Free Business Intelligence – An Easy and Reliable Alternative

TÂRNĂVEANU DIANA
diana.tarnaveanu@feaa.uvt.ro
MUNTEAN I. MIHAELA
mihaela.muntean@feaa.uvt.ro
Business Information Systems Department
West University of Timişoara, Faculty of Economics and Business Administration
16, H. Pestalozzi St., 300115, Timişoara
ROMANIA

Abstract: Business Intelligence (BI) represents the ability to look into the core of a business, in order to fundament the most effective and profitable decisions. An operational BI system sustains daily activities through the following functionalities: real-time informing, secured access to information and easy to use analysis. This change is a natural response of a passing to a new organizational culture of management based on measurable objectives. An operational BI system assumes tracking down trends, problems and other factors as soon as they act, allowing employers to solve them in real time. Implementing such a system presumes the existence of an organizational culture where the employee is not longer an executor, but a decision factor. Because the well-known systems are extremely expensive, we focused on finding a free BI software with the same capabilities. We present a case of implementing a BI example using Tableau Public – a free data visualization software. We believe that the future lies in cloud BI with the same strong capabilities.

Key-Words: business intelligence, data warehouses, data analysis, decision-making

1 State of Art

Business Intelligence is a concept used in Romania often in the last 10 years. BI software is an information system that extract, consolidate, process and transform data into information and transmit them to the decisional factors within the organization, in the form of reports, analysis and performance synthetic indicators. The information support the decision processes and can extend the capabilities of the firm.

1.1 General Considerations

According to 2012 Gartner report [19], the trends to keep an eye on are: consumerization and the tablet, the infinite data center, IT consumption, context awareness, hybrid clouds, fabric data centers, IT complexity, patterns and analytics, the virtual enterprise and social networking.

It is necessary to have a business analysis comparative tool, because only optimizing performance we can survive and remain a vital competitor in a changing market, constantly taking advantage of the raisin opportunities, risking and being flexible at new multiple demands. Having as a main goal productivity and profitability, BI initiatives have some invisible advantages, such as: reduction of destructive influence of power games;

the disposal of ungrounded, subjective and supra-dimensional fervor, and decisional enthusiasm; limiting over-exposure of ego in managerial community and avoiding decisional jams. BI can provide static reports like tables/charts, visual analysis, performance management through monitoring of some synthetic performance indicators, planning/budgeting, statistical processing, dashboards, etc.

At the global level, the market of Business Intelligence has an upward trend. International Data Corporation (IDC), at the second part of last year, estimated that between 2009 and 2013 this tendency will continue [15].
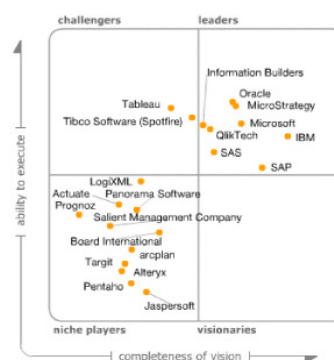

Fig. 1 – Gartner's magic quadrant for BI platforms [source: 28]

The Magic Quadrant for Business Intelligence Platforms [21] presents a global view of Gartner's opinion of the main software vendors that should be considered by organizations seeking to develop business intelligence (BI) applications – Fig. 1.

In Romania, small steps were made in this direction. From the firms that adopted Business Intelligence systems, 24% implemented it 2-3 years ago, 14% in the last 5-6 years, and 5% over 7 years. As for the vendors, business-intelligence.ro [26] conducts a study, and based on their preliminary answers, we can notice that Microsoft, SAP, IMB and Oracle are fighting for the supreme position, but we can also notice that some Open Source software tend to outgrow them – Fig. 2.
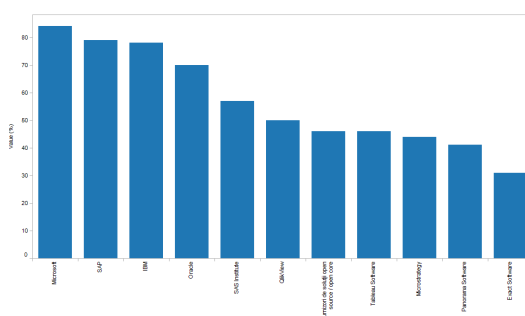

Fig. 2 – BI Vendor Awareness in Romania
[source: 26]

We consider all implementations should start with creating a BICC. The Business Intelligence Competency Center (BICC) is essential to an enterprise's BI strategy. It can effectively address critical challenges such as staffing, planning and resource acquisition [25].
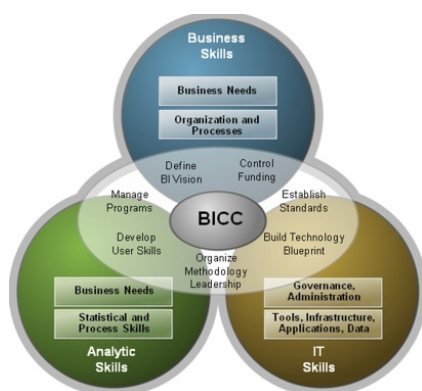

Fig. 3 – BI Competency Centre
[source: 25]

The role of BICC is to develop the overall strategic plan and priorities, define and implement the requirements and help the organization to interpret and apply the insight to make business decisions – Fig. 3. The BICC should be a cross-organizational group that encompasses people skilled in Business, IT and Analytics.

1.2 Open source BI

Today's BI architecture typically consists of a data warehouse (or one or more data marts), which consolidates data from several operational databases, and serves a variety of front-end querying, reporting, and analytic tools. The goal is to facilitate the design and implementation of optimal flows to meet business requirements.

We explored the market of BI solutions, and we found the following free or Open Source solutions:

1. **Google Chart Tools** – a perfect way to visualize data on a website. From simple line charts to complex hierarchical tree maps exposed as JavaScript classes, Google Chart Tools provides many chart types, allowing customization [38];

2. **Many Eyes**, an experiment designed by IBM Research and the IBM Cognos software group. The heart of this site is a collection of data visualizations. Many Eyes allows viewing data sets and creating, viewing and discussing visualizations. All the visualizations on Many Eyes have an attached discussion [37];

3. **Indicee** – propose a complex service that is not free after a limit. One of the most common uses of the Indicee Platform API is to provide developers with the ability to embed world class analytics into their application and provide their customers with reporting and dashboards. Indicee's cloud-based approach allows building data over time [36];

4. **Tableau Software** –creates interactive graphs, dashboards, maps and tables from virtually any data and embeds them on a website or blog in minutes. If the user decides to keep the results to himself or for the company, than he will have to choose the fully functional version. Otherwise, the results are saved and displayed on a gallery on the web [39];

5. The **Pentaho BI Project** is an ongoing effort by the Open Source community to provide organizations with best-in-class solutions for their enterprise BI needs. It encompasses the following major application areas: reporting, analysis, dashboards, data mining, BI Platform [35];

6. **Jasper Soft** – a single easy-to-use environment designed with the non-technical user in mind for delivering insight against data stored in relational, OLAP, and Big Data environments [34];
7. **Actuate BIRT** – provide a wide range of options for building rich information applications. In addition to the free open source Business Intelligence tools, Actuate has created a suite of commercial BIRT products, which adds to the open source BI industry's standard, widely adopted BIRT tools a variety of value-added products that elevate the already superior BIRT development environment to a new plateau [31];
8. **Spago BI** – an open source, complete and flexible BI suite: robust, secure, scalable, industry-grade OS BI suite with 17 analytical areas, 21 engines; unique solutions, not only usual reporting and charting tools: Geo, QbE, Dossier, KPIs, Interactive Dashboards, real-time BI [33];
9. **Palo BI** – Palo Suite combines all core applications – OLAP Server, Palo Web, Palo ETL Server and Palo for Excel – into one comprehensive and customizable Business Intelligence platform. The platform is completely based on Open Source products representing a high-end Business Intelligence solution which is available entirely free of any license fees [32];
10. **Jedox** – Jedox Suite offers capabilities for planning, reporting, analysis and dashboarding. Jedox Suite is designed to enhance the user's familiar Excel working environment with specific Business Intelligence functionalities. The Excel add-in interface combines conventional spreadsheet capabilities with complementary Jedox functions [40].

2 Developing an Open Source BI solution

It is estimated that today more than 60% of companies and governments worldwide use some form of open source software, either as a known resource or as a resource embedded in other applications, many of which are vendor supplied. Some of the most common industry applications of open source software are banking and financial BI solutions, federal government business intelligence,

education performance management and operational and executive scorecards for healthcare professionals [29].

2.1 Establishing the future measures
We decided to analyze an insurance company based on these measures:
- **M1** – analyzing the objects insured and the sum of money payed in counties, cities and zip codes;
- **M2** – analyzing the objects insured by different client types and the sum of money payed in counties and different years;
  M3 – analyzing the agents and the sum of money payed with different types of payment, depending on the object insured, on different years.

2.2 Analyzing data sources
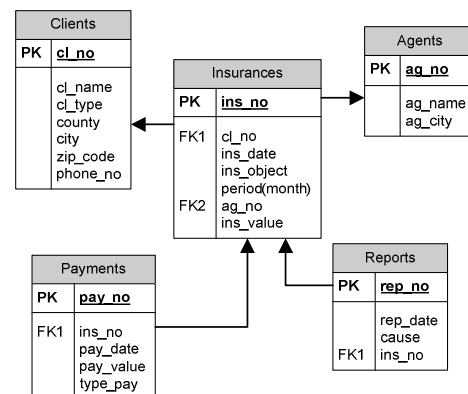We considered a database created on Microsoft Access 2007, containing data about an insurance company – Fig. 4.

Fig. 4 – Insurances Database

Clients can be private individuals companies characterized by a unique number, first name and last name/firm's name, address and phone number. They can sign different types of contracts (assets, life insurance and so on). Insurances are closed by agents characterized by a unique internal number, first name and last name. The insurance contract is characterized by an unique number, insurance date, insured object, period (in months) and insured value. Both types of clients can pay with cash, credit or check, receiving receipts. Each document contains a unique number (imprinted on the document), payment date, and the amount of money paid. When damage happens, clients receive compensations. In order to do that, an official report has to be signed. This report is characterized by a unique number, date and description of the cause that generated the damage.

2.3 Implementation aspects

With regards to the business requirements and as a result of a complex data analysis, the data model will ground the logical design of the data warehouse. Facts and dimensions, building a multidimensional approach (Fig. 5, Fig. 8 and Fig. 10) will be established. Tableau Software open source BI software was chosen for implementation (Fig. 6). Visualizations offer managers the necessary support in real-time decision-making processes (Fig. 7, Fig. 9 and Fig. 11).
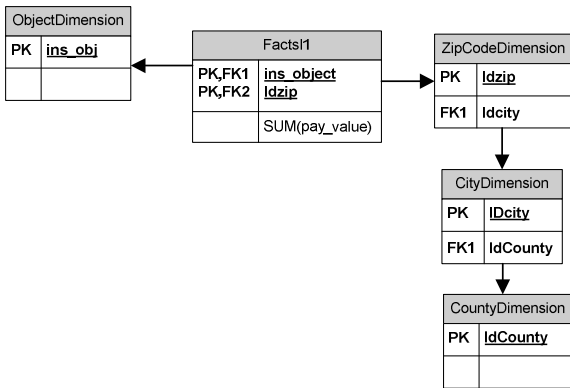

Fig. 5 – Measure M1

We used a snowflake data schema with a hierarchy – Fig. 5, in order to construct the table – Fig. 6. We selected the dimension hierarchy county with city and zip_code and the dimension ins_object (insured object), and for the measure pay_value (payed value) we selected SUM.
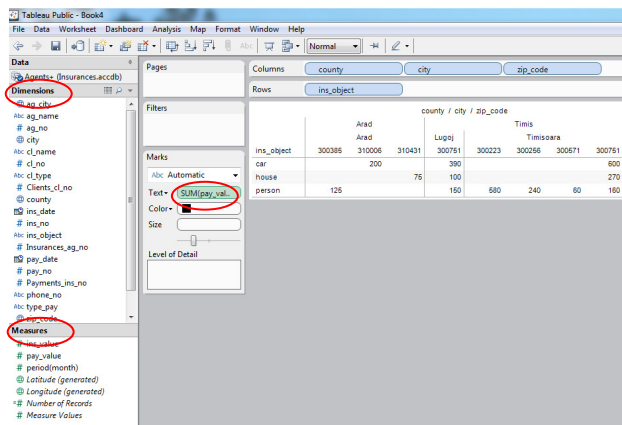

Fig. 6 – Tableau Public Dimensions and Measures

We created two sheets, one for each type of visualization, and a Dashboard to display the results in two different ways: a bar version and a geographical approach. A Tableau dashboard is a collection of several related visualizations shown on a single page, usually tied together through interactivity. Dashboards increase the analytical power of the visualization by allowing multiple perspectives on the dataset in the same location – Fig. 7.
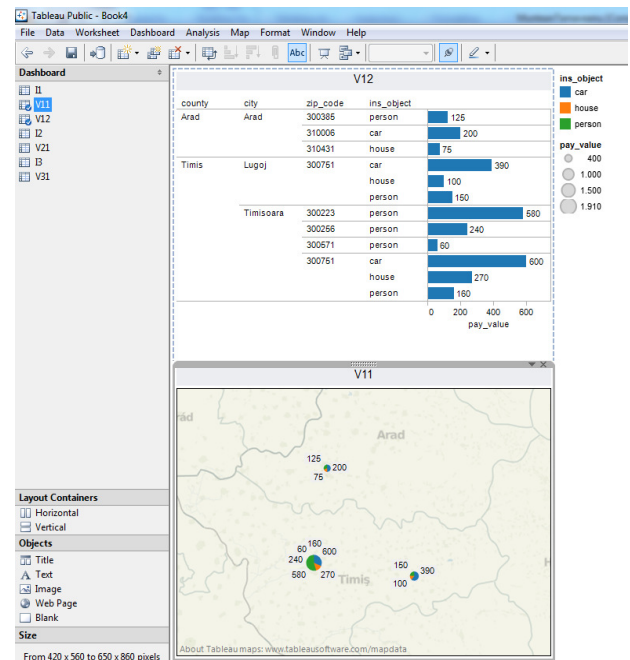

Fig. 7 – Dashboard 1 (Measure M1)

In the first visualization, we can see the sum of money payed on each county, city and zip-code. The second visualization displays the sum of money on geographical zone, displayed on a map.

For the second measure we choose a basic star scheme – Fig. 8. The dimensions were county, year from payment date, client type and insured object, and the measure sum of payed value.
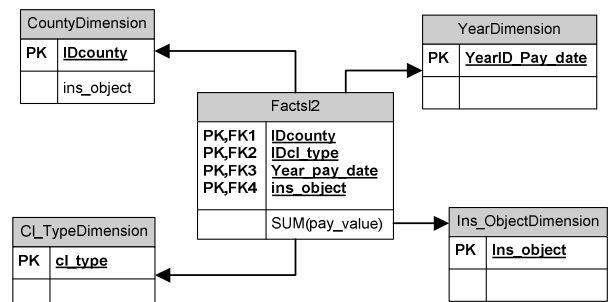

Fig. 8 – Measure M2

On a dashboard we displayed both the table and the stacked bars type of chart – Fig. 9. On the legend displayed in the right hand up corner, we can see with different colors the months of payment. On the same chart we can see the values payed for the two types of clients, on cities, and on the object insured.
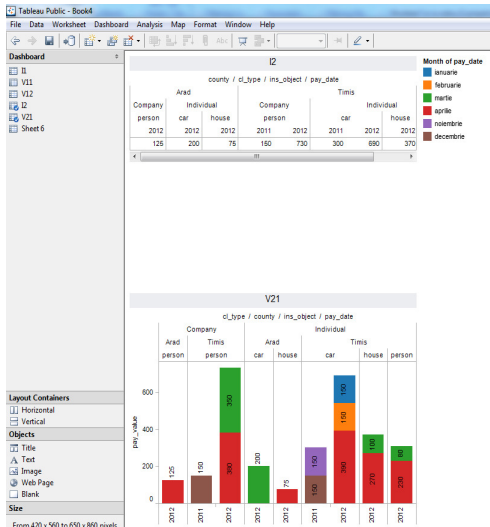
Fig. 9 – Dashboard 2(Measure M2)

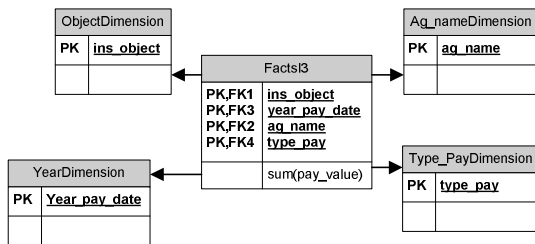For the third measure we used another star schema – Fig. 11.

Fig. 10 – Measure M3

For the last measure we chose dimensions: insured object, agent name, type of payment and year from the payment date, and the measure sum of payed money.
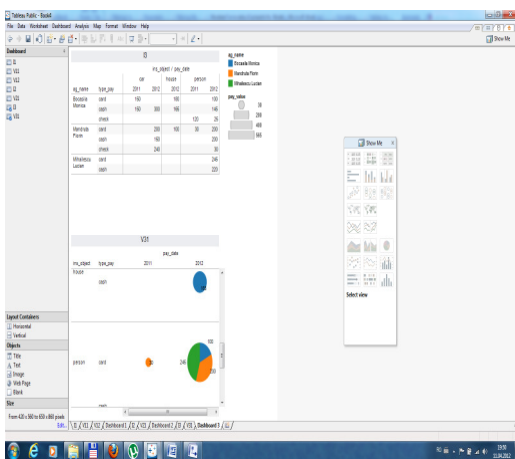

Fig. 11 – Dashboard 3 – Indicator I3

We obtain a complete analysis on each agent, based on the type of payment, object insured and date.

4 Conclusions

In our opinion, free BI is a good alternative for traditional, expensive solutions. Technologies such as Java and Flash make it possible to access, analyze and interpret data, the results being publish directly on the web, using online communities specific sharing facilities. Tableau Software is for anyone who likes to post content to the web, being a tremendous advancement for online publishers. Journalists like Scott Austin at the Wall Street Journal, Ramon Martinez at the Pan American Health Organization, bloggers like Tim Ellis at Seattle Bubble, advocates like Patrick Montjourides at UNESCO, professors like Robert Kosara at UNC Charlotte and his students, The Guardian Datablog, Data Driven Consulting and Seattle Times use an Open Source BI, obtaining interactive visualizations which provide insight into their data. Open source solutions are now becoming serious alternatives to proprietary software with ever increasing open source projects providing a wide variety of tools for data warehousing and full BI suites.

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