# Organizational Optimization of a Company Through the Implementation of Business Intelligence Solutions

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**Abstract:** Most organizations don't need data. On the contrary, they have dozens of applications, files, data bases in which the smallest details are memorized regarding the daily activity. Yet, all these data should be united, compared, analysed and filtered to emphasize what is really important for the business. We have to find tendencies, opportunities, strategic directions. This is the role of Business Intelligence solutions. In this work, we shall tackle the importance of implementation of a Business Intelligence solution in a company and present a case study at a food distribution company from Romania. For the optimization of the company's management, we designed with the help of QlikView application some sales analysis reports, some presented under the form of tables, other under the form of graphs.

**Keywords:** data management; analysis; reports; QlikView

**JEL Classification:** M12; M15

## 1 Introduction

Making good decisions when doing business is as important as in our private life. Every day, we should make decisions which determine the direction and efficiency of activities from an organization. We make decisions regarding production, marketing or staff. The decisions made affect costs, sales and profit.

At first sight, we can say that only the persons from the hierarchy's top (Council Board, head manager, president) should take efficient decisions which bring success within the organization.

The efficient plans developed by the management of the organization can fail because of wrong decisions made by persons from inferior parts of the hierarchy in the implementation or performance process.

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In conclusion, all people from organization should take efficient decisions. The efficient decisions made at each level of the organization lead towards success.

Major changes determine the need for new instruments and approaches of decision process:

- Tough competition creates a high pressure upon profit gain. Businesses which act and react after past example are perfect candidates for the list of endangered species;
- Electronic data and data bases simply shoot up. Today's sophisticated systems as well as Enterprise Resource Planning(ERP) systems, e-commerce system, data warehouses and web heavily extend the available data quantity. The old instruments can no longer come up to the new challenges. From a historical point of view, the problem was data finding; now the problem is at the opposite side: how these data can be filtered in order to have a meaning?
- Pressure upon profit and rise of business steps determined the flattening and weakening of organizations. Everywhere, managers ask themselves the same questions: how can I obtain greater results with less resources? Flattened organizations are expected to move more rapidly because of the fact that the decision process is pushed down on the organizational hierarchy. How can these persons be accordingly prepared for new tasks?

From a historical point of view (but also for many actual companies), the companies lost too much time dealing with fiscal year end and data and financial reports preparation and too little time with analyses and revisions. This thing caused a discordance between analysis and revision and action process.

## 2. What is Business Intelligence?

Informational technologies evolved continuously and rapidly along last decades. During those times, companies implemented and ran a few generations of IT systems. Each of these systems addressed a specific set of business challenges and contributed to the company's full performance (Adelman & Moss, 2000). Also, the systems have been more or less integrated one with another so that end-to-end processes could better function and the information captured in a certain area of the organization could be used somewhere else.

Later, IT managers realized that these systems captured information which could be valuable to makers. Data from individual applications and data bases which managed the general account books, supply chains, sales, assistance given to clients and other similar were collected and consolidated in data warehouses and data marts. By interrogation and analysis of these consolidated data sets, business users could achieve a high-level insight of the key business opportunities and tendencies.

Thus, instead to limit itself only to help individual departments to operate effectively and more efficiently, IT supplied the necessary infrastructure to support the strategic management of the entire company.

Efficient decisions are those choices which lead the organization closer to the objectives established in due time. Taking into consideration this definition, we can notice three important components which help us take efficient decisions:

- determination of objectives;
- determination of some measuring methods for the identification of deviation from objectives;
- determination of terms in which objectives should be attained.

This information represents the starting point for decision making but also a quality assessment method of decisions made. Objectives should be clearly established and made known to all involved in the organization's activity. So that an objective can be the basis of efficient decisions, a measuring method should be defined for the determination at any moment of the deviation registered in current activity.

Business intelligence (BI) is a powerful instrument that the companies can use to improve the organizational performance offering valuable information for all the parties involved in the business. BI has become such a comprising concept that we must take a few minutes to revise it. Firstly, BI includes disciplines that are connected to each other, yet divided. Thus BI can be divided into four basic zones (Moss & Atre, 2003):

- Data integration refers to the modality that allows data from different business processes, programs, platforms and systems to be assimilated so as to create consistent information that can be trusted an easily used;
- Data management means creating a central deposit to stock data in a form and location that makes them more accessible to the analysis engine;
- Analysis is a term used for mining, modeling and optimizing data to estimate the tendencies that will be communicated to the decision makers;
- Reporting allows final users to see and show the results in a personalized form.

The BI concept represents an architecture and a collection of applications and integrated operative databases, as well as of systems based on decision assistance, that provide to the business community easy access to the data on the respective business. The BI concept represents a series of marketing techniques and analyses which can be fulfilled with the help of a special software. By means of this system, the experts analyse the internal data of a company (Anandarajan & Srinivasan, 2004; Loshin, 2003).

The BI concept focuses on the interdepartmental activities of a company, the analysis of material and informational flows as well as the improvement strategies of the activities inside of the company. The "Organizational Management"

considers Business Intelligence to be a vital means of activity improvement, gaining of competitive advantage and meeting the strategic goals (Turban & all, 2007, Vitt & Stacia, 2002).

In Romania, the market of Business Intelligence solutions, together with that of ERP solutions, experienced an impressive evolution due both to the national economical development and to meet the need of companies to remain competitive on the market.

### 2.1. Advantages of Business Intelligence Solution Implementation in a Company

With a BI solution you can easily obtain answers to questions of the type:

- Who are the most profitable clients and which are the most efficient products?
- What is the company's profitability at quarter level?
- What last day events need special attention?

The work instruments which BI applications offer give the managerial department of the company the possibility to get involved and to begin analyzing data, without having to wait for the IT departments to hand in complex reports (Bălăceanu, 2007, p. 67-73). The use of a BI solution should not be limited to a single department or group within a company. Each department may use specific capacities of such solution (Dresner, 2010):

- The IT department provides the necessary operational systems for the other departments. Report generation has been the IT departments' traditional responsibility, but they should be released from this burden and provide, in exchange - with minimum time, information resources or outfit – an analysis and reporting solution for all the other departments, so that they get quickly the necessary information;
- The financial department uses the BI capacities to analyze data, generate reports and financial statistics, and make financial decisions with them;
- The logistics department may anticipate demands and estimate inventories;
- The marketing and sale departments may estimate sales, profitability and analyze the market behaviour on brands (groups of products) and distribution channels (groups of customers).

BI applications offer to users a valuable internal vision to use information, to identify business problems and opportunities quickly (Biere, 2003). Users can access and operate great quantities of information to analyse relations and understand tendencies which support finally the business decisions. These tools prevent the potential loss of knowledge within the company which results from massive accumulation of information which are not easily accessible or in an usable form.

The desired result of BI projects in business is the company's continuous improvement through the opportune information which increases the power of decision.

### 2.2. A Study Realized at Some Companies which Implemented a BI

As a result of a study realized at some Romanian companies which implemented a BI solution, we concluded the following aspects:

- The time of access to business information and analysis reduces with 50%;
- Any BI solution consolidates multiple data sources easily;
- The speed to obtain the reports rises from 1-2 days for complex reports up to few minutes;
- It presents flexibility regarding data measurement – if it has been found an area which needs explanations (for example an unexpected diminution of sold quantities from a sales channel) we can dig deeper into data till we identify the problem in a very short time (we select the channel or group, choose the client and then the product which determined the diminution);
- It leads to the reduction of the number of employees who are taking care of reporting (from six persons to one person);
- The obtainment of quick results determines the action of sales agents only when main problems appear (when sales decrease);
- Management and performance staff have access to same data and alarm signals displayed by BI, the discussion switching to figures interpretation and corrective actions.

The benefits brought by a „business intelligence" software application can be synthesized as follows (Zillman, 2010):

- Reduction of necessary staff: staff cost reduction in the process attended by software solution;
- Reduction of number of errors: cost reduction with revision or redress for errors resulted from a certain process;
- Revenue increase: by sales increase due for example to the time processing diminution of orders;
- Generation of a comprehensive image about the clients behaviour, risks and profitability, thus contributing to the efficiency improvement of offers and marketing companies;
- Creation of a coherent perspective about real costs, profitability, scenarios with previsions and optimization strategies;
- Savings resulted from productivity growth;
- Decision process improvement;
- Quality improvement;

- Improvement of client satisfaction, partners or employees;
- Information quality improvement for decision process;
- Identification, measuring, monitoring, control and correct reporting of risks within the business.

The beneficiaries of BI solutions are unanimous regarding the results of their implementation vis-a-vis the implementation of other solutions from ERP family. The benefits are appreciated as being greater and visible more rapidly. The effects of a BI system installation are amazing because this produces the necessary information at the moment when it is required, ensuring one of the ingredients of success in business.

## 3. Case Study – Design of a BI Solution with the Help of Qlikview Application

In order to design the reports on analysis we used the QlikView application, which is an excellent tool in analyzing the critical information on a business (QlikTech International, 2010). We chose the QlikView application instead of any other BI solution available on the local market because of the advantages offered by this technology:

- very little development time;
- simple modification and maintenance;
- extremely intuitive interface (almost there is no need for training);
- small price in comparison with other solutions;
- flexible licensing system (but not complicated or formed from dozens of modules as to other solutions);
- possibility to offer Business Intelligence Off-The-Shelf.

As a synthesis, we consider that the strongest points of QlikView application in comparison with competing solutions from local market are the very strong analysis engine, with little response time to great volumes of data, price and duration of implementation.

QlikView is the business intelligence solution that extends the concept of simplifying the analysis for everybody, further than ever (Swoyer, 2008). The extended facilities for personalizing and visualizing information, combined with advanced co-operative work abilities make QlikView easily adapted within organizations (companies and public institutions) that use intensively electronic data stocks. QlikView offers (Manohar, 2008):

- personalized dashboards;
- a powerful reporting engine – fast and easily combines and distributes data from multiple sources;

- flexible solutions - QlikView users can connect to the internet;
- personalized applications – the possibility to develop very fast 100% personalized solutions.

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, Invoicing Code;
- Invoice heading which comprises: ID, Invoicing Code, Date, Warehouse Location, Warehouse and Bill;
- Invoice lines consisting of: ID, Product Code, Quantity and Price.

The most important operation that can be done very easily with QlikView is the "Filter" spreadsheet. This allows visualizing several pieces of information at the same time. The operations that can be made on this page are:

- The simple or multiple selection: for example if we select a certain product we can visualize information about the name, the customer's type and location to whom the product was distributed, about the group of product to which the particular product belongs, the warehouse, the delivered quantity and the price of the product, about the bills released for the sell of the product.
- The search: for example, if we want to find a bill number in order to see the information comprised in this particular bill (sold product, date of release, quantity, price), we have to select the thing corresponding to the bill and introduce the number of the bill. As the numbers are being introduced, all the bills that have the specified values comprised in their number are selected.

A very important thing for the drawing of all the spreadsheets is the dimension established as representative for them. Thus we used as dimensions: time, location of warehouses, customers or products. These can be selected and altered on each sheet and we can use combinations of these dimensions in order to define groups.

Further, there are presented a few sales analysis reports achieved by the company in different time periods. Each report can be very easily modified by a single click or by modifying the display way (table or graph) or by choosing another option from defined groups (for example for time dimension we defined the "Period" group formed from: year, month, week, current date, weekend).

**A. Dashboard.** In this graph, it is presented the sales evolution by pursuit of sold quantities evolution, obtained value, average price and there have been calculated

the daily average, average per client, number of sold products, number of clients and KPI (see figure 1).

To obtain KPI, we used a variable No_months which represents a natural number which shows with how many months behind I can go for the comparison with the selected period. It is compared the period from the beginning of the month till Data_analysis (for example 10. 08. 2011) with the same period from the month obtained by completing the value for No_months.

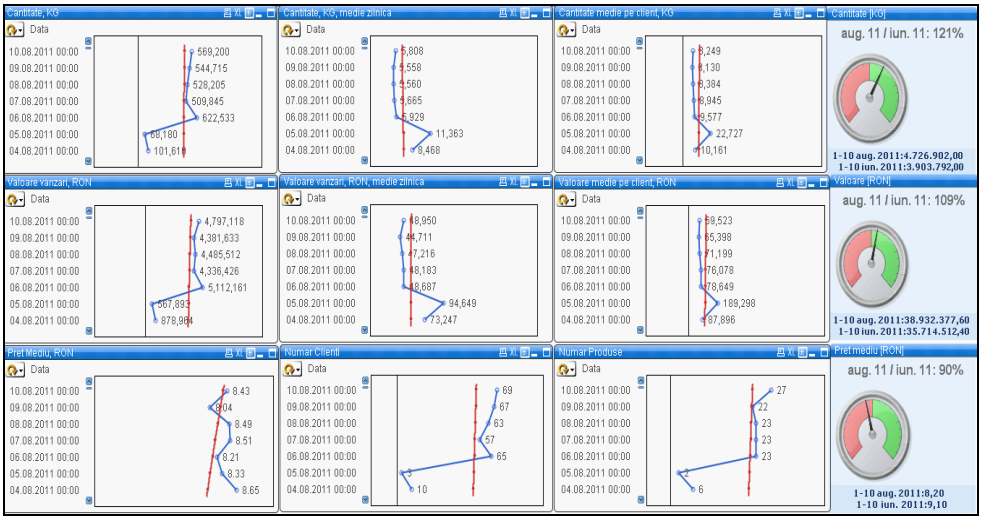


**Figure 1. Dashboard**

**B. Sales structure.** In this table, there are presented the products sold to each client and the relative proportion regarding selection (see figure 2) at a certain date.

Structura vanzari canal per client la data

| Location | R : 10.08.2011 | Pondere (%) |
|---|---|---|
| **Total** | **4,726,902** | **100.00%** |
| Bucuresti | 883,690 | 18.69% |
| Pitesti | 540,860 | 11.44% |
| Brasov | 805,681 | 17.04% |
| Craiova | 385,320 | 8.15% |
| Iasi | 343,915 | 7.28% |
| Timisoara | 329,376 | 6.97% |
| Valcea | 1,438,060 | 30.42% |

**Figure 2. Structure of sales**

The information from this table can be displayed also in detail by presentation of all groups of products from each location or for each client. For example, for a selected group of products, we obtain the detailed information about products sold from the respective group, per client or on the whole (see figure 3). The same

information (realized sales and weight) can be pointed out also for each group of clients, for each group of products, per locality or for each issued invoice.

Structura vanzari canal per client la data : 10.08.2011

| Location | Name of product | Client | R : 10.08.2011 | Pondere (%) |
|---|---|---|---|---|
| **Total** | | | **2,244,670** | **100.00%** |
| Bucuresti | PATE BUCEGI | | 23,000 | 1.02% |
| | PATE SIBIU GASCA | SC 273 | 10,000 | 0.45% |
| | PATE SIBIU PORC | SC 250 | 29,940 | 1.33% |
| | | SC 635 | 20,840 | 0.93% |
| | PATE SIBIU PUI | | 98,240 | 4.38% |
| Pitesti | PATE ARDEAL PORC | SC 7 | 2,220 | 0.10% |
| | PATE BUCEGI | | 216,120 | 9.63% |
| | PATE SIBIU GASCA | SC 7 | 2,650 | 0.12% |
| | | SC 353 | 1,500 | 0.07% |
| | | SC 622 | 3,000 | 0.13% |
| | PATE SIBIU PORC | SC 22 | 29,190 | 1.30% |
| | | SC 324 | 89,080 | 3.97% |
| | | SC 621 | 2,910 | 0.13% |
| | | SC LORIMAD ... | 17,890 | 0.80% |
| | PATE SIBIU PUI | | 139,360 | 6.21% |
| Brasov | PATE BUCEGI | | 297,440 | 13.25% |
| | PATE SIBIU PORC | SC 51 | 10,000 | 0.45% |
| | | SC 703 | 20,900 | 0.93% |
| | | SC 727 | 13,000 | 0.58% |
| | | SC 759 | 6,600 | 0.29% |
| | | SC LAICOM SRL | 5,000 | 0.22% |
| | PATE SIBIU PUI | | 185,820 | 8.28% |
| Craiova | PATE BUCEGI | | 201,000 | 8.95% |
| | PATE SIBIU PUI | | 128,500 | 5.72% |
| Iasi | PATE ARDEAL PUI | SC 679 | 980 | 0.04% |
| | PATE BUCEGI | | 120 | 0.01% |
| Timisoara | PATE SIBIU PUI | | 41,280 | 1.84% |
| Valcea | PATE ARDEAL PORC | SC 273 | 1,010 | 0.04% |
| | | SC 554 | 5,080 | 0.23% |
| | PATE BUCEGI | | 405,480 | 18.06% |
| | PATE SIBIU GASCA | SC 273 | 5,000 | 0.22% |
| | PATE SIBIU PUI | | 231,520 | 10.31% |

**Figure 3. Sales structure for group of products „Meat"**

**C. Portfolio analysis of product categories.** In order to obtain information regarding the products which sell better or which products have to be replaced, we realized a new report in which we presented the monthly quantity sold for each product from the group of products selected per total or per location of warehouses as well as the monthly relative proportion per quantity (see figure 4).

Analiza Portofoliu Categorii

| | | | Cantitate (kg) | | | Pondere in categorie (%) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | YEAR_MONTH | oct.-2011 | nov.-2011 | dec.-2011 | mar.-2011 | apr.-2011 | mai.-2011 | iun.-2011 |
| Group of products | Product... | Location | | | | | | | |
| MF2 | PATE ARDEAL PORC | Pitesti | 12,960 | 16,590 | 12,420 | 0.00% | 0.28% | 0.07% | 0.03% |
| | | Valcea | 6,810 | 4,830 | 4,910 | 0.12% | 0.08% | 0.17% | 0.24% |
| | PATE ARDEAL PUI | Pitesti | 0 | 0 | 0 | 0.21% | 0.12% | 0.12% | 0.00% |
| | | Iasi | 21,820 | 55,500 | 20,075 | 0.07% | 0.01% | 0.00% | 0.03% |
| | | Timisoara | 56 | 0 | 0 | 0.00% | 0.00% | 0.00% | 0.00% |
| | PATE BUCEGI | Bucuresti | 74,160 | 33,240 | 3,280 | 1.18% | 1.82% | 1.19% | 0.91% |
| | | Pitesti | 704,800 | 686,480 | 578,520 | 10.55% | 11.30% | 8.33% | 8.51% |
| | | Brasov | 805,700 | 961,680 | 1,025,280 | 15.66% | 14.98% | 11.27% | 14.23% |
| | | Craiova | 533,720 | 633,280 | 650,440 | 9.26% | 10.67% | 9.88% | 9.69% |
| | | Iasi | 1,590,080 | 2,346,520 | 2,317,520 | 6.93% | 0.90% | 6.37% | 3.32% |
| | | Timisoara | 0 | 165,420 | 157,540 | 0.00% | 0.00% | 0.00% | 0.00% |
| | | Valcea | 1,458,980 | 1,620,120 | 1,298,880 | 6.66% | 6.57% | 13.87% | 17.95% |
| | PATE DE CA... | Brasov | 6,000 | 11,940 | 6,000 | 0.00% | 0.00% | 0.00% | 0.00% |
| | PATE SIBIU... | | 63,700 | 99,700 | 45,000 | 2.76% | 3.33% | 1.73% | 0.00% |
| | PATE SIBIU PORC | Bucuresti | 249,160 | 133,860 | 88,680 | 3.34% | 2.20% | 2.71% | 2.15% |
| | | Pitesti | 413,110 | 421,810 | 514,030 | 0.46% | 4.25% | 6.61% | 3.60% |
| | | Brasov | 55,700 | 79,440 | 195,360 | 3.35% | 2.56% | 1.78% | 2.89% |
| | | Craiova | 44,300 | 0 | 0 | 0.13% | 0.00% | 0.00% | 0.00% |
| | | Iasi | 131,940 | 98,560 | 176,680 | 2.15% | 0.13% | 0.00% | 0.00% |
| | | Timisoara | 0 | 0 | 0 | 2.62% | 4.24% | 4.01% | 4.17% |
| | | Valcea | 229,530 | 241,430 | 132,190 | 0.00% | 0.00% | 1.07% | 0.53% |
| | PATE SIBIU... | | 2,423,645 | 3,487,880 | 2,420,220 | 34.53% | 36.30% | 30.78% | 31.75% |

**Figure 4. Portfolio analysis of food products**

## 4. Conclusion

Business Intelligence systems are useful to all who need quality information as to be efficient, especially to decision factors from management, financial, marketing, sales, logistics or IT departments.

A BI system is simple, visual and easy to understand, offering to people the liberty to answer questions on the spot. The way of visualization can be changed only by a single click depending of the needs of every user. BI system can realize interactive visualizations in only few seconds even when we work with great volumes of information. This allows to users from different company levels to pass from data tables to interactive visualizations by only a click. Then, they will be able to explore, visualize and share information without specialized support.

BI solutions offer the possibility to select needed data in view of realization of suitable analyses, generation of graphs according to different types of content and forecasting – all integrated in the specific business context. Moreover, they provide the support for daily activities: issuance of offers, contracts, personalized invoices, takeover of orders and complaints.

Implementation of a BI system is a necessity in terms of today's competitive market. If fifteen years ago, managers got along perfectly without Excel or mobile phone, these are indispensable tools for a business management nowadays. A business intelligence system is equally essential.

BI capitalizes the advantage of enterprise applications (ERP, CRM, SCM) already installed which maximize the benefits of IT investments. BI extracts valuable information from transactional data bases of the company. Important companies

which greatly invested in the creation of data warehouses can do the following step by implementing a BI system which fully accomplishes the investment efforts.

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