



Business Intelligence as a Future Analysis And Interpretation Of Data In Real Time

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ABSTRACT

Contemporary organizations rely on knowledge and intelligence to create personalized products, services and virtual, dynamic structures that meet market and customer needs. The article presents the specificity of Business Intelligence systems in the creation and management of knowledge in the organization.

Keywords: Business Intelligence, Data, Information

1. INTRODUCTION

Organizational changes and their associated difficulties in managing efficiently, engaging employees in effective action for the organization mean businesses are constantly looking for effective tools to help them efficiently manage and monitor the company's data and their flow in real time. One such tool is an application generator based on BPMN models integrated with Business Intelligence - Qlik Sense. The set of tools helps in many aspects of a company's operation, but it has a number of advantages, but its formation requires intentional action on different levels.

Business results are the result of the decisions and resources that an organization uses in response to market requirements. The implementation of the organization's activities largely derives from the way the management process is carried out. The management process is conditional on a management system. In this paper, the management system is defined as the whole: values and objectives, regulations and structures, management methods and practices, and the resulting mechanisms of adaptation of relations between them. On the other hand, it can be considered as a tool for implementing process management in the organization. To decisions managers could directly and correctly translate into effects tool, the management system must have features allowing its proper operation. One of the features of the management system must

be efficient so that very often is identified in the teachings of management efficiency.

Organizations are increasingly adopting a business process management system, which primarily allows for rapid collection, processing and transfer of data in real time to optimize their operations.

The article presents a graphic illustration of the data used to monitor real-time data in the Business Intelligence tool - Qlik Sense after integration with the Aurea BPM system in which data is stored.

Interest in business modelling, review of relevant literature has made it easier to understand and observe many of the changes taking place in contemporary approaches to presenting phenomena with a model, and to draw relevant conclusions.

Key participatory observation and the ability to participate in a project that uses business process modelling contributed to the deepening of knowledge and expertise in the field. The paper uses deductive reasoning based on literary analysis. The reflections in the work were based on the current literature of the subject.

2. DATA, INFORMATION AND KNOWLEDGE IN THE ORGANIZATION

Data, information, knowledge, wisdom are basic concepts that need to be distinguished from one another and not used interchangeably. Because it is necessary to distinguish these concepts from each other, at the beginning of this chapter they have been characterized in detail.

The notion of knowledge presented in various research perspectives can be found in many positions in literature. It is difficult to define and measure. The notion of knowledge is not given a clear interpretation, and it is unlikely to be a single definition to satisfy all the scientists. Knowledge is invisible, it cannot be codified [1].

A. K. Koźminski include knowledge to soft resources of the company, we believe that this is a resource produced from the social fabric and the social relationship with the environment. Soft resource that is classified as knowledge is unpredictable and cannot be controlled by anyone. [2]

In the literature of the subject you will find many definitions of knowledge that are perceived as an enterprise resource - they are presented below.

Armstrong defines knowledge as "information submitted to productive use that is individual and often difficult to grasp and may not be elusive" [3].

Ulrich D., in his definition, presents what enterprise knowledge is: "Knowledge has become a direct competitive advantage for companies offering ideas and relationships" [4].

The key, however, for our deliberations was the definition presented by G. Probst, S. Raub, K. Romhardt: "Knowledge is the whole message and skill used by individuals to solve problems. It includes theoretical, practical and general principles and detailed instructions. The basis of knowledge is information and data. However, the basic difference between them and knowledge is that the latter is always associated with a particular person. It is the work of individuals and represents their beliefs about causal relationships"[5].

Fundamental, indivisible components of knowledge are data. Data is most often facts, numbers, descriptions or signs of results and observations. Data taken out of context do not have intrinsic meaning and meaning, because they are not related to time and space. Data can be saved on media with appropriate equipment [6].

Selected, compiled, compared, grouped, linked and ordered logically and logically for their use in decision making, data subjected to appropriate evaluation based on specific criteria, are becoming useful and gain new, higher quality and become informative. The word information comes from the Latin informare, which means to form. Therefore, in every organization there are decision makers who observe the data and the logical and substantive relationships between them, and through their appropriate association, ordering, merging, and inferencing, are informed. Information versus data has a purpose, meaning and meaning. Information assigns the location of the data in a specific context, environment and time, and changes the way things are perceived and objects are changed.

"Knowledge is closely linked with the person or institution holder, while the information can exist independently (eg. In the form of a document). Information is often confused with knowledge, because both information and knowledge circulate within the organization by structural network management systems and organizations "[7]. Information becomes knowledge at the time of its interpretation [8]. Competences vested in the person interpreting and presenting the information to decide whether the information becomes knowledge. Not every person will place the information in the same context.

Interpretation of information, namely the creation of knowledge is achieved through reflection, associating facts, experience and intuition.

In summarizing the relationships between data, information and knowledge, the words of N. Fleming should be quoted [9]:

- The data set is not information,
- The collection of information is not knowledge,
- The collection of knowledge is not yet a wisdom,
- The collection of wisdom does not have to be true.

In recent years, the breakthroughs in theories of organizational theory and practice have been made. The solutions developed in the 21st century are innovative and are related to changes in the economy and society. At present, the most valuable strategic asset of an organization is knowledge that is consciously acquired, created and used. This will lead to initiatives that combine a single, coherent IT infrastructure (providing universal and continuous access to knowledge and information resources), organizational structure, and staffing [10].

Knowledge management should have a utilitarian dimension. Utilitarianism is closely linked to the effectiveness of knowledge management processes in all areas of the organization's activity, which simultaneously determines its competitiveness. At present, companies that use knowledge-intensive activities are transformed into knowledge-based businesses. Literature of the subject presents knowledge, which is not a value in itself. Its value is seen when the use of knowledge brings the economic effect.

In order for data to be able to deliver information, their organization should allow for efficient processing. There are many different ways of organizing data such as tables, lists or formulas.

Modelling data is organized in such a way that it faithfully reflects the real situation and at the same time can be saved on the computer.

To determine the best organization of the data for a given application, you need to know their characteristics, important for understanding their meaning.

These features will allow you to formulate a general statement as to how the data is organized and processed. An irreconcilable, formal set of such statements defines a data model. At first, the characteristics of the data that constitutes the definition of the data model are explored and the ways in which these qualities of computerization can be presented [11].

3. BI IN THE CREATION AND MANAGEMENT OF KNOWLEDGE IN THE ORGANIZATION

Looking for answers to the question of how to manage knowledge in an organization, it is worthwhile to realize how to create it. Knowledge can be created in two ways. The first, referred to as university, is related to the supply of knowledge.

Knowledge is treated as homogeneous, expert, disciplinary, and hierarchical. Such knowledge is verified e.g. by employees.

In business practice, different knowledge management methods are used. Unquestioned help in this area are carried by systems and information technology. Currently, the most commonly used knowledge management methods are included [12]:

- Information management and access to information - support for knowledge management processes that have been codified in structured or non-structured databases and data stores (open-content knowledge). Database systems, groupware, office work, EDI, data warehouses, Internet portals, and specialized management information systems such as SIK, SWD, and SE are particularly helpful.
- Knowledge of processes - knowledge management as part of individual processes in the enterprise (open knowledge). Much has been achieved in this area involving MRP II, ERP, SCM, workflow systems.
- Knowledge-based workplaces - knowledge management by "informed" people (secret knowledge). These issues can be partially supported by the SE and artificial intelligence techniques.
- E-business - managing the integration of enterprise knowledge with internal and external systems. For this purpose data warehouses, OLAP techniques, data mining, web search systems, intelligent agents technology are increasingly being used.
- Managing Intellectual Capital - Managing value creation processes from available enterprise intellectual assets or capital of knowledge.

Business Intelligence is a broad category of applications and technologies for gathering, collecting, analysing, and delivering data [13]. Business Intelligence applications include Decision Support Systems (DSS), Q & R (Query and Reporting), Online Analytical Processing (OLAP), Static Analysis, Data Mining and Forecasting (OLAP) [14].

The data warehouse is a thematically structured database that stores information relevant to the context of the company's decision. This database is separated from the operating bases so that it can have a different structure - optimized for search speed rather than editing data. Such architecture also relieves transactional systems by reporting operations that have so far affected the current operation of the system and often disrupted the implementation of basic functions [15].

To fully utilize the data contained in the data warehouse, On Line Analytical Processing (OLAP) is used – a tool for analysing and visualizing their results in real time.

The main source of data for Business Intelligence systems are transaction systems: ERP / MRP, CRM, SCM or call centre. Sometimes data is also downloaded from Excel files, Access files, email programs and Internet services. These data must be

collected in one place (in the data warehouse) so that the reports and analyses performed on them are complete [16].

Online Analytical Processing (OLAP) is a computerized processing that allows the user to easily and selectively extract and view data from various dimensions. OLAP analysis (multivariate analysis) uses the concept of so called. OLAP cubes, which have dimensions, also called perspectives, hierarchies, and measures. Indeed, such an analysis often involves many dimensions (also above three), so the concept of "cubes" of OLAP (three dimensions) is rather a metaphor to help understand this way of analysing data [17]. Data is written in an OLAP cube hierarchically.

The result of using Business Intelligence tools is the availability of quick information about key business indicators such as:

- customers,
- competition,
- business partners,
- the economic situation,
- internal operations.

BI systems are an opportunity for organizations to quickly and effectively use information and transform it into useful knowledge that enables them to meet business objectives. It is assumed that BI systems should improve organizational knowledge management in a strategic, tactical and operational sense.

At the strategic level they allow for more precise targeting and follow-up. They allow you to make a variety of comparative comparisons, e.g. historical results, profitability of individual offers, distribution channels efficiency, etc., as well as development simulations, forecasts of future results based on specific assumptions.

At the tactical level BI systems can provide the basis for decision-making in marketing, sales, finance, capital management. They allow you to optimize future actions and accordingly modify aspects of the organizational, financial and technological functioning of the company, so that they meet it strategic goals.

At the operational level, BI analyses are performed ad hoc, responding to questions related to operations departments, state finance, sales, state co-operation with suppliers, customers, clients, etc.

Business Intelligence systems relate to different people in the company (management, employees, customers, business partners), and decision making. The premise of Business Intelligence [18]:

- Individualization of knowledge for decision-makers.
- The creation of new disciplines in the decision-making process.
- Recognition of new skills necessary for knowledge workers.
- Emergence of electronic markets.

Business Intelligence systems are a specific combination of data, information, processes, tools and technology for intelligent data analysis. The characteristics of business intelligence

systems, determining the formation of analytical skills in organizations, but above all:

- The ability to conduct a variety of analyses and forecasts.
- Data mining capabilities, multi-user support within and outside the company.
- Openness and consistent compliance with company and market standards.
- Support for distributed data resources.
- The speed of information delivery to potential users and high data readability (application of data visualization techniques).

The use of Business Intelligence tools brings organizations a number of benefits and supports the operation of almost all areas of the organization. Transforming data into information replaces guesswork and conjecture conclusions based on facts. Business Intelligence improves Moreover, communication between the departments of the company - the data are reduced to a common denominator and there is a single source of truth. Since the information is reliable, timely and delivered in an appropriate form, the organization can quickly respond to changes in financial conditions, customers' preferences or operations in the supply chain.

Each company should predict their decisions on the basis of historical data collected in the various sections, taking into account any additional business information such as analyst reports, expert opinions. On the basis of the forecast can be developed several alternative scenarios of business strategy. They should then be subjected to simulate different effects in different scenarios preserve the economic environment.

4. THE DATA ORGANIZATION IN REAL TIME

The latest BI systems are characterized by the ability to download data from a variety of sources (including web portals) and share results in the form of reports and graphical analyses via popular interfaces such as web browsers.

As an example, you can call Qlik Sense here. Qlik Sense is one of the leading business analytics tools. The application allows for a comprehensive solution in the field of Business Intelligence and is used for complex visualization of data.

Qlik Sense software is a visualization and information analysis tool that facilitates analysis and accelerates business decision making. Qlik Sense enables the preparation of interactive reports and dashboards containing intuit-graphic and readable graphs. The tool allows you to easily and smoothly navigate between huge collections of data that may come from different sources.

The following Fig. (Figure 1) shows an advanced way of presenting the data in the table on the map:

- country, • sales, • margin, • count (distinct sales order).

Qlik Sense has advanced visualization methods. The map on the left side has been divided into individual countries and data

are presented on it, depending on the size of different colour for your country.

The map on the right side shows a more detailed data gathered in the place in which it actually is the phenomenon of colour intensity dependent on the magnitude phenomenon.

For this case is the ability to present data for:

- order year, • order quarter, • order month, •country,
- product, • customer name.

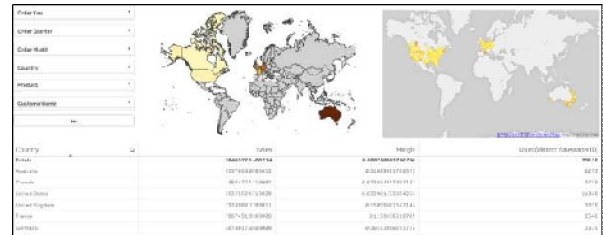


Figure 1: Sales of products

Qlik sense allows you to quickly make changes and transformations of the system, so it can be presented data interface (Figure. 2).

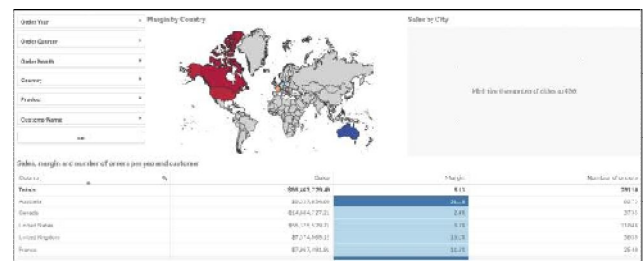


Figure 2: Margin of products

In the next example shows the structure of sales per product category, subcategory and product (Figure 3). Fig.s presented:

- accessories, •bikes: mountain; road; touring.
- clothing, •components.

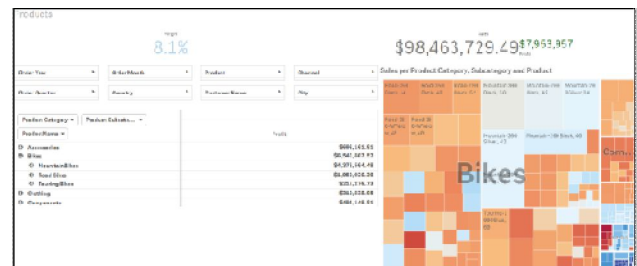


Figure 3: The structure of sales per product category, subcategory and product

The last example shows the sales (Figure 4):

- sales by country,
- sales vs margin per product,

- sales by year-quarter.

The data in this case are shown in the diagrams.

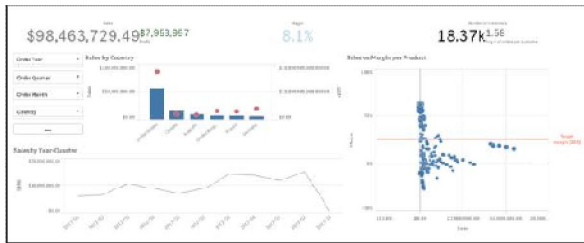


Figure 4: Structure of sales

It is not difficult to see that the proposed BI configuration can successfully support equal enterprise strategic initiatives such as CRM, SCM, e-business, providing access to static and dynamic knowledge (based on ad hoc queries and information from databases and wholesalers). It integrates information from equal sources, offering multidimensional and personalized information (according to user permissions, user roles), as well as the ability to quickly search and distribute diverse knowledge resources.

The strengths of BI systems are their analytical properties. There are solutions to the past, based on standard reporting or user definable reporting.

Standard reporting is associated with modest possibilities for presenting information and generating reports. At present, in such a way to analyse data, it is equipped with almost any trading system. This type of reporting does not require analytical processing in principle - only data access is required.

New ICTs force changes in managerial approach to company management. Business Intelligence systems are different from previous decision support models and decision support. Technology changes include primarily data warehouses, advanced analytical techniques, data visualization techniques, and learning systems. The synergy of these solutions creates an intelligent environment for decision-making in the organization.

5. STRENGTHS AND WEAKNESSES OF BI

Recently, the popularity of Business Intelligence tools has grown. They are used by both larger and smaller companies. By analysing the solutions of the leaders of the global business intelligence market (Business Objects, SAS, Cognos, IBM, Oracle, Microstrategy, Microsoft), it is concluded that the strengths of BI systems include:

- Shorten the time of analysis and decision-making.
- Ease of preparation of a variety of provisional, aggregate, particulars and aggregate reports.
- Comprehensive reporting systems.
- Short response time to user inquiries.
- Data consolidation, allocation and data mining.

- Shift of focus from data entry to analysis, extraction of hidden data and thorough interpretation,
- Relatively easy location of critical conditions in the company e.g. from the point cost, time of delivery, customer service, etc.
- Providing current and forecast data.
- Easy and easy to navigate the system.
- The ability to extend the model and to continually interact with the user.
- The system modelling process.
- Diversification of data sources.

Practice shows that in turn the weaknesses of BI systems belong:

- High user training costs.
- Relatively costly and long implementation.
- High hardware and software requirements.
- System sensitivity to poor quality and inconsistency of data.
- High costs of system supervision and development.

6. CONCLUSION

In the Information Age, characterized by the increase in the importance of information, data overload, globalization of economies, and rapid changes in the environment, companies are looking for systems that help them make informed, fact-based decisions that translate into effective business management. This goal can be achieved by providing each employee with the right information, in the right form and at the right time. The key element of this solution is instant access to all business data.

From the above analysis, it is necessary to search for solutions which, on the one hand, will in an integrated way support all processes related to acquiring, managing and distributing knowledge within the organization, and on the other hand would give the possibility to create new networks of relations. It also aims to transform the knowledge of individual employees and companies working with the organization to create corporate knowledge that can otherwise be called corporate intelligence. This is what Business Intelligence systems are supposed to do. Their job is to collect, store, and share and manage knowledge using a variety of analytical tools. Intelligent data analysis is achieved through OLAP and Data Mining techniques and data warehouse technology.

Most BI systems are limited in functionality within the organization. It seems that the future of BI lies in linking these systems to the Internet and intranets. In this situation, it will be necessary to improve the process of downloading data directly from the network. At present, storing huge amounts of data through web servers is not an easy task. Most likely you will need to use new, specialized solutions. Analytical tools that work with data wholesalers must be tailored to the needs of the Internet and the standards that apply to it. First and foremost, it should be taken into account that the primary communication

tool for the user is the browser. The integration of analytical systems with intra- and inter-site services is therefore associated with a relatively short response time. Continuous data availability and updates are also required.

In this situation, BI systems can not represent solutions addressed to a narrow audience. In a sense, it is necessary to move from an isolated BI environment to a BI enterprise portal - a place to integrate various knowledge resources: information, applications, and web services..

Success in business largely depends on having the right information, and in the wider context of having the right knowledge at the right place and time. Business processes generate more and more data in smaller and shorter periods of time. They must be collected and properly processed so that they turn into a measurable and useful value that is information. Its ownership allows you to look for new business process capabilities and thus respond quickly to change and faster decision-making.

Business Intelligence is a management concept that allows you to organize information to streamline your business process. This infrastructure is a tool for acquiring, cleansing, combining, analysing data, and then providing processed information for quick and accurate management decisions.

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