USING BUSINESS INTELLIGENCE SOLUTIONS FOR COMPANY PERFORMANCE MANAGEMENT

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Abstract: An adequate performance management needs monitoring and reporting tools that should allow for making correct decisions. Currently, multiple operations specific to the managerial process in an organization require using information systems able to meet the requirements of the time factor in making decisions, as well as the need to identify alternative decisions. Information technologies have evolved continuously and rapidly over the past few years. Business Intelligence is a strong tool in the hands of companies, which can improve organizational performance providing valuable information on all aspects of a business. The paper presents a few aspects concerning the use of QlikView as a Business Intelligence tool for company performance management.

Key words: performance, Business Intelligence, dashboard, QlikView

JEL Classification Codes: C80, M10, M15

1. INTRODUCTION

We are currently in the era of knowledge-based economy, and also in the era of the environmental and social economy. Sustainable development is based on three major objectives: the improvement of the economic results of the company (economic performance), environmental protection (environmental performance), and the development of human society as a whole (social performance). An adequate performance management requires monitoring and reporting situations that should allow for making the correct decisions.

Most companies have invested in several generations of IT systems. Each of these systems have solved a number of problems, have addressed a specific set of business challenges, and have contributed to an adequate company performance management. The purchased information systems have been, more or less, integrated with each other, in such a way as the information collected in a certain area of the organization can be used in other areas as well. Meanwhile, IT specialists found out that these systems capture information that could be valuable. The data from the individual applications and databases which contained accounting books, supply chains, sales, assistance provided to customers etc. have been collected and consolidated into data warehouses.

Due to the large volume of data, and also to the huge processing needs, both the dynamic reporting solutions, as well as the data mining ones need a powerful information infrastructure that should allow for storage capacity, interconnection, massive processing and correlation (which comprise not only the hardware capacities, but also and especially the software ones, including the parameterizations specific to each organization).

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By analysing and querying these sets of data, business users could acquire a better understanding of the business opportunities and trends. Understanding the importance of accurate data analysis, IT departments supplied the infrastructure required to support the strategic management of the whole company. Due to the fact that the existing reporting systems were not able to cover the areas of interest necessary for a thorough analysis of the business processes, the Business Intelligence solutions emerged.

2. BUSINESS INTELLIGENCE AND THE PERFORMANCE MONITORING AND REPORTING SITUATIONS

Studying the specialised literature, we can notice that, in defining the notion of performance, three main visions were outlined, more specifically: defining performance according to the level of achievement of the objectives (Bourguignon, 1995), according to the productivity and efficiency of the company (Cohen, 1995), and according to the creation of value (Porter, 1986; Lorino, 2000).

Many authors prefer to talk about a performance management system rather than a performance measurement system, which is an aspect highlighted by E.Lardenoije et al. (2005). Referring to the management of a coal mine, Paliu-Popa et al (2010) underlines "the lack of information that would enable making some decisions able to control and reduce costs".

In our opinion, performance should be assessed according to the objectives set in advance. It is impossible to assess performance in the absence of clearly-set objectives that can be expressed quantitatively and qualitatively, and must have a deadline for completion. We believe that performance measurement is a necessary condition for the development of a company, but it is not sufficient, and thus it should be one of the performance management components.

The dashboard has been used for several decades now to track the degree of achievement of the objectives, and the level of the results obtained, in order to ensure an improvement of the level of substantiating decisions. It allows managers to control or monitor certain areas or even the company as a whole. The dashboard is, on the one hand, a manner of rationalizing the information system within the company, while on the other hand, it is a managerial method that has a direct, favourable impact on managers' time budget and on the latter's structure. The ultimate purpose of the dashboard is not only to convey information related to the results recorded in the managed environment, but also to make corrective decisions, depending on the nature of the causes underlying the deviations.

The dashboard contains a number of indicators expressed in absolute and/or relative values. Based on the values of these indicators, the activity of the company can be assessed, controlled and adjusted in good time. The dashboard prepared both at overall company level, as well as at the level of each and every subunit within the company (Bondoc & Sîrbu, 2008).

Whether a company uses the classic dashboard, or one of its more modern versions, such as the Balanced Scorecard, the Business Intelligence (BI) solutions are nowadays indispensable when it comes to obtaining information rapidly. The implementation of a Business Intelligence (BI) solution in a company is an advantage due to the overall view of the database and to the fact that managers are allowed to make better decisions, in a faster pace (Turban et al, 2007).

The Business Intelligence notion is based on the idea of a decision support system for the management, which is able to collect, integrate, analyse and present, synthetically, all operational data. The strength of the implementation of such a system is a correct and intelligent interpretation of the information, in such a way as to be accessed by any user, regardless of location. "The entrepreneur is the factor with a decisive weight in setting up a company" (Secară, 2010), and the adoption of an IT solution within the company largely depends on his or her

involvement. This statement takes into consideration the expenses implied by the adoption of a BI solution, as well as the human resources required for its use. There are still issues related to the mentality of certain managers who have to be persuaded to adopt overall Business Intelligence solutions.

3. THE USE OF QLIK VIEW FOR CREATING PERFORMANCE REPORTS

In order to illustrate the use of BI to design analysis reports, we used the QlikView application, which is an excellent critical business information analysis tool. QlikView is a complete and powerful BI and data analysis software package, which provides a better method of working with the data of a business. The graphical interface provides users with a high interactivity. With just a few clicks, they have immediate access to information starting from a general level, and reaching the smallest details. Thus, organizations manage to discover information unsuspected before, to have a better understanding of what is going on in the current activity, and consequently to make the best decisions for their development.

The broad information customization and visualisation facilities (tables, charts), make the QlikView application easily adjustable within companies that use electronically stored data intensively. The QlikView applications can be developed rapidly, are easily managed by the IT department of a company, and provide end users with unlimited freedom for ad-hoc queries, at any level of the database.

From the point of view of the end user, the information user, the information system made by means of the QlikView application provides two important functionalities: the free navigation through the data warehouse in search of relevant information, and various possibilities of presenting data. These functionalities are closely interlinked and it is hard to say which is the navigation operation, and which is the presentation one. The navigation through the data warehouse is made by specifying the selection criteria. The user can easily express simple criteria, or criteria combined through logical operators, in order to look for information. The application allows for the simultaneous access (in one screen), to all the information presented in the database, and the selection of some of this information can be made by a simple "qlik", while its search is done by entering the corresponding criteria.

The specification of the presentation method should allow the person who analyses the data to find the optimal visual use of the extracted data. In addition to the specific graphical presentation options, it is important for the user to be able to view multidimensional data under the form of tables. Thus, complex tables can be designed, which can group rows and columns expressing defined dimensions and different aggregation levels.

The powerful Business Intelligence analysis engine QlikView uses the AQL (Associative Query Logic) technology, which accesses information structured from various sources, in a dynamic and interactive manner, propagating the analysis selections throughout the entire database, in order to build an associative, non-relational and extremely efficient database. AQL allows QlikView to work with millions of data cells and still respond to queries in less than one second. By replacing resource intensive relational joins with AQL, QlikView removes the need to pre-aggregate data for most applications. It also allows for the connection of any data source, (ERP, CRM, Microsoft Excel, logs, Access databases), thus managing to unify information generated by the multitude of independent applications used within a company.

QlikView provides users to the power to find their own way towards data analysis and understanding. QlikView is the business intelligence solution that simplifies the analysis process for everybody now more than ever. QlikView provides companies with:
- customised dashboards;

- a powerful reporting engine – which combines and distributes data from multiple sources, rapidly and easily;

- flexible solutions - the QlikView users can connect themselves remotely via the Internet;

- customised applications – the possibility to develop 100% customised solutions very quickly.

To give an example we considered a company that deals with food distribution in Romania. The company has got several warehouses situated at different addresses and furnishes food products to several clients from all over the country. The used information refers to:

- Articles characterized through: Product Code, Product Name, Weight, Product Group, Group Type;

- Customers defined through: Customer Code, Customer Name, Location Code, Customer Location Name, Customer Group, Customer Group Type, Department, Town;

- Invoice heading which comprises: Invoicing Code, Date, Warehouse Location, Bill;

- Invoice lines consisting of: ID, Product Code, Quantity and Price.

To illustrate the use of QlikView, we created a series of charts: the sales map, the evolution of the mark-up, the comparative evolution of the average product price and of the number of customers, the evolution of the performance indicators on various periods and groups, the periodic evolution of the quantity sold, a dashboard.

1. The sales map is a graphical presentation of the sales in each county for the selected period. In order to have a clear image of the sales made each and every day, week or month, for a certain group of products, for a certain product, or for a certain branch by selecting the desired options (see Fig. 1).
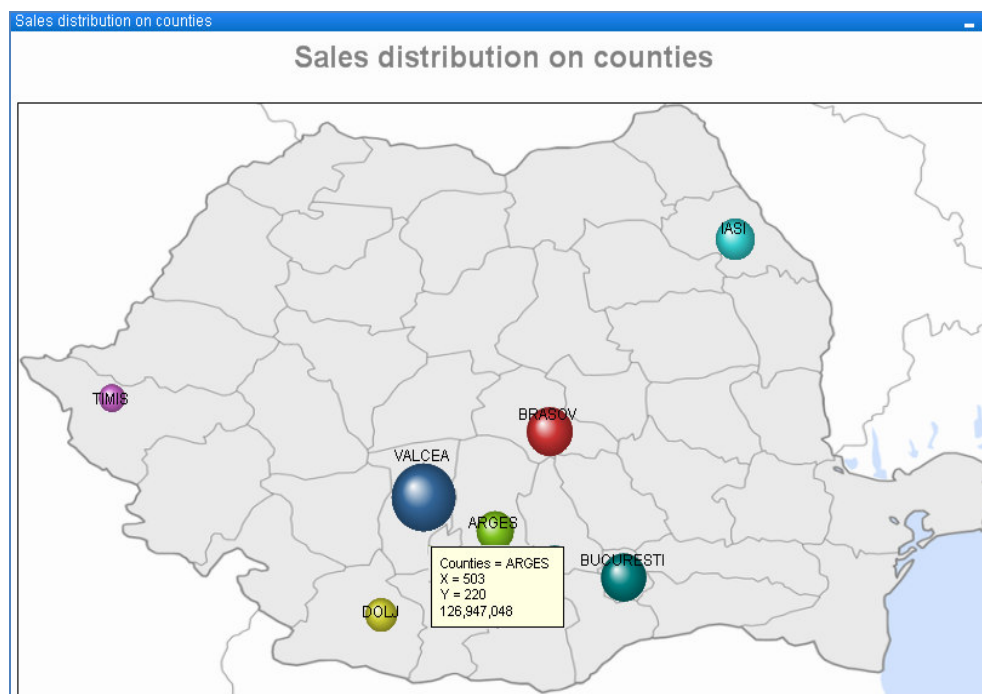
Figure 1. The sales map
(Source: developed by the authors using QlikView

2. The evolution of the mark-up

The commercial margin known as mark-up must be set in such a way as to allow for recovering goods movement costs, including the legal taxes related to the movement of goods (the equivalent value of the factors spent for the transport, storage and sale of the products urchased, the market fees, etc.) and to make a certain profit. Figure 2 se can be used to analyse the mark-up on various time periods (year, month, quarter, week, day), but it is also from this chart that, by a selection made in the menu, we can display the total quantity of products sold, the value obtained, the number of products, and the average price.
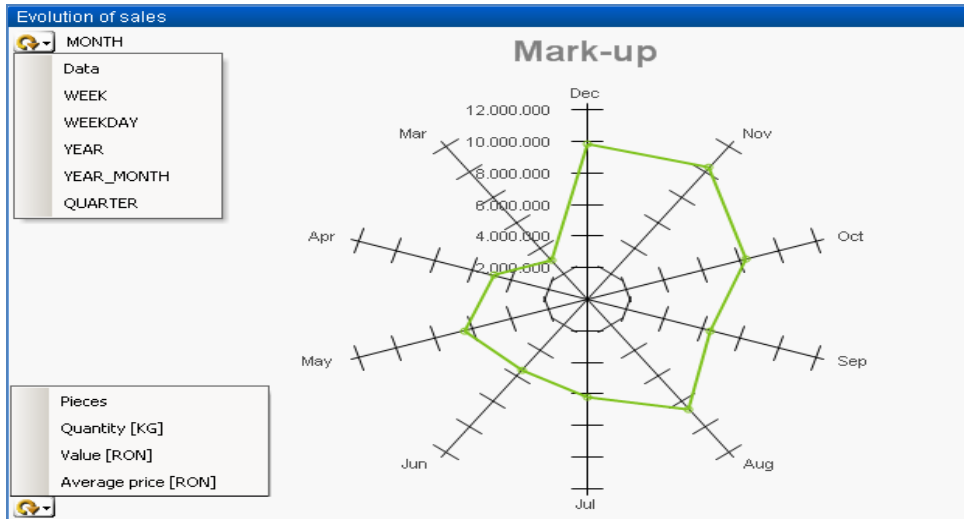
Figure 2. The evolution of the mark-up

(Source: developed by the authors using QlikView)

3. The comparative evolution in which a detailed analysis of the sales is made using several dimensions represented graphically on one or two axes.
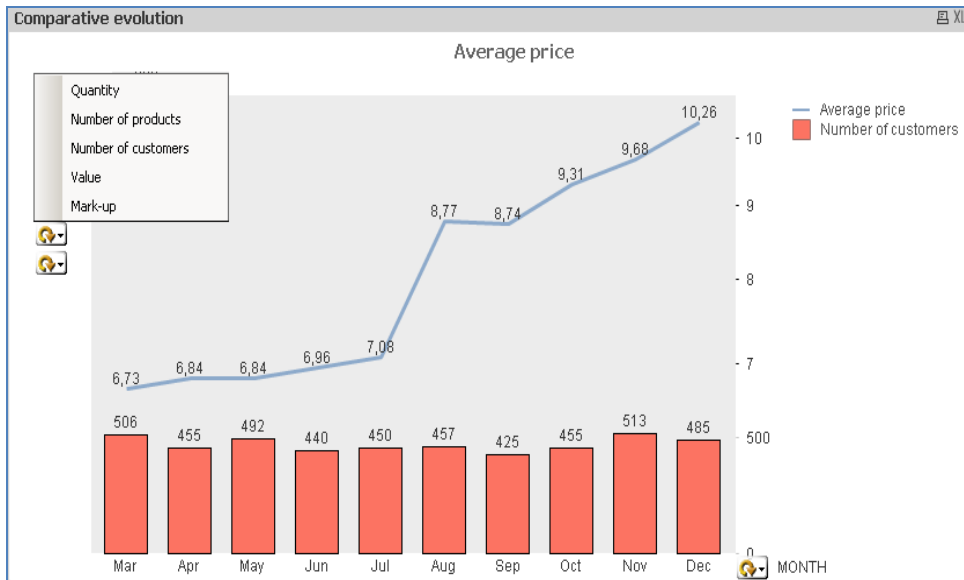
Figure 3. Comparative evolution of the average product price and of the number of customers

Source: developed by the authors using QlikView

Here we can determine whether there are logical correlations between the dimensions selected, over certain periods of time, for example between the average price and the number of customers (we can study what happens to the number of customers if the average price is increased or vice versa) (see Fig. 3). In this chart, by one click, comparisons can be made between other indicators: the total value, the total quantity o products sold, the average price or the mark-up. All these evolutions can be made both monthly, as well as quarterly, weekly, for certain days of the week, etc.

4. The evolution of the performance indicators on various periods and groups

In figure 4 we made a three-dimensional table that displays, on each branch and group of products, the total value, the average price, the mark-up, the number of products and the number of customers on year. The minimum and maximum values are symbolised by the red and green colour, respectively, in such a way as to enable the manager to intervene where he immediately detects problems. These indicators can be grouped on other periods of time as well: monthly, quarterly, weekly, and on different groups: for example, we can select from the menu, to display the information of groups of customers, invoicing code, products, customers, etc.

The information in this PivotTable can be displayed in an expanded manner, by instantaneously calculating the values on each group of products in the branches (see Brasov, Bucuresti, Piteşti), or condensed by displaying the total value of the indicators on branches (see Timişoara). A very important aspect for the construction of all spreadsheets is represented by the dimensions set as being representative for them. For example, we have used as dimensions: the time, the location of the warehouses, the clients, the products, etc. They can be selected and changed at each sheet, and we can also use combinations of these dimensions by defining groups.

Tabel in 3 dimensiuni			Valoare	Pret mediu	Marja	Numar produse	Numar Clineti
		YEAR	2014	2014	2014	2014	2014
Cod...		GrupaProd					
BRASOV		MF1	4.142.381,81	10,14	257.387,46	4	55
		MF2	116.372.245,51	7,82	6.825.706,38	4	232
		MF3	2.758.124,76	8,91	161.698,56	5	38
		MFA	12.828.490,51	8,57	758.568,62	2	55
		MFG	43.257.615,84	9,13	2.631.976,05	4	21
		MFO	8.983.122,40	9,43	549.193,25	1	22
		MGZ	1.610.829,30	9,78	92.206,00	4	22
BUCURESTI		MF2	36.323.677,49	5,86	2.171.466,45	4	64
		MF3	5.210.213,92	8,72	329.902,06	3	6
		MFA	4.027.830,11	8,13	246.264,68	2	9
		MFG	132.422.772,10	8,93	8.014.896,56	1	6
		MFP	3.142,50	7,76	197,12	1	2
		MGS	1.086.120,00	9,00	84.201,72	1	1
		MGZ	5.080.719,05	8,53	318.927,15	4	8
PITESTI		MF2	98.481.305,31	7,09	5.846.919,91	7	103
		MF3	222.605,51	7,94	11.047,07	5	11
		MFA	10.821.991,61	8,26	639.482,30	3	25
		MFG	13.210.783,00	8,02	826.343,78	2	8
		MFO	635.207,36	9,44	36.403,35	1	9
		MGS	275.174,66	4,96	22.029,76	4	7
		MGZ	3.299.980,77	8,33	202.921,30	4	26
TIMISOARA			63.957.330,23	7,79	3.791.711,00	25	157

Figure 4. The evolution of the performance indicators on various periods and groups

Source: developed by the authors using QlikView

5. The periodic evolution of the quantity sold. In this chart, a detailed analysis of the sales is made, by determining the evolution of the quantity sold from a group of products on various periods of time. The dimensions of this chart can be changed in such a way as to display the sold quantities for another period of time (in weekend, weekly, daily, yearly, etc). At the same time, the evolution of the quantities sold can be displayed, on different groups of products or

simultaneously, for two or more groups.
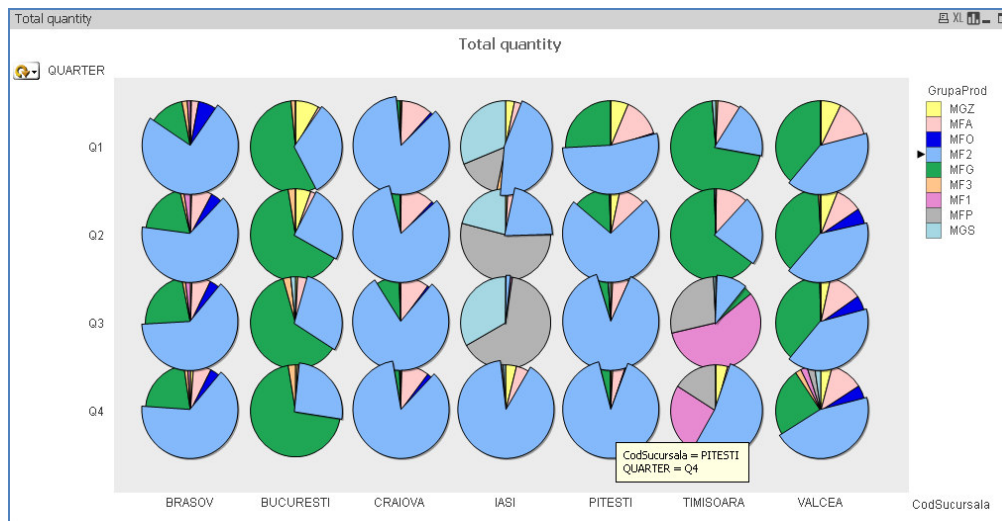
Figure 5. The periodic evolution of the quantity sold

Source: developed by the authors using QlikView

6. Dashboard. This chart presents the evolution of sales by monitoring the evolution of the quantities sold, the value obtained, the average price, and the daily average, the number of products sold, the average per customer, and the number of customers on various periods of time were calculated (see Fig. 6).
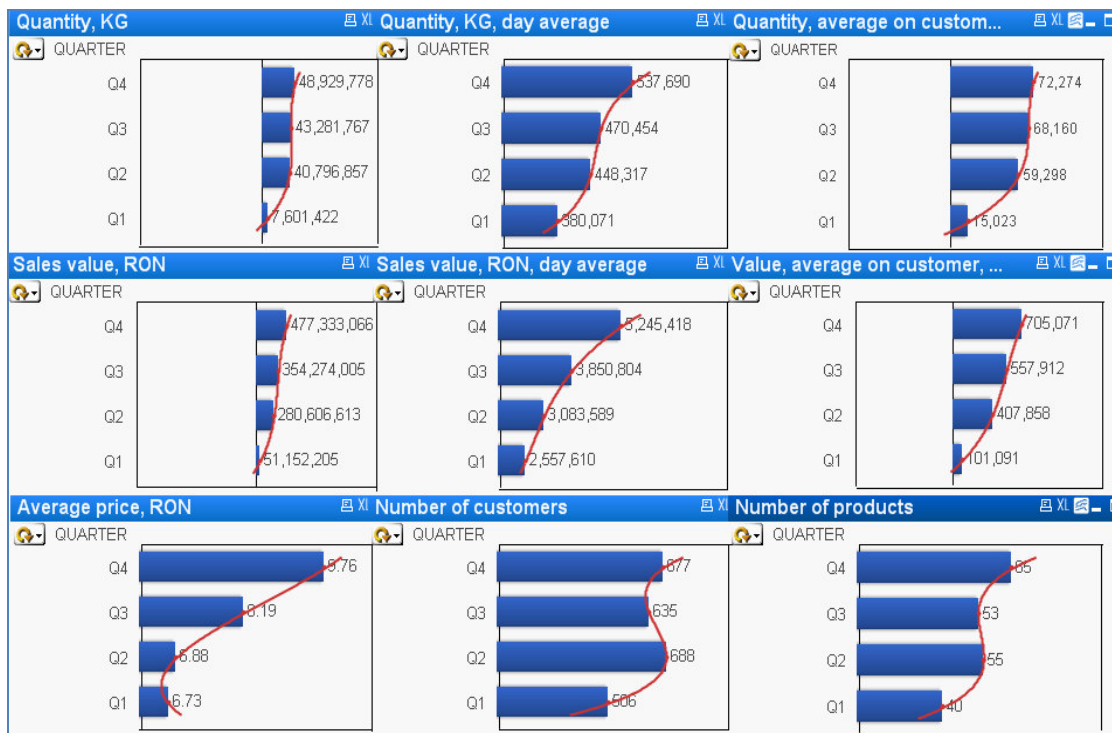
Figure 6. Dashboard made by means of QlikView

Source: developed by the authors using QlikView

4. CONCLUSIONS

Business Intelligence applications are still in their infancy, and their implementation within many companies is only a dream for the moment. Currently, in the business world, the key to success lies in the ability to make better decisions and in a time shorter than the competitors. In fact, the life of a company depends increasingly on such decisions, which makes it impossible to deny the benefit provided by Business Intelligence. The value of the implementation of Business Intelligence systems is translated into time savings made by the company management for the time span in which they get the information, and into financial gains arising from the quality of their decisions.

The problems seen in most companies are the lack of rapid, centralised and relevant information, the large quantity of data used only partially, and last, but not least, the impossibility to turn data into benefits, as a result of the users' sporadic and superficial access to them.

In our opinion, in the future, Business Intelligence solutions will become indispensable for the management of any organization, because optimal and fast decisions are essential for the survival and evolution on a competitive market. Romania has a high potential of assimilating IT solutions, its receptiveness for Business Intelligence solution being increasingly obvious, both due to the mentality, as well as in practice, in the Romanian business environment.

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