BUSINESS INTELLIGENCE IN MICROSOFT SQL SERVER 2008 APPLICATION

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ABSTRACT  
The objective of this paper is, on one hand, the brief presentation of the significance of the business intelligence term in big and medium sized enterprises, and, on the other hand, the capitalization and implementation of business intelligence with the aid of the Microsoft platform. With the help of the presented standards, a real business intelligence model comes to life and based on this model the functions of the Microsoft SQL Server 2008 product are highlighted. This paper shows how enterprises make better and faster decisions in what concerns the clients, the partners and the operations through the transformation of data into valuable business information. In the end, it is described the way in which are brought together – with the aid of business intelligence information - people and technology, in order to obtain successful business strategies.

KEYWORDS: Business intelligence solutions, business processes, data warehouse, Microsoft SQL Server 2008, Data Mining.

1. Introduction  
A plurality of factors come together to produce an explosion of memory information. Activated through new types of information, like the digitalization of images, movies and sensor information, the quantity of digital information within an organization has increased a lot.

The need to obey rules and the rapid globalization demand that all the information has to be stored in safe environments and it has to be available at all times. At the same time, the costs of hard-disks have reduced dramatically thereby enterprises can store more data. The users have to search rapidly through large volumes of data to find relevant information. More than that, the users wish to control that information on any device and with the programs that they use daily, like the ones in the Microsoft Office package.

The administration of this explosion of data and the growing expectations of the users create numerous challenges for the enterprise. In this way, employees can penetrate in the organization in an applicable manner so that they can oversee, analyze and plan the situation of the company; this leads to stimulation, responsibility and profound knowledge which generate actions in the entire organization.

In an increasingly competitive market, organizations admit that they can be successful only through a proactive identification of the market trend and of the chances and through a fast reaction in what concerns the new requirements of the clients (Kemper, Mehanna & Unger, 2004).
2. The Microsoft Vision Data Platform

The Microsoft Vision platform satisfies these requirements by offering solutions which can be used by organizations to store and administrate many types of data, including XML, E-mail, time/calendar, folders, documents, geodata during an integral search, a consultation, a data analysis, reporting, data integration and robust synchronization. The users can access information from creation to archiving on any device, from a server up to a desktop or a mobile device. Microsoft ® SQL Server ® 2008 provides all these requirements as it can be seen below (Microsoft Corporation, 2010a), (Microsoft Corporation, 2010b), (Schultz, Knuth, & Pruß, 2008).

Figure no. 1 Microsoft vision

SQL Server 2008 makes business intelligence, for everybody, through a profound integration with Microsoft Office and provides the suitable tool, for the right user at the right price (Schultz, Knuth, & Pruß, 2008). The employees from all levels of an organization can influence the performance of the company, by working with tools which are user friendly and efficient.

The integration with the help of Microsoft Office 2007 makes it easier for users to see the business result in a way in that is comfortable and common for them. That is why employees have to ensure the activity in the company and the outputs with the most efficient use of the available resources and to make efficient decisions within the enterprise. In order to face these challenges, the employees need to have a look deep down in the company, and this look has to generate actions so that they can make informed decisions, thus contributing to the success of the company.

Organizations would like to create this look in daily activities of the company in such a way that all the employees can be expressly and implicitly involved. Microsoft provides a complete business intelligence, which relies on a scalable data platform for the integration of data, Data Warehousing, analysis and reporting, including efficient and intuitive tools which can be used by users to access data and to analyze business information (Computerwoche 2002), (Keller, 2005). In the center of the BI Microsoft offer is Microsoft SQL Server 2008, a complete data platform, which eases the following operations:

- Standardization and access for all the data in the entire enterprise;
• Preparation and administration of pretentious BI solutions;
• Eases the access of the business intelligence solution to all employees.

The specific technologies of the SQL Server 2008, (Microsoft Corporation, 2010b), which form the basis for this efficient BI offer are described in the following table.

### Table no. 1

<table>
<thead>
<tr>
<th>Components</th>
<th>Description</th>
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<tbody>
<tr>
<td>SQL Server database mode</td>
<td>A data storage service of high performance, scalable for enormous quantities of data – this makes it the ideal choice for the consolidation of the business data from the entire enterprise into a central deposit of data for analysis and reporting</td>
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<tr>
<td>SQL Server Integration Service</td>
<td>A comprehensive platform for the extraction, transformation and uploading of the (ETL) procedures, which eases the occupation and synchronization of the warehouse data with data from different data sources which can be used by the business applications in the entire enterprise</td>
</tr>
<tr>
<td>SQL Server Analysis Services</td>
<td>They offer a system of stimulation of the analysis for the Online Analytical Processing (OLAP) solutions, and also the aggregation measurement through many key performance dimensions and indicators (KPIs) and Data Mining solutions, special algorithms, which recognize patterns, trends and ease association in business data</td>
</tr>
<tr>
<td>SQL Server Reporting Services</td>
<td>A comprehensive solution of reporting which is easy to build and publish and the detailed business reports can be shared both inside and outside the enterprise</td>
</tr>
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</table>

The administration tools of the SQL Servers 2008, (Microsoft Corporation, 2010a) are briefly described in the following section:

- **SQL Computer Manager** – it eases the administration of the following servers: SQL, SQL Agent, Report Server and Analysis Server SQL;
- **Server Management Studio** – with the aid of the Explorer integrated object, the banks of data with tables, views and triggers can be built and processed. This tool accepts the registered server, Analyses Server, Report Server and Integration Server;
- **Business Intelligence Development Studio** – this tool is a plug-in from Visual Studio 2008 and serves for preparation of projects and the use of Integration Services, Analysis Services and Reporting Services. Here are defined the OLAP models, the Key Performance indicators and Data Mining models with the help of the cubes.

### 3. The Database and the Data Warehouse

A database is a system which organizes big quantities of data without any problem, it stores the data and it consults the data. The database consists of an organized collection of data for one or multiple purposes, typically in a digital form. A possibility of classification of databases contains the type of content. The digital databases are administered with the databases management systems which store the content of the database and ease the construction, the care as well as the search and another type of access (Kurz, 1999).

A data warehouse is a place where the data for archiving, analysis and insurance are stored. Normally, the data warehouse is formed either by one computer either by more computers (servers) (Kurz, 1999).

The data can consist of raw data or of formatted data. The data can appear in various forms, like the turnover of the organization, salaries, operative data, data...
centralizations, including reports, data copies, personal data, data regarding stocks, external data which serve simulations and analysis. Beside the storage activity for large quantities of data, a data warehouse needs to have systems which should simplify the access to the data for the everyday use.

A data warehouse plays an important role in Decision Support System. DSS is a technique used by organizations to present actions, trends or relations which help organizations to make efficient decisions or to prepare efficient strategies in order to fulfill the objectives of the enterprise.

In order to present BI models, we chose the fictional enterprise ‘Adventure Sports’ which sells sportswear. First of all, a database is required. To demonstrate the BI models, the database is built based on the requirements with sample data which were partially imported from the data warehouse “Adventure Works DW” and “Northwind”. The database was built in a realistic way and it could look like a medium-sized enterprise. The construction of the database takes place in SQL Server Management Studio (Figure no. 2).

Entity-Relationship-Model (or the ER model) is a graphic representation of the logical relationships of the entities (or objects) for the construction of a database (Kurz, 1999). In the ER modeling, the structure for a database is represented as a diagram, a so-called entity relationship diagram (or ER diagram). The entities are represented by points, polygons, circles or ovals. The relationships are portrayed by a line between dots, polygons, circles or ovals. Each ER diagram has a corresponding relational table and each relational table has a corresponding ER diagram.

The ER diagram is a priceless aid for engineers in the development, optimization and debugging of database programs. In a logical sense, the units are the equivalent of the grammatical nouns, like employees, departments, products or networks. An enterprise can be defined through its characteristics as attributes. The relationships are the equivalent of the verbs and conjunctions, like the document of acquisition, the document of repair, a member of a group being retrieved as a custodian of a department. A relationship can be defined through the number of associated organizations.

This database was especially built as a demonstration model and comprises only the tables which are necessary for this BI solution.

In Figure no. 3, it is presented the entity-relationship model for the database of the “Adventure Sports” company.
In the case of this model, the database also serves as a data warehouse. This situation often appears in practice as well because in small and medium-sized organizations, the capacity of access of the data doesn’t suffer from this. Here, it is about an artificial and thus homogenous data source. The calculation and the storage of KPIs take place through the tables which serve as a component of Data Warehouse (Microsoft Corporation, 2010b). The tables have the same structure and thus, they ease the tracking of the development of the values through the storage of the historical data.

4. Analysis Services

The Key Performance indicators, (Microsoft Corporation, 2010b) of the Business Score Card of the “Adventure Sports” company are represented with the help of Analysis Services. Analysis Services is found in Business Intelligence Development Studio as part of Visual Studio 2008. The first thing that needs to be done is to create a bond between this applications to the database so that later the data can be defined as cubes. With the aid of the cubes KPIs can be built. Microsoft Analysis Services is a collection of Online Analytical Processing (OLAP) and services of Data Mining delivered along with Microsoft SQL Server, (Microsoft Corporation, 2010b). “Data Warehouse” and “OLAP” are often used as synonyms to describe two different elements of Decision Support system.

The progress in data storage, data transfer, database management tools and computerization of the business processes ease the constant technological development in data manipulation and data analysis. Analysis Services offer management staff the possibility to research the intermediary memories of the collected and current data, to define business trends and the models and to extract data in order to make delicate decisions regarding business.

Figure no. 3 Entity-Relationship model
Analysis Services and its environment is adequately configured and it is used from development up to production. An administrator of Analysis Services which manages data banks will also be capable to operate and take care of Analysis Services within the pale of an IT and database infrastructure.

The modification of access, operative aspects, problem fixing, automation and tracking techniques have to be understood and used to test the changes of an existing structure of medium and database. The capacity, problem fixing and the assurance of the availability of Analysis Services-Cubes have to be actively anticipated.

5. Conclusions
A BI solution helps the user within an organization to reach the following critical targets for the enterprise: reaching or exceeding the profit figures; maximizing profitability by identifying the most profitable programs; the pursuit of possibilities to reduce costs in the entire organization; the avoidance of the overuse of the IT resources, business teams becoming much more confident in their own strengths; faster and more efficient activation of the IT domain for the internal business clients and the preparation of a 360 degrees summary oriented towards the clients.

A BI solution makes it easier for business teams to understand the interrelation of data in the entire organization and synthesis, in comprehensive analyses, of results, trends and forecast results, to understand the implications of this approach, in depth, concerning the objectives of the organization. The BI users understand what happened, what happens and what measures have to be enforced in the future.

REFERENCES