SA, the National Center for Statistics and Information).

Along with the bibliographic documentation, the elaboration of the paper requires the use of computerized research, which must facilitate the access to software packages used for collecting and synthesizing mathematics and statistics data. Beside them, another important source of information is the economic and financial information from SC Automobile Dacia SA, based on which we can make a proper analysis of the sales activity. To gain access to the computerized research we used the demo versions for the package SPSS v.24 and the module @Risk v.7.

In the last part of the study we use the analysis and synthesis, using modern information technologies through which we will test and highlight the causality links, the variation and the dynamic of the main indicators that influence the foundation and the adoption of decisions.

4. Data Analysis with SPSS (Statistical Package for the Social Sciences)

The objective of this analysis is to identify the availability of people to buy new cars from the domestic brand. To achieve the objective we have identified which information is representative for our research, then, we conducted a questionnaire which we distributed to the main Dacia dealers in the southwest area (Craiova, Pitesti and Valcea). The questionnaire allowed the collection of data on several aspects, including: the option for a particular Dacia model, preferred fuel type, sex, age, monthly salary, other monthly income, monthly expenses, and the amount one would be willing to allocate as a monthly rate for purchasing a car.

The processing of the collected data will be made with SPSS v.24 package (Statistical Package for the Social Sciences) which is a software package specialized in statistical analysis, characterized by rigorous structure and ease of use. The completed questionnaires were at the beginning of the SPSS analysis, respectively at the creation of the corresponding database and data loading (Figure 1).

We then proceeded to prepare the data for analysis. Besides the entered variables, we considered that there is a need to have the total revenue generated by a person, and so we made a summation of values for the different categories of incomes, yielding a new variable that will be placed after all the existing variables. In order to see which models are the most requested by age and sex, we have conducted a sorting of the database. Then, for a more efficient analysis of the database I split it into subgroups by age, for separate analysis of each group, and thus any analysis procedure performed will automatically be applied separately for each subgroup, as there will be several databases analyzed in parallel.

After making various types of sorting and filtering, the database is ready to select the statistical procedures to calculate descriptive statistical indicators, and we will achieve the statistical hypothesis testing.

Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
ID_Questionnaire	Numeric	6	0	Questionnaire i...	None	99	11	Right	Scale	Input
Gender	Numeric	1	0		{1, Male}...	99	5	Right	Nominal	Input
Age	Numeric	2	0		None	9999, 9998,...	6	Right	Ordinal	Input
Model	Numeric	1	0		{1, Sandero}...	99	9	Right	Nominal	Input
Combustible	Numeric	1	0		{1, Diesel}...	99	10	Right	Nominal	Input
Wage	Numeric	6	0		None	9999, 9998,...	8	Right	Ordinal	Input
Other_incomes	Numeric	6	0		None	9999, 9998,...	10	Right	Ordinal	Input
Monthly_expenditure	Numeric	6	0		None	9999, 9998,...	8	Right	Ordinal	Input
Monthly_incomes_allocated	Numeric	5	0		None	9999, 9998,...	10	Right	Ordinal	Input

ID_Questionnaire	Gender	Age	Model	Combustible	Wage	Other_incomes	Monthly_expenditure	Monthly_incomes_allocated
1	Male	28	Duster	Diesel	1140	0	300	200
3	Female	22	Sandero	Benzine	1200	200	560	200
4	Female	26	Logan	Diesel	1500	0	450	500
5	Male	57	Dokker Van	Diesel	2800	1000	1500	1000
7	Female	44	Duster	Diesel	3600	0	900	800
8	Male	30	Lodgy	Diesel	2200	2500	1800	1200
9	Male	35	Dokker	Diesel	3380	0	1300	1000
10	Male	57	Logan MCV	Diesel	2200	1200	1700	1000
12	Male	27	Logan	Benzine	2100	0	650	900
13	Male	44	Logan	Benzine	2250	1000	1450	700
14	Male	38	Duster	Diesel	1850	1350	1100	900
15	Male	32	Sandero	Benzine	1800	0	700	500
17	Male	28	Lodgy	Benzine	1700	1000	900	700
18	Female	19	Sandero	Benzine	500	0	200	200
19	Male	22	Duster	Benzine	1380	0	400	500
20	Female	33	Sandero	Benzine	1450	0	600	300
22	Male	34	Logan MCV	Diesel	1250	1600	1000	800
23	Male	39	Dokker Van	Diesel	1850	3200	1800	1500
25	Female	51	Logan	Benzine	1250	1000	1200	900
26	Male	39	Lodgy	Diesel	1800	1250	1000	1100
27	Male	32	Duster	Diesel	2350	0	1100	900
28	Female	28	Logan	Benzine	1650	0	600	300
29	Female	41	Duster	Benzine	1560	500	900	500
31	Female	37	Logan	Benzine	2300	700	850	700
32	Male	28	Dokker Van	Diesel	1780	1200	1000	900
33	Male	40	Lodgy	Benzine	3200	0	1000	1000
34	Female	26	Sandero	Benzine	1250	0	400	300
36	Male	39	Logan	Benzine	2350	0	800	500
37	Male	19	Sandero	Benzine	770	0	200	300

Figure 1. Database.

For this analysis we will analyze numerical variables like: age, salary, other monthly income, monthly expenses, monthly sums allocated (Figure 2) and nominal variables like: gender, model and fuel (Figure 3).

Through descriptive statistical indicators we will analyze the characteristics of the variables in terms of central tendency, spreading and shape of distribution.

By using descriptive indicators we can tell if a variable distribution is normal. We will use the data from the created database to determine if between the total revenue and the monthly allocated amount of females and males are significant differences (Figures 4, 5).

Frequencies

Statistics

		Age	Total_revenue	Monthly_expenditure	Monthly_incomes_allocated
N	Valid	38	38	38	38
	Missing	0	0	0	0
Mean		35.45	2667.37	939.74	744.74
Std. Error of Mean		1.725	201.419	74.090	54.616
Median		34.50	2535.00	900.00	800.00
Mode		28[a]	2350[a]	900[a]	900
Std. Deviation		10.636	1241.631	456.724	336.675
Variance		113.119	1541646.942	208597.226	113349.929
Skewness		.615	.519	.464	-.029
Std. Error of Skewness		.383	.383	.383	.383
Kurtosis		-.200	-.219	-.371	-.747
Std. Error of Kurtosis		.750	.750	.750	.750
Range		39	4800	1700	1300
Minimum		19	500	200	200
Maximum		58	5300	1900	1500
Sum		1347	101360	35710	28300
Percentiles	10	22.00	1194.00	390.00	290.00
	20	26.00	1440.00	538.00	300.00
	25	27.75	1612.50	600.00	500.00
	30	28.00	1982.00	635.00	500.00
	40	31.20	2268.00	850.00	700.00
	50	34.50	2535.00	900.00	800.00
	60	37.40	2944.00	1000.00	900.00
	70	39.00	3200.00	1100.00	930.00
	75	40.25	3282.50	1125.00	1000.00
	80	44.00	3440.00	1330.00	1000.00
	90	56.10	5032.00	1710.00	1200.00

a. Multiple modes exist. The smallest value is shown

Figure 2. Descriptive statistics for numerical variables.

Frequencies

Statistics

Model		
N	Valid	50
	Missing	0
Mean		3.10
Std. Error of Mean		.258
Median		3.00
Mode		3
Std. Deviation		1.821
Variance		3.316
Skewness		.817
Std. Error of Skewness		.337
Kurtosis		-.247
Std. Error of Kurtosis		.662
Range		6
Minimum		1
Maximum		7
Sum		155
Percentiles	10	1.00
	20	1.20
	25	2.00
	30	2.00
	40	2.00
	50	3.00
	60	3.00
	70	3.70
	75	4.00
	80	5.00
	90	6.00

Model

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sandero	10	20.0	20.0	20.0
	Logan	12	24.0	24.0	44.0
	Duster	13	26.0	26.0	70.0
	Logan MCV	4	8.0	8.0	78.0
	Lodgy	4	8.0	8.0	86.0
	Dokker	3	6.0	6.0	92.0
	Dokker Van	4	8.0	8.0	100.0
	Total	50	100.0	100.0	

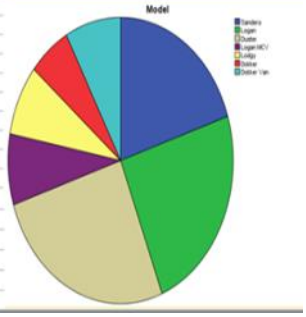


Figure 3. Descriptive statistics for nominal variable "model".

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Total_revenue	Male	25	3074.00	1238.272	247.654
	Female	13	1885.38	824.526	228.682

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Total_revenue	Equal variances assumed	1.294	.263	3.111	36	.004	1188.615	382.121	413.638	1963.593
	Equal variances not assumed			3.526	33.567	.001	1188.615	337.088	503.245	1873.986

Figure 4. T-test for total income.

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Monthly_incomes_allocated	Male	25	876.00	304.521	60.904
	Female	13	492.31	243.110	67.427

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Monthly_incomes_allocated	Equal variances assumed	.149	.702	3.930	36	.000	383.692	97.632	185.686	581.698
	Equal variances not assumed			4.223	29.688	.000	383.692	90.861	198.048	569.337

Figure 5. T-test for monthly amount.

To measure the intensity of the connection and to test the significance of the link between income and total monthly amount allocated we will use the correlation analysis (Figure 6).

Correlations

Descriptive Statistics

	Mean	Std. Deviation	N
Total_revenue	2667.37	1241.631	38
Monthly_incomes_allocated	744.74	336.675	38

Correlations

		Total_revenue	Monthly_incomes_allocated
Total_revenue	Pearson Correlation	1	.902**
	Sig. (2-tailed)		.000
	Sum of Squares and Cross-products	57040936.84	13945473.68
	Covariance	1541646.942	376904.694
	N	38	38
Monthly_incomes_allocated	Pearson Correlation	.902**	1
	Sig. (2-tailed)	.000	
	Sum of Squares and Cross-products	13945473.68	4193947.368
	Covariance	376904.694	113349.929
	N	38	38

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 6. The relationship between income and total monthly amount allocated.

5. Risk Analysis in selling with @RISK module

Synthetically, risk analysis involves applying the laws of probability to the key variables that affect a particular activity expressed through a specific set of indicators, to identify the distribution of values that the evaluated indicator can take. The analysis aims to generally estimate the probability distribution of each factor influencing such a decision and the simulation of the range of possible outcomes with the associated probabilities. The @RISK module uses the simulation technique to combine all uncertainties identified in the model, delivering the results in a graphic form, significantly highlighting the risks. We can use @RISK whenever we do an analysis that could be affected by uncertainty that can be used effectively, or as a basis to provide results for other analysis.

We intend to use this module to make an analysis of the evolution of the domestic sales. For this we created the required model in order to start the process of risk analysis, based on the sales in the period 2014-2015, because in these two years there were more significant increases for the domestic market, and then we will try to anticipate their evolution, and their distribution on models in the future.

Table 1. Sales in the period 2014-2015

Model	Sales		Starting price	
	2014	2015	2014	2015
Sandero (inclusive Stepway)	4957	5562	31647.45	32007
Logan sedan	11349	16119	30749.65	31099
Logan MCV	2646	3111	35014.2	35412
Dokker	1700	2003	41523.25	41995
Lodgy	638	697	50276.8	50848
Duster	6134	7271	48930.1	49486
Dokker VAN	2201	2183	40401	40860
Total sales	29625	36946		

Source: http://www.daciagroup.com/comercial/vanzari-dacia-vanzari-2015

We set as variable data, the number of units sold per model and the price in the two years analyzed, we assign the distribution and we can customize the graphics using the facilities of the options underlying the graph. It is important to note that we can achieve two types of charts simultaneously to see which is more significant for each function, the argument is displayed, and on the right we see statistics on the application of each function (Figure 7).

From the data presented in the figure, it is obvious that statistical values, minimum, maximum, standard deviation and the average, differ from one function to another. It is possible to check all the functions and to choose the most significant for the studied situation.

The distributions may be customized by choosing a certain type of graphic, certain titles, colors, delimiters and other options. After choosing the type of distribution, we can analyze the sales values depending on the change of probability, by simply dragging the mouse over the heading of probabilities and observing what happens to the value when the probability varies.

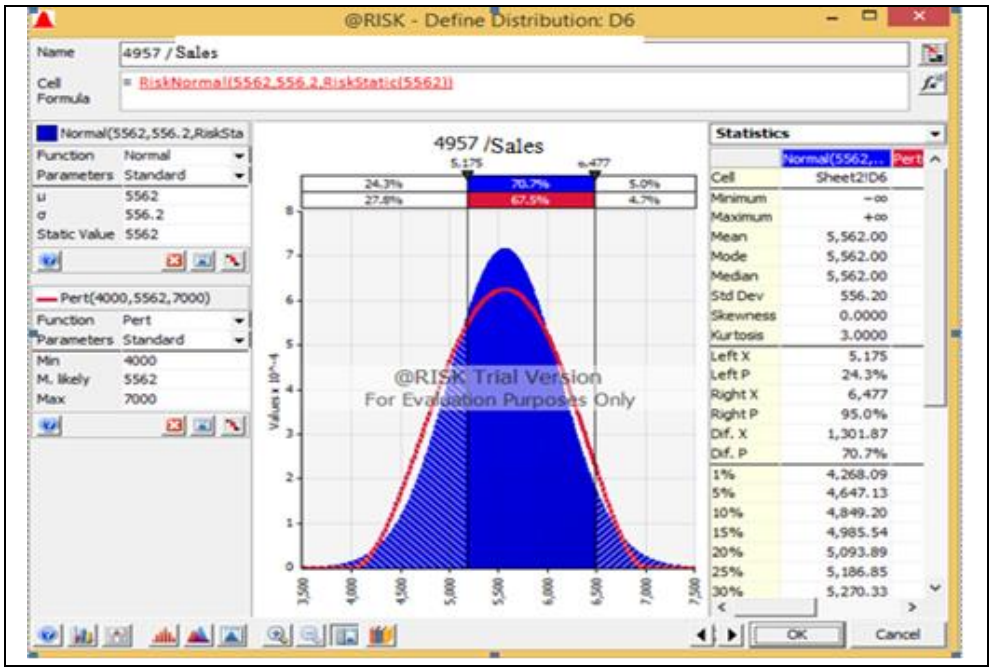


Figure 7. Charts overlapping for the distribution Sales "Sandero" model.

Once assigned the distributions of variables we can define the correlations between probability distributions, needing only to establish exactly between which elements we want to establish the correlations, based on which the correlation matrix will be formed. By selecting the Scatter Plots icon a dispersion matrix will appear in which we can observe how the values are correlated between two distributions, and by moving the cursor on the correlation coefficient it dynamically changes the dispersion of each set of inputs. For the analysis we can choose any dispersion cell and by dragging it out of the matrix we will expand the taken image into a separate graphic and so, any change made through the cursor will dynamically update the correlation coefficient (Figure 8).

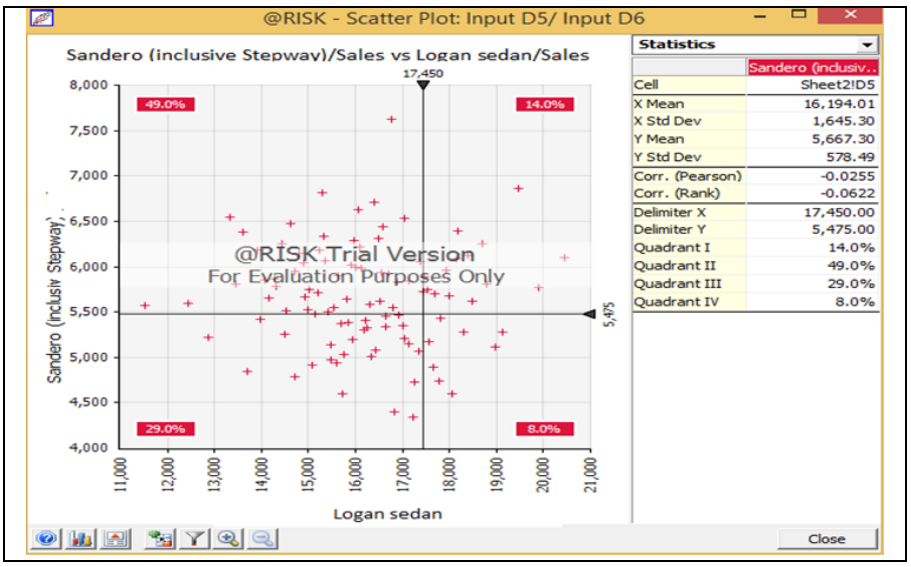
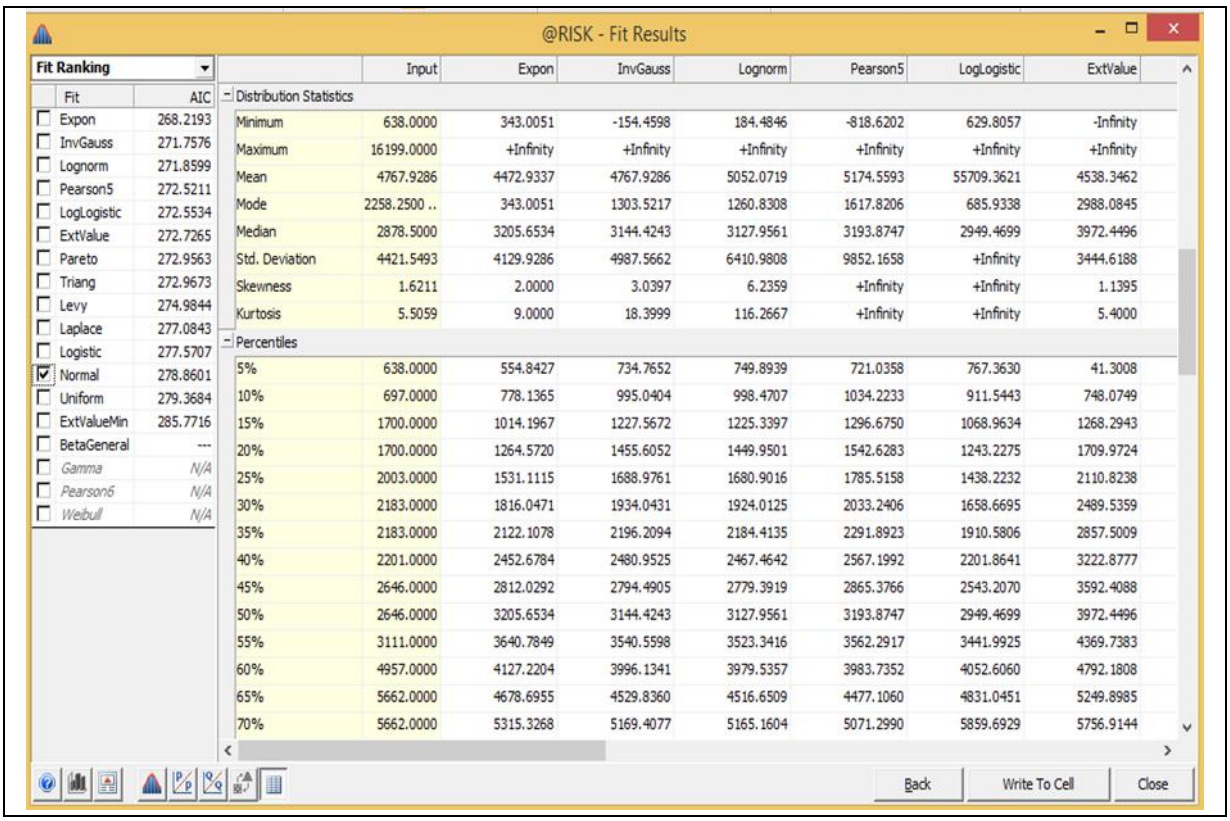


Figure 8. The matrix dispersion sales graph for Sandero/Logan sedan

Through the images, we can easier observe how we can influence the sales. Analogously we represent the scattering for the pairs of the matrix' elements, choosing those that are significant for analysis. After performing the simulation, it is enough to make a click on the cell in the matrix when one "navigates" the simulation results in the spreadsheet and o can check the real correlations for the input matrix.

To achieve different predictions for the coming period, we will simulate various scenarios by assigning probabilities, to see how sales value would vary by type of models. To start the simulation, we consider as output data the total sales for the years 2014 and 2015, on which we test the variation of the input data. It is important to see which models have a significant influence in the total sales in order to establish a strategy for the next period. Once the model is created, it can be viewed and revised.

We can opt for the automatic identification of the best distributions for the sales volume of the years 2014 and 2015, yielding both graphically and as a statistical report, containing a summary of the results for each variant (minimum, maximum, module, percent, etc.). Through this report we can see what happens at the choosing of each type of representation and which are the statistical data related to the selected distribution for which it gives us the most suitable variants (Figure 9).

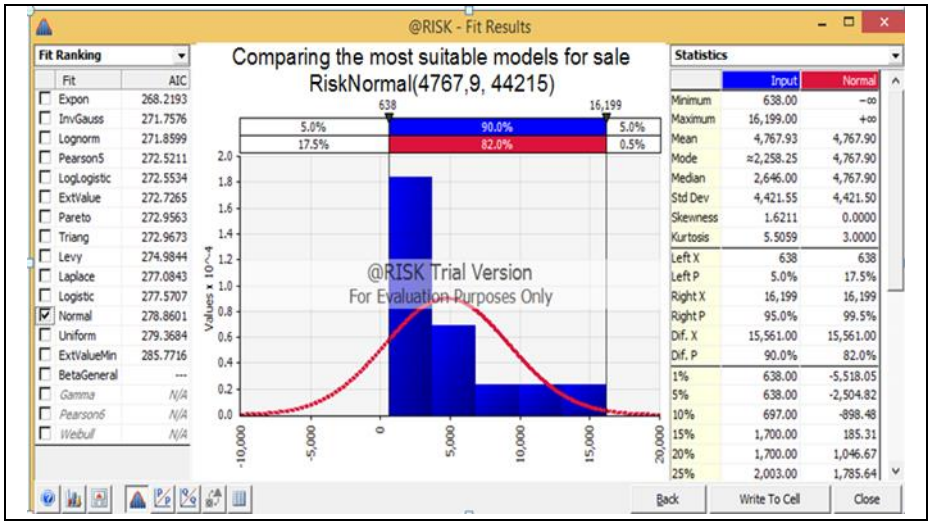


Fit	AIC
Expon	268.2193
InvGauss	271.7576
Lognorm	271.8599
Pearson5	272.5211
LogLogistic	272.5534
ExtValue	272.7265
Pareto	272.9563
Triang	272.9673
Levy	274.9844
Laplace	277.0843
Logistic	277.5707
Normal	278.8601
Uniform	279.3684
ExtValueMin	285.7716
BetaGeneral	---
Gamma	N/A
Pearson6	N/A
Weibull	N/A

	Input	Expon	InvGauss	Lognorm	Pearson5	LogLogistic	ExtValue
Distribution Statistics							
Minimum	638.0000	343.0051	-154.4598	184.4846	-818.6202	629.8057	-Infinity
Maximum	16199.0000	+Infinity	+Infinity	+Infinity	+Infinity	+Infinity	+Infinity
Mean	4767.9286	4472.9337	4767.9286	5052.0719	5174.5593	55709.3621	4538.3462
Mode	2258.2500 ..	343.0051	1303.5217	1260.8308	1617.8206	685.9338	2988.0845
Median	2878.5000	3205.6534	3144.4243	3127.9561	3193.8747	2949.4699	3972.4496
Std. Deviation	4421.5493	4129.9286	4987.5662	6410.9808	9852.1658	+Infinity	3444.6188
Skewness	1.6211	2.0000	3.0397	6.2359	+Infinity	+Infinity	1.1395
Kurtosis	5.5059	9.0000	18.3999	116.2667	+Infinity	+Infinity	5.4000
Percentiles							
5%	638.0000	554.8427	734.7652	749.8939	721.0358	767.3630	41.3008
10%	697.0000	778.1365	995.0404	998.4707	1034.2233	911.5443	748.0749
15%	1700.0000	1014.1967	1227.5672	1225.3397	1296.6750	1068.9634	1268.2943
20%	1700.0000	1264.5720	1455.6052	1449.9501	1542.6283	1243.2275	1709.9724
25%	2003.0000	1531.1115	1688.9761	1680.9016	1785.5158	1438.2232	2110.8238
30%	2183.0000	1816.0471	1934.0431	1924.0125	2033.2406	1658.6695	2489.5359
35%	2183.0000	2122.1078	2196.2094	2184.4135	2291.8923	1910.5806	2857.5009
40%	2201.0000	2452.6784	2480.9525	2467.4642	2567.1992	2201.8641	3222.8777
45%	2646.0000	2812.0292	2794.4905	2779.3919	2865.3766	2543.2070	3592.4088
50%	2646.0000	3205.6534	3144.4243	3127.9561	3193.8747	2949.4699	3972.4496
55%	3111.0000	3640.7849	3540.5598	3523.3416	3562.2917	3441.9925	4369.7383
60%	4957.0000	4127.2204	3996.1341	3979.5357	3983.7352	4052.6060	4792.1808
65%	5662.0000	4678.6955	4529.8360	4516.6509	4477.1060	4831.0451	5249.8985
70%	5662.0000	5315.3268	5169.4077	5165.1604	5071.2990	5859.6929	5756.9144

Figure 9. Statistical distributions report.

We can accomplish a graphical representation, in which we highlight the comparing of the different types of options offered (Figure 10):



Fit	AIC
Expon	268.2193
InvGauss	271.7576
Lognorm	271.8599
Pearson5	272.5211
LogLogistic	272.5534
ExtValue	272.7265
Pareto	272.9563
Triang	272.9673
Levy	274.9844
Laplace	277.0843
Logistic	277.5707
Normal	278.8601
Uniform	279.3684
ExtValueMin	285.7716
BetaGeneral	---
Gamma	N/A
Pearson6	N/A
Weibull	N/A

	Input	Normal
Minimum	638.00	−∞
Maximum	16,199.00	+∞
Mean	4,767.93	4,767.90
Mode	≈2,258.25	4,767.90
Median	2,646.00	4,767.90
Std Dev	4,421.55	4,421.50
Skewness	1.6211	0.0000
Kurtosis	5.5059	3.0000
Left X	638	638
Left P	5.0%	17.5%
Right X	16,199	16,199
Right P	95.0%	99.5%
Dif. X	15,561.00	15,561.00
Dif. P	90.0%	82.0%
1%	638.00	-5,518.05
5%	638.00	-2,504.82
10%	697.00	-898.48
15%	1,700.00	185.31
20%	1,700.00	1,046.67
25%	2,003.00	1,785.64

Figure 10. Graphical comparison of the best versions of the probability distribution for total sales in 2015.

Once we were able to see which the best choices for our model are, we can achieve an improvement of the simulations by adding a multitude of options. Along with the execution of the simulation, a real-time updating of the graphs and reports in Excel is done, scrolling down on the screen in graphical form the whole process of simulation and displaying the report of results with each change of distribution, in real time.

To see the trend in sales and the starting price on entry models, we used two types of charts: Summary Trend and Box Plot (Figure 11):

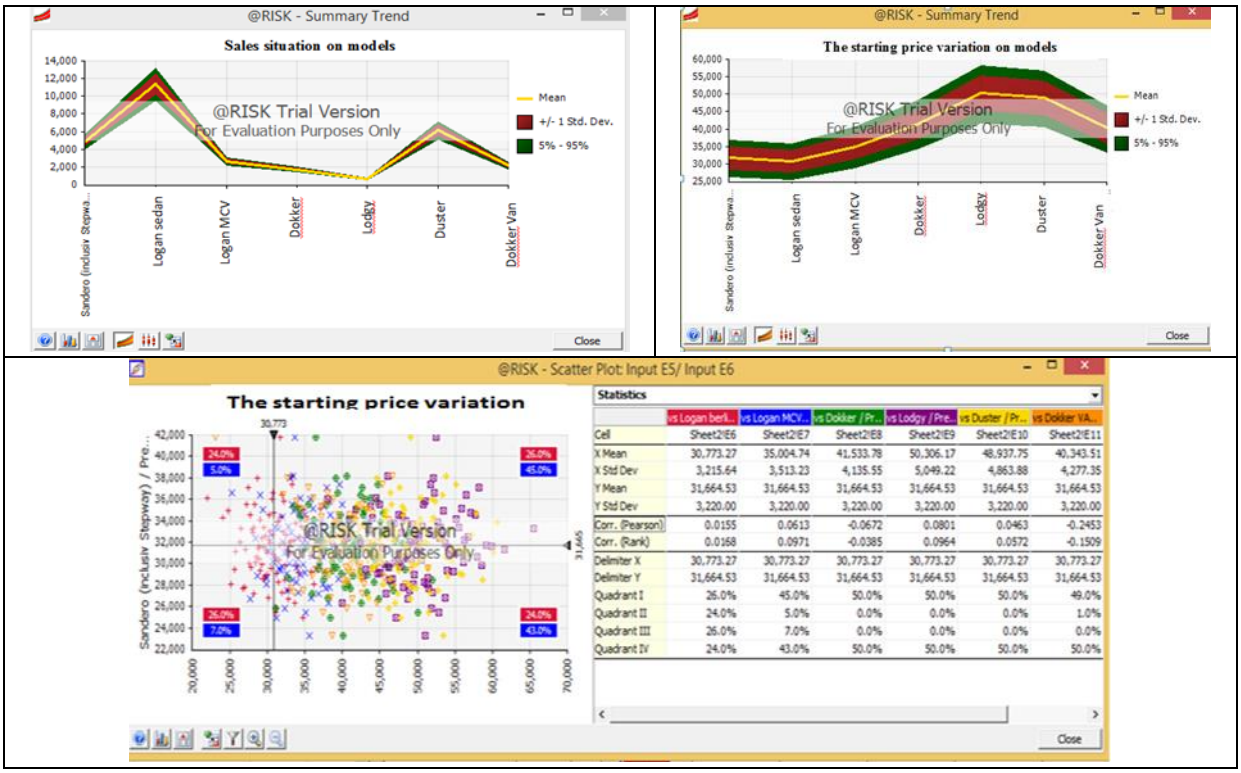


Figure 11. Sales and price variation depending on models.

To see a ranking of distributions which have an impact on the overall sales we will use the Tornado graphics (regression coefficients, regression – mapped values and correlations coefficients).

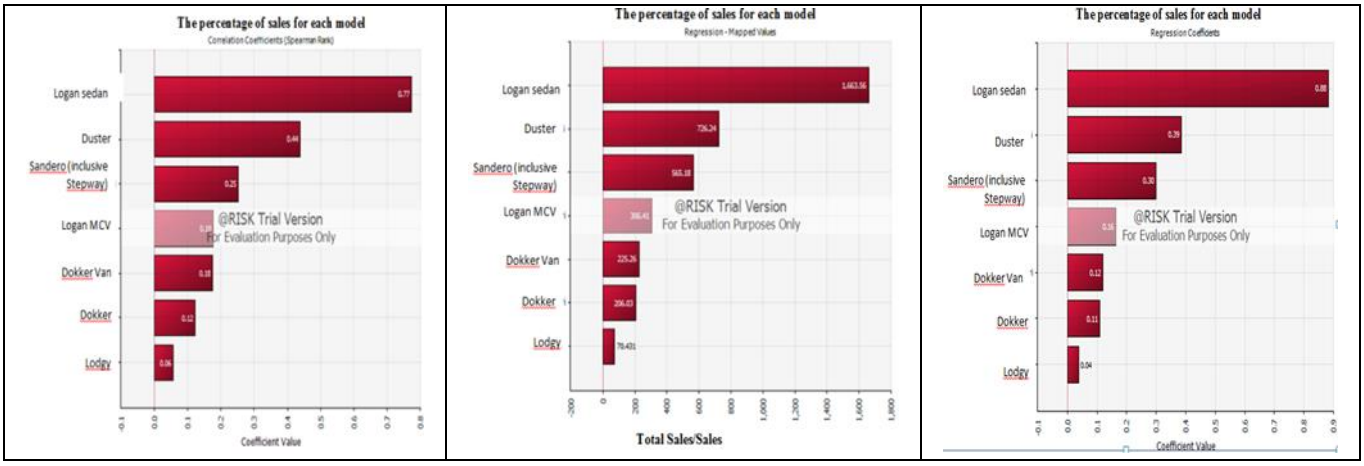


Figure 12. Tornado Graphs - The percentage of sales for each model.

To achieve different predictions for the forthcoming period, we simulate some scenarios to see how the sales values would vary depending on models by changing the assigned probabilities by viewing the detailed statistical reports.

@RISK Detailed Statistics

Date: Saturday, April 16, 2016 5:14:41 PM

Name	Description	Minimum	Maximum	Mean	Std Deviati	Variance	Skewness	Kurtosis	Mode	5% Perc	10% Perc	15% Perc	20% Perc	25% Perc	30% Perc	35% Perc	40% Perc	45% Perc	50% Perc
Total sales / Sales	Output (Basi	32224.32	42826.78	36948.6	1935.916	3747770	0.4258074	3.192438	35763	33900	34428.27	35107.83	35607.65	35757.74	35818.46	35951.17	36238.75	36427.87	36597.75
Total sales / Sales	Output (D5 (	31588.43	41340.35	35801.4	1887.254	3561726	0.2598384	3.10189	33794	32754	33478.06	33798.61	34260.62	34729.61	34808.61	35011.71	35230.12	35355.29	35590.4
Total sales / Sales	Output (D6 (	30261.55	36449.32	33624.6	1122.732	1260527	0.2235266	3.341501	33332	32041	32228.2	32385.9	32592.93	32876.32	33058.1	33264.39	33329.93	33354.03	33502.17
Total sales / Sales	Output (D7 (	31679.87	41359.8	36305.7	1888.298	3565669	0.3491262	2.875994	35178	33404	33931.1	34577.98	34774.97	35071.74	35182.93	35366.64	35666.64	35754.82	35921.56
Total sales / Sales	Output (D8 (	31820.98	42547.37	36535.4	1945.578	3785274	0.4737911	3.25677	36016	33475	34156.19	34723.52	35215.08	35348.24	35441.8	35538.55	35695.54	35990.38	36218.38
Total sales / Sales	Output (D9 (	32088.46	42604.7	36804.7	1929.882	3724444	0.4218801	3.173198	35467	33810	34244.48	35030.78	35464.03	35617.64	35723.58	35821.71	36042.47	36212.8	36461.17
Total sales / Sales	Output (D10	31356.98	40808.92	35446.2	1753.669	3075354	0.3287545	3.08671	35137	32481	33365.81	33613.59	33994.12	34366.21	34620	34715.08	34939.84	35012.03	35135.26
Total sales / Sales	Output (D11	31841.17	42383.72	36499.1	1960.83	3844854	0.421427	3.160108	37562	33358	34097.17	34683.84	34943.07	35249.27	35426.4	35482.08	35797.07	35929.3	36101.34
Total sales/ Sales	Output (Basi	25443.01	34440.65	29613.3	1627.79	2649701	0.1823136	3.422674	28335	26945	27550.15	27829.28	28336.64	28652.33	28822.41	28994.66	29253.44	29372.32	29521.48
Sandero (inclusive	RiskNormal(4	3437.288	6403.909	4956.53	506.0654	256102.1	-3.553329E-0	3.377763	4798.5	4140.3	4313.289	4431.938	4528.755	4611.397	4690.198	4757.209	4823.743	4889.51	4944.765
Sandero (inclusive	RiskNormal(5	4078.242	7014.705	5561.36	560.6089	314282.3	2.101207E-01	2.986012	5554.1	4607.9	4842.132	4971.116	5089.902	5172.881	5268.52	5334.315	5409.823	5482.433	5555.874
Sandero (inclusive	RiskNormal(3	3586.218	4645.916	4414.15	208.1947	43345.02	-1.442093	5.337025	4605	3974.5	4125.026	4200.958	4265.988	4308.437	4354.165	4383.566	4415.185	4443.413	4469.77
Sandero (inclusive	RiskNormal(5	4078.242	7014.705	5561.36	560.6089	314282.3	2.101207E-01	2.986012	5554.1	4607.9	4842.132	4971.116	5089.902	5172.881	5268.52	5334.315	5409.823	5482.433	5555.874
Sandero (inclusive	RiskNormal(1	24220.8	39623.7	31654.1	3123.641	9757135	3.197692E-01	2.797635	31122	26378	27496.2	28284.87	28928.83	29425.28	29950.61	30352	30794.52	31169.72	31645.43
Logan sedan / Sale	RiskNormal(8	8367.391	14210.66	11345	1137.371	1293613	-3.910198E-0	2.922446	11598	9400.4	9837.47	10166.24	10358.27	10572.46	10723.04	10904.94	11044.28	11206.1	11336.94
Logan sedan / Sale	RiskNormal(1	12261.83	19989.06	16120.4	1606.168	2579774	-2.375896E-0	2.827307	16098	13426	14048.01	14435.96	14746.18	15023.41	15269.11	15465.72	15683.56	15882.93	16096.79
Logan sedan / Sale	RiskNormal(1	10734.14	13461.25	12796.4	592.9919	351639.5	-1.348001	4.764967	13425	11567	11963.83	12191.25	12360.63	12501.96	12618.91	12706.67	12797.71	12875.22	12952.12
Logan sedan / Star	RiskNormal(2	23196.36	38018.52	30745.4	3036.215	9218600	-1.677236E-0	2.741631	31406	25635	26655.19	27560.65	28151.27	28656.79	29059.38	29522.35	29930.51	30346.02	30749.65
Logan MCV / Sales	RiskNormal(2	2024.968	3424.22	2647.05	265.6251	70556.69	0.1053062	3.006531	2702.4	2189.6	2293.29	2363.493	2419.503	2467.331	2502.876	2543.503	2572.683	2607.542	2643.552
Logan MCV / Sales	RiskNormal(3	2354.411	4066.106	3112.57	314.1715	98703.72	0.1159368	3.149381	3011.1	2591	2700.763	2787.77	2840.943	2892.153	2944.609	2991.106	3028.477	3068.94	3104.774
Logan MCV / Sales	RiskNormal(1	2062.495	2599.125	2469.72	114.1231	13024.08	-1.333119	4.718878	2580.9	2232.2	2302.616	2353.839	2382.93	2409.247	2434.389	2455.081	2470.595	2486.251	2499.116

Figure 13. Statistical Report Data.

To get a picture of the results of the sensitivity analysis for the model outputs realized we will use sensory analysis and to test the sensitivity of the distribution inputs in a model we will use advanced sensory analysis.

Advanced Sensitivity Analysis Summary Report

Date: Saturday, April 16, 2016 3:31:55 PM
Output: Total sales/ Sales
Inputs Analyzed: 7
Simulations: 49

Input					Output: Total sales / Sales								
Name	Analysis	Value	Mean	Min	Max	Mode	Median	StdDev	Var	Kurtosis	Skewness	5%	95%
Sandero (inclusive	Perc%: 1%	4268.085312	35661.36124	31790.8556	39873.18745	35889.10656	35892.73661	1798.987145	3236354.747	2.700579059	-0.081294195	32156.62347	38250.73126
Sandero (inclusiv S	Perc%: 5%	4647.132413	36040.40834	32169.9027	40252.23455	36268.15366	36271.78371	1798.987145	3236354.747	2.700579059	-0.081294195	32535.67057	38629.77836
Sandero (inclusiv S	Perc%: 25%	5186.848801	36580.12473	32709.6191	40791.95094	36807.87005	36811.5001	1798.987145	3236354.747	2.700579059	-0.081294195	33075.38696	39169.49475
Sandero (inclusive	Perc%: 50%	5562	36955.27593	33084.7703	41167.10214	37183.02125	37186.65129	1798.987145	3236354.747	2.700579059	-0.081294195	33450.53816	39544.64594
Sandero (inclusive	Perc%: 75%	5937.151199	37330.42713	33459.9215	41542.25334	37558.17245	37561.80249	1798.987145	3236354.747	2.700579059	-0.081294195	33825.68936	39919.79714
Sandero (inclusive	Perc%: 95%	6476.867587	37870.14352	33999.6379	42081.96973	38097.88884	38101.51888	1798.987145	3236354.747	2.700579059	-0.081294195	34365.40575	40459.51353
Sandero (inclusive	Perc%: 99%	6855.914688	38249.19062	34378.685	42461.01683	38476.93594	38480.56598	1798.987145	3236354.747	2.700579059	-0.081294195	34744.45285	40838.56063
Logan sedan / Sal	Perc%: 1%	12369.15986	33198.30175	30354.238	35174.37302	33494.37961	33254.1427	956.4173917	914734.2271	2.928665107	-0.276215384	31543.83378	34736.93539
Logan sedan / Sal	Perc%: 5%	13467.66044	34296.80232	31452.7386	36272.8736	34592.88019	34352.64327	956.4173917	914734.2271	2.928665107	-0.276215384	32642.33436	35835.43597
Logan sedan / Sal	Perc%: 25%	15031.78997	35860.93186	33016.8681	37837.00313	36157.00972	35916.77281	956.4173917	914734.2271	2.928665107	-0.276215384	34206.46389	37399.5655
Logan sedan / Sal	Perc%: 50%	16119	36948.14188	34104.0781	38924.21316	37244.21975	37003.98283	956.4173917	914734.2271	2.928665107	-0.276215384	35293.67392	38486.77553
Logan sedan / Sal	Perc%: 75%	17206.21003	38035.35191	35191.2882	40011.42319	38331.42978	38091.19286	956.4173917	914734.2271	2.928665107	-0.276215384	36380.88395	39573.98556
Logan sedan / Sal	Perc%: 95%	18770.33956	39599.48144	36755.4177	41575.55272	39895.55931	39655.32239	956.4173917	914734.2271	2.928665107	-0.276215384	37945.01348	41138.11509
Logan sedan / Sal	Perc%: 99%	19868.84014	40697.98202	37853.9183	42674.0533	40994.05989	40753.82297	956.4173917	914734.2271	2.928665107	-0.276215384	39043.51406	42236.61567
Logan MCV /Sales	Perc%: 1%	2387.273176	36232.05423	31111.1195	40704.08004	36592.16771	36303.52777	1793.136672	3215339.125	3.060260348	-0.265980253	33018.70928	38804.94432
Logan MCV / Sales	Perc%: 5%	2599.286037	36444.06709	31323.1324	40916.0929	36804.18057	36515.54063	1793.136672	3215339.125	3.060260348	-0.265980253	33230.72214	39016.95718
Logan MCV / Sales	Perc%: 25%	2901.166239	36745.94729	31625.0126	41217.9731	37106.06077	36817.42083	1793.136672	3215339.125	3.060260348	-0.265980253	33532.60234	39318.83738
Logan MCV /Sales	Perc%: 50%	3111	36955.78105	31834.8464	41427.80687	37315.89453	37027.25459	1793.136672	3215339.125	3.060260348	-0.265980253	33742.4361	39528.67114
Logan MCV / Sales	Perc%: 75%	3320.833761	37165.61481	32044.6801	41637.64063	37525.7283	37237.08835	1793.136672	3215339.125	3.060260348	-0.265980253	33952.26987	39738.5049
Logan MCV / Sales	Perc%: 95%	3622.713963	37467.49502	32346.5603	41939.52083	37827.6085	37538.96855	1793.136672	3215339.125	3.060260348	-0.265980253	34254.15007	40040.38511

Figure 14. Sensitive analysis Report on sales.

After completing the simulation, the stress analysis will offer a collection of reports and graphics that one can use to analyse the effects of certain distributions on the selected output.

Input					Output: Total sales / Sales							
Name	Stress Analysis	Mean	Min	Max	Mode	Median	StdDev	Var	Kurtosis	Skewness	5%	95%
(none)	baseline	36948.57837	32224.32208	42826.77774	35762.622	36597.74981	1935.915698	3747769.591	3.192438301	0.425807445	33900.25803	40400.10116
Sandero (inclusive	0% to 5.00%	35801.3714	31588.42741	41340.34695	33793.535	35590.40413	1887.253492	3561725.742	3.101889578	0.259838373	32753.80104	38908.76642
Logan berlina / Sal	0% to 5.00%	33624.59863	30261.55147	36449.32057	33332.376	33502.16891	1122.731809	1260526.715	3.341501573	0.223526574	32040.73219	35681.3242
Logan MCV / Sales	0% to 5.00%	36305.72581	31679.87227	41359.79602	35178.214	35921.56079	1888.297904	3565668.976	2.875994218	0.349126172	33403.75554	39454.10464
Dokker / Sales	0% to 5.00%	36535.35999	31820.98269	42547.37016	36016.169	36218.3765	1945.578121	3785274.223	3.256770322	0.473791123	33475.23549	39846.9473
Lodgy / Sales	0% to 5.00%	36804.65715	32088.46108	42604.69595	35466.982	36461.16787	1929.881797	3724443.752	3.173197903	0.421880101	33810.45453	40232.46789
Duster / Sales	0% to 5.00%	35446.23033	31356.97821	40808.91611	35137.338	35135.26254	1753.668809	3075354.291	3.086709752	0.328754451	32481.1164	38487.21783
Dokker VAN / Sales	0% to 5.00%	36499.14423	31841.17192	42383.72297	37562.379	36101.33442	1960.829882	3844853.828	3.160108116	0.421427	33357.95243	39934.42378

Figure 15. Synthesis Report of the stress analysis.

These reports are detailed for each type of input selected and include entries and the corresponding statistics of the sale as minimum, maximum, mode, median, standard deviation, variation, asymmetry, percent.

6. Results and Discussions

After examining the questionnaires, we considered for analysis a number of 50 which had conclusive data, and of these, 38 were fully completed. The analysis performed with SPSS v.24, led to the following results:

- The predominant age group was between 26-35 years, followed by the one between 36-45 years;
- Of the 50 cases studied the average value of the age is 35.18 years, total revenues of 2667.3684 RON, monthly expenditure of 939.74 and the monthly amount allocated for car purchase is 690.00;
- Half of the respondents are under the age of 34.50 years, have a total income of less than 2535 lei, have expenses lower than 900 lei and are willing to allocate less than 700 lei for a car rate and the other half of the respondents are over these values;
- Dispersion of the variables is very high, which shows a large scatter of the values from the average;
- The most common age among respondents is 39 years, the most frequent total revenues are about 2350 lei, most common value for spending is 900 lei, and the most frequent amount allocated for a car rate is 300 lei;
- Distribution of the studied variables present a deviation of symmetry to the right (Average relative deviation for the age 0544, total income 0519 and expenses 0464 and a less pronounced deviation for the monthly amount allocated 0179);
- The distribution form of the studied variables (age, total income, expenses, monthly amount allocated) compared to the normal distribution have negative values (-.418, -.219, -.371, -.739) so it is flatter than the normal curve;
- The minimum age is 19, the minimum value of the total income is 500 lei and expenses and the amount allocated are about 200 lei per month;
- The maximum values of the variables are: age 58 years, total income 5300, expenses 1900 and 1500 lei for the allocated monthly amount;
- After analyzing the correlation between income and total monthly amount allocated we found out that between the two variables there is a direct link (the correlation coefficient R is 0.902);
- Following the analysis of the nominal variables it is found that the option of the interviewees ranks the Duster in first place, followed close by Logan and Sandero. Interviewees of both sexes are quite close in percentage (58% men and 42% women). The option for the fuel type also varies very little, 58% opted for gasoline and 42% for diesel. Regarding the gender option for a specific model we found out that Duster

and Logan are equally preferred by men and women, Sandero is preferred by women, and the other models are only in the men's list of options.

Through @Risk module, based on the sales (units sold) and on the starting prices of models from the years 2014, 2015 we have chosen the normal distribution, and by changing the probabilities we were able to make an analyze depending on the sales of models and on the starting price, observing what happens to their value when there is a variation of probabilities. We performed the correlation between the input variables through the appropriate matrix and through images and we could easily see how we can influence the sales. We represented the dispersion for each pair of elements of the matrix, and we found the most significant ones for the analysis and we realized successive simulations through which we checked the real correlations for the inputs matrix.

Through the results report of the statistical distributions we have noticed what happens at the choosing of each type of representation and which are the selected statistical data relating to the distribution that gives us the most suitable variants. We performed different predictions for the forthcoming period we simulated various scenarios by assigning probabilities to see how the sales would vary based on type of models. Once a simulation is completed, @RISK has provided us the report on the simulation results.

The data report provided us, iterative, all the calculated values for the simulated outputs, and all the values from the sample for the probability distributions of the input data.

The sensitivity analysis allowed us to test different input values, setting the influence on total sales of each model and therefore we could identify the model with the strongest effect (Logan), and the models which show increased uncertainty (Lodgy).

In the scenario analysis we generated a series of stress tests, in which we captured the combination between the variables and also the values that should be targeted, or rather to avoid or, remove them.

To make predictions for the forthcoming period, we simulated various scenarios by assigning probabilities, and we have noticed how the sales vary depending on models. We have assigned the scenarios to the distributions, for which we wanted to see the evolution, and we could change the probabilities depending on the evolution of the values in the period of 2014-2015 but also on the trend of the domestic demand, especially in conditions of downsize. In an optimistic scenario for a nationally sales growth of 75% there is an increase in the sales of Logan sedan and Duster models by 79%. An increase of 50% implies an increase at about the same proportions for the sales of Logan (51%) and Sandero (50%). The scenario of a drop in sales of 25% would lead to a decrease in sales of the Logan sedan by 16%. A decrease of 50% in sales would lead to a massive decline in the sales of the Logan (65%).

An increase in the price of the Logan sedan, which is the best sold car on the Romanian market, with 10%, would not greatly diminishes the sales, only by 2%, but a 10% increase in the price of the Sandero diminishes the sales by 25%. Also a 10% increase in the price of Duster would lead to a decrease in sales of 15%. A decrease in the price of the models with the lowest sales (Logan MCV, Lodgy, Dokker Van) by 10%, will lead to a significant increase in sales of Dokker Van (5%), otherwise the increases are insignificant.

Following the analysis, we can therefore say that managers should consider to increase the sales by keeping the prices at the same level for the most requested models (Logan, Duster and Sandero), styling these models, automating them, turn to electric or hybrid models, so as to be one step ahead their customer requirements. Also to stimulate the sales of other models, especially the Dokker Van (which is on downtrend) managers should try to lower the prices and find the most effective advertising solutions to broad the potential circle of customers.

7. Conclusions

It is obvious that in the last few years more and more brands have appeared that compete with Dacia cars, in terms of quality-price ratio, so, for 2016 a drop in production by 9% is forecasted, the Dacia models being in their second part of the life-cycle. Thus the managers see themselves faced with choosing the best decision not only to survive in an extremely dynamic market but also to be successful.

The data analysis at the company level should be easily accomplished by any user, and it must deliver updated information, in real-time and secure access to the data from any location. In that effect, for the case study we used SPSS v.24., to identify the availability of individuals to buy new cars from the local brand and we have determined a profile for the potential client of Dacia.

Within the Company Automobile Dacia, which is a multinational company, vehicles sales trends face a number of risks and threats which are diverse and can occur at any level. For modeling and risk analysis we used @RISK module from the intelligent tools package Palisade. In adopting the decision to increase the sales, we used the simulation technique which allowed us to combine all the uncertainties identified in the model, and by obtaining the results in graphic form the more significant risks could be emphasized. Once completed the simulation work, @RISK gave us a range of statistics needed for the decision making process to set up the strategy. The conclusion is that Dacia will need to switch its strategy to increase the sales towards the models that have the highest sales and thus it would be able to maintain and consolidate its position as market leader in Romania.

The main recommendations for increasing the domestic car sales on the Romanian market are related to the adoption of appropriate regulations by the government. For example, a multiannual Jalopy program could be approved (which started this year on the 15th of June) that would be held continuously over two to three years, and thus it would support a larger number of vehicles.

It is important that the government, through legal action, try to stimulate the domestic production of vehicles and also protect the environment by imposing solutions to lower the import of very old cars.

Through predictive analysis we have revealed a potential client profile for Dacia and through the simulations carried out we have highlighted the best scenarios to increase the sales. We hope that by making this paper we came to support the company and show them the benefits of using intelligent technologies in the decision-making process.

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