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Usage of Big Data in decision making process in companies

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Abstract

The rapid development in the field of information-communication technologies, which has been recorded in recent years, it has caused an increase in the volume of data in companies last year about 40 to 50% [1]. By analysing large amounts of data, it is possible to get information that is important for the enterprise and on the basis of which it is possible to improve the decision-making process for managers. The main problems in the management and decision-making of enterprises is constantly growing amount of data generated within the undertaking and its surroundings. These data reach the volumes and structures, which is not possible from the time and cost to manage through the current management information systems. The fastest increasing volumes of data are unstructured data, which may contain data with significant information value, for the purposes of decision making in the enterprise. In the light of the principle of the processing of data in the existing MIS, i.e. the processing of structured data, such as data capture, utility companies have to transform and analyse. The question of how to process and integrate data of different types of technology, solves the Big Data. This technology allows to handle different kinds of data, from a variety of data sources, in a very short amount of time (in milliseconds).

Keywords: Management,Big Data, decision making, business, MIS,technology.

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1. Introduction

In terms of information-communication technologies Big Data represents very rapidly changing and expanding field. Big data is associated primarily with the modern, trendy technologies that generate a wealth of data, where appropriate, the amount of data used, as for example, semantic technology, sound processing and voice, whether or not the internet of things. For this reason, it is very difficult to clearly define the concept of Big Data. Another reasons are also temporal changes in the meaning of rapid technological development, i.e. data, which represented a large data-intensive processing in the 1990s, the influence of the development of the technology today, can handle common computers or mobile devices [2]. Big Data is currently a modern way of working with information, the importance of it is absconded by a number of enterprises. The very concept of Big Data can be misleading, as evidenced by the company for the conduct of a survey of IBM, in which 18% of Directors sees Big Data just as a larger amount of data, and 8% as a new term, or the term to describe the amount of data [3]. The concept of big data represents data that are too big, too quick and too demanding for the processing of existing instruments. Too high means that the enterprises must constantly deal with the petabytes data, which come from reports, transaction systems, sensors, etc. Too fast in terms of the data-processing system, which must be very fast, for example; detection of frauds at the point of sale, or the detection of ads, to be provided to the user on the website. Too difficult, such data processing, which for the purposes of a specific analysis cannot easily provide existing tools. [4]

1.1. Characteristic of Big Data solution

Big Data is a new generation of technologies and structures for the processing of large amounts of disparate data. This technology allows the rapid collection, sorting, analyzing and extracting the valuable data from large volumes of data. According to the IBM, Big Data brings platform with options, how to handle large amounts of data in relation to the business opportunities of the enterprise. Big Data platform includes technologies for processing of structured and unstructured data with traditional links to new technologies focused on speed, flexibility, and task force exploring, discovering, analyzing the data. According to IBM's defining Big Data the following features: [5]

- Volume represents a very large number of collected data- for analytical processing (e.g. Airbus aircraft generated every half an hour to 40 TB of data, Twitter generates a day 12 TB of data, Facebook 25 TB, etc.) [6, 7], which presents an opportunity for businesses to process voluminous data in a single database summary structure
- Variety means that the data are well structured in a structured form, i.e., the data entered into the form of messages, images, and other types of data generated by the GPS signals via the Internet and telecommunications equipment
- Velocity indicates that the data must be gathered and processed very quickly, i.e. in real or near real time, which enables businesses to respond flexibly to changes in the market, or gain a competitive advantage
- Veracity represents the possibility of obtaining, as a large number of diverse processing output distorted data is processed and the amount of data that contain noise or distortion (e.g. data from social networks)

According to other sources, it is possible to include additional features to Big Data which are gradually emerging with increasing quantity. For example: [8]

- Variability represents an ever-increasing variety of inconsistent data, which are generated on a daily, seasonal in larger quantities. These are high-quality data for processing and understanding
- Complexity, i.e. the need to associate, to transform, to compare and correlate the relationships and links between the data that is generated in large volumes from a variety of data sources, in order to check the data

Big Data platform contains a variety of methods, techniques and services that allow for the processing of large volumes of data. Among the most important capabilities of this platform include, in particular: [9]

- Analysis Hadoop, of the process and allows you to analyze various types of data, Hadoop in the commodity server clusters
- Stream Computing, provides ongoing analysis of large volumes of data with a reaction time of less than one millisecond
- Data storage, clearly presents the information on traffic by extending the analysis to be carried out within the database
- The integration and control of information, allows the analyst to understand, to clean, transform, and control to raise the necessary, relevant information they need in carrying out their work or decisions

The basic support services in the context of Big Data platform include: [10]

- Visualization and discovery, assisted by the analyst to examine large volumes of complex data
- Development of applications, supporting the process of creating applications for the purposes of the processing of data
- Managing systems, provides for the monitoring and management of Big Data and at the same time encourages their security and optimal performance
- Accelerators, support the return on investment in a short time thanks to, analytical and professional modules

In practice, different solutions are used in Big Data. These solutions are being often used by ordinary users, even though they do not realize this. Examples include Google or Yahoo search engines. These companies within their Web browsers to generate a wealth of data about the users of the Internet (the most common searches for the user what the site visits, etc.). Since the internet is a worldwide available, every second are entered into search engines, millions of queries. All these data are recorded, which represents a very large amount of data, which are then referred to by the technology being processed. The processing of those data then the company adapted to the search results for each user separately, i.e. If two users enter the same keywords in their search results are different. Big Data can be further divided according to the nature of the data in motion and data at rest as well [6]

2. Usage of Big Data in business practice

The technology implemented in the context of your Business Big Data given its financial, technological and administrative complexity, especially large and medium-sized enterprises. Data-

processing by means of technology options for Big Data used in the present company Macys.com. The company handles customer data in particular, and these data have been processed before the introduction of the Big Data through software, MS Excel, which has been very inefficient in terms of time and at the same time it was not possible to process all the available data [11]. The integration of analytical Big Data tools allowed the company to analyze millions of terabytes of new information every day. The company has begun to take into account in the formation of public limited liability product offers also information that is obtained through the analysis of unstructured data from social networks (Twitter in particular). Based on this information, the company can accurately analyze shopping behavior of consumers, and then edit the menu according to customer needs and requirements. Big Data allowed the company to boost margins and streamline technology operations across all divisions, which has led to an almost immediate increase in sales by 10%. [12, 13]. In the form of large volumes of transactions from all customer processes through Big Data is being used by Bank of America, when it mainly focuses on unstructured data. In the past, the Bank was unable to analyze all of the data at the same time, or to carry out the analysis of the whole data set, therefore, ran only on the basis of the analysis of certain samples. Through the technology of Big Data bank can currently handle and evaluate data from the whole dataset, i.e. from all customers. On the basis of these analyses, the bank may identify primary customers, or clients, foresee clients businesses and provide services for satisfying their needs. The data are processed, are, in particular, data from the Internet, call centers, online applications, etc. Various communication channels are interconnected and analyzed in real time, i.e. on the basis of the use of online applications, the Bank may subsequently be sent via email and offers, etc. [10]

The Data Big technology has also been applied in UPS for the optimization route couriers. UPS uses a system of Orion, which can analyze about 200 000 variants for each route in real time. Technology helps the enterprise to understand the behavior of the vehicle Data Big on different paths, and thus ensures the selection of the most appropriate route. UPS through the processing of large volumes of data, identified as ineffective in terms of time that left- turns are economically wasteful fuel at idle turns. By Big Data in an enterprise in the period from 2004 to 2012, ultimately spared the costs in the form of 10 million gallons of gas and reduce carbon emissions by 100 000 tones. At the same time of increasing the profit, an enterprise security product, optimizes the following cycle transport products to consumers and also has a positive environmental impact. [14, 15]

Another great company that uses Big Data is Tesco. The loyalty program company in the form of Clubcard was introduced in 1990, data have been obtained by means of magnetic strips and later customer barcode on the card [16, 17]. In the past, the company could not handle, like Bank of America, all of the customer data within a single data file. By Big Data can currently analyze customer data, and by Tesco to adapt to events and coupons, according to the purchasing behavior of consumers. In this way, the company ensures an increase in the speed of use of discount coupons from 3% to 70%. Through the predictive analysis, based on the historical data on the sale of products, the company managed to save around 100 million pounds in stock [17]. Other sources of data, analyzed by Big Data in company Tesco include: [16]

- Data from the self-service machines
- Data from digital cameras (Broccoli Cam) scan empty containers in the vegetable shelves, which allows you to keep the supply in the short term
- Data from websites and catalogues of companies, etc.

Big Data helps technology companies to analyze the more than 400 million consumers on Tesco's throughout the world. The main task of the use of Big Data in the company is the subsequent analysis of the satisfaction of the needs of consumers in the stores at the same time and at the same time through mobile devices or your computer. For example, the implementation of orders via the Internet and then pick up the ordered products in the brick and mortar store the other day. [16]. Danish company Vestas, operating in the field of energy and wind power, are among the world's leading

suppliers of electricity. Big Data is managed through technology companies enhance the overall efficiency, since it was able to deliver more electricity, thanks to the appropriate location of the turbines in each of the locations. The identification of suitable sites in the past, before the introduction of the technology Big Data spanned about a week, but at the moment this process is done in hours. [18]. The technology Big Data was applied in the company Wal-Mart, the largest retailer in the world. The company carries out approximately one million transactions every hour. The results of the analyzed data are applied in practice, which has helped increase the company's turnover by about 60%. Through the tools of Big Data the company has managed to unite web pages and store all data in a single 10 database (Hadoop). The company is also focused on the analysis of user queries on the web, so that it can offer a product to a specific customer, where applicable, with the necessary information, or special offers, etc. [19]. On the basis of practical examples of the use of Big Data can be judged that technology can be used in the management and decision-making of the enterprise in a variety of areas. Because of the amount of generated data (with potentially significant information value) is constantly increasing, it is also possible to assume, that the technology will be continuously developed and intensified, in particular in the use of medium-sized and large enterprises, which generate and handle the amount of data.

3. Usage of Big Data in decision making process in companies

Usage of Big Data in decision making process in companies is expressed in terms of the model (Figure 1). The model is based on the modified model of the decision-making process according to Hittmár (2006) [20], in which the need for ICT has been identified in the framework of its individual partial components. The model is supplemented by elements of the general architecture of the Big Data (Hadoop), together with the identification of data sources that generate data needed for decision-making of managers. The basic activity of the whole decision-making process is defining the problem with the realization of the impact and the problem identified, which can cause inappropriately that the resulting decision will not solve the real and still a persistent problem. Such a procedure leads to wasting time, resources, and at the same time the cost of the undertaking, which are caused by the impact of continued an unidentified problem.

The phenomenon of the emergence of a potential problem can be identified by a variety of indicators. Can it be the various systems that monitor routine, automated actions, possibly negative consumer queries whether the judgement and the ability of the responsible official, analyst or Manager. The mere identification of the problem thus arises based on these input data. Consequently, it is necessary to determine whether the raw data are available, sufficient for defining the problem. In the event that the responsible Solver based on their experience, abilities, skills, it considers that the proper definition of the problem, it is necessary for a greater amount of information, the accesses to the data source from which an enterprise's Solver is able to obtain the necessary information. The model, therefore, focuses on the use of the technology of Big Data, as a supporting instrument or system, which allows you to obtain all relevant information relating to the Solver problem and phase of the decision-making process, in which the investigator is located. Similarly, as in the definition of the problem, the solver can use integrated technology Big Data tools in defining options for the selection of a variant of the solutions and in the implementation of the chosen variant. These tools allow you to visualize and predict the effects of the decision through the analysis solver of large volumes of data in a relatively short period of time. Part of the integrated platform of Big Data, and also in the sense of continuous control of the decision-making process, is a man, an analyst or manager who is able to assess the relevance of the information obtained from the available resources in the light of the stage of the decision-making process, in which the investigator is located and to which demands of the information system.

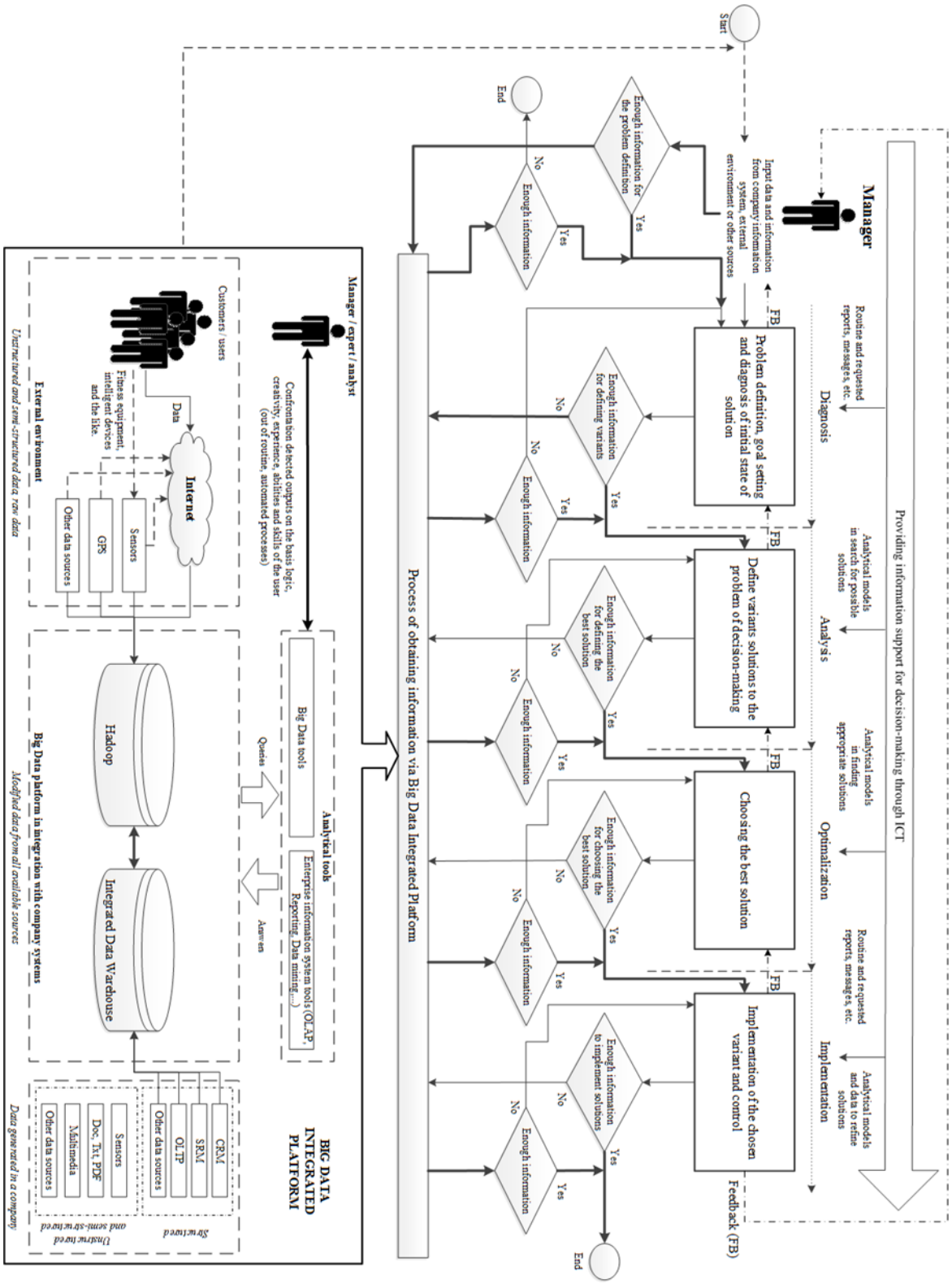

Figure 1. Usage of Big Data in decision making process in companies

4. Conclusion

The main problems in the management and decision-making of enterprises is constantly growing amount of data generated within the undertaking and its surroundings. These data reach the volumes and structures, which is not possible from the time and cost to manage through the current management information systems. The question of how to process and integrate data of different types of technology solves the Big Data. The technology of Big Data can be used in almost all areas and sectors of business. The use of Big Data tools brings various advantages for enterprise, such as.:

- gain a competitive advantage,
- cost-saving,
- optimization of business processes
- anticipation of purchase consumer behavior,
- fraud detection,
- better targeting of marketing campaigns,
- greater understanding of customer´s needs and requirements,
- offer specific products and services to a specific customer,
- analyzing the phenomenon that is being investigated in real time for flexible responses to changing conditions, etc.

Big Data technology provides business managers the opportunity to realize the decision-making process on the basis of a larger quantity of available information. In general, the more information the better decision may be taken. Based on the above facts, it is thus possible to answer the question: how much of the data is necessary to achieve the best decision? The answer to this question is: there is never enough.

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