BUSINESS INTELLIGENCE IN EDUCATION

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Abstract: In order to steer their internal organization, companies are experiencing mountains of data need to obtain information about the processes and people within the organization, the companies' environment, and other factors that influence their business. Business Intelligence (BI) provides support for delivering this information and helps organizations achieve this focus giving the complete vision to learn from the past, monitor the present and gain an inside into the future. Nowadays, on the market there is a wide range of software rather included in the term "umbrella", products that are nothing but a combination of decision support systems, query and reporting tools, online analytical processing (OLAP) and also, forecasting and data mining systems. To discover at first hidden information that are received from a data warehouse, BI uses a variety of algorithms to establish relationships between different data and variables. The effectiveness of these tools is quite high given that have began to appear BI solutions that not only serve the economic profile organizations but also other types of organizations to which we wouldn't think, like education. In this article we propose to prove that Business Intelligence solutions can be successfully used also in education. Educational environment need this software because Business Intelligence combines data gathering, data storage, and knowledge management with analytical tools to present complex, useful and competitive information about students, results, performance and interesting correlations between different educational variables. BI solutions include the latest and most advanced technologies to support decision making and covers all information resources necessary to support decisions. They allow the models offered to make calculations and highlight the knowledge, while the final decision-maker appreciates reporting to reality and taking decision, even in education.

Keywords: business intelligence, education, performance

I. CONCEPTUAL FRAMEWORK

Even if the economic environment economic actors' coloration is very rich, purpose of all is the same: the development of their business to achieve profit maximization. Regardless of how they chose to address this goal is hit all kinds of situations. There are times when things can be provided and take action but there are moments when the hazard makes its presence felt and influence. In this situation, companies need solutions that provide relevant information about their economic activity or competition activity is becoming greater. Some of them choose to draw pocket aces using Business Intelligence (BI) solutions.

Since its arrival, BI has stirred controversy because everyone thought it was just a marketing strategy to promote concepts and programs on the market but not used by companies. Now, the question that arises is: "Implementing a BI solution is a necessity or just a trend among companies?"

To give a plausible answer we must look carefully on some values: according to analysis of famous company Gartner, the level of income on 2010 from the sale of business intelligence totaled to 10.5 million [11]. The number is relevant: billions of dollars invested by companies worldwide to acquire BI confirms the vital importance of this software is the life of an organization today.

Officially, the Business Intelligence term appears first in the IBM Journal on October 1958, when Hans Peter Luhn defines in his article "A Business Intelligence System" term to represent an automatic system used to disseminate information in various sectors of industrial organizations, scientific or government [6].

However, most work that addresses this notion claim that the term is due Dresner analyst from famous company Garter Group that would be mentioned for the first time in 1989. There is some truth to this assumption leaving: Dresner's merit of is to have popularized the notion of BI, defining it as an "umbrella concept that describes a set of concepts and methods to improve business decisions by assist systems use decisions based on facts "[7].

On the literature, BI comprised of two approaches, the controversial concept produces the following controversy: BI is a management tool or economic espionage? [12].

BI approach as economic espionage [3], [5] was established because companies need to better understand the competitive environment: a successful company is a company based on the analysis of potential competitors, because knowing their strategies may be one step ahead. A small similarity between BI and espionage exist but the differences between the two are quite pronounced: economic espionage is an illegal way to get a temporary advantage over the competition, while BI is a legitimate organizational activity, which occurs to some degree or any other company [5]. BI is the monitoring of external business environment to gather relevant information for decision making by the company.

In terms of management, BI is the "transposition of data organization information environment supporting optimal decision. Put simply, BI must allow strategic thinking and action within the organization. BI make available information needed at all levels of the organization, from senior management, to the employee on the first level "[8]. Can we conclude that these tools support managers to take tactical decisions such as establishing or changing strategies of the organization to improve the financial status of the organization and to gain competitive advantages. In other words, BI provides an overview of the company situation management at a certain moment as well as medium term projections, allowing a correct evaluation of results in real time and competent decisions.

II. BUSINESS INTELLIGENCE IN ORGANISATIONS

Times in which executives and managers were helping by stacks of monthly reports to manage and plan their business within the organization are long gone. Today companies use software applications providing sophisticated analysis. BI is currently the most popular tool that promises to mold these requirements so that the desired results finally come true.

Gradually, BI has become a popular term in the terminology of information systems. Currently, on the market exist a wide range of software products included in the term "umbrella" [10] products that are nothing but a combination of decision support systems, queries and reporting tools, online analytical processing (OLAP), and also, forecasting and data mining systems. To discover hidden information at first from a data warehouse, BI uses a variety of algorithms to find relationships between different data and variables.

In BI there are a variety of technologies designed to assist potential users of different types of organization, depending on needs, budget, size, activity and importance of data a company, which is why we find many of the BI architecture. A comprehensive BI solution contains at least the following basic components (Eubanks, 2008):

• Data Warehouse (data warehouse) represents a collection of database that integrates all data in the organization, regardless of its source, structure and their type;

• Data Mining, an advanced tool that takes the data collected and processed data warehouse, which is in the form of correlations, trends and significant models for the organization undetectable in another manner;

• OLAP (OnLine Analytical Processing) represents a tool that allows user to access a large variety of data in a multidimensional manner; these data come either directly from Data Warehouse or as a result of Data Mining;

• Balanced scorecard (BSC) and / or Key Performance Indicators (KPY) - graphical tools linking performance indicators goals, objectives and strategies of the organization through the results of the processing of instruments presented above.

It is not mandatory for a BI solution to include all of them but would be preferable. The simplest BI tool found in practice but also framed in the literature is classical Excel from Microsoft.

So, concrete, what is BI? Business Intelligence tools can be found in the following categories [1]:

• reporting systems
• query and analysis tools
• performance management tools
• analytical applications (Business Analytics)

Currently, on the world there are over 100 BI solutions, each organization can choose a solution that think fits him according to the business, organization size, market bound volume of data and finance facing the organization but also will to invest in a decision support tool. World's leading BI market is SAP, Oracle, Microsoft, IBM SAS Microstrategy, Actuate, Panorama Software and TIBCO Software.

III. EDUCATION AND BUSINESS INTELLIGENCE?

Most people, when hearing about term Business Intelligence automatically make correlations with the economy: sales, purchases, product promotions etc. It is natural but BI can cover any area, even like education, pharmaceutical industry, sport or police.

On first glance we would say it's easier to manage a school or university and that their needs are simple and clear but on closer analysis we realize that the educational environment needs analysis and evaluation at all levels including students, parents, teachers, administrators, alumni, and state institutions, each of whom have their own requirements and each with very important place in university functioning. Even the institutions need to manage their budget, continuously have an update of the fees and other financial information that is synchronized with government regulations.

For educational institutions, has become essential to have automated data monitoring and report generating functionality incorporated into existing systems to manage huge volumes of data. These systems require a solution capable of handling reporting use among multiple users, large amounts of data and data security level to be highly.

To maintain their prestige, but also to know with accuracy which is the quality of education offered, universities need an application that indicate constantly Key Performance Indicators (KPI) that are used to measure results and performance, but then to emit alerts to notify users when a preset threshold was not reached or was exceeded, as appropriate. Most times, but not required, results are displayed in graphical form as the dashboards and scorecards.

If we look on a financial perspective, on education environment must be evaluated and monitored financial and operational health of the institution, too. Various university-related expenses of utilities, supplies, payroll, corporate events and courses, but also requires tax revenues from managed and reported properly and on addition must comply with government regulations.

Looking from another point of view, BI needs the educational environment, too. According to a survey conducted by Herschel, 41% of IT university profile students that were interviewed had no idea what is BI, starting from this, he identifies a problem that deserves to be considered "BI field is relatively new and most students entering the university or [2] One reason which for BI is important on the global labor market is because is created new jobs related to this software. It is no wonder, considering the fact that internationally there are over 100 BI tools. The most representative and specific jobs on BI that we identified are: BI solution integration specialists and architects, BI analysts, developers and testers, Data Warehouse Specialists, Data mining specialist, etc. As response, universities have taken steps; proof is that started being master degree in Business Intelligence, including Romania, there are on ASE Bucureşti and West University of Timişoara.

IV. BI SOLUTIONS FOR EDUCATION

Every company has its own identity defined by the business, market segment bound, rules (business rules), etc. It is entirely justified and that the organization has its own requirements regarding data, information to be gathered and technologies that focus on data processing activities to achieve more desirable results. Education does not deviate from this principle.

I analyzed two BI solutions dedicated to education and tried to see which would be most advantageous in terms of user. In Table 1 I summarized the conclusions that I reached from position of simple user / tester of both solutions chosen.

Table no. 1 A comparative analysis between BI solutions implementable on Education

BI Solution Obs.	InetSoft	InformationBuilders
Advantages	- ease of use: data can be collected and analyzed in Excel, not necessarily advanced database, loaded with a simple import and filtering based on selections made display results in graphical form, easily understandable.	- comprehensive treatment of environmental issues education: well captures both aspects related to school performance and efficiency of the entire educational process by monitoring satisfaction, labor market insertion, etc.
Disadvantages	- simplicity: it deals only performance results, there is nothing related to management fees - the financial module is not directly related to the education to achieve a correlation between fees and students;	- does not store information about the competition anywhere, in this case other universities and high schools.

The criteria that I used to choose the two solutions were demo versions available for testing, positioning the top BI solutions implemented in universities and reviews on them in the literature. I was pleasantly surprised to be able to test the two solutions directly on their site without having to install software on your computer.

In conclusion, I think is a good start but in my opinion BI software development companies still have to treat specific cases only education. For example, none of the solutions I have not found anything about funding projects which I find a great escape considering that often funds from funding for universities have a significant contribution.

V. CONCLUSIONS

Any activity within an institution regardless of activity can be initiated, conducted and controlled only based on information. How its management of information resources is essential to a modern and efficient. Given that the organizations we usually deal with large amounts of data to be

stored and kept, then managed and processed, have sought effective solutions to optimize these processes.

When choosing a software solution that addresses the educational institutions should take into account challenges they face - from managing costs and revenues, increase staff performance, improve student achievement, which is why I believe that BI solutions would be most appropriate.

In the end, Business Intelligence is the ability of organization to convert data that it has into precise information that is always on hand and could deliver a competitive advantage, bringing an extra value to the organization. The "open minded" organizations have understood this, proof that started to appear BI solutions serving not only organizations with economic profile but also other types of profiles that we didn't think like education.

Acknowledgements

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