



4th World Conference on Business, Economics and Management, WCBEM

## Possibility of improving efficiency within business intelligence systems in companies

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### Abstract

Management and decision-making in modern companies currently significantly affect information collected and distributed to managers through a variety of information and communication technology (ICT). The amount of information is growing due to modern technologies, their constant development and improvement in companies. This large amount of information companies has to be processed and therefore complex information systems such as Business Intelligence (BI) system are used more often. These systems are designed to support deciding of leading workers in the company. They are very difficult and expensive with regard to information infrastructure, technical equipment and staff of the company. To ensure efficient use of these expensive systems it is essential to provide constant mapping and implementing the new trends in the development and use of the systems. This paper describes the possibility of improving efficiency within business intelligence systems in companies.

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Peer-review under responsibility of Academic World Research and Education Center

*Keywords:* Business Intelligence, Big Data, benefits, management, decision-making, information system, SAP, efficiency, technologies, mobile devices, integration, implementation.

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### 1. Introduction

Processes in the management, decision-making in modern factories are constantly depending on the available and relevant information. To obtain relevant information companies often use complex information systems Business Intelligence. This solution enables companies to analyze the generated amount of available data that are available to

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managers and analysts in particular the structure and form. The outputs of the analysis of these data are reports with relevant information value for managers, which also serve as inputs into decision-making and management processes of the company. The continuous development of information and communication technology across all industries in the world, caused by the emergence of new trends and possibilities for improving the effectiveness of Business Intelligence solutions in the form of various processes, models, applications, integration etc. Because of the complexity of Business Intelligence systems and their use in the company in the future, it is therefore appropriate to seek solutions for the development of such systems in the form of new software solutions, integration of new technologies and the like. In this way, companies can ultimately achieve overall cost reductions, elimination of downtime, gain competitive advantage, increase the skills of employees, to discover new business opportunities and many other advantages.

## 2. Business Intelligence

Business Intelligence systems can be defined as systems that provide collection, storage and updating structured data from various sources (Negash, 2004). The system allows the managers to work with dynamically changing data, analyze them and understand what ultimately leads to acceleration of obtaining relevant information and its effective use in the processes of governance and decision-making in the company (Den Hamer, 2005, Nofal et al., 2013). Business Intelligence can also be understood as a process comprising a systematic series of actions defined on the basis of the specific information needs of managers, in order to achieve competitive advantage (Pirttimaki, 2007). Tyson (1986) defines as a Business Intelligence system focused on the collection, processing and presentation of data about customers, competitors, technology, markets, products and environments.

Business Intelligence solutions are currently used mainly by large and medium-sized companies. These businesses generate the amount of structured data from which acquire, through various methods and analyzes the necessary information to support business process management. The data are generated in the company of the most common operating systems and are stored in a certain database structure, ready for processing. The complexity of Business Intelligence solutions, mainly based on the availability of a variety of automated and analytical tools and functions necessary for data processing. These tools are the most common: ETL, OLAP, Data Mining, Reporting, and the like. (Bourman, Dogen, 2009; Jenco, 2011; Novotny et al, 2005).

Business Intelligence systems are a particular application in small and medium-sized companies that generate large amounts of data. These companies are Business Intelligence used especially in terms of automation of routine processes (finance, production etc.). Under the generated data in the present processes can be performed with a time resolution of the analysis. In this way, we can predict the emergence of a phenomenon and make decisions to minimize its impact on businesses. (Harmanova, 2013)

For the central role of Business Intelligence solutions we consider decision support, using specific tools and data analysis obtained by distributing relevant information management company. Business Intelligence systems can be applied in virtually all business processes in business practice.

In the sphere of large companies on the Slovak market, applies the tools and techniques of Business Intelligence solutions also ZSSK, Inc. Supplier of business intelligence solutions for ZSSK SAP Slovakia. The system BI modules are current SAP ERP system, specifically to the modules FI (Financial Accounting) and CO (Controlling). The basic structure of a database system consists of a data warehouse SAP BW (Business Warehouse). Individual modules of the system integrate SAP BO (Business Object), which serves as the presentation layer of the data warehouse. Thanks to the Business Intelligence company has an overview of all the data in the data warehouse. The data in the data warehouse can then analyze the sales force through OLAP technology and distribute the results of analyzes in the form of reports to other users of the system for processing, or managers for decision-making purposes (ZSSK's internal documents).

Currently, the BI system in ZSSK is mainly used for the production and processing of standard reports available from structured data. Therefore, can be the potential of a business intelligence system not used in every way. (ZSSK's internal documents; Koman, Siantova, 2015).

Business Intelligence solutions are costly for companies, especially because of the high demands on ICT security. We consider the main cause for the implementation of these solutions, especially in large companies that have sufficient resources and the necessary ICT infrastructure. In the event that the company wants to use business

intelligence solutions, it is necessary in order to understand whether the actual needs and effective use. Another important factor in the implementation of the system is the continuous development of ICT, which means that the company will have to invest for the future costs are to update itself BI solutions, but also the entire ICT structure. If not, is the implementation of Business Intelligence for the company in terms of the future of inefficient investment.

### 3. Options for improving the efficiency of business intelligence in companies

For the purpose of continuous improvement of the efficiency of business intelligence is necessary that this has been in business regularly updated and integrated with trendy data analysis approaches. BI improves efficiency can thus be achieved by:

- providing software support embedded system
- the integration of mobile devices,
- the integration of the technology for the processing of various data

#### 3.1. Software security support

In the development of hardware and software, gradually creating new software approaches to organizing and presenting data. These new software solutions are a prerequisite for improving the effectiveness of BI, mainly thanks to new possibilities of looking at the data, graphical reports, ease of handling and the like.

As an example of software solutions for Business Intelligence systems based on SAP platform, include the SAP application Lumira. The application is characterized by a particular rate of generation of graphical reports from multiple data sources. Data can be recorded to the application from Microsoft Excel program, or directly from relational databases. It is possible to create different user applications intuitive and graphical reports based on OLAP analysis with the point-and-click visualizations in the so-called. drag-and-drop interface, for example, see Fig 1.

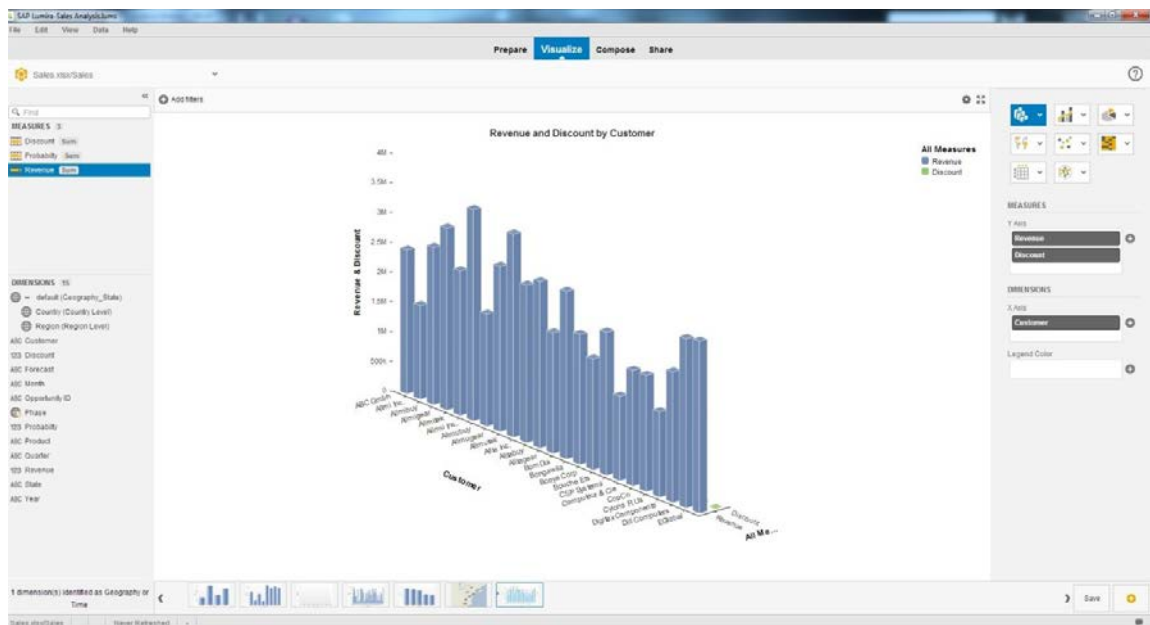


Fig. 1. Graphical summary of the SAP Lumira based OLAP analysis

Additional advantages of the software solution can also be simple use and input attributes analysis, i.e. user does not have knowledge of programming languages, data processing offline, links to mobile devices, the possibility of publishing the results of the analyzes to SAP Lumira Cloud-in and many others.

Implementation of new software solutions to the Business Intelligence can increase work performance of employees, improve the availability of generated reports for decision-making purposes, and not least to enhance the quality of decision-making executives available through a particularly understandable graphical reports.

### 3.2. The integration of mobile devices

Because of technological advances in mobile hardware and software can now mobile devices like tablets, smartphone and other application find use within business processes. Use of mobile devices is a constantly growing trend, as evidenced by their sales, which increased in 2012 compared to 2011 by almost 40%. Google's Android platform uses 72% of the mobile market and an additional 13.9% use the Apple iOS platform (Surveys - Results from surveys about the Slovak IT market).

From the foregoing, the integration of business intelligence to mobile devices, in terms of improving the efficiency of the system is important for the future.

Integration of BI to mobile devices allows the managers to access data and reports venture outside office through facilities that are always available. In this way it is also possible to encourage the emergence of a new 'information-communication channel between enterprise managers and analysts at all times. Via mobile devices and applications necessary it is also possible to create dashboard-y shared the BI system, in terms of monitoring business performance. For example, see Fig 2.

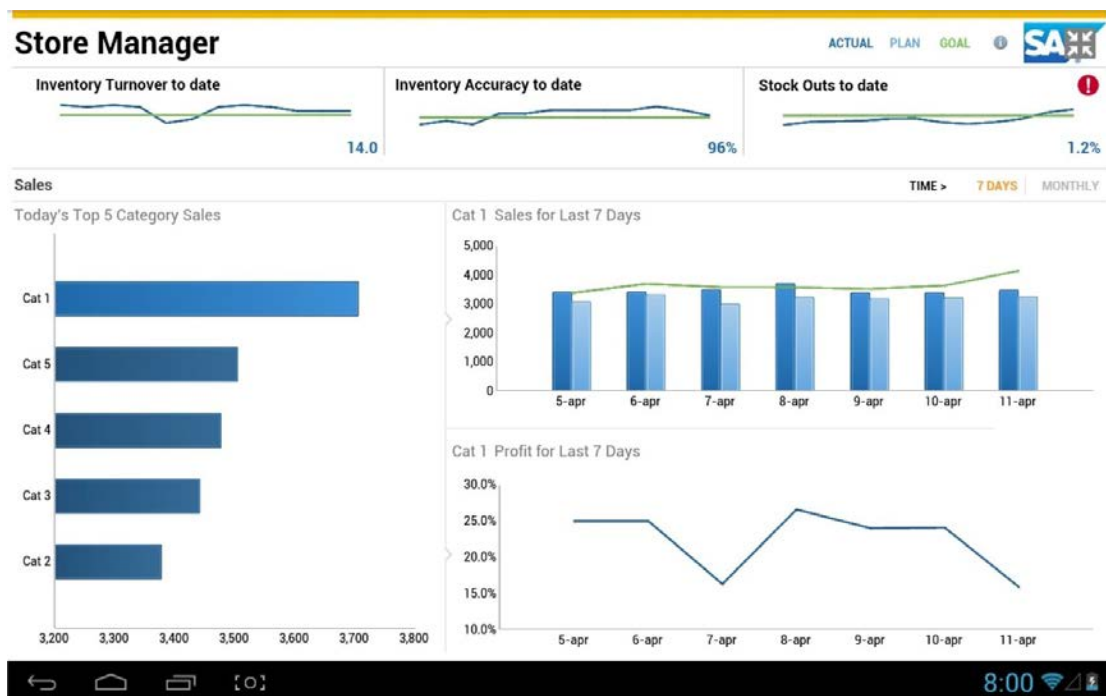


Fig. 2. Working area BI system (SAP) for the Android platform

In mobile applications, users can use for analysis of similar graphics as the BI system, i.e. create a clear graphical reports, with the possibility of changes in the parameters and source data in real time.

### 3.3. Integration of technologies for the processing of various data

The rapid development of information and communication technologies, which has been recorded in recent years, has caused an increase in the amounts of data in companies annually by 40-50%. For this amount of data can nowadays enterprises, only one quarter. It is expected that by 2020, the volume of data zeta bytes 35 (Big Data Insights and Opportunities). By analyzing large amounts of data, it is possible to obtain information that is important for the company and provide the necessary basis for improving the decision-making process managers. In terms of effective use of the amount of data, today there are technologies for large amounts of data - Big Data (BD). Precisely because of extracting information from unstructured and semi-structured data, it is appropriate to integrate BI solution in dealing with Big Data. For example, see Fig third

Big Data represent data that are too big, too fast and too difficult for the processing of existing instruments. Too much means that companies must constantly deal with petabytes of data derived from reports, transaction systems, sensors and the like. Too fast, puts forward an inquiry stock very fast data processing, for example detection of fraud at the point of sale, or detection of ads to be provided to the user on the website. Too difficult, it is also the processing of data to the creation of some specific analysis can easily not to provide existing instruments (Madden, 2012).

There are plenty of providers dealing with services related to the integration of BI and BD. Individual integration solutions differ primarily in the options data processing or in database structures necessary for the implementation of real-time analysis and so on.

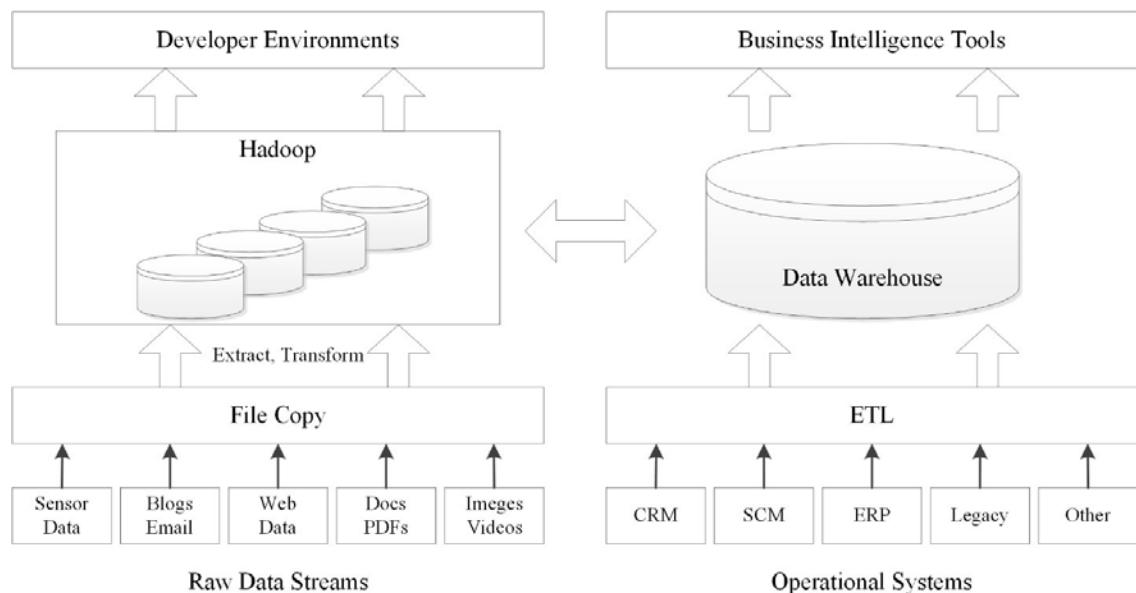


Fig. 3. Integration of BI and BD by IBM

Big Data technology can be used in almost all areas and business sectors. The use of Big Data tools combined with business intelligence solutions can bring various benefits to enterprises like:

- gain a competitive advantage,
- cost savings.
- optimization of business processes,
- the predicted purchasing behaviour of consumers,
- fraud detection,
- better target marketing campaigns

- accurate understanding of the needs and requirements of our customers,
- offer specific products and services to specific customers;
- analyzing the phenomenon in real time to the needs of flexible response to changes in conditions, etc.

#### 4. Conclusion

Business Intelligence systems have great potential for processing and analyzing the amount of structured data generated by the enterprise from different data sources. From these data it is possible to obtain various important information, knowledge, and even uncover competitive advantage. These issues raise the need to continually improve the effectiveness of the system.

Defined options to improve the efficiency of business intelligence were established in relation to the new trends in processing, analyzing and presenting data. In relation to the processing of data, are at the forefront of technology (Big Data), allowing also handle unstructured and semi-structured data. These data represent the majority of generated data at present and may contain important information for management and decision-making venture. Therefore, it is appropriate to consider the integration of Big Data Business Intelligence solutions.

#### Acknowledgements

This article is the outcome of the project KEGA 035ZU-4/2013 (Master degree study program: Operations Management and Logistics).

This paper is supported by the following project: University Science Park of the University of Zilina (ITMS: 26220220184) supported by the Research & Development Operational Program funded by the European Regional Development Fund.

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